



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:25

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJE0737 - REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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Recovery limits for target analytes in MS/MSD QC samples are advisory only.


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Reported:
 13-Dec-2021 16:25

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0741 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0741-BLK1)						Prepared: 28-May-2021 Analyzed: 01-Jun-2021 12:32					
Mercury, Dissolved	0.000052	0.000013	0.000100	mg/L							J
LCS (BJE0741-BS1)						Prepared: 28-May-2021 Analyzed: 01-Jun-2021 12:34					
Mercury, Dissolved	0.00195	0.000013	0.000100	mg/L	0.00200		97.5	80-120			
Duplicate (BJE0741-DUP1)						Source: 21E0194-03 Prepared: 28-May-2021 Analyzed: 01-Jun-2021 12:39					
Mercury, Dissolved	0.000048	0.000013	0.000100	mg/L		0.000038			22.00	20	L, J
Matrix Spike (BJE0741-MS1)						Source: 21E0194-03 Prepared: 28-May-2021 Analyzed: 01-Jun-2021 12:41					
Mercury, Dissolved	0.00101	0.000013	0.000100	mg/L	0.00100	0.000038	97.1	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJE0741-MSD1)						Source: 21E0194-03 Prepared: 28-May-2021 Analyzed: 01-Jun-2021 12:44					
Mercury, Dissolved	0.000982	0.000013	0.000100	mg/L	0.00100	0.000038	94.3	75-125	2.80	20	
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Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJE0419 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: BF

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0419-BLK1)						Prepared: 17-May-2021 Analyzed: 17-May-2021 18:43					
Ferrous Iron	ND	0.040	0.040	mg/L							U
LCS (BJE0419-BS1)						Prepared: 17-May-2021 Analyzed: 17-May-2021 18:43					
Ferrous Iron	0.489	0.040	0.040	mg/L	0.500		97.8	90-110			
Duplicate (BJE0419-DUP1)						Source: 21E0194-02 Prepared: 17-May-2021 Analyzed: 17-May-2021 18:45					
Ferrous Iron	28.8	0.800	0.800	mg/L		29.2			1.59	20	D
Matrix Spike (BJE0419-MS2)						Source: 21E0194-02 Prepared: 17-May-2021 Analyzed: 17-May-2021 19:07					
Ferrous Iron	45.7	2.00	2.00	mg/L	20.0	29.2	82.3	75-125			D

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Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJE0445 - No Prep Wet Chem

Instrument: IC930 Analyst: CDE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0445-BLK1)					Prepared: 18-May-2021 Analyzed: 18-May-2021 16:33						
Chloride	ND	0.100	0.100	mg/L							U
Nitrate-N	ND	0.100	0.100	mg/L							U
Nitrite-N	ND	0.100	0.100	mg/L							U
Blank (BJE0445-BLK2)					Prepared: 18-May-2021 Analyzed: 21-May-2021 21:34						
Nitrate-N	ND	0.100	0.100	mg/L							U
Nitrite-N	ND	0.100	0.100	mg/L							U
Sulfate	ND	0.100	0.100	mg/L							U
LCS (BJE0445-BS1)					Prepared: 18-May-2021 Analyzed: 18-May-2021 16:53						
Chloride	4.62	0.100	0.100	mg/L	5.00		92.4	90-110			
Nitrate-N	4.62	0.100	0.100	mg/L	5.00		92.4	90-110			
Nitrite-N	5.08	0.100	0.100	mg/L	5.00		102	90-110			
LCS (BJE0445-BS2)					Prepared: 18-May-2021 Analyzed: 21-May-2021 21:54						
Nitrate-N	4.73	0.100	0.100	mg/L	5.00		94.6	90-110			
Nitrite-N	5.21	0.100	0.100	mg/L	5.00		104	90-110			
Sulfate	4.89	0.100	0.100	mg/L	5.00		97.8	90-110			
Duplicate (BJE0445-DUP1)					Source: 21E0194-02		Prepared: 18-May-2021 Analyzed: 19-May-2021 17:03				
Chloride	3.74	0.100	0.100	mg/L		3.66			2.24	20	
Nitrate-N	ND	0.100	0.100	mg/L		ND					U
Nitrite-N	ND	0.100	0.100	mg/L		ND					U
Duplicate (BJE0445-DUP2)					Source: 21E0194-02RE1		Prepared: 18-May-2021 Analyzed: 21-May-2021 22:34				
Sulfate	ND	0.100	0.100	mg/L		ND					U
Matrix Spike (BJE0445-MS1)					Source: 21E0194-02		Prepared: 18-May-2021 Analyzed: 19-May-2021 17:23				
Chloride	5.69	0.100	0.100	mg/L	2.00	3.66	101	75-125			
Nitrate-N	1.82	0.100	0.100	mg/L	2.00	ND	91.0	75-125			
Nitrite-N	1.90	0.100	0.100	mg/L	2.00	ND	94.9	75-125			
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Matrix Spike (BJE0445-MS2)					Source: 21E0194-02RE1		Prepared: 18-May-2021 Analyzed: 21-May-2021 22:54				
Sulfate	1.78	0.100	0.100	mg/L	2.00	ND	89.1	75-125			
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Certified Analyses included in this Report

Analyte	Certifications
EPA 300.0 in Water	
Chloride	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrate-N	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrite-N	DoD-ELAP,WADOE,WA-DW,NELAP
Sulfate	DoD-ELAP,WADOE,WA-DW,NELAP
EPA 6020B in Water	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
EPA 6020B UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP


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Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC


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EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE


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Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP


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1-Methylnaphthalene	ADEC, DoD-ELAP, NELAP, WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC, DoD-ELAP, NELAP, WADOE
Acenaphthene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzofuran	ADEC, DoD-ELAP, NELAP
Fluorene	ADEC, DoD-ELAP, NELAP, WADOE
Phenanthrene	ADEC, DoD-ELAP, NELAP, WADOE
Anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Carbazole	NELAP
Fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(a)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Chrysene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(b)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(k)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Perylene	ADEC, NELAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, WADOE

EPA RSK-175 in Water

Methane	NELAP
Ethane	NELAP
Ethene	NELAP
Acetylene	NELAP

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE


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Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP,NELAP,WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP,NELAP,WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP,NELAP,WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP,NELAP,WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP,NELAP,WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP,NELAP,WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP,NELAP,WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP,NELAP,WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP,NELAP,WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP,NELAP,WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE,DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE,DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE,DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE,ADEC,DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE,DoD-ELAP

SM 3500-Fe B-97 in Water

Ferrous Iron	WADOE,NELAP
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Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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Notes and Definitions

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
D1	Surrogate was not detected due to sample extract dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
L	Analyte concentration is ≤ 5 times the reporting limit and the replicate control limit defaults to $\pm$ RL instead of 20% RPD
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria ($<20\%$ RSD, $<20\%$ drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

13 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21E0206

Associated SDG ID(s)
N/A

Susan
Dunniho

Digitally signed by
Susan Dunniho
Date: 2021.12.15
14:25:53 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunniho For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21E0206		Turn-around Requested: Standard		Page: 1 of 1	
ARI Client Company: Shannon & Wilson, Inc.		Phone: 206-695-6716		Date: 5/18/21	
Client Contact: Shoshana Howard				Ice Present? Yes	
Client Project Name: LDW				No. of Coolers: 3	
Client Project #: 21-1-12596		Samplers: CTC, BON		Cooler Temps: See CPE	

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested										Notes/Comments
					TPH-G	TPH-DX	BTEX	HVOCs	MTBE	PAHs	Full list SVOCs	Limited SVOCs	PCBs	Metals (total)	
MW-71-20211805	5/18/21	9:40	W	13	X	X	X	X		X			X	X	V, As, Ba, Cr, Mn, Ni, Cd, Zn, Co, Cu, Fe, Pb, Hg, Se, Ag
TB-4-20211805	5/18/21	9:50	W	5	X		X	X							As
MW-24-20211805	5/18/21	10:40	W	9				X			X	X	X		V, As, Ba, Cr, Mn, Ni, Cd, Zn, Co, Cu, Fe, Pb, Hg, Se, Ag
MW-59-20211805	5/18/21	11:40	W	9		X	X	X		X			X		
MW-45-20211805	5/18/21	12:35	W	9		X	X	X			X	X			Mn
MW-31-20211805	5/18/21	13:35	W	9		X		X		X					
MW-48-20211805	5/18/21	16:00	W	3			X								
MW-25-20211805	5/18/21	16:30	W	7				X	X				X		As
 															
 															

Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Christian Cantfield	Printed Name: Jacob [unclear]	Printed Name:	Printed Name:
	Company: Shannon & Wilson	Company: ARI	Company:	Company:
	Date & Time: 5/18/21 1654	Date & Time: 05/18/2021 1654	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, not withstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-71-20211805	21E0206-01	Water	18-May-2021 09:40	18-May-2021 16:54
MW-71-20211805	21E0206-02	Water	18-May-2021 09:40	18-May-2021 16:54
TB-4-20211805	21E0206-03	Water	18-May-2021 16:30	18-May-2021 16:54
MW-24-20211805	21E0206-04	Water	18-May-2021 10:40	18-May-2021 16:54
MW-24-20211805	21E0206-05	Water	18-May-2021 10:40	18-May-2021 16:54
MW-59-20211805	21E0206-06	Water	18-May-2021 11:40	18-May-2021 16:54
MW-59-20211805	21E0206-07	Water	18-May-2021 11:40	18-May-2021 16:54
MW-45-20211805	21E0206-08	Water	18-May-2021 12:35	18-May-2021 16:54
MW-45-20211805	21E0206-09	Water	18-May-2021 12:35	18-May-2021 16:54
MW-31-20211805	21E0206-10	Water	18-May-2021 13:35	18-May-2021 16:54
MW-48-20211805	21E0206-11	Water	18-May-2021 16:00	18-May-2021 16:54
MW-25-2011805	21E0206-12	Water	18-May-2021 16:30	18-May-2021 16:54
MW-25-2011805	21E0206-13	Water	18-May-2021 16:30	18-May-2021 16:54



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish
Work Order: 21E0206

Sample receipt

Samples as listed on the preceding page were received 18-May-2021 16:54 under ARI work order 21E0206. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Gasoline by NWTPH-q (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except surrogate 2,4,6- Tribromophenol which was out of control high. All samples which contain analytes have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except 2,4,6- Tribromophenol which was out of control in the initial and continuing calibration verification (ICV/CCV) and have been flagged.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except Dibenzo(a,h)anthracene which was out of control in sample 21E0206-10RE1 which has been flagged.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Total and Dissolved Metals - EPA Method 6020B



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0206-02 in Dissolved Metals batch BJE0744. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0206-02 in Dissolved Mercury batch BJE0054. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

REVISED to correct VOA list.



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon d. Wilson

Project Name: LDH

COC No(s): NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: NA

Assigned ARI Job No: 21E0206

Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1654 5.2 4.8 3.9

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 806

Cooler Accepted by: JS Date: 5/18/21 Time: 1654

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: NA

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI: NA 10/23/20

Were the sample(s) split by ARI? NA YES Date/Time: Equipment: Split by:

Samples Logged by: SC Date: 5/19/21 5/18/21 Time: 0913 Labels checked by: SC

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

- Air bubbles in 2 of the trip blanks. (D+E)

By: SC

Date: 5/18/21



WORK ORDER

21E0206

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0206-01 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0206-01 B	Glass NM, Amber, 1000 mL		
21E0206-01 C	Glass NM, Amber, 1000 mL		
21E0206-01 D	Glass NM, Amber, 500 mL		
21E0206-01 E	Glass NM, Amber, 500 mL		
21E0206-01 F	Glass NM, Amber, 500 mL		
21E0206-01 G	Glass NM, Amber, 500 mL		
21E0206-01 H	VOA Vial, Clear, 40 mL, HCL		
21E0206-01 I	VOA Vial, Clear, 40 mL, HCL		
21E0206-01 J	VOA Vial, Clear, 40 mL, HCL		
21E0206-01 K	VOA Vial, Clear, 40 mL, HCL		
21E0206-01 L	VOA Vial, Clear, 40 mL, HCL		
21E0206-02 A	Large OJ, 1000 mL	> 2	Fail
21E0206-03 A	VOA Vial, Clear, 40 mL, HCL		
21E0206-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0206-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0206-03 D	VOA Vial, Clear, 40 mL, HCL	Bubbles	
21E0206-03 E	VOA Vial, Clear, 40 mL, HCL	Bubbles	
21E0206-04 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0206-04 B	Glass NM, Amber, 1000 mL		
21E0206-04 C	Glass NM, Amber, 1000 mL		
21E0206-04 D	Glass NM, Amber, 500 mL		
21E0206-04 E	Glass NM, Amber, 500 mL		
21E0206-04 F	VOA Vial, Clear, 40 mL, HCL		
21E0206-04 G	VOA Vial, Clear, 40 mL, HCL		
21E0206-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0206-05 A	Large OJ, 1000 mL	> 2	Fail
21E0206-06 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0206-06 B	Glass NM, Amber, 500 mL		
21E0206-06 C	Glass NM, Amber, 500 mL		
21E0206-06 D	Glass NM, Amber, 500 mL		
21E0206-06 E	Glass NM, Amber, 500 mL		
21E0206-06 F	VOA Vial, Clear, 40 mL, HCL		
21E0206-06 G	VOA Vial, Clear, 40 mL, HCL		
21E0206-06 H	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21E0206

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0206-07 A	Large OJ, 1000 mL	> 2	Fail
21E0206-08 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	Pass
21E0206-08 B	Glass NM, Amber, 1000 mL		
21E0206-08 C	Glass NM, Amber, 1000 mL		
21E0206-08 D	Glass NM, Amber, 500 mL		
21E0206-08 E	Glass NM, Amber, 500 mL		
21E0206-08 F	VOA Vial, Clear, 40 mL, HCL		
21E0206-08 G	VOA Vial, Clear, 40 mL, HCL		
21E0206-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0206-09 A	Large OJ, 1000 mL	> 2	Fail
21E0206-10 A	Glass NM, Amber, 500 mL		
21E0206-10 B	Glass NM, Amber, 500 mL		
21E0206-10 C	Glass NM, Amber, 500 mL		
21E0206-10 D	Glass NM, Amber, 500 mL		
21E0206-10 E	Glass NM, Amber, 500 mL		
21E0206-10 F	Glass NM, Amber, 500 mL		
21E0206-10 G	VOA Vial, Clear, 40 mL, HCL		
21E0206-10 H	VOA Vial, Clear, 40 mL, HCL		
21E0206-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0206-11 A	VOA Vial, Clear, 40 mL, HCL		
21E0206-11 B	VOA Vial, Clear, 40 mL, HCL		
21E0206-11 C	VOA Vial, Clear, 40 mL, HCL		
21E0206-12 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	Pass
21E0206-12 B	Glass NM, Amber, 500 mL		
21E0206-12 C	Glass NM, Amber, 500 mL		
21E0206-12 D	VOA Vial, Clear, 40 mL, HCL		
21E0206-12 E	VOA Vial, Clear, 40 mL, HCL		
21E0206-12 F	VOA Vial, Clear, 40 mL, HCL		
21E0206-13 A	Large OJ, 1000 mL	> 2	Fail

SC

Preservation Confirmed By

5/19/21
5/18/21 SC

Date



WORK ORDER

21E0206

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0206-01 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0206-01 B	Glass NM, Amber, 1000 mL		
21E0206-01 C	Glass NM, Amber, 1000 mL		
21E0206-01 D	Glass NM, Amber, 500 mL		
21E0206-01 E	Glass NM, Amber, 500 mL		
21E0206-01 F	Glass NM, Amber, 500 mL		
21E0206-01 G	Glass NM, Amber, 500 mL		
21E0206-01 H	VOA Vial, Clear, 40 mL, HCL		
21E0206-01 I	VOA Vial, Clear, 40 mL, HCL		
21E0206-01 J	VOA Vial, Clear, 40 mL, HCL		
21E0206-01 K	VOA Vial, Clear, 40 mL, HCL		
21E0206-01 L	VOA Vial, Clear, 40 mL, HCL		
21E0206-02 A	Large OJ, 1000 mL	> 2	Fail ①
21E0206-03 A	VOA Vial, Clear, 40 mL, HCL		
21E0206-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0206-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0206-03 D	VOA Vial, Clear, 40 mL, HCL	Bubbles	
21E0206-03 E	VOA Vial, Clear, 40 mL, HCL	Bubbles	
21E0206-04 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0206-04 B	Glass NM, Amber, 1000 mL		
21E0206-04 C	Glass NM, Amber, 1000 mL		
21E0206-04 D	Glass NM, Amber, 500 mL		
21E0206-04 E	Glass NM, Amber, 500 mL		
21E0206-04 F	VOA Vial, Clear, 40 mL, HCL		
21E0206-04 G	VOA Vial, Clear, 40 mL, HCL		
21E0206-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0206-05 A	Large OJ, 1000 mL	> 2	Fail ①
21E0206-06 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0206-06 B	Glass NM, Amber, 500 mL		
21E0206-06 C	Glass NM, Amber, 500 mL		
21E0206-06 D	Glass NM, Amber, 500 mL		
21E0206-06 E	Glass NM, Amber, 500 mL		
21E0206-06 F	VOA Vial, Clear, 40 mL, HCL		
21E0206-06 G	VOA Vial, Clear, 40 mL, HCL		
21E0206-06 H	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21E0206

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0206-07 A	Large OJ, 1000 mL	> 2	Fail ①
21E0206-08 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	Pass
21E0206-08 B	Glass NM, Amber, 1000 mL		
21E0206-08 C	Glass NM, Amber, 1000 mL		
21E0206-08 D	Glass NM, Amber, 500 mL		
21E0206-08 E	Glass NM, Amber, 500 mL		
21E0206-08 F	VOA Vial, Clear, 40 mL, HCL		
21E0206-08 G	VOA Vial, Clear, 40 mL, HCL		
21E0206-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0206-09 A	Large OJ, 1000 mL	> 2	Fail ①
21E0206-10 A	Glass NM, Amber, 500 mL		
21E0206-10 B	Glass NM, Amber, 500 mL		
21E0206-10 C	Glass NM, Amber, 500 mL		
21E0206-10 D	Glass NM, Amber, 500 mL		
21E0206-10 E	Glass NM, Amber, 500 mL		
21E0206-10 F	Glass NM, Amber, 500 mL		
21E0206-10 G	VOA Vial, Clear, 40 mL, HCL		
21E0206-10 H	VOA Vial, Clear, 40 mL, HCL		
21E0206-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0206-11 A	VOA Vial, Clear, 40 mL, HCL		
21E0206-11 B	VOA Vial, Clear, 40 mL, HCL		
21E0206-11 C	VOA Vial, Clear, 40 mL, HCL		
21E0206-12 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	Pass
21E0206-12 B	Glass NM, Amber, 500 mL		
21E0206-12 C	Glass NM, Amber, 500 mL		
21E0206-12 D	VOA Vial, Clear, 40 mL, HCL		
21E0206-12 E	VOA Vial, Clear, 40 mL, HCL		
21E0206-12 F	VOA Vial, Clear, 40 mL, HCL		
21E0206-13 A	Large OJ, 1000 mL	> 2	Fail ①

SC

Preservation Confirmed By

5/18/21

Date

① Filtered at 0.45um and preserved to pH < 2.0 with 0.75ml Conc. HNO₃ (12314) ml 05/19/21

Reviewed By

Date


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-71-20211805
21E0206-01 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/18/2021 09:40

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 15:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0206-01 H

Preparation Batch: BJE0456

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	105	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	95.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	89.7	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-71-20211805

21E0206-01 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/18/2021 09:40

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 15:50

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0206-01 H

Preparation Batch: BJE0456

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	95.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	89.6	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-71-20211805

21E0206-01 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/18/2021 09:40

Instrument: NT11 Analyst: VTS

Analyzed: 06/11/2021 11:30

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF	Sample Size: 500 mL	Extract ID: 21E0206-01 E 01
	Preparation Batch: BJE0492	Final Volume: 0.5 mL	
	Prepared: 05/20/2021		

Sample Cleanup:	Cleanup Method: Silica Gel	Initial Volume: 0.5 mL	Extract ID: 21E0206-01 E 01
	Cleanup Batch: CJE0211	Final Volume: 0.5 mL	
	Cleaned: 26-May-2021		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.004	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.001	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.005	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.091	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	0.003	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	0.012	ug/L	
Phenanthrene	85-01-8	1	0.001	0.010	0.004	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	0.050	ug/L	
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	0.014	ug/L	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10					42-120 %	60.0 %	
Surrogate: Dibenzo[a,h]anthracene-d14					29-120 %	44.4 %	
Surrogate: Fluoranthene-d10					57-120 %	69.5 %	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-71-20211805
21E0206-01 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/18/2021 09:40

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 00:26

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0206-01 D 01

Preparation Batch: BJE0459

Sample Size: 500 mL

Prepared: 05/20/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>78.8</i>	<i>%</i>	



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-71-20211805

21E0206-01 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/18/2021 09:40

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 22:00

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0516 Prepared: 05/21/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0206-01 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0218 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-01 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0216 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-01 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0217 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-01 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	63.4	%	
Surrogate: Tetrachlorometaxylene				32-120 %	58.7	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	59.9	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	44.0	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-71-20211805
21E0206-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/18/2021 09:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 03:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0206-01 A 01

Preparation Batch: BJF0053

Sample Size: 25 mL

Prepared: 06/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	10.5	ug/L	
Chromium	7440-47-3	1	0.260	0.500	0.685	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	0.883	ug/L	
Iron	7439-89-6	1	18.2	36.0	11600	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.268	ug/L	
Manganese	7439-96-5	5	0.710	2.50	528	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	3.36	ug/L	


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 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-71-20211805
21E0206-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/18/2021 09:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 03:38

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0053 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0206-01 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	6.18	ug/L	
Copper	7440-50-8	1	0.173	0.500	1.28	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	0.405	ug/L	J
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-71-20211805

21E0206-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/18/2021 09:40

Instrument: HYDRA Analyst: ML

Analyzed: 06/07/2021 14:15

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0206-01 A

Preparation Batch: BJE0743

Sample Size: 20 mL

Prepared: 05/28/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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Reported:
 13-Dec-2021 16:40

MW-71-20211805
21E0206-01RE1 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/18/2021 09:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 17:15

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0053 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0206-01RE1 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U


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Reported:
 13-Dec-2021 16:40

MW-71-20211805
21E0206-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/18/2021 09:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 03:43

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0206-02 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	2.76	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.777	ug/L	
Iron, Dissolved	7439-89-6	1	18.2	36.0	5610	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	5	0.710	2.50	509	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.432	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-71-20211805
21E0206-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/18/2021 09:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 03:43

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0206-02 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	3.17	ug/L	
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.182	ug/L	J
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-71-20211805

21E0206-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/18/2021 09:40

Instrument: HYDRA Analyst: ML

Analyzed: 06/07/2021 14:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0206-02 A 01

Preparation Batch: BJE0744

Sample Size: 20 mL

Filtration Batch: BJE0466

Prepared: 05/28/2021

Final Volume: 20 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-71-20211805
21E0206-02RE1 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/18/2021 09:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 17:20

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0206-02RE1 A 01
	Preparation Batch: BJF0054	Filtration Batch: BJE0466
	Prepared: 06/02/2021	Filtration Date: 05/19/2021 14:40
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

TB-4-20211805
21E0206-03 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/18/2021 16:30

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 13:05

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0206-03 B

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	104	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	94.6	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	89.0	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	102	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

TB-4-20211805
21E0206-03 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/18/2021 16:30

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 13:05

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0206-03 B

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	94.6	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	89.0	%	



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-24-20211805

21E0206-04 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/18/2021 10:40

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 16:12

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0206-04 H

Preparation Batch: BJE0456

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	0.08	ug/L	J
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	105	%	
Surrogate: Toluene-d8				80-120 %	94.7	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	86.9	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	102	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-24-20211805
21E0206-04 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/18/2021 10:40

Instrument: NT10 Analyst: VTS

Analyzed: 05/26/2021 18:21

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0206-04 B 01

Preparation Batch: BJE0493

Sample Size: 1000 mL

Prepared: 05/20/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	0.3	ug/L	J
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	0.3	ug/L	

Surrogate: 2-Fluorophenol

30-160 %

46.5 %

Surrogate: Phenol-d5

30-160 %

31.0 %

Surrogate: 2-Chlorophenol-d4

30-160 %

78.1 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

63.2 %

Surrogate: Nitrobenzene-d5

30-160 %

90.6 %

Surrogate: 2-Fluorobiphenyl

30-160 %

74.6 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

136 %

Q

Surrogate: p-Terphenyl-d14

30-160 %

82.7 %



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-24-20211805

21E0206-04 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/18/2021 10:40

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 22:21

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0516 Prepared: 05/21/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0206-04 C 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0218 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-04 C 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0216 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-04 C 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0217 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-04 C 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	52.9	%	
Surrogate: Tetrachlorometaxylene				32-120 %	46.5	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	50.4	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	35.7	%	


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Reported:
 13-Dec-2021 16:40

MW-24-20211805
21E0206-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/18/2021 10:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 22:29

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0053 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0206-04 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	5	0.187	1.00	33.4	ug/L	D


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Reported:
 13-Dec-2021 16:40

MW-24-20211805
21E0206-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/18/2021 10:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 22:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0206-05 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	5	0.187	1.00	8.09	ug/L	D



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Project: Lower Duwamish
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Reported:
13-Dec-2021 16:40

MW-59-20211805

21E0206-06 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/18/2021 11:40

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 16:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0206-06 G

Preparation Batch: BJE0456

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	107	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.9	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	85.5	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	104	%	



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MW-59-20211805

21E0206-06 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/18/2021 11:40

Instrument: NT11 Analyst: VTS

Analyzed: 06/11/2021 12:02

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJE0492
Prepared: 05/20/2021

Sample Size: 500 mL
Final Volume: 0.5 mL

Extract ID: 21E0206-06 C

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.002	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U

Surrogate: 2-Methylnaphthalene-d10

42-120 % 62.0 %

Surrogate: Dibenzo[a,h]anthracene-d14

29-120 % 46.6 %

Surrogate: Fluoranthene-d10

57-120 % 69.0 %


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MW-59-20211805
21E0206-06 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/18/2021 11:40

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 00:47

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0206-06 B 01

Preparation Batch: BJE0459

Sample Size: 500 mL

Prepared: 05/20/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>86.0</i>	<i>%</i>	


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MW-59-20211805
21E0206-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/18/2021 11:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 04:26

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0053 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0206-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	7.55	ug/L	
Chromium	7440-47-3	1	0.260	0.500	0.354	ug/L	J
Cobalt	7440-48-4	1	0.0173	0.200	1.53	ug/L	
Iron	7439-89-6	1	18.2	36.0	850	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0870	ug/L	J
Manganese	7439-96-5	1	0.142	0.500	216	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	2.72	ug/L	


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MW-59-20211805
21E0206-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/18/2021 11:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 21:27

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0053 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0206-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.900	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	1.23	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	2.27	ug/L	
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

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Reported:
13-Dec-2021 16:40

MW-59-20211805

21E0206-06 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/18/2021 11:40

Instrument: HYDRA Analyst: ML

Analyzed: 06/07/2021 14:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0206-06 A

Preparation Batch: BJE0743

Sample Size: 20 mL

Prepared: 05/28/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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Reported:
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MW-59-20211805
21E0206-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/18/2021 11:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 04:31

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0206-07 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			6.02	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500			ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200			1.32	ug/L	
Iron, Dissolved	7439-89-6	1	18.2	36.0			204	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100			ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500			199	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200			1.17	ug/L	


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MW-59-20211805
21E0206-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/18/2021 11:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 21:22

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0206-07 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.421	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.683	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.96	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U


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MW-59-20211805
21E0206-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/18/2021 11:40

Instrument: HYDRA Analyst: ML

Analyzed: 06/07/2021 14:57

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0206-07 A

Preparation Batch: BJE0744

Sample Size: 20 mL

Filtration Batch: BJE0466

Prepared: 05/28/2021

Final Volume: 20 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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Reported:
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MW-45-20211805
21E0206-08 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/18/2021 12:35

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 16:56

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0206-08 F

Preparation Batch: BJE0456

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	108	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.8	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	87.1	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	102	%	



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MW-45-20211805

21E0206-08 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/18/2021 12:35

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 01:51

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0206-08 D 01

Preparation Batch: BJE0459

Sample Size: 500 mL

Prepared: 05/20/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.514	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	80.4	%	



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MW-45-20211805

21E0206-08 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/18/2021 12:35

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 22:43

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0516 Prepared: 05/21/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0206-08 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0218 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-08 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0216 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-08 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0217 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-08 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	48.2	%	
Surrogate: Tetrachlorometaxylene				32-120 %	43.3	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	44.6	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	34.5	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-45-20211805
21E0206-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/18/2021 12:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 16:14

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0206-08 A 01

Preparation Batch: BJF0053

Sample Size: 25 mL

Prepared: 06/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	1	0.142	0.500	51.5	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-45-20211805

21E0206-09 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/18/2021 12:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 01:11

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21E0206-09 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	5	0.710	2.50	352	ug/L	D



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-31-20211805

21E0206-10 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/18/2021 13:35

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 15:41

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0206-10 G

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	110	%	
Surrogate: Toluene-d8				80-120 %	95.5	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	85.8	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	105	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-31-20211805
21E0206-10 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/18/2021 13:35

Instrument: NT10 Analyst: VTS

Analyzed: 05/26/2021 18:58

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0206-10 C 01

Preparation Batch: BJE0493

Sample Size: 1000 mL

Prepared: 05/20/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

49.1 %

Surrogate: Phenol-d5

30-160 %

33.3 %

Surrogate: 2-Chlorophenol-d4

30-160 %

79.2 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

62.9 %

Surrogate: Nitrobenzene-d5

30-160 %

95.4 %

Surrogate: 2-Fluorobiphenyl

30-160 %

79.2 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

143 %

Q

Surrogate: p-Terphenyl-d14

30-160 %

80.5 %



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-31-20211805

21E0206-10 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/18/2021 13:35

Instrument: NT11 Analyst: VTS

Analyzed: 06/11/2021 12:34

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0492 Prepared: 05/20/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0206-10 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0211 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-10 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.004	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.005	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.009	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	0.026	ug/L	
Acenaphthene	83-32-9	1	0.003	0.010	2.46	ug/L	E
Dibenzofuran	132-64-9	1	0.002	0.010	0.008	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	0.030	ug/L	
Phenanthrene	85-01-8	1	0.001	0.010	1.40	ug/L	E
Anthracene	120-12-7	1	0.001	0.010	0.129	ug/L	
Carbazole	86-74-8	1	0.001	0.010	0.002	ug/L	J
Fluoranthene	206-44-0	1	0.002	0.010	0.077	ug/L	
Pyrene	129-00-0	1	0.001	0.010	0.025	ug/L	
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	57.4	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	42.6	%	
Surrogate: Fluoranthene-d10				57-120 %	62.1	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-31-20211805
21E0206-10 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/18/2021 13:35

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 02:12

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0206-10 A 01

Preparation Batch: BJE0459

Sample Size: 500 mL

Prepared: 05/20/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	1.51	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	86.7	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-31-20211805 21E0206-10RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/18/2021 13:35

Instrument: NT11 Analyst: VTS

Analyzed: 06/11/2021 14:44

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0492 Prepared: 05/20/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0206-10RE1 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0211 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-10RE1 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	10	0.013	0.100	ND	ug/L	U
2-Methylnaphthalene	91-57-6	10	0.010	0.100	ND	ug/L	U
1-Methylnaphthalene	90-12-0	10	0.009	0.100	ND	ug/L	U
Acenaphthylene	208-96-8	10	0.019	0.100	0.024	ug/L	J, D
Acenaphthene	83-32-9	10	0.029	0.100	4.51	ug/L	D
Dibenzofuran	132-64-9	10	0.015	0.100	ND	ug/L	U
Fluorene	86-73-7	10	0.015	0.100	ND	ug/L	U
Phenanthrene	85-01-8	10	0.013	0.100	2.43	ug/L	D
Anthracene	120-12-7	10	0.012	0.100	0.144	ug/L	D
Carbazole	86-74-8	10	0.012	0.100	ND	ug/L	U
Fluoranthene	206-44-0	10	0.017	0.100	0.073	ug/L	J, D
Pyrene	129-00-0	10	0.012	0.100	0.025	ug/L	J, D
Benzo(a)anthracene	56-55-3	10	0.008	0.100	ND	ug/L	U
Chrysene	218-01-9	10	0.009	0.100	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	10	0.005	0.100	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	10	0.032	0.100	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	10	0.019	0.100	ND	ug/L	U
Benzofluoranthenes, Total		10	0.036	0.100	ND	ug/L	U
Benzo(a)pyrene	50-32-8	10	0.025	0.100	ND	ug/L	U
Perylene	1985-5-0	10	0.059	0.100	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	10	0.010	0.100	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	10	0.013	0.100	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	10	0.014	0.100	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	60.5	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	23.0	%	*
Surrogate: Fluoranthene-d10				57-120 %	62.4	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-48-20211805
21E0206-11 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/18/2021 16:00

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 16:03

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0206-11 B

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>				80-120 %	95.9	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	87.3	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-25-2011805

21E0206-12 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/18/2021 16:30

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 16:26

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0206-12 E

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	111	%	
Surrogate: Toluene-d8				80-120 %	94.8	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	84.0	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	104	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

MW-25-2011805

21E0206-12 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/18/2021 16:30

Instrument: NT11 Analyst: VTS

Analyzed: 06/11/2021 13:07

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0492 Prepared: 05/20/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0206-12 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0211 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0206-12 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.002	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.178	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	0.003	ug/L	J
Phenanthrene	85-01-8	1	0.001	0.010	0.035	ug/L	
Anthracene	120-12-7	1	0.001	0.010	0.004	ug/L	J
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	0.008	ug/L	J
Pyrene	129-00-0	1	0.001	0.010	0.004	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	60.2	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	45.8	%	
Surrogate: Fluoranthene-d10				57-120 %	69.9	%	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-25-2011805
21E0206-12 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/18/2021 16:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 23:37

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
 Preparation Batch: BJF0053 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0206-12 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	5	0.187	1.00	15.5	ug/L	D


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

MW-25-2011805
21E0206-13 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/18/2021 16:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 23:42

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0206-13 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	5	0.187	1.00	9.48	ug/L	D


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJE0456 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0456-BLK1)		Prepared: 19-May-2021 Analyzed: 19-May-2021 09:54								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.83		ug/L	5.00		96.6	80-120			
Surrogate: 4-Bromofluorobenzene	4.77		ug/L	5.00		95.5	80-120			
Blank (BJE0456-BLK2)		Prepared: 19-May-2021 Analyzed: 19-May-2021 09:54								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.16		ug/L	5.00		103	80-129			
Surrogate: Toluene-d8	4.83		ug/L	5.00		96.6	80-120			
Surrogate: 4-Bromofluorobenzene	4.77		ug/L	5.00		95.5	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.04		ug/L	5.00		101	80-120			
LCS (BJE0456-BS1)		Prepared: 19-May-2021 Analyzed: 19-May-2021 08:04								
Gasoline Range Organics (Tol-Nap)	955	100	ug/L	1000		95.5	72-128			
Surrogate: Toluene-d8	5.04		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	4.95		ug/L	5.00		99.0	80-120			
LCS (BJE0456-BS2)		Prepared: 19-May-2021 Analyzed: 19-May-2021 08:26								
Vinyl Chloride	9.78	0.08	0.20	ug/L	10.0	97.8	66-133			
1,1-Dichloroethene	10.3	0.08	0.20	ug/L	10.0	103	69-135			
trans-1,2-Dichloroethene	9.60	0.07	0.20	ug/L	10.0	96.0	78-128			
cis-1,2-Dichloroethene	10.1	0.08	0.20	ug/L	10.0	101	80-121			
Benzene	10.3	0.05	0.20	ug/L	10.0	103	80-120			
Trichloroethene	10.0	0.07	0.20	ug/L	10.0	100	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0456 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0456-BS2)						Prepared: 19-May-2021	Analyzed: 19-May-2021 08:26				
Toluene	10.1	0.05	0.20	ug/L	10.0		101	80-120			
Tetrachloroethene	9.90	0.09	0.20	ug/L	10.0		99.0	80-120			
Ethylbenzene	10.4	0.05	0.20	ug/L	10.0		104	80-120			
m,p-Xylene	21.3	0.14	0.40	ug/L	20.0		106	80-121			
o-Xylene	9.91	0.08	0.20	ug/L	10.0		99.1	80-121			
Xylenes, total	31.2	0.22	0.60	ug/L	30.0		104	76-127			
Surrogate: 1,2-Dichloroethane-d4	4.92			ug/L	5.00		98.5	80-129			
Surrogate: Toluene-d8	5.04			ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	5.17			ug/L	5.00		103	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.99			ug/L	5.00		99.7	80-120			
LCS Dup (BJE0456-BSD1)						Prepared: 19-May-2021	Analyzed: 19-May-2021 08:48				
Gasoline Range Organics (Tol-Nap)	924		100	ug/L	1000		92.4	72-128	3.32	30	
Surrogate: Toluene-d8	5.10			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	4.96			ug/L	5.00		99.2	80-120			
LCS Dup (BJE0456-BSD2)						Prepared: 19-May-2021	Analyzed: 19-May-2021 09:10				
Vinyl Chloride	10.1	0.08	0.20	ug/L	10.0		101	66-133	2.85	30	
1,1-Dichloroethene	10.4	0.08	0.20	ug/L	10.0		104	69-135	1.37	30	
trans-1,2-Dichloroethene	9.87	0.07	0.20	ug/L	10.0		98.7	78-128	2.73	30	
cis-1,2-Dichloroethene	10.6	0.08	0.20	ug/L	10.0		106	80-121	4.55	30	
Benzene	10.6	0.05	0.20	ug/L	10.0		106	80-120	3.00	30	
Trichloroethene	10.3	0.07	0.20	ug/L	10.0		103	80-120	2.65	30	
Toluene	10.4	0.05	0.20	ug/L	10.0		104	80-120	3.15	30	
Tetrachloroethene	10.3	0.09	0.20	ug/L	10.0		103	80-120	4.17	30	
Ethylbenzene	10.8	0.05	0.20	ug/L	10.0		108	80-120	3.98	30	
m,p-Xylene	22.3	0.14	0.40	ug/L	20.0		111	80-121	4.66	30	
o-Xylene	10.3	0.08	0.20	ug/L	10.0		103	80-121	4.07	30	
Xylenes, total	32.6	0.22	0.60	ug/L	30.0		109	76-127	4.47	30	
Surrogate: 1,2-Dichloroethane-d4	4.89			ug/L	5.00		97.7	80-129			
Surrogate: Toluene-d8	5.09			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	5.18			ug/L	5.00		104	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.96			ug/L	5.00		99.1	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJE0476 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0476-BLK1)		Prepared: 20-May-2021 Analyzed: 20-May-2021 12:42								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.77		ug/L	5.00		95.3	80-120			
Surrogate: 4-Bromofluorobenzene	4.41		ug/L	5.00		88.2	80-120			
Blank (BJE0476-BLK2)		Prepared: 20-May-2021 Analyzed: 20-May-2021 12:42								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.05		ug/L	5.00		101	80-129			
Surrogate: Toluene-d8	4.77		ug/L	5.00		95.3	80-120			
Surrogate: 4-Bromofluorobenzene	4.49		ug/L	5.00		89.8	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.05		ug/L	5.00		101	80-120			
LCS (BJE0476-BS1)		Prepared: 20-May-2021 Analyzed: 20-May-2021 10:08								
Gasoline Range Organics (Tol-Nap)	1060	100	ug/L	1000		106	72-128			
Surrogate: Toluene-d8	5.01		ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	4.88		ug/L	5.00		97.6	80-120			
LCS (BJE0476-BS2)		Prepared: 20-May-2021 Analyzed: 20-May-2021 10:29								
Vinyl Chloride	9.29	0.08	0.20	ug/L	10.0	92.9	66-133			
1,1-Dichloroethene	9.79	0.08	0.20	ug/L	10.0	97.9	69-135			
trans-1,2-Dichloroethene	9.48	0.07	0.20	ug/L	10.0	94.8	78-128			
cis-1,2-Dichloroethene	9.83	0.08	0.20	ug/L	10.0	98.3	80-121			
Benzene	10.0	0.05	0.20	ug/L	10.0	100	80-120			
Trichloroethene	9.90	0.07	0.20	ug/L	10.0	99.0	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0476 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0476-BS2)					Prepared: 20-May-2021		Analyzed: 20-May-2021 10:29				
Toluene	9.73	0.05	0.20	ug/L	10.0		97.3	80-120			
Tetrachloroethene	10.2	0.09	0.20	ug/L	10.0		102	80-120			
Ethylbenzene	10.3	0.05	0.20	ug/L	10.0		103	80-120			
m,p-Xylene	21.1	0.14	0.40	ug/L	20.0		105	80-121			
o-Xylene	9.60	0.08	0.20	ug/L	10.0		96.0	80-121			
Xylenes, total	30.7	0.22	0.60	ug/L	30.0		102	76-127			
Surrogate: 1,2-Dichloroethane-d4	4.67			ug/L	5.00		93.5	80-129			
Surrogate: Toluene-d8	4.97			ug/L	5.00		99.4	80-120			
Surrogate: 4-Bromofluorobenzene	4.92			ug/L	5.00		98.3	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.97			ug/L	5.00		99.4	80-120			
LCS Dup (BJE0476-BSD1)					Prepared: 20-May-2021		Analyzed: 20-May-2021 10:51				
Gasoline Range Organics (Tol-Nap)	1020		100	ug/L	1000		102	72-128	3.63	30	
Surrogate: Toluene-d8	5.04			ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	4.81			ug/L	5.00		96.2	80-120			
LCS Dup (BJE0476-BSD2)					Prepared: 20-May-2021		Analyzed: 20-May-2021 11:13				
Vinyl Chloride	8.80	0.08	0.20	ug/L	10.0		88.0	66-133	5.42	30	
1,1-Dichloroethene	9.40	0.08	0.20	ug/L	10.0		94.0	69-135	4.09	30	
trans-1,2-Dichloroethene	9.08	0.07	0.20	ug/L	10.0		90.8	78-128	4.35	30	
cis-1,2-Dichloroethene	9.53	0.08	0.20	ug/L	10.0		95.3	80-121	3.14	30	
Benzene	9.68	0.05	0.20	ug/L	10.0		96.8	80-120	3.41	30	
Trichloroethene	9.39	0.07	0.20	ug/L	10.0		93.9	80-120	5.27	30	
Toluene	9.43	0.05	0.20	ug/L	10.0		94.3	80-120	3.17	30	
Tetrachloroethene	9.67	0.09	0.20	ug/L	10.0		96.7	80-120	5.75	30	
Ethylbenzene	9.89	0.05	0.20	ug/L	10.0		98.9	80-120	4.28	30	
m,p-Xylene	20.2	0.14	0.40	ug/L	20.0		101	80-121	4.27	30	
o-Xylene	9.25	0.08	0.20	ug/L	10.0		92.5	80-121	3.74	30	
Xylenes, total	29.4	0.22	0.60	ug/L	30.0		98.1	76-127	4.11	30	
Surrogate: 1,2-Dichloroethane-d4	4.69			ug/L	5.00		93.8	80-129			
Surrogate: Toluene-d8	5.08			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	4.87			ug/L	5.00		97.4	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.00			ug/L	5.00		100	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0493 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0493-BLK1)						Prepared: 20-May-2021 Analyzed: 26-May-2021 16:28					
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
<i>Surrogate: 2-Fluorophenol</i>	3.67			ug/L	7.50		49.0	30-160			
<i>Surrogate: Phenol-d5</i>	2.48			ug/L	7.50		33.1	30-160			
<i>Surrogate: 2-Chlorophenol-d4</i>	5.97			ug/L	7.50		79.6	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	2.87			ug/L	5.00		57.5	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	4.55			ug/L	5.00		90.9	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	3.60			ug/L	5.00		72.0	30-160			
<i>Surrogate: 2,4,6-Tribromophenol</i>	10.2			ug/L	7.50		136	30-160			Q
<i>Surrogate: p-Terphenyl-d14</i>	4.39			ug/L	5.00		87.9	30-160			
LCS (BJE0493-BS1)						Prepared: 20-May-2021 Analyzed: 26-May-2021 17:05					
1,4-Dichlorobenzene	2.8	0.03	0.2	ug/L	5.00		56.3	30-160			
1,2-Dichlorobenzene	3.1	0.03	0.2	ug/L	5.00		63.0	30-160			
2,4-Dimethylphenol	9.9	0.3	1.0	ug/L	13.0		75.9	30-160			
Benzoic acid	9.6	0.1	2.0	ug/L	23.0		41.8	30-160			
N-Nitrosodiphenylamine	3.8	0.03	0.2	ug/L	5.00		75.3	30-160			
Pentachlorophenol	13.2	0.1	1.0	ug/L	13.0		102	30-160			
Di-n-Butylphthalate	4.1	0.05	0.2	ug/L	5.00		81.6	30-160			
Butylbenzylphthalate	4.5	0.07	0.2	ug/L	5.00		89.7	30-160			
bis(2-Ethylhexyl)phthalate	4.3	0.2	0.2	ug/L	5.00		85.3	30-160			
<i>Surrogate: 2-Fluorophenol</i>	4.06			ug/L	7.50		54.1	30-160			
<i>Surrogate: Phenol-d5</i>	2.88			ug/L	7.50		38.3	30-160			
<i>Surrogate: 2-Chlorophenol-d4</i>	5.93			ug/L	7.50		79.0	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	2.99			ug/L	5.00		59.8	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	4.64			ug/L	5.00		92.9	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	3.83			ug/L	5.00		76.5	30-160			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0493 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0493-BS1)						Prepared: 20-May-2021	Analyzed: 26-May-2021 17:05				
Surrogate: 2,4,6-Tribromophenol	9.67			ug/L	7.50		129	30-160			Q
Surrogate: p-Terphenyl-d14	4.20			ug/L	5.00		83.9	30-160			
LCS Dup (BJE0493-BSD1)						Prepared: 20-May-2021	Analyzed: 26-May-2021 17:43				
1,4-Dichlorobenzene	3.0	0.03	0.2	ug/L	5.00		60.9	30-160	7.82	30	
1,2-Dichlorobenzene	3.4	0.03	0.2	ug/L	5.00		67.5	30-160	6.87	30	
2,4-Dimethylphenol	10.6	0.3	1.0	ug/L	13.0		81.2	30-160	6.72	30	
Benzoic acid	11.3	0.1	2.0	ug/L	23.0		49.3	30-160	16.30	30	
N-Nitrosodiphenylamine	3.9	0.03	0.2	ug/L	5.00		77.6	30-160	3.05	30	
Pentachlorophenol	14.9	0.1	1.0	ug/L	13.0		115	30-160	12.30	30	
Di-n-Butylphthalate	4.3	0.05	0.2	ug/L	5.00		86.0	30-160	5.23	30	
Butylbenzylphthalate	4.8	0.07	0.2	ug/L	5.00		96.2	30-160	6.93	30	
bis(2-Ethylhexyl)phthalate	4.4	0.2	0.2	ug/L	5.00		88.3	30-160	3.51	30	
Surrogate: 2-Fluorophenol	4.01			ug/L	7.50		53.4	30-160			
Surrogate: Phenol-d5	2.89			ug/L	7.50		38.5	30-160			
Surrogate: 2-Chlorophenol-d4	5.99			ug/L	7.50		79.8	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.10			ug/L	5.00		61.9	30-160			
Surrogate: Nitrobenzene-d5	4.60			ug/L	5.00		91.9	30-160			
Surrogate: 2-Fluorobiphenyl	3.80			ug/L	5.00		75.9	30-160			
Surrogate: 2,4,6-Tribromophenol	9.52			ug/L	7.50		127	30-160			Q
Surrogate: p-Terphenyl-d14	4.33			ug/L	5.00		86.6	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BJE0492 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0492-BLK1)						Prepared: 20-May-2021 Analyzed: 11-Jun-2021 09:53					
Naphthalene	0.002	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.001	0.001	0.010	ug/L							J
1-Methylnaphthalene	0.001	0.0009	0.010	ug/L							J
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	0.003	0.003	0.010	ug/L							J
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.004	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.176			ug/L	0.300		58.7	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.135			ug/L	0.300		45.0	29-120			
<i>Surrogate: Fluoranthene-d10</i>	0.199			ug/L	0.300		66.5	57-120			

LCS (BJE0492-BS1)						Prepared: 20-May-2021 Analyzed: 11-Jun-2021 10:25					
Naphthalene	0.200	0.001	0.010	ug/L	0.300		66.5	37-120			
2-Methylnaphthalene	0.193	0.001	0.010	ug/L	0.300		64.4	37-120			
1-Methylnaphthalene	0.193	0.0009	0.010	ug/L	0.300		64.4	29-120			
Acenaphthylene	0.187	0.002	0.010	ug/L	0.300		62.4	41-120			
Acenaphthene	0.199	0.003	0.010	ug/L	0.300		66.5	41-120			
Dibenzofuran	0.190	0.002	0.010	ug/L	0.300		63.4	38-120			
Fluorene	0.201	0.002	0.010	ug/L	0.300		67.0	43-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0492 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0492-BS1)						Prepared: 20-May-2021 Analyzed: 11-Jun-2021 10:25					
Phenanthrene	0.197	0.001	0.010	ug/L	0.300		65.8	41-120			
Anthracene	0.194	0.001	0.010	ug/L	0.300		64.8	40-120			
Carbazole	0.206	0.001	0.010	ug/L	0.300		68.6	30-160			
Fluoranthene	0.209	0.002	0.010	ug/L	0.300		69.8	45-120			
Pyrene	0.203	0.001	0.010	ug/L	0.300		67.7	41-120			
Benzo(a)anthracene	0.202	0.0008	0.010	ug/L	0.300		67.5	42-120			
Chrysene	0.196	0.0009	0.010	ug/L	0.300		65.2	44-120			
Benzo(b)fluoranthene	0.225	0.0005	0.010	ug/L	0.300		75.1	44-120			
Benzo(k)fluoranthene	0.215	0.003	0.010	ug/L	0.300		71.6	50-120			
Benzo(j)fluoranthene	0.195	0.002	0.010	ug/L	0.300		65.1	39-160			
Benzofluoranthenes, Total	0.636	0.004	0.010	ug/L	0.900		70.6	46-120			
Benzo(a)pyrene	0.189	0.002	0.010	ug/L	0.300		63.0	35-120			
Perylene	0.177	0.006	0.010	ug/L	0.300		58.9	30-160			
Indeno(1,2,3-cd)pyrene	0.169	0.001	0.010	ug/L	0.300		56.4	37-120			
Dibenzo(a,h)anthracene	0.161	0.001	0.010	ug/L	0.300		53.6	34-120			
Benzo(g,h,i)perylene	0.196	0.001	0.010	ug/L	0.300		65.5	38-120			
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.197			ug/L	0.300		65.5	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.162			ug/L	0.300		54.1	29-120			
<i>Surrogate: Fluoranthene-d10</i>	0.209			ug/L	0.300		69.7	57-120			
LCS Dup (BJE0492-BS1)						Prepared: 20-May-2021 Analyzed: 11-Jun-2021 10:57					
Naphthalene	0.208	0.001	0.010	ug/L	0.300		69.3	37-120	4.17	30	
2-Methylnaphthalene	0.201	0.001	0.010	ug/L	0.300		67.0	37-120	3.99	30	
1-Methylnaphthalene	0.199	0.0009	0.010	ug/L	0.300		66.5	29-120	3.24	30	
Acenaphthylene	0.195	0.002	0.010	ug/L	0.300		65.1	41-120	4.35	30	
Acenaphthene	0.209	0.003	0.010	ug/L	0.300		69.5	41-120	4.45	30	
Dibenzofuran	0.199	0.002	0.010	ug/L	0.300		66.3	38-120	4.35	30	
Fluorene	0.210	0.002	0.010	ug/L	0.300		69.9	43-120	4.23	30	
Phenanthrene	0.210	0.001	0.010	ug/L	0.300		69.9	41-120	5.96	30	
Anthracene	0.206	0.001	0.010	ug/L	0.300		68.7	40-120	5.81	30	
Carbazole	0.218	0.001	0.010	ug/L	0.300		72.5	30-160	5.61	30	
Fluoranthene	0.222	0.002	0.010	ug/L	0.300		74.2	45-120	6.11	30	
Pyrene	0.215	0.001	0.010	ug/L	0.300		71.7	41-120	5.62	30	
Benzo(a)anthracene	0.215	0.0008	0.010	ug/L	0.300		71.6	42-120	5.97	30	
Chrysene	0.208	0.0009	0.010	ug/L	0.300		69.2	44-120	6.00	30	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0492 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0492-bsd1)						Prepared: 20-May-2021 Analyzed: 11-Jun-2021 10:57					
Benzo(b)fluoranthene	0.239	0.0005	0.010	ug/L	0.300		79.6	44-120	5.78	30	
Benzo(k)fluoranthene	0.231	0.003	0.010	ug/L	0.300		77.0	50-120	7.28	30	
Benzo(j)fluoranthene	0.214	0.002	0.010	ug/L	0.300		71.4	39-160	9.16	30	
Benzofluoranthenes, Total	0.684	0.004	0.010	ug/L	0.900		76.0	46-120	7.34	30	
Benzo(a)pyrene	0.207	0.002	0.010	ug/L	0.300		69.0	35-120	9.07	30	
Perylene	0.197	0.006	0.010	ug/L	0.300		65.6	30-160	10.90	30	
Indeno(1,2,3-cd)pyrene	0.177	0.001	0.010	ug/L	0.300		59.1	37-120	4.77	30	
Dibenzo(a,h)anthracene	0.168	0.001	0.010	ug/L	0.300		55.9	34-120	4.21	30	
Benzo(g,h,i)perylene	0.208	0.001	0.010	ug/L	0.300		69.3	38-120	5.60	30	
Surrogate: 2-Methylnaphthalene-d10	0.196			ug/L	0.300		65.2	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.162			ug/L	0.300		54.1	29-120			
Surrogate: Fluoranthene-d10	0.214			ug/L	0.300		71.5	57-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJE0459 - EPA 3510C SepF

Instrument: FID4 Analyst: CTO

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0459-BLK1)		Prepared: 20-May-2021 Analyzed: 25-May-2021 20:56							
Diesel Range Organics (C12-C24)	ND	0.100	mg/L						U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L						U
<i>Surrogate: o-Terphenyl</i>	0.187		mg/L	0.225	82.9	50-150			
LCS (BJE0459-BS1)		Prepared: 20-May-2021 Analyzed: 25-May-2021 21:17							
Diesel Range Organics (C12-C24)	2.32	0.100	mg/L	3.00	77.2	56-120			
<i>Surrogate: o-Terphenyl</i>	0.174		mg/L	0.225	77.4	50-150			
LCS Dup (BJE0459-BSD1)		Prepared: 20-May-2021 Analyzed: 25-May-2021 21:38							
Diesel Range Organics (C12-C24)	2.28	0.100	mg/L	3.00	75.9	56-120	1.78	30	
<i>Surrogate: o-Terphenyl</i>	0.170		mg/L	0.225	75.6	50-150			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC

Aroclor PCB - Quality Control

Batch BJE0516 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0516-BLK1)						Prepared: 21-May-2021 Analyzed: 28-May-2021 20:13					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0133			ug/L	0.0200		66.6	29-120			
Surrogate: Tetrachlorometaxylene	0.0116			ug/L	0.0200		58.2	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0122			ug/L	0.0200		61.0	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00933			ug/L	0.0200		46.7	32-120			
LCS (BJE0516-BS1)						Prepared: 21-May-2021 Analyzed: 28-May-2021 20:35					
Aroclor 1016	0.038	0.002	0.010	ug/L	0.0500		76.3	54-120			
Aroclor 1260	0.036	0.003	0.010	ug/L	0.0500		71.1	51-128			
Surrogate: Decachlorobiphenyl	0.0135			ug/L	0.0200		67.4	29-120			
Surrogate: Tetrachlorometaxylene	0.0127			ug/L	0.0200		63.5	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0128			ug/L	0.0200		64.2	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00943			ug/L	0.0200		47.1	32-120			
LCS Dup (BJE0516-BSD1)						Prepared: 21-May-2021 Analyzed: 28-May-2021 20:56					
Aroclor 1016	0.036	0.002	0.010	ug/L	0.0500		72.4	54-120	5.23	30	
Aroclor 1260	0.035	0.003	0.010	ug/L	0.0500		70.1	51-128	1.39	30	
Surrogate: Decachlorobiphenyl	0.0132			ug/L	0.0200		66.2	29-120			
Surrogate: Tetrachlorometaxylene	0.0120			ug/L	0.0200		59.8	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0125			ug/L	0.0200		62.3	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00889			ug/L	0.0200		44.4	32-120			



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJE0743 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0743-BLK1)					Prepared: 28-May-2021 Analyzed: 07-Jun-2021 13:36					
Mercury	ND	0.000013	0.000100	mg/L						U
LCS (BJE0743-BS1)					Prepared: 28-May-2021 Analyzed: 07-Jun-2021 13:38					
Mercury	0.00199	0.000013	0.000100	mg/L	0.00200		99.3	80-120		


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0053 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0053-BLK1)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 18:44						
Barium	135	ND	0.114	0.500	ug/L							U
Barium	137	ND	0.0765	0.500	ug/L							U
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
Cobalt	59	ND	0.0173	0.200	ug/L							U
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U
Lead	208	ND	0.0513	0.100	ug/L							U
Manganese	55	ND	0.142	0.500	ug/L							U
Silver	107	ND	0.0220	0.200	ug/L							U
Vanadium	51a	ND	0.0556	0.200	ug/L							U
Vanadium	51b	ND	0.0521	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
Copper	63	ND	0.173	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0792	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Selenium	78	ND	0.179	0.500	ug/L							U
Zinc	66	ND	2.92	6.00	ug/L							U
Zinc	67	ND	0.940	6.00	ug/L							U

LCS (BJF0053-BS1)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 18:49						
Barium	135	25.8	0.114	0.500	ug/L	25.0		103	80-120			
Barium	137	25.7	0.0765	0.500	ug/L	25.0		103	80-120			
Chromium	52	25.7	0.260	0.500	ug/L	25.0		103	80-120			
Chromium	53	25.5	0.239	0.500	ug/L	25.0		102	80-120			
Cobalt	59	25.4	0.0173	0.200	ug/L	25.0		102	80-120			
Iron	54	5060	18.2	36.0	ug/L	5000		101	80-120			
Iron	57	5200	6.63	36.0	ug/L	5000		104	80-120			
Lead	208	25.1	0.0513	0.100	ug/L	25.0		101	80-120			
Manganese	55	25.2	0.142	0.500	ug/L	25.0		101	80-120			
Silver	107	26.1	0.0220	0.200	ug/L	25.0		104	80-120			
Vanadium	51a	24.0	0.0556	0.200	ug/L	25.0		96.0	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0053 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0053-BS1)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 18:49						
Vanadium	51b	24.0	0.0521	0.200	ug/L	25.0		96.0	80-120			
Arsenic	75a	25.0	0.0373	0.200	ug/L	25.0		100	80-120			
Cadmium	111	25.2	0.0300	0.100	ug/L	25.0		101	80-120			
Cadmium	114	25.4	0.0400	0.100	ug/L	25.0		101	80-120			
Copper	63	25.7	0.173	0.500	ug/L	25.0		103	80-120			
Copper	65	25.7	0.350	0.500	ug/L	25.0		103	80-120			
Nickel	60	25.6	0.0792	0.500	ug/L	25.0		103	80-120			
Nickel	62	25.5	0.220	0.500	ug/L	25.0		102	80-120			
Selenium	78	79.2	0.179	0.500	ug/L	80.0		99.0	80-120			
Zinc	66	79.5	2.92	6.00	ug/L	80.0		99.3	80-120			
Zinc	67	73.7	0.940	6.00	ug/L	80.0		92.1	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0744 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0744-BLK1)						Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:29					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L							U
LCS (BJE0744-BS1)						Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:32					
Mercury, Dissolved	0.00206	0.000013	0.000100	mg/L	0.00200		103	80-120			
Duplicate (BJE0744-DUP1)						Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:36					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJE0744-MS1)						Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:43					
Mercury, Dissolved	0.00102	0.000013	0.000100	mg/L	0.00100	ND	102	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJE0744-MSD1)						Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:45					
Mercury, Dissolved	0.00105	0.000013	0.000100	mg/L	0.00100	ND	105	75-125	2.71	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0054 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0054-BLK1)						Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 00:54						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Cobalt, Dissolved	59	ND	0.0173	0.200	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	6.63	20.0	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	5.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	4.00	ug/L							U

LCS (BJF0054-BS1)						Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 00:59						
Barium, Dissolved	135	25.1	0.114	0.500	ug/L	25.0		101	80-120			
Barium, Dissolved	137	25.2	0.0765	0.500	ug/L	25.0		101	80-120			
Chromium, Dissolved	52	25.8	0.260	0.500	ug/L	25.0		103	80-120			
Chromium, Dissolved	53	25.6	0.239	0.500	ug/L	25.0		102	80-120			
Cobalt, Dissolved	59	23.8	0.0173	0.200	ug/L	25.0		95.3	80-120			
Iron, Dissolved	54	5270	18.2	36.0	ug/L	5000		105	80-120			
Iron, Dissolved	57	5380	6.63	20.0	ug/L	5000		108	80-120			
Lead, Dissolved	208	23.4	0.0513	0.100	ug/L	25.0		93.4	80-120			
Manganese, Dissolved	55	24.7	0.142	0.500	ug/L	25.0		98.6	80-120			
Silver, Dissolved	107	24.4	0.0220	0.200	ug/L	25.0		97.4	80-120			
Vanadium, Dissolved	51a	24.1	0.0556	0.200	ug/L	25.0		96.4	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJJ0054 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0054-BS1)						Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 00:59						
Vanadium, Dissolved	51b	24.1	0.0521	0.200	ug/L	25.0		96.3	80-120			
Arsenic, Dissolved	75a	23.4	0.0373	0.200	ug/L	25.0		93.7	80-120			
Cadmium, Dissolved	111	24.3	0.0300	0.100	ug/L	25.0		97.3	80-120			
Cadmium, Dissolved	114	24.4	0.0400	0.100	ug/L	25.0		97.4	80-120			
Copper, Dissolved	63	24.1	0.173	0.500	ug/L	25.0		96.4	80-120			
Copper, Dissolved	65	24.5	0.350	0.500	ug/L	25.0		98.1	80-120			
Nickel, Dissolved	60	24.6	0.0792	0.500	ug/L	25.0		98.2	80-120			
Nickel, Dissolved	62	24.7	0.220	0.500	ug/L	25.0		99.0	80-120			
Selenium, Dissolved	78	72.3	0.179	0.500	ug/L	80.0		90.4	80-120			
Zinc, Dissolved	66	74.1	2.92	6.00	ug/L	80.0		92.6	80-120			
Zinc, Dissolved	67	68.9	0.940	6.00	ug/L	80.0		86.2	80-120			
Duplicate (BJF0054-DUP2)						Source: 21E0206-02 Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 03:48						
Barium, Dissolved	135	2.80	0.114	0.500	ug/L		2.76			1.47	20	
Chromium, Dissolved	52	ND	0.260	0.500	ug/L		ND					U
Cobalt, Dissolved	59	0.728	0.0173	0.200	ug/L		0.777			6.51	20	
Iron, Dissolved	54	5510	18.2	36.0	ug/L		5610			1.70	20	
Lead, Dissolved	208	ND	0.0513	0.100	ug/L		ND					U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND					U
Vanadium, Dissolved	51a	0.418	0.0556	0.200	ug/L		0.432			3.29	20	
Arsenic, Dissolved	75a	3.08	0.0373	0.200	ug/L		3.17			2.88	20	
Copper, Dissolved	63	ND	0.173	0.500	ug/L		ND					U
Nickel, Dissolved	60	0.176	0.0792	0.500	ug/L		0.182			3.35	20	J
Selenium, Dissolved	78	ND	0.179	0.500	ug/L		ND					U
Zinc, Dissolved	66	ND	2.92	5.00	ug/L		ND					U
Duplicate (BJF0054-DUP4)						Source: 21E0206-02 Prepared: 02-Jun-2021 Analyzed: 04-Jun-2021 01:21						
Manganese, Dissolved	55	499	0.710	2.50	ug/L		509			2.03	20	D
Duplicate (BJF0054-DUP6)						Source: 21E0206-02RE1 Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 17:25						
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L		ND					U
Matrix Spike (BJF0054-MS2)						Source: 21E0206-02 Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 03:53						
Barium, Dissolved	135	28.7	0.114	0.500	ug/L	25.0	2.76	104	75-125			
Chromium, Dissolved	52	23.5	0.260	0.500	ug/L	25.0	ND	94.2	75-125			
Cobalt, Dissolved	59	25.7	0.0173	0.200	ug/L	25.0	0.777	99.8	75-125			



Analytical Report

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Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJJ0054 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJF0054-MS2)		Source: 21E0206-02		Prepared: 02-Jun-2021		Analyzed: 03-Jun-2021 03:53						
Iron, Dissolved	54	10200	18.2	36.0	ug/L	5000	5610	91.7	75-125			
Lead, Dissolved	208	24.1	0.0513	0.100	ug/L	25.0	ND	96.5	75-125			
Silver, Dissolved	107	24.3	0.0220	0.200	ug/L	25.0	ND	97.4	75-125			
Vanadium, Dissolved	51a	22.5	0.0556	0.200	ug/L	25.0	0.432	88.3	75-125			
Arsenic, Dissolved	75a	27.5	0.0373	0.200	ug/L	25.0	3.17	97.2	75-125			
Copper, Dissolved	63	25.0	0.173	0.500	ug/L	25.0	ND	99.8	75-125			
Nickel, Dissolved	60	24.6	0.0792	0.500	ug/L	25.0	0.182	97.6	75-125			
Selenium, Dissolved	78	74.8	0.179	0.500	ug/L	80.0	ND	93.5	75-125			
Zinc, Dissolved	66	76.5	2.92	6.00	ug/L	80.0	ND	95.7	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0054-MS4)		Source: 21E0206-02		Prepared: 02-Jun-2021		Analyzed: 04-Jun-2021 01:27						
Manganese, Dissolved	55	528	0.710	2.50	ug/L	25.0	509	76.4	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0054-MS6)		Source: 21E0206-02RE1		Prepared: 02-Jun-2021		Analyzed: 03-Jun-2021 17:30						
Cadmium, Dissolved	111	25.5	0.0300	0.100	ug/L	25.0	ND	102	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0054-MSD2)		Source: 21E0206-02		Prepared: 02-Jun-2021		Analyzed: 03-Jun-2021 03:59						
Barium, Dissolved	135	28.9	0.114	0.500	ug/L	25.0	2.76	105	75-125	0.60	20	
Chromium, Dissolved	52	23.2	0.260	0.500	ug/L	25.0	ND	92.6	75-125	1.65	20	
Cobalt, Dissolved	59	25.5	0.0173	0.200	ug/L	25.0	0.777	98.9	75-125	0.96	20	
Iron, Dissolved	54	10100	18.2	36.0	ug/L	5000	5610	90.0	75-125	0.83	20	
Lead, Dissolved	208	24.6	0.0513	0.100	ug/L	25.0	ND	98.6	75-125	2.17	20	
Silver, Dissolved	107	24.2	0.0220	0.200	ug/L	25.0	ND	97.0	75-125	0.42	20	
Vanadium, Dissolved	51a	22.3	0.0556	0.200	ug/L	25.0	0.432	87.3	75-125	1.13	20	
Arsenic, Dissolved	75a	27.3	0.0373	0.200	ug/L	25.0	3.17	96.4	75-125	0.78	20	
Copper, Dissolved	63	25.0	0.173	0.500	ug/L	25.0	ND	100	75-125	0.38	20	
Nickel, Dissolved	60	24.7	0.0792	0.500	ug/L	25.0	0.182	98.2	75-125	0.65	20	
Selenium, Dissolved	78	73.5	0.179	0.500	ug/L	80.0	ND	91.9	75-125	1.79	20	
Zinc, Dissolved	66	75.1	2.92	5.00	ug/L	80.0	ND	93.8	75-125	1.94	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0054-MSD4)		Source: 21E0206-02		Prepared: 02-Jun-2021		Analyzed: 04-Jun-2021 01:33						
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Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0054 - REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJF0054-MSD4)			Source: 21E0206-02			Prepared: 02-Jun-2021			Analyzed: 04-Jun-2021 01:33			
Manganese, Dissolved	55	544	0.710	2.50	ug/L	25.0	509	138	75-125	2.85	20	D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.												
Matrix Spike Dup (BJF0054-MSD6)			Source: 21E0206-02RE1			Prepared: 02-Jun-2021			Analyzed: 03-Jun-2021 17:36			
Cadmium, Dissolved	111	25.3	0.0300	0.100	ug/L	25.0	ND	101	75-125	0.74	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.												



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Certified Analyses included in this Report

Analyte	Certifications
<i>EPA 6020B in Water</i>	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
<i>EPA 6020B UCT-KED in Water</i>	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP


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Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE


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Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE


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m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP
2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP


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2-Methylphenol	NELAP,DoD-ELAP
Hexachloroethane	NELAP,DoD-ELAP
N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP
Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP
2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP
2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP
2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

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 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:40

Benzo(k)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Perylene	ADEC, NELAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP, NELAP, WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP, NELAP, WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP, NELAP, WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE, DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE, DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE, DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE, ADEC, DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE, DoD-ELAP



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:40

Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
J	Estimated concentration value detected below the reporting limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

13 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21E0213

Associated SDG ID(s)
N/A

Susan
Dunniho

Digitally signed by Susan
Dunniho
Date: 2021.12.15 14:30:36
-08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunniho For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: <u>2160213</u>		Turn-around Requested: <u>Standard</u>		Page: <u>1</u> of <u>1</u>																																																																																																																																																												
ARI Client Company: <u>Shannon & Wilson, Inc.</u>		Phone: <u>206-695-6716</u>		Date: <u>5/19/21</u>	Ice Present? <u>Yes</u>																																																																																																																																																											
Client Contact: <u>Shoshana Howard</u>		No. of Coolers: <u>2</u>		Cooler Temps: <u>5.2 5.6</u>																																																																																																																																																												
Client Project Name: <u>LDW</u>		<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="10">Analysis Requested</th> <th>Notes/Comments</th> </tr> <tr> <th>TPH-G</th> <th>TPH-Dx</th> <th>BTEX</th> <th>HVOCs</th> <th>MTBE</th> <th>PAHs</th> <th>Full List SVOCs</th> <th>Limited SVOCs</th> <th>PCBs</th> <th>Metals (total + diss.)</th> <th>Attenuation indicators ①</th> <th></th> </tr> <tr> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td>① nitrate, nitrite, chloride, sulfate, sulfate sulfite, ferrous iron, dissolved manganese, methane, ethane, ethene.</td> </tr> <tr> <td></td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>As, Mn, Ni, Cd, Cu, Pb, Hg, Se, Ag, Zn</td> </tr> <tr> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td>As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn</td> </tr> <tr> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td>As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn</td> </tr> <tr> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td>As, Mn, Cd, Cu</td> </tr> <tr> <td></td> <td></td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td>①</td> <td>Mn</td> </tr> <tr><td colspan="12"> </td></tr> <tr><td colspan="12"> </td></tr> <tr><td colspan="12"> </td></tr> <tr><td colspan="12"> </td></tr> <tr><td colspan="12"> </td></tr> </table>				Analysis Requested										Notes/Comments	TPH-G	TPH-Dx	BTEX	HVOCs	MTBE	PAHs	Full List SVOCs	Limited SVOCs	PCBs	Metals (total + diss.)	Attenuation indicators ①				X	X						X		① nitrate, nitrite, chloride, sulfate, sulfate sulfite, ferrous iron, dissolved manganese, methane, ethane, ethene.			X	X								As, Mn, Ni, Cd, Cu, Pb, Hg, Se, Ag, Zn			X	X	X	X				X		As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn			X	X	X	X				X		As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn			X	X	X					X		As, Mn, Cd, Cu			X	X	X					X	①	Mn																																																												
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Client Project #: <u>21-1-12596</u>		Samplers: <u>CTC, BON</u>																																																																																																																																																														

Sample ID	Date	Time	Matrix	No. Containers
MW-49-20211905	5/19/21	0825	W	5
TB-5-20211905	5/19/21	0830	W	5
MW-57-20211905	5/19/21	0920	W	9
MW-101-20211905	5/19/21	0935	W	9
MW-9-20211905	5/19/21	1045	W	9
MW-30-20211905	5/19/21	1245	W	17

Comments/Special Instructions	Relinquished by: (Signature) <u>[Signature]</u>	Received by: (Signature) <u>[Signature]</u>	Relinquished by: (Signature) _____	Received by: (Signature) _____
	Printed Name: <u>Christian Canfield</u>	Printed Name: <u>Jacob Leathe</u>	Printed Name: _____	Printed Name: _____
	Company: <u>Shannon & Wilson</u>	Company: <u>ARI</u>	Company: _____	Company: _____
	Date & Time: <u>5/19/21 1316</u>	Date & Time: <u>05/19/2021 1316</u>	Date & Time: _____	Date & Time: _____

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



WORK ORDER

21E0213

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0213-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-09 A	Large OJ, 1000 mL	> 2	Fail ①
21E0213-10 A	HDPE NM, 500 mL		
21E0213-10 B	Small OJ, 500 mL		
21E0213-10 C	Small OJ, 500 mL, ZnOAC	< 4	Fail
21E0213-10 D	Small OJ, 500 mL, EDTA		
21E0213-10 E	Glass NM, Amber, 500 mL, HCL		
21E0213-10 F	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	Pass
21E0213-10 G	Glass NM, Amber, 500 mL		
21E0213-10 H	Glass NM, Amber, 500 mL		
21E0213-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 M	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 N	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 O	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 P	VOA Vial, Clear, 40 mL, HCL		
21E0213-11 A	Large OJ, 1000 mL	> 2	Fail ①


Preservation Confirmed By

Date

05/19/2021 ① Filtered at 0.45 um
and preserved to pH 2.0 with
0.75ml conc. HNO₃ (J2314).
ml 5/19/21

Reviewed By

Date


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-49-20211905	21E0213-01	Water	19-May-2021 08:25	19-May-2021 13:16
MW-49-20211905	21E0213-02	Water	19-May-2021 08:25	19-May-2021 13:16
TB-5-20211905	21E0213-03	Water	19-May-2021 08:25	19-May-2021 13:16
MW-57-20211905	21E0213-04	Water	19-May-2021 09:20	19-May-2021 13:16
MW-57-20211905	21E0213-05	Water	19-May-2021 09:20	19-May-2021 13:16
MW-101-20211905	21E0213-06	Water	19-May-2021 09:35	19-May-2021 13:16
MW-101-20211905	21E0213-07	Water	19-May-2021 09:35	19-May-2021 13:16
MW-9-20211905	21E0213-08	Water	19-May-2021 10:45	19-May-2021 13:16
MW-9-20211905	21E0213-09	Water	19-May-2021 10:45	19-May-2021 13:16
MW-30-20211905	21E0213-10	Water	19-May-2021 12:45	19-May-2021 13:16
MW-30-20211905	21E0213-11	Water	19-May-2021 12:45	19-May-2021 13:16



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish
Work Order: 21E0213

Sample receipt

Samples as listed on the preceding page were received 19-May-2021 13:16 under ARI work order 21E0213. For details regarding sample receipt, please refer to the Cooler Receipt Form.

Gasoline by NWTPH-g (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

The trip blank 21E0213-03 contained Toluene above the reporting limit. The vial was prepared in October.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Total and Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times except Sulfite. The Sulfite holding time was exceeded upon sample receipt.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

The reference material (SRM) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0213-10 in Sulfite batch BJE0468, Ferrous Iron batch BJE0470 and Anions batch BJE0525. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

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 13-Dec-2021 16:58

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0213-01 in Total Mercury batch BJE0743 and in association with sample 21E0213-02 in Dissolved Mercury batch BJE0744. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Volatile Gases - MEE by RSK175

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

REVISED to correct VOA list



WORK ORDER

21E0213

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0213-01 A	HDPE NM, 1000 mL, 1:1 HNO3	<2	Pass
21E0213-01 B	VOA Vial, Clear, 40 mL, HCL		
21E0213-01 C	VOA Vial, Clear, 40 mL, HCL		
21E0213-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0213-02 A	Large OJ, 1000 mL	7.2	Fail
21E0213-03 A	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0213-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0213-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0213-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0213-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0213-04 A	HDPE NM, 1000 mL, 1:1 HNO3	<2	Pass
21E0213-04 B	Glass NM, Amber, 500 mL		
21E0213-04 C	Glass NM, Amber, 500 mL		
21E0213-04 D	Glass NM, Amber, 500 mL		
21E0213-04 E	Glass NM, Amber, 500 mL		
21E0213-04 F	VOA Vial, Clear, 40 mL, HCL		
21E0213-04 G	VOA Vial, Clear, 40 mL, HCL		
21E0213-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-05 A	Large OJ, 1000 mL	7.2	Fail
21E0213-06 A	HDPE NM, 1000 mL, 1:1 HNO3	<2	Pass
21E0213-06 B	Glass NM, Amber, 500 mL		
21E0213-06 C	Glass NM, Amber, 500 mL		
21E0213-06 D	Glass NM, Amber, 500 mL		
21E0213-06 E	Glass NM, Amber, 500 mL		
21E0213-06 F	VOA Vial, Clear, 40 mL, HCL		
21E0213-06 G	VOA Vial, Clear, 40 mL, HCL		
21E0213-06 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-07 A	Large OJ, 1000 mL	3.5 - 7.2	Fail
21E0213-08 A	HDPE NM, 1000 mL, 1:1 HNO3	<2	Pass
21E0213-08 B	Glass NM, Amber, 500 mL		
21E0213-08 C	Glass NM, Amber, 500 mL		
21E0213-08 D	VOA Vial, Clear, 40 mL, HCL		
21E0213-08 E	VOA Vial, Clear, 40 mL, HCL		
21E0213-08 F	VOA Vial, Clear, 40 mL, HCL		
21E0213-08 G	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21E0213

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0213-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-09 A	Large OJ, 1000 mL	72	Fail
21E0213-10 A	HDPE NM, 500 mL		
21E0213-10 B	Small OJ, 500 mL		
21E0213-10 C	Small OJ, 500 mL, ZnOAC	< 4	Fail
21E0213-10 D	Small OJ, 500 mL, EDTA		
21E0213-10 E	Glass NM, Amber, 500 mL, HCL		
21E0213-10 F	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0213-10 G	Glass NM, Amber, 500 mL		
21E0213-10 H	Glass NM, Amber, 500 mL		
21E0213-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 M	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 N	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 O	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 P	VOA Vial, Clear, 40 mL, HCL		
21E0213-11 A	Large OJ, 1000 mL	72	Fail

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Preservation Confirmed By

05/19/2021
Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon & Wilson

Project Name: LDW

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 21E0213

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1:316

5.2 5.6

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 5206

Cooler Accepted by: JS

Date: 05/19/2001

Time: 1:316

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI... NA A

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JS Date: 05/19/2001 Time: 1422 Labels checked by: JS

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

vials w/air bubbles marked on preservation sheet, lab to determine sizes.

3 TBS dates for 5 vials, 2 made 10/23/2000
2 made 01/15/2001
1 made 05/05/2001

By: JS

Date: 05/19/2001



WORK ORDER

21E0213

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0213-01 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0213-01 B	VOA Vial, Clear, 40 mL, HCL		
21E0213-01 C	VOA Vial, Clear, 40 mL, HCL		
21E0213-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0213-02 A	Large OJ, 1000 mL	7.2	Fail
21E0213-03 A	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0213-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0213-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0213-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0213-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0213-04 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0213-04 B	Glass NM, Amber, 500 mL		
21E0213-04 C	Glass NM, Amber, 500 mL		
21E0213-04 D	Glass NM, Amber, 500 mL		
21E0213-04 E	Glass NM, Amber, 500 mL		
21E0213-04 F	VOA Vial, Clear, 40 mL, HCL		
21E0213-04 G	VOA Vial, Clear, 40 mL, HCL		
21E0213-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-05 A	Large OJ, 1000 mL	7.2	Fail
21E0213-06 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0213-06 B	Glass NM, Amber, 500 mL		
21E0213-06 C	Glass NM, Amber, 500 mL		
21E0213-06 D	Glass NM, Amber, 500 mL		
21E0213-06 E	Glass NM, Amber, 500 mL		
21E0213-06 F	VOA Vial, Clear, 40 mL, HCL		
21E0213-06 G	VOA Vial, Clear, 40 mL, HCL		
21E0213-06 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-07 A	Large OJ, 1000 mL	3.5-7.2	Fail
21E0213-08 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0213-08 B	Glass NM, Amber, 500 mL		
21E0213-08 C	Glass NM, Amber, 500 mL		
21E0213-08 D	VOA Vial, Clear, 40 mL, HCL		
21E0213-08 E	VOA Vial, Clear, 40 mL, HCL		
21E0213-08 F	VOA Vial, Clear, 40 mL, HCL		
21E0213-08 G	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21E0213

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0213-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-09 A	Large OJ, 1000 mL	22	Fail
21E0213-10 A	HDPE NM, 500 mL		
21E0213-10 B	Small OJ, 500 mL		
21E0213-10 C	Small OJ, 500 mL, ZnOAC	< 4	Fail 2nd GN back to pH > 12
21E0213-10 D	Small OJ, 500 mL, EDTA		
21E0213-10 E	Glass NM, Amber, 500 mL, HCl		Pass (20) checked prior to analysis
21E0213-10 F	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0213-10 G	Glass NM, Amber, 500 mL		
21E0213-10 H	Glass NM, Amber, 500 mL		
21E0213-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 M	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 N	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 O	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 P	VOA Vial, Clear, 40 mL, HCL		
21E0213-11 A	Large OJ, 1000 mL	22	Fail

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Preservation Confirmed By

05/19/2021
Date



WORK ORDER

21E0213

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0213-01 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0213-01 B	VOA Vial, Clear, 40 mL, HCL		
21E0213-01 C	VOA Vial, Clear, 40 mL, HCL		
21E0213-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0213-02 A	Large OJ, 1000 mL	7.2	Fail (1)
21E0213-03 A	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0213-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0213-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0213-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0213-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0213-04 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0213-04 B	Glass NM, Amber, 500 mL		
21E0213-04 C	Glass NM, Amber, 500 mL		
21E0213-04 D	Glass NM, Amber, 500 mL		
21E0213-04 E	Glass NM, Amber, 500 mL		
21E0213-04 F	VOA Vial, Clear, 40 mL, HCL		
21E0213-04 G	VOA Vial, Clear, 40 mL, HCL		
21E0213-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-05 A	Large OJ, 1000 mL	7.2	Fail (1)
21E0213-06 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0213-06 B	Glass NM, Amber, 500 mL		
21E0213-06 C	Glass NM, Amber, 500 mL		
21E0213-06 D	Glass NM, Amber, 500 mL		
21E0213-06 E	Glass NM, Amber, 500 mL		
21E0213-06 F	VOA Vial, Clear, 40 mL, HCL		
21E0213-06 G	VOA Vial, Clear, 40 mL, HCL		
21E0213-06 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-07 A	Large OJ, 1000 mL	3.4 < 7.2	Fail (1)
21E0213-08 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0213-08 B	Glass NM, Amber, 500 mL		
21E0213-08 C	Glass NM, Amber, 500 mL		
21E0213-08 D	VOA Vial, Clear, 40 mL, HCL		
21E0213-08 E	VOA Vial, Clear, 40 mL, HCL		
21E0213-08 F	VOA Vial, Clear, 40 mL, HCL		
21E0213-08 G	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21E0213

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0213-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-09 A	Large OJ, 1000 mL	22	Fail (1)
21E0213-10 A	HDPE NM, 500 mL		
21E0213-10 B	Small OJ, 500 mL		
21E0213-10 C	Small OJ, 500 mL, ZnOAC	< 4	Fail
21E0213-10 D	Small OJ, 500 mL, EDTA		
21E0213-10 E	Glass NM, Amber, 500 mL, HCl		
21E0213-10 F	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0213-10 G	Glass NM, Amber, 500 mL		
21E0213-10 H	Glass NM, Amber, 500 mL		
21E0213-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 M	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 N	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 O	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 P	VOA Vial, Clear, 40 mL, HCL		
21E0213-11 A	Large OJ, 1000 mL	22	Fail (1)


Preservation Confirmed By

Date

05/19/2021 (1) Filtered at 0.45 um
and preserved to pH 2.0 with
0.75ml conc. HNO3 (J2314).
MI 5/19/21



WORK ORDER

21E0213

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0213-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0213-09 A	Large OJ, 1000 mL	> 2	Fail ①
21E0213-10 A	HDPE NM, 500 mL		
21E0213-10 B	Small OJ, 500 mL		
21E0213-10 C	Small OJ, 500 mL, ZnOAC	< 4	Fail
21E0213-10 D	Small OJ, 500 mL, EDTA		
21E0213-10 E	Glass NM, Amber, 500 mL, HCL		
21E0213-10 F	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	Pass
21E0213-10 G	Glass NM, Amber, 500 mL		
21E0213-10 H	Glass NM, Amber, 500 mL		
21E0213-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 M	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 N	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 O	VOA Vial, Clear, 40 mL, HCL		
21E0213-10 P	VOA Vial, Clear, 40 mL, HCL		
21E0213-11 A	Large OJ, 1000 mL	> 2	Fail ①


Preservation Confirmed By

Date

05/19/2021 ① Filtered at 0.45 um
and preserved to pH 2.0 with
0.75ml conc. HNO₃ (J2314).
ml 5/19/21

Reviewed By

Date


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-49-20211905
21E0213-01 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/19/2021 08:25

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 16:48

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0213-01 B

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	0.47	ug/L	
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	4.86	ug/L	
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	2.34	ug/L	
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>					<i>80-129 %</i>	<i>112 %</i>	
<i>Surrogate: Toluene-d8</i>					<i>80-120 %</i>	<i>92.6 %</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>					<i>80-120 %</i>	<i>85.4 %</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					<i>80-120 %</i>	<i>102 %</i>	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-49-20211905
21E0213-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/19/2021 08:25

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 04:36

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0213-01 A 01

Preparation Batch: BJF0053

Sample Size: 25 mL

Prepared: 06/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese	7439-96-5	1	0.142	0.500	7.37	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-49-20211905
21E0213-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 08:25

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 02:05

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0213-01 A 01

Preparation Batch: BJF0053

Sample Size: 25 mL

Prepared: 06/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.458	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	0.706	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	2.91	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.377	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-49-20211905

21E0213-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/19/2021 08:25

Instrument: HYDRA Analyst: ML

Analyzed: 06/07/2021 13:54

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0213-01 A

Preparation Batch: BJE0743

Sample Size: 20 mL

Prepared: 05/28/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-49-20211905
21E0213-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/19/2021 08:25

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 04:41

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0213-02 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500	1.56	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-49-20211905
21E0213-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 08:25

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 02:10

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0213-02 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.233	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.564	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	2.41	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-49-20211905

21E0213-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/19/2021 08:25

Instrument: HYDRA Analyst: ML

Analyzed: 06/07/2021 14:48

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0213-02 A 01

Preparation Batch: BJE0744

Sample Size: 20 mL

Filtration Batch: BJE0466

Prepared: 05/28/2021

Final Volume: 20 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

TB-5-20211905
21E0213-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/19/2021 08:25

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 13:27

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0213-03 B

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.24	ug/L	
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	106	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	94.9	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	89.4	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	102	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-57-20211905
21E0213-04 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/19/2021 09:20

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 17:10

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0213-04 F

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>114</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>96.3</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>85.7</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>104</i>	<i>%</i>	



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-57-20211905

21E0213-04 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/19/2021 09:20

Instrument: NT11 Analyst: VTS

Analyzed: 06/11/2021 13:39

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0492 Prepared: 05/20/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0213-04 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0211 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0213-04 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.003	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.005	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.004	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	0.013	ug/L	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10					42-120 %	59.0 %	
Surrogate: Dibenzo[a,h]anthracene-d14					29-120 %	40.7 %	
Surrogate: Fluoranthene-d10					57-120 %	68.9 %	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-57-20211905
21E0213-04 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/19/2021 09:20

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 20:46

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0213-04 C 01

Preparation Batch: BJE0494

Sample Size: 500 mL

Prepared: 05/21/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.264	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	69.0	%	


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-57-20211905
21E0213-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/19/2021 09:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 04:56

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0053 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0213-04 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	12.7	ug/L	
Chromium	7440-47-3	1	0.260	0.500	2.29	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	3.13	ug/L	
Iron	7439-89-6	1	18.2	36.0	12600	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.595	ug/L	
Silver	7440-22-4	1	0.0220	0.200	0.0740	ug/L	J
Vanadium	7440-62-2	1	0.0556	0.200	10.1	ug/L	


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 Project Manager: Meg Strong

Reported:
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MW-57-20211905
21E0213-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 09:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 02:15

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0213-04 A 01

Preparation Batch: BJF0053

Sample Size: 25 mL

Prepared: 06/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	13.7	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	6.83	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	4.89	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.477	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-57-20211905

21E0213-04 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/19/2021 09:20

Instrument: HYDRA Analyst: ML

Analyzed: 06/07/2021 14:20

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0213-04 A

Preparation Batch: BJE0743

Sample Size: 20 mL

Prepared: 05/28/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-57-20211905
21E0213-04RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/19/2021 09:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 03:35

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJF0053 Sample Size: 25 mL
Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0213-04RE1 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	5	0.710	2.50	476	ug/L	D


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 Project: Lower Duwamish
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Reported:
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MW-57-20211905
21E0213-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/19/2021 09:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 04:46

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0213-05 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			2.80	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500			1.15	ug/L	
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200			2.34	ug/L	
Iron, Dissolved	7439-89-6	1	18.2	36.0			8220	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100			0.0640	ug/L	J
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200			5.83	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-57-20211905
21E0213-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 09:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 02:20

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0213-05 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	11.1	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	1.48	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	3.32	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.292	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-57-20211905

21E0213-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/19/2021 09:20

Instrument: HYDRA Analyst: ML

Analyzed: 06/07/2021 14:59

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0213-05 A 01

Preparation Batch: BJE0744

Sample Size: 20 mL

Filtration Batch: BJE0466

Prepared: 05/28/2021

Final Volume: 20 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-57-20211905
21E0213-05RE1 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/19/2021 09:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 03:40

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0213-05RE1 A 01
	Preparation Batch: BJF0054	Filtration Batch: BJE0466
	Prepared: 06/02/2021	Filtration Date: 05/19/2021 14:40
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	5	0.710	2.50	416	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-101-20211905
21E0213-06 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/19/2021 09:35

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 17:33

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0213-06 G

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>112</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>95.8</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>84.1</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>104</i>	<i>%</i>	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-101-20211905 21E0213-06 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/19/2021 09:35

Instrument: NT11 Analyst: VTS

Analyzed: 06/11/2021 14:11

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0492 Prepared: 05/20/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0213-06 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0211 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0213-06 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.004	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.004	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.004	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	0.011	ug/L	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10					42-120 %	56.9 %	
Surrogate: Dibenzo[a,h]anthracene-d14					29-120 %	39.1 %	
Surrogate: Fluoranthene-d10					57-120 %	67.8 %	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-101-20211905
21E0213-06 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/19/2021 09:35

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 21:07

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0213-06 C 01

Preparation Batch: BJE0494

Sample Size: 500 mL

Prepared: 05/21/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.316	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	67.2	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-101-20211905
21E0213-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/19/2021 09:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 05:02

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0053 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0213-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	11.8	ug/L	
Chromium	7440-47-3	1	0.260	0.500	2.20	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	2.92	ug/L	
Iron	7439-89-6	1	18.2	36.0	12500	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.527	ug/L	
Silver	7440-22-4	1	0.0220	0.200	0.0760	ug/L	J
Vanadium	7440-62-2	1	0.0556	0.200	9.78	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-101-20211905
21E0213-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 09:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 02:25

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0053 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0213-06 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	13.2	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	6.37	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	4.66	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.533	ug/L	
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



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Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-101-20211905

21E0213-06 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/19/2021 09:35

Instrument: HYDRA Analyst: ML

Analyzed: 06/07/2021 14:22

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0213-06 A

Preparation Batch: BJE0743

Sample Size: 20 mL

Prepared: 05/28/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



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Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-101-20211905
21E0213-06RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/19/2021 09:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 03:45

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJF0053 Sample Size: 25 mL
Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0213-06RE1 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	5	0.710	2.50	464	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-101-20211905
21E0213-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/19/2021 09:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 04:51

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0213-07 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			3.20	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500			1.20	ug/L	
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200			2.40	ug/L	
Iron, Dissolved	7439-89-6	1	18.2	36.0			9100	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100			0.0830	ug/L	J
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200			6.23	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-101-20211905
21E0213-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 09:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 16:21

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0213-07 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	12.1	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.932	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	3.50	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.311	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U



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Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-101-20211905

21E0213-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/19/2021 09:35

Instrument: HYDRA Analyst: ML

Analyzed: 06/07/2021 15:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0213-07 A 01

Preparation Batch: BJE0744

Sample Size: 20 mL

Filtration Batch: BJE0466

Prepared: 05/28/2021

Final Volume: 20 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-101-20211905
21E0213-07RE1 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/19/2021 09:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 03:51

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0213-07RE1 A 01
	Preparation Batch: BJF0054	Filtration Batch: BJE0466
	Prepared: 06/02/2021	Filtration Date: 05/19/2021 14:40
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	5	0.710	2.50	424	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-9-20211905
21E0213-08 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/19/2021 10:45

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 17:55

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0213-08 F

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>				80-120 %	94.7	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	85.2	%	



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Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-9-20211905

21E0213-08 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/19/2021 10:45

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 17:55

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0213-08 F

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	94.7	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	85.2	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-9-20211905
21E0213-08 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/19/2021 10:45

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 21:29

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0213-08 B 01

Preparation Batch: BJE0494

Sample Size: 500 mL

Prepared: 05/21/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>80.5</i>	<i>%</i>	



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Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
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MW-9-20211905

21E0213-08 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/19/2021 10:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/07/2021 17:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21E0213-08 A 01

Preparation Batch: BJF0053

Sample Size: 25 mL

Prepared: 06/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	5	0.710	2.50	348	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-9-20211905
21E0213-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 10:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 02:35

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0053 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

Extract ID: 21E0213-08 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	6.79	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	0.448	ug/L	
Copper	7440-50-8	1	0.173	0.500	1.77	ug/L	



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Analytical Report

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Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-9-20211905

21E0213-09 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/19/2021 10:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 05:08

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21E0213-09 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	1	0.142	0.500	265	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-9-20211905
21E0213-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 10:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 02:42

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0054 Sample Size: 25 mL
 Prepared: 06/02/2021 Final Volume: 25 mL

 Extract ID: 21E0213-09 A 01
 Filtration Batch: BJE0466
 Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.932	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	0.275	ug/L	
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.276	ug/L	J



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-30-20211905

21E0213-10 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/19/2021 12:45

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 18:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0213-10 M

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	115	%	
Surrogate: Toluene-d8				80-120 %	96.9	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	86.3	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	104	%	



Analytical Resources, LLC
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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-30-20211905

21E0213-10 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/19/2021 12:45

Instrument: NT2 Analyst: PKC

Analyzed: 05/20/2021 18:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0213-10 M

Preparation Batch: BJE0476

Sample Size: 10 mL

Prepared: 05/20/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.9	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	86.3	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-30-20211905
21E0213-10 (Water)
Dissolved Gases

Method: EPA RSK-175

Sampled: 05/19/2021 12:45

Instrument: FID6 Analyst: PB

Analyzed: 05/25/2021 17:05

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0213-10 O

Preparation Batch: BJE0615

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	882	ug/L	
Ethane	74-84-0	1	1.23	ND	ug/L	U
Ethene	74-85-1	1	1.14	ND	ug/L	U
<i>Surrogate: Propane</i>			<i>72-122 %</i>	<i>106</i>	<i>%</i>	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-30-20211905
21E0213-10 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/19/2021 12:45

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 21:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0213-10 G 01

Preparation Batch: BJE0494

Sample Size: 500 mL

Prepared: 05/21/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	1.11	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	0.383	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	76.7	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-30-20211905
21E0213-10 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/19/2021 12:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 03:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0213-10 F 01

Preparation Batch: BJF0053

Sample Size: 25 mL

Prepared: 06/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	5	0.710	2.50	632	ug/L	D


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 Project Manager: Meg Strong

Reported:
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MW-30-20211905
21E0213-10 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/19/2021 12:45

Instrument: IC930 Analyst: CDE

Analyzed: 05/21/2021 12:56

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0213-10 B

Preparation Batch: BJE0525

Sample Size: 10 mL

Prepared: 05/21/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	0.100	6.10	mg/L	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	0.100	ND	mg/L	H, U

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	0.100	ND	mg/L	H, U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

MW-30-20211905
21E0213-10 (Water)
Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 05/19/2021 12:45

Instrument: UV1800-2 Analyst: CDE

Analyzed: 05/19/2021 16:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0213-10 E

Preparation Batch: BJE0470

Sample Size: 5 mL

Prepared: 05/19/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		50	2.00	2.00	25.9	mg/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-30-20211905

21E0213-10 (Water)

Wet Chemistry

Method: SM 4500-SO3 B-00

Sampled: 05/19/2021 12:45

Instrument: N/A Analyst: UW

Analyzed: 05/19/2021 15:03

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0213-10

Preparation Batch: BJE0468

Sample Size: 50 mL

Prepared: 05/19/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfite	14265-45-3	1	1.4	1.4	ND	mg/L	H, U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-30-20211905
21E0213-10RE1 (Water)

Wet Chemistry

Method: EPA 300.0

Sampled: 05/19/2021 12:45

Instrument: IC930 Analyst: CDE

Analyzed: 06/03/2021 12:32

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0213-10RE1 B

Preparation Batch: BJE0525

Sample Size: 10 mL

Prepared: 05/21/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	10	1.00	1.00	49.8	mg/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

MW-30-20211905

21E0213-11 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/19/2021 12:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/04/2021 03:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21E0213-11 A 01

Preparation Batch: BJF0054

Sample Size: 25 mL

Filtration Batch: BJE0466

Prepared: 06/02/2021

Final Volume: 25 mL

Filtration Date: 05/19/2021 14:40

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	5	0.710	2.50	596	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJE0476 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0476-BLK1)		Prepared: 20-May-2021 Analyzed: 20-May-2021 12:42								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.77		ug/L	5.00		95.3	80-120			
Surrogate: 4-Bromofluorobenzene	4.41		ug/L	5.00		88.2	80-120			
Blank (BJE0476-BLK2)		Prepared: 20-May-2021 Analyzed: 20-May-2021 12:42								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.05		ug/L	5.00		101	80-129			
Surrogate: Toluene-d8	4.77		ug/L	5.00		95.3	80-120			
Surrogate: 4-Bromofluorobenzene	4.49		ug/L	5.00		89.8	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.05		ug/L	5.00		101	80-120			
LCS (BJE0476-BS1)		Prepared: 20-May-2021 Analyzed: 20-May-2021 10:08								
Gasoline Range Organics (Tol-Nap)	1060	100	ug/L	1000		106	72-128			
Surrogate: Toluene-d8	5.01		ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	4.88		ug/L	5.00		97.6	80-120			
LCS (BJE0476-BS2)		Prepared: 20-May-2021 Analyzed: 20-May-2021 10:29								
Vinyl Chloride	9.29	0.08	0.20	ug/L	10.0	92.9	66-133			
1,1-Dichloroethene	9.79	0.08	0.20	ug/L	10.0	97.9	69-135			
trans-1,2-Dichloroethene	9.48	0.07	0.20	ug/L	10.0	94.8	78-128			
cis-1,2-Dichloroethene	9.83	0.08	0.20	ug/L	10.0	98.3	80-121			
Benzene	10.0	0.05	0.20	ug/L	10.0	100	80-120			
Trichloroethene	9.90	0.07	0.20	ug/L	10.0	99.0	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0476 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0476-BS2)					Prepared: 20-May-2021		Analyzed: 20-May-2021 10:29				
Toluene	9.73	0.05	0.20	ug/L	10.0		97.3	80-120			
Tetrachloroethene	10.2	0.09	0.20	ug/L	10.0		102	80-120			
Ethylbenzene	10.3	0.05	0.20	ug/L	10.0		103	80-120			
m,p-Xylene	21.1	0.14	0.40	ug/L	20.0		105	80-121			
o-Xylene	9.60	0.08	0.20	ug/L	10.0		96.0	80-121			
Xylenes, total	30.7	0.22	0.60	ug/L	30.0		102	76-127			
Surrogate: 1,2-Dichloroethane-d4	4.67			ug/L	5.00		93.5	80-129			
Surrogate: Toluene-d8	4.97			ug/L	5.00		99.4	80-120			
Surrogate: 4-Bromofluorobenzene	4.92			ug/L	5.00		98.3	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.97			ug/L	5.00		99.4	80-120			
LCS Dup (BJE0476-BSD1)					Prepared: 20-May-2021		Analyzed: 20-May-2021 10:51				
Gasoline Range Organics (Tol-Nap)	1020		100	ug/L	1000		102	72-128	3.63	30	
Surrogate: Toluene-d8	5.04			ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	4.81			ug/L	5.00		96.2	80-120			
LCS Dup (BJE0476-BSD2)					Prepared: 20-May-2021		Analyzed: 20-May-2021 11:13				
Vinyl Chloride	8.80	0.08	0.20	ug/L	10.0		88.0	66-133	5.42	30	
1,1-Dichloroethene	9.40	0.08	0.20	ug/L	10.0		94.0	69-135	4.09	30	
trans-1,2-Dichloroethene	9.08	0.07	0.20	ug/L	10.0		90.8	78-128	4.35	30	
cis-1,2-Dichloroethene	9.53	0.08	0.20	ug/L	10.0		95.3	80-121	3.14	30	
Benzene	9.68	0.05	0.20	ug/L	10.0		96.8	80-120	3.41	30	
Trichloroethene	9.39	0.07	0.20	ug/L	10.0		93.9	80-120	5.27	30	
Toluene	9.43	0.05	0.20	ug/L	10.0		94.3	80-120	3.17	30	
Tetrachloroethene	9.67	0.09	0.20	ug/L	10.0		96.7	80-120	5.75	30	
Ethylbenzene	9.89	0.05	0.20	ug/L	10.0		98.9	80-120	4.28	30	
m,p-Xylene	20.2	0.14	0.40	ug/L	20.0		101	80-121	4.27	30	
o-Xylene	9.25	0.08	0.20	ug/L	10.0		92.5	80-121	3.74	30	
Xylenes, total	29.4	0.22	0.60	ug/L	30.0		98.1	76-127	4.11	30	
Surrogate: 1,2-Dichloroethane-d4	4.69			ug/L	5.00		93.8	80-129			
Surrogate: Toluene-d8	5.08			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	4.87			ug/L	5.00		97.4	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.00			ug/L	5.00		100	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Dissolved Gases - Quality Control
Batch BJE0615 - EPA 5030C (Purge and Trap)

Instrument: FID6 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0615-BLK1)		Prepared: 25-May-2021 Analyzed: 25-May-2021 14:15								
Methane	ND	0.65	ug/L							U
Ethane	ND	1.23	ug/L							U
Ethene	ND	1.14	ug/L							U
<i>Surrogate: Propane</i>	2060		ug/L	1800		114	72-122			
LCS (BJE0615-BS1)		Prepared: 25-May-2021 Analyzed: 25-May-2021 13:35								
Methane	668	0.65	ug/L	656		102	80-120			
Ethane	1370	1.23	ug/L	1230		111	80-120			
Ethene	1080	1.14	ug/L	1150		93.5	80-120			
<i>Surrogate: Propane</i>	2020		ug/L	1800		112	62-122			
LCS Dup (BJE0615-BSD1)		Prepared: 25-May-2021 Analyzed: 25-May-2021 13:49								
Methane	686	0.65	ug/L	656		105	80-120	2.73	30	
Ethane	1360	1.23	ug/L	1230		111	80-120	0.33	30	
Ethene	1080	1.14	ug/L	1150		93.6	80-120	0.10	30	
<i>Surrogate: Propane</i>	2080		ug/L	1800		116	62-122			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0492 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0492-BLK1)						Prepared: 20-May-2021 Analyzed: 11-Jun-2021 09:53					
Naphthalene	0.002	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.001	0.001	0.010	ug/L							J
1-Methylnaphthalene	0.001	0.0009	0.010	ug/L							J
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	0.003	0.003	0.010	ug/L							J
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.004	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.176			ug/L	0.300		58.7	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.135			ug/L	0.300		45.0	29-120			
<i>Surrogate: Fluoranthene-d10</i>	0.199			ug/L	0.300		66.5	57-120			
LCS (BJE0492-BS1)						Prepared: 20-May-2021 Analyzed: 11-Jun-2021 10:25					
Naphthalene	0.200	0.001	0.010	ug/L	0.300		66.5	37-120			
2-Methylnaphthalene	0.193	0.001	0.010	ug/L	0.300		64.4	37-120			
1-Methylnaphthalene	0.193	0.0009	0.010	ug/L	0.300		64.4	29-120			
Acenaphthylene	0.187	0.002	0.010	ug/L	0.300		62.4	41-120			
Acenaphthene	0.199	0.003	0.010	ug/L	0.300		66.5	41-120			
Dibenzofuran	0.190	0.002	0.010	ug/L	0.300		63.4	38-120			
Fluorene	0.201	0.002	0.010	ug/L	0.300		67.0	43-120			


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0492 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0492-BS1)						Prepared: 20-May-2021	Analyzed: 11-Jun-2021 10:25				
Phenanthrene	0.197	0.001	0.010	ug/L	0.300		65.8	41-120			
Anthracene	0.194	0.001	0.010	ug/L	0.300		64.8	40-120			
Carbazole	0.206	0.001	0.010	ug/L	0.300		68.6	30-160			
Fluoranthene	0.209	0.002	0.010	ug/L	0.300		69.8	45-120			
Pyrene	0.203	0.001	0.010	ug/L	0.300		67.7	41-120			
Benzo(a)anthracene	0.202	0.0008	0.010	ug/L	0.300		67.5	42-120			
Chrysene	0.196	0.0009	0.010	ug/L	0.300		65.2	44-120			
Benzo(b)fluoranthene	0.225	0.0005	0.010	ug/L	0.300		75.1	44-120			
Benzo(k)fluoranthene	0.215	0.003	0.010	ug/L	0.300		71.6	50-120			
Benzo(j)fluoranthene	0.195	0.002	0.010	ug/L	0.300		65.1	39-160			
Benzofluoranthenes, Total	0.636	0.004	0.010	ug/L	0.900		70.6	46-120			
Benzo(a)pyrene	0.189	0.002	0.010	ug/L	0.300		63.0	35-120			
Perylene	0.177	0.006	0.010	ug/L	0.300		58.9	30-160			
Indeno(1,2,3-cd)pyrene	0.169	0.001	0.010	ug/L	0.300		56.4	37-120			
Dibenzo(a,h)anthracene	0.161	0.001	0.010	ug/L	0.300		53.6	34-120			
Benzo(g,h,i)perylene	0.196	0.001	0.010	ug/L	0.300		65.5	38-120			
Surrogate: 2-Methylnaphthalene-d10	0.197			ug/L	0.300		65.5	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.162			ug/L	0.300		54.1	29-120			
Surrogate: Fluoranthene-d10	0.209			ug/L	0.300		69.7	57-120			
LCS Dup (BJE0492-BS1)						Prepared: 20-May-2021	Analyzed: 11-Jun-2021 10:57				
Naphthalene	0.208	0.001	0.010	ug/L	0.300		69.3	37-120	4.17	30	
2-Methylnaphthalene	0.201	0.001	0.010	ug/L	0.300		67.0	37-120	3.99	30	
1-Methylnaphthalene	0.199	0.0009	0.010	ug/L	0.300		66.5	29-120	3.24	30	
Acenaphthylene	0.195	0.002	0.010	ug/L	0.300		65.1	41-120	4.35	30	
Acenaphthene	0.209	0.003	0.010	ug/L	0.300		69.5	41-120	4.45	30	
Dibenzofuran	0.199	0.002	0.010	ug/L	0.300		66.3	38-120	4.35	30	
Fluorene	0.210	0.002	0.010	ug/L	0.300		69.9	43-120	4.23	30	
Phenanthrene	0.210	0.001	0.010	ug/L	0.300		69.9	41-120	5.96	30	
Anthracene	0.206	0.001	0.010	ug/L	0.300		68.7	40-120	5.81	30	
Carbazole	0.218	0.001	0.010	ug/L	0.300		72.5	30-160	5.61	30	
Fluoranthene	0.222	0.002	0.010	ug/L	0.300		74.2	45-120	6.11	30	
Pyrene	0.215	0.001	0.010	ug/L	0.300		71.7	41-120	5.62	30	
Benzo(a)anthracene	0.215	0.0008	0.010	ug/L	0.300		71.6	42-120	5.97	30	
Chrysene	0.208	0.0009	0.010	ug/L	0.300		69.2	44-120	6.00	30	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0492 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0492-bsd1)						Prepared: 20-May-2021 Analyzed: 11-Jun-2021 10:57					
Benzo(b)fluoranthene	0.239	0.0005	0.010	ug/L	0.300		79.6	44-120	5.78	30	
Benzo(k)fluoranthene	0.231	0.003	0.010	ug/L	0.300		77.0	50-120	7.28	30	
Benzo(j)fluoranthene	0.214	0.002	0.010	ug/L	0.300		71.4	39-160	9.16	30	
Benzofluoranthenes, Total	0.684	0.004	0.010	ug/L	0.900		76.0	46-120	7.34	30	
Benzo(a)pyrene	0.207	0.002	0.010	ug/L	0.300		69.0	35-120	9.07	30	
Perylene	0.197	0.006	0.010	ug/L	0.300		65.6	30-160	10.90	30	
Indeno(1,2,3-cd)pyrene	0.177	0.001	0.010	ug/L	0.300		59.1	37-120	4.77	30	
Dibenzo(a,h)anthracene	0.168	0.001	0.010	ug/L	0.300		55.9	34-120	4.21	30	
Benzo(g,h,i)perylene	0.208	0.001	0.010	ug/L	0.300		69.3	38-120	5.60	30	
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.196			ug/L	0.300		65.2	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.162			ug/L	0.300		54.1	29-120			
<i>Surrogate: Fluoranthene-d10</i>	0.214			ug/L	0.300		71.5	57-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJE0494 - EPA 3510C SepF

Instrument: FID4 Analyst: CTO

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0494-BLK1)				Prepared: 21-May-2021 Analyzed: 26-May-2021 19:42						
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
<i>Surrogate: o-Terphenyl</i>	0.169		mg/L	0.225		74.9	50-150			
LCS (BJE0494-BS1)				Prepared: 21-May-2021 Analyzed: 26-May-2021 20:04						
Diesel Range Organics (C12-C24)	2.39	0.100	mg/L	3.00		79.8	56-120			
<i>Surrogate: o-Terphenyl</i>	0.176		mg/L	0.225		78.1	50-150			
LCS Dup (BJE0494-BSD1)				Prepared: 21-May-2021 Analyzed: 26-May-2021 20:25						
Diesel Range Organics (C12-C24)	2.33	0.100	mg/L	3.00		77.8	56-120	2.55	30	
<i>Surrogate: o-Terphenyl</i>	0.172		mg/L	0.225		76.4	50-150			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJE0743 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0743-BLK1)					Prepared: 28-May-2021 Analyzed: 07-Jun-2021 13:36						
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJE0743-BS1)					Prepared: 28-May-2021 Analyzed: 07-Jun-2021 13:38						
Mercury	0.00199	0.000013	0.000100	mg/L	0.00200		99.3	80-120			
Duplicate (BJE0743-DUP2)					Source: 21E0213-01 Prepared: 28-May-2021 Analyzed: 07-Jun-2021 13:57						
Mercury	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJE0743-MS2)					Source: 21E0213-01 Prepared: 28-May-2021 Analyzed: 07-Jun-2021 13:59						
Mercury	0.00101	0.000013	0.000100	mg/L	0.00100	ND	101	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJE0743-MSD2)					Source: 21E0213-01 Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:01						
Mercury	0.00103	0.000013	0.000100	mg/L	0.00100	ND	103	75-125	2.13	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0053 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0053-BLK1)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 18:44						
Barium	135	ND	0.114	0.500	ug/L							U
Barium	137	ND	0.0765	0.500	ug/L							U
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
Cobalt	59	ND	0.0173	0.200	ug/L							U
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U
Lead	208	ND	0.0513	0.100	ug/L							U
Manganese	55	ND	0.142	0.500	ug/L							U
Silver	107	ND	0.0220	0.200	ug/L							U
Vanadium	51a	ND	0.0556	0.200	ug/L							U
Vanadium	51b	ND	0.0521	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
Copper	63	ND	0.173	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0792	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Selenium	78	ND	0.179	0.500	ug/L							U
Zinc	66	ND	2.92	6.00	ug/L							U
Zinc	67	ND	0.940	6.00	ug/L							U

LCS (BJF0053-BS1)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 18:49						
Barium	135	25.8	0.114	0.500	ug/L	25.0		103	80-120			
Barium	137	25.7	0.0765	0.500	ug/L	25.0		103	80-120			
Chromium	52	25.7	0.260	0.500	ug/L	25.0		103	80-120			
Chromium	53	25.5	0.239	0.500	ug/L	25.0		102	80-120			
Cobalt	59	25.4	0.0173	0.200	ug/L	25.0		102	80-120			
Iron	54	5060	18.2	36.0	ug/L	5000		101	80-120			
Iron	57	5200	6.63	36.0	ug/L	5000		104	80-120			
Lead	208	25.1	0.0513	0.100	ug/L	25.0		101	80-120			
Manganese	55	25.2	0.142	0.500	ug/L	25.0		101	80-120			
Silver	107	26.1	0.0220	0.200	ug/L	25.0		104	80-120			
Vanadium	51a	24.0	0.0556	0.200	ug/L	25.0		96.0	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0053 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0053-BS1)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 18:49						
Vanadium	51b	24.0	0.0521	0.200	ug/L	25.0		96.0	80-120			
Arsenic	75a	25.0	0.0373	0.200	ug/L	25.0		100	80-120			
Cadmium	111	25.2	0.0300	0.100	ug/L	25.0		101	80-120			
Cadmium	114	25.4	0.0400	0.100	ug/L	25.0		101	80-120			
Copper	63	25.7	0.173	0.500	ug/L	25.0		103	80-120			
Copper	65	25.7	0.350	0.500	ug/L	25.0		103	80-120			
Nickel	60	25.6	0.0792	0.500	ug/L	25.0		103	80-120			
Nickel	62	25.5	0.220	0.500	ug/L	25.0		102	80-120			
Selenium	78	79.2	0.179	0.500	ug/L	80.0		99.0	80-120			
Zinc	66	79.5	2.92	6.00	ug/L	80.0		99.3	80-120			
Zinc	67	73.7	0.940	6.00	ug/L	80.0		92.1	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0744 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0744-BLK1)						Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:29					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L							U
LCS (BJE0744-BS1)						Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:32					
Mercury, Dissolved	0.00206	0.000013	0.000100	mg/L	0.00200		103	80-120			
Duplicate (BJE0744-DUP2)						Source: 21E0213-02 Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:50					
Mercury, Dissolved	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJE0744-MS2)						Source: 21E0213-02 Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:52					
Mercury, Dissolved	0.00107	0.000013	0.000100	mg/L	0.00100	ND	107	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJE0744-MSD2)						Source: 21E0213-02 Prepared: 28-May-2021 Analyzed: 07-Jun-2021 14:55					
Mercury, Dissolved	0.00101	0.000013	0.000100	mg/L	0.00100	ND	101	75-125	5.30	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0054 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0054-BLK1)						Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 00:54						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Cobalt, Dissolved	59	ND	0.0173	0.200	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	6.63	20.0	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	5.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	4.00	ug/L							U

LCS (BJF0054-BS1)						Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 00:59						
Barium, Dissolved	135	25.1	0.114	0.500	ug/L	25.0		101	80-120			
Barium, Dissolved	137	25.2	0.0765	0.500	ug/L	25.0		101	80-120			
Chromium, Dissolved	52	25.8	0.260	0.500	ug/L	25.0		103	80-120			
Cobalt, Dissolved	59	23.8	0.0173	0.200	ug/L	25.0		95.3	80-120			
Chromium, Dissolved	53	25.6	0.239	0.500	ug/L	25.0		102	80-120			
Iron, Dissolved	54	5270	18.2	36.0	ug/L	5000		105	80-120			
Iron, Dissolved	57	5380	6.63	20.0	ug/L	5000		108	80-120			
Lead, Dissolved	208	23.4	0.0513	0.100	ug/L	25.0		93.4	80-120			
Manganese, Dissolved	55	24.7	0.142	0.500	ug/L	25.0		98.6	80-120			
Silver, Dissolved	107	24.4	0.0220	0.200	ug/L	25.0		97.4	80-120			
Vanadium, Dissolved	51a	24.1	0.0556	0.200	ug/L	25.0		96.4	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0054 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0054-BS1)						Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 00:59					
Vanadium, Dissolved	51b	24.1	0.0521	0.200	ug/L	25.0		96.3	80-120		
Arsenic, Dissolved	75a	23.4	0.0373	0.200	ug/L	25.0		93.7	80-120		
Cadmium, Dissolved	111	24.3	0.0300	0.100	ug/L	25.0		97.3	80-120		
Cadmium, Dissolved	114	24.4	0.0400	0.100	ug/L	25.0		97.4	80-120		
Copper, Dissolved	63	24.1	0.173	0.500	ug/L	25.0		96.4	80-120		
Copper, Dissolved	65	24.5	0.350	0.500	ug/L	25.0		98.1	80-120		
Nickel, Dissolved	60	24.6	0.0792	0.500	ug/L	25.0		98.2	80-120		
Nickel, Dissolved	62	24.7	0.220	0.500	ug/L	25.0		99.0	80-120		
Selenium, Dissolved	78	72.3	0.179	0.500	ug/L	80.0		90.4	80-120		
Zinc, Dissolved	66	74.1	2.92	6.00	ug/L	80.0		92.6	80-120		
Zinc, Dissolved	67	68.9	0.940	6.00	ug/L	80.0		86.2	80-120		


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJE0468 - No Prep Wet Chem

Instrument: N/A

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0468-BLK1)					Prepared: 19-May-2021 Analyzed: 19-May-2021 15:03					
Sulfite	ND	1.4	1.4	mg/L						U
LCS (BJE0468-BS1)					Prepared: 19-May-2021 Analyzed: 19-May-2021 15:03					
Sulfite	3.8	1.4	1.4	mg/L	4.97		77.2 75-100			
Duplicate (BJE0468-DUP1)					Source: 21E0213-10 Prepared: 19-May-2021 Analyzed: 19-May-2021 15:03					
Sulfite	ND	1.4	1.4	mg/L		ND				U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJE0470 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: CDE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0470-BLK1)						Prepared: 19-May-2021 Analyzed: 19-May-2021 16:22					
Ferrous Iron	ND	0.040	0.040	mg/L							U
LCS (BJE0470-BS1)						Prepared: 19-May-2021 Analyzed: 19-May-2021 16:22					
Ferrous Iron	0.495	0.040	0.040	mg/L	0.500		99.0	90-110			
Duplicate (BJE0470-DUP1)						Source: 21E0213-10 Prepared: 19-May-2021 Analyzed: 19-May-2021 16:24					
Ferrous Iron	24.9	2.00	2.00	mg/L		25.9			4.14	20	D
Matrix Spike (BJE0470-MS1)						Source: 21E0213-10 Prepared: 19-May-2021 Analyzed: 19-May-2021 16:24					
Ferrous Iron	42.8	2.00	2.00	mg/L	20.0	25.9	84.3	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJE0525 - No Prep Wet Chem

Instrument: IC930 Analyst: CDE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0525-BLK1)						Prepared: 21-May-2021 Analyzed: 21-May-2021 14:16					
Chloride	ND	0.100	0.100	mg/L							U
Nitrate-N	ND	0.100	0.100	mg/L							U
Nitrite-N	ND	0.100	0.100	mg/L							U
Sulfate	ND	0.100	0.100	mg/L							U
LCS (BJE0525-BS1)						Prepared: 21-May-2021 Analyzed: 21-May-2021 14:36					
Chloride	4.69	0.100	0.100	mg/L	5.00		93.7	90-110			
Nitrate-N	4.73	0.100	0.100	mg/L	5.00		94.6	90-110			
Nitrite-N	5.20	0.100	0.100	mg/L	5.00		104	90-110			
Sulfate	4.91	0.100	0.100	mg/L	5.00		98.2	90-110			
Duplicate (BJE0525-DUP1)						Source: 21E0213-10 Prepared: 21-May-2021 Analyzed: 21-May-2021 13:16					
Chloride	6.07	0.100	0.100	mg/L		6.10			0.51	20	
Nitrate-N	ND	0.100	0.100	mg/L		ND					H, U
Nitrite-N	ND	0.100	0.100	mg/L		ND					H, U
Duplicate (BJE0525-DUP2)						Source: 21E0213-10RE1 Prepared: 21-May-2021 Analyzed: 03-Jun-2021 12:52					
Sulfate	49.4	1.00	1.00	mg/L		49.8			0.65	20	D
Matrix Spike (BJE0525-MS1)						Source: 21E0213-10 Prepared: 21-May-2021 Analyzed: 21-May-2021 13:36					
Chloride	8.05	0.100	0.100	mg/L	2.00	6.10	97.4	75-125			
Nitrate-N	1.85	0.100	0.100	mg/L	2.00	ND	92.6	75-125			H
Nitrite-N	1.92	0.100	0.100	mg/L	2.00	ND	96.1	75-125			H
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike (BJE0525-MS2)						Source: 21E0213-10RE1 Prepared: 21-May-2021 Analyzed: 03-Jun-2021 13:11					
Sulfate	125	2.00	2.00	mg/L	100	49.8	75.0	75-125			D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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Certified Analyses included in this Report

Analyte	Certifications
<i>EPA 300.0 in Water</i>	
Chloride	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrate-N	DoD-ELAP,WADOE,WA-DW,NELAP
Nitrite-N	DoD-ELAP,WADOE,WA-DW,NELAP
Sulfate	DoD-ELAP,WADOE,WA-DW,NELAP
<i>EPA 6020B in Water</i>	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
<i>EPA 6020B UCT-KED in Water</i>	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:58

Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
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 Project Manager: Meg Strong

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cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE


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1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(k)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(j)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Perylene	ADEC,NELAP


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Indeno(1,2,3-cd)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzo(a,h)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(g,h,i)perylene	ADEC,DoD-ELAP,NELAP,WADOE

EPA RSK-175 in Water

Methane	NELAP
Ethane	NELAP
Ethene	NELAP
Acetylene	NELAP

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP,NELAP,WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP,NELAP,WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP,NELAP,WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP,NELAP,WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP,NELAP,WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP,NELAP,WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP,NELAP,WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP,NELAP,WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP,NELAP,WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP,NELAP,WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP,NELAP,WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE,DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE,DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE,DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE,ADEC,DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE,DoD-ELAP

SM 3500-Fe B-97 in Water



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Ferrous Iron

WADOE,NELAP

SM 4500-SO3 B-00 in Water

Sulfite

WADOE,NELAP

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
J	Estimated concentration value detected below the reporting limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

13 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21E0244

Associated SDG ID(s)
N/A

Susan
Dunniho

Digitally signed by
Susan Dunniho
Date: 2021.12.15
14:35:00 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunniho For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21E0244		Turn-around Requested: Standard		Page: 1 of 1	
ARI Client Company: Shannon & Wilson, Inc.		Phone:		Date: 5/20/21	Ice Present? Yes
Client Contact: Shoshana Howard				No. of Coolers: 4	Cooler Temps: See CRF
Client Project Name: LDW				Analysis Requested	
Client Project #: 21-1-12596		Samplers: CTC, BON		Notes/Comments	

Sample ID	Date	Time	Matrix	No. Containers	TPH-G	TPH-Dx	BTEX	HVOCs	MTBE	PAHs	Full List SVOCs	Limited SVOCs	PCBs (arocls)	Total Metals (Diss.)			
MW-62-2021905	5/19/21	1430	W	11		X	X	X		X			X	X			As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn
MW-103-2021905	5/19/21	1445	W	11		X	X	X		X			X	X			As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn
MW-73-20212005	5/20/21	0835	W	11	X	X	X	X		X				X			As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn
TB-6-20212005	5/20/21	0838	W	5	X		X	X									
MW-64-20212005	5/20/21	1000	W	11		X	X	X		X			X	X			As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn
MW-63-20212005	5/20/21	1120	W	11		X	X	X			X		X	X			As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn
MW-40-20212005	5/20/21	1315	W	11		X		X		X		X		X			As, Mn, Ni, Cd, Cu, Pb, Hg, Se, Ag, Zn
MW-41-20212005	5/20/21	1235	W	11		X		X		X		X		X			As, Mn, Ni, Cd, Cu, Pb, Hg, Se, Ag, Zn
MW-74-20212005	5/20/21	1430	W	11	X	X	X	X		X				X			As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn
BON																	

Comments/Special Instructions	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: Blaine Nesbit	Printed Name: Jacob L. [Signature]	Printed Name:	Printed Name:
	Company: Shannon & Wilson	Company: ARI	Company:	Company:
	Date & Time: 5/20/2021 4:14pm	Date & Time: 05/20/2021 1614	Date & Time:	Date & Time:

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-62-20211905	21E0244-01	Water	19-May-2021 14:30	20-May-2021 16:14
MW-62-20211905	21E0244-02	Water	19-May-2021 14:30	20-May-2021 16:14
MW-103-20211905	21E0244-03	Water	19-May-2021 14:45	20-May-2021 16:14
MW-103-20211905	21E0244-04	Water	19-May-2021 14:45	20-May-2021 16:14
MW-73-20212005	21E0244-05	Water	20-May-2021 08:35	20-May-2021 16:14
MW-73-20212005	21E0244-06	Water	20-May-2021 08:35	20-May-2021 16:14
TB-6-20212005	21E0244-07	Water	20-May-2021 08:38	20-May-2021 16:14
MW-64-20212005	21E0244-08	Water	20-May-2021 10:00	20-May-2021 16:14
MW-64-20212005	21E0244-09	Water	20-May-2021 10:00	20-May-2021 16:14
MW-63-20212005	21E0244-10	Water	20-May-2021 11:20	20-May-2021 16:14
MW-63-20212005	21E0244-11	Water	20-May-2021 11:20	20-May-2021 16:14
MW-40-20212005	21E0244-12	Water	20-May-2021 13:15	20-May-2021 16:14
MW-40-20212005	21E0244-13	Water	20-May-2021 13:15	20-May-2021 16:14
MW-41-20212005	21E0244-14	Water	20-May-2021 12:35	20-May-2021 16:14
MW-41-20212005	21E0244-15	Water	20-May-2021 12:35	20-May-2021 16:14
MW-74-20212005	21E0244-16	Water	20-May-2021 14:30	20-May-2021 16:14
MW-74-20211905	21E0244-17	Water	20-May-2021 08:35	20-May-2021 16:14



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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

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Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish
Work Order: 21E0244

Sample receipt

Samples as listed on the preceding page were received 20-May-2021 16:14 under ARI work order 21E0244. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Gasoline by NWTPH-q (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.



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Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except 2-Nitroaniline, 3-Nitroaniline, 4-Nitroaniline, Hexachlorobenzene and surrogate 2,4,6-Tribromophenol which were out of control high in the initial calibration verification (ICV). All samples which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except 2,4,6- Tribromophenol which was out of control high in the ICV and has been flagged.

The method blank(s) were clean at the reporting limits except Di-n-Butylphthalate. All samples which contain analyte have been flagged with a "B" qualifier.

The blank spike (BS/LCS) percent recoveries were within control limits except 4-Chloroaniline which was out of control low and 2-Nitroaniline which was out of control high. Deviations have been flagged.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except Benzo(g,h,i)perylene which was out of control high in the initial calibration verification (ICV). All samples which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.


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Total and Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0244-02 in Dissolved Metals batch BJJ0145. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0244-01 in Total Mercury batch BJJ0195 and in association with sample 21E0244-02 in Dissolve Mercury batch BJJ0243. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

REVISED to correct VOA list.



WORK ORDER

21E0244

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH
21E0244-01 A	HDPE NM, 1000 mL, 1:1 HNO3	<2 Pass
21E0244-01 B	Glass NM, Amber, 1000 mL	
21E0244-01 C	Glass NM, Amber, 1000 mL	
21E0244-01 D	Glass NM, Amber, 500 mL	
21E0244-01 E	Glass NM, Amber, 500 mL	
21E0244-01 F	Glass NM, Amber, 500 mL	
21E0244-01 G	Glass NM, Amber, 500 mL	
21E0244-01 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-01 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-01 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-02 A	Large OJ, 1000 mL	>2 Fail
21E0244-03 A	HDPE NM, 1000 mL, 1:1 HNO3	<2 Pass
21E0244-03 B	Glass NM, Amber, 1000 mL	
21E0244-03 C	Glass NM, Amber, 1000 mL	
21E0244-03 D	Glass NM, Amber, 500 mL	
21E0244-03 E	Glass NM, Amber, 500 mL	
21E0244-03 F	Glass NM, Amber, 500 mL	
21E0244-03 G	Glass NM, Amber, 500 mL	
21E0244-03 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-03 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-03 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-04 A	Large OJ, 1000 mL	>2 Fail
21E0244-05 A	HDPE NM, 1000 mL, 1:1 HNO3	<2 Pass
21E0244-05 B	Glass NM, Amber, 500 mL	
21E0244-05 C	Glass NM, Amber, 500 mL	
21E0244-05 D	Glass NM, Amber, 500 mL	
21E0244-05 E	Glass NM, Amber, 500 mL	
21E0244-05 F	VOA Vial, Clear, 40 mL, HCL	
21E0244-05 G	VOA Vial, Clear, 40 mL, HCL	
21E0244-05 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-05 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-05 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-06 A	Large OJ, 1000 mL	>2 Fail
21E0244-07 A	VOA Vial, Clear, 40 mL, HCL	
21E0244-07 B	VOA Vial, Clear, 40 mL, HCL	



WORK ORDER

21E0244

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0244-07 C	VOA Vial, Clear, 40 mL, HCL	
21E0244-07 D	VOA Vial, Clear, 40 mL, HCL	
21E0244-07 E	VOA Vial, Clear, 40 mL, HCL	
21E0244-08 A	HDPE NM, 1000 mL, 1:1 HNO3	<2 Pass
21E0244-08 B	Glass NM, Amber, 1000 mL	
21E0244-08 C	Glass NM, Amber, 1000 mL	
21E0244-08 D	Glass NM, Amber, 500 mL	
21E0244-08 E	Glass NM, Amber, 500 mL	
21E0244-08 F	Glass NM, Amber, 500 mL	
21E0244-08 G	Glass NM, Amber, 500 mL	
21E0244-08 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-08 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-08 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-09 A	Large OJ, 1000 mL	>2 Fail
21E0244-10 A	HDPE NM, 1000 mL, 1:1 HNO3	<2 Pass
21E0244-10 B	Glass NM, Amber, 1000 mL	
21E0244-10 C	Glass NM, Amber, 1000 mL	
21E0244-10 D	Glass NM, Amber, 500 mL	
21E0244-10 E	Glass NM, Amber, 500 mL	
21E0244-10 F	Glass NM, Amber, 500 mL	
21E0244-10 G	Glass NM, Amber, 500 mL	
21E0244-10 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-10 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-10 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-11 A	Large OJ, 1000 mL	>2 Fail
21E0244-12 A	HDPE NM, 1000 mL, 1:1 HNO3	<2 Pass
21E0244-12 B	Glass NM, Amber, 500 mL	
21E0244-12 C	Glass NM, Amber, 500 mL	
21E0244-12 D	Glass NM, Amber, 500 mL	
21E0244-12 E	Glass NM, Amber, 500 mL	
21E0244-12 F	Glass NM, Amber, 500 mL	
21E0244-12 G	Glass NM, Amber, 500 mL	
21E0244-12 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-12 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-12 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-13 A	Large OJ, 1000 mL	>2 Fail
21E0244-14 A	HDPE NM, 1000 mL, 1:1 HNO3	<2 Pass



WORK ORDER

21E0244

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0244-14 B	Glass NM, Amber, 500 mL	
21E0244-14 C	Glass NM, Amber, 500 mL	
21E0244-14 D	Glass NM, Amber, 500 mL	
21E0244-14 E	Glass NM, Amber, 500 mL	
21E0244-14 F	Glass NM, Amber, 500 mL	
21E0244-14 G	Glass NM, Amber, 500 mL	
21E0244-14 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-14 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-14 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-15 A	Large OJ, 1000 mL	> 2 Fail
21E0244-16 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2 Pass
21E0244-16 B	Glass NM, Amber, 500 mL	
21E0244-16 C	Glass NM, Amber, 500 mL	
21E0244-16 D	Glass NM, Amber, 500 mL	
21E0244-16 E	Glass NM, Amber, 500 mL	
21E0244-16 F	VOA Vial, Clear, 40 mL, HCL	
21E0244-16 G	VOA Vial, Clear, 40 mL, HCL	
21E0244-16 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-16 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-16 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-17 A	Large OJ, 1000 mL	> 2 Fail

KD

Preservation Confirmed By

5/21/21

Date

Reviewed By

Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon Wilson

Project Name: LDW

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand-Delivered Other: _____

Assigned ARI Job No: 21E0244

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES YES NO

Were custody papers properly filled out (ink, signed, etc.) YES YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1614 2.5 2.8 1.7 3.0

If cooler temperature is out of compliance fill out form 00070F Temp Gun ID#: DOO 206

Cooler Accepted by: JBW Date: 05/20/2021 Time: 1614

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Ice Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI: NA 5/19/21

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: KD Date: 5/21/21 Time: 0857 Labels checked by: KD

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Printed: 5/21/2021 10:35:35AM

WORK ORDER

21E0244

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH
21E0244-01 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2 Pass
21E0244-01 B	Glass NM, Amber, 1000 mL	
21E0244-01 C	Glass NM, Amber, 1000 mL	
21E0244-01 D	Glass NM, Amber, 500 mL	
21E0244-01 E	Glass NM, Amber, 500 mL	
21E0244-01 F	Glass NM, Amber, 500 mL	
21E0244-01 G	Glass NM, Amber, 500 mL	
21E0244-01 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-01 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-01 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-02 A	Large OJ, 1000 mL	> 2 Fail ①
21E0244-03 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2 Pass
21E0244-03 B	Glass NM, Amber, 1000 mL	
21E0244-03 C	Glass NM, Amber, 1000 mL	
21E0244-03 D	Glass NM, Amber, 500 mL	
21E0244-03 E	Glass NM, Amber, 500 mL	
21E0244-03 F	Glass NM, Amber, 500 mL	
21E0244-03 G	Glass NM, Amber, 500 mL	
21E0244-03 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-03 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-03 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-04 A	Large OJ, 1000 mL	> 2 Fail ①
21E0244-05 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2 Pass
21E0244-05 B	Glass NM, Amber, 500 mL	
21E0244-05 C	Glass NM, Amber, 500 mL	
21E0244-05 D	Glass NM, Amber, 500 mL	
21E0244-05 E	Glass NM, Amber, 500 mL	
21E0244-05 F	VOA Vial, Clear, 40 mL, HCL	
21E0244-05 G	VOA Vial, Clear, 40 mL, HCL	
21E0244-05 H	VOA Vial, Clear, 40 mL, HCL	
21E0244-05 I	VOA Vial, Clear, 40 mL, HCL	
21E0244-05 J	VOA Vial, Clear, 40 mL, HCL	
21E0244-06 A	Large OJ, 1000 mL	> 2 Fail ①
21E0244-07 A	VOA Vial, Clear, 40 mL, HCL	
21E0244-07 B	VOA Vial, Clear, 40 mL, HCL	

Reviewed By

Date

Page 1 of 3



Analytical Resources, Incorporated
Analytical Chemists and Consultants

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WORK ORDER

21E0244

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0244-07 C	VOA Vial, Clear, 40 mL, HCL		
21E0244-07 D	VOA Vial, Clear, 40 mL, HCL		
21E0244-07 E	VOA Vial, Clear, 40 mL, HCL		
21E0244-08 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0244-08 B	Glass NM, Amber, 1000 mL		
21E0244-08 C	Glass NM, Amber, 1000 mL		
21E0244-08 D	Glass NM, Amber, 500 mL		
21E0244-08 E	Glass NM, Amber, 500 mL		
21E0244-08 F	Glass NM, Amber, 500 mL		
21E0244-08 G	Glass NM, Amber, 500 mL		
21E0244-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0244-08 I	VOA Vial, Clear, 40 mL, HCL		
21E0244-08 J	VOA Vial, Clear, 40 mL, HCL		
21E0244-09 A	Large OJ, 1000 mL	> 2	Fail (1)
21E0244-10 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0244-10 B	Glass NM, Amber, 1000 mL		
21E0244-10 C	Glass NM, Amber, 1000 mL		
21E0244-10 D	Glass NM, Amber, 500 mL		
21E0244-10 E	Glass NM, Amber, 500 mL		
21E0244-10 F	Glass NM, Amber, 500 mL		
21E0244-10 G	Glass NM, Amber, 500 mL		
21E0244-10 H	VOA Vial, Clear, 40 mL, HCL		
21E0244-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0244-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0244-11 A	Large OJ, 1000 mL	> 2	Fail (1)
21E0244-12 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0244-12 B	Glass NM, Amber, 500 mL		
21E0244-12 C	Glass NM, Amber, 500 mL		
21E0244-12 D	Glass NM, Amber, 500 mL		
21E0244-12 E	Glass NM, Amber, 500 mL		
21E0244-12 F	Glass NM, Amber, 500 mL		
21E0244-12 G	Glass NM, Amber, 500 mL		
21E0244-12 H	VOA Vial, Clear, 40 mL, HCL		
21E0244-12 I	VOA Vial, Clear, 40 mL, HCL		
21E0244-12 J	VOA Vial, Clear, 40 mL, HCL		
21E0244-13 A	Large OJ, 1000 mL	> 2	Fail (1)
21E0244-14 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass

Reviewed By: _____

Date: _____

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Printed: 5/21/2021 10:35:35AM

WORK ORDER

21E0244

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0244-14 B	Glass NM, Amber, 500 mL		
21E0244-14 C	Glass NM, Amber, 500 mL		
21E0244-14 D	Glass NM, Amber, 500 mL		
21E0244-14 E	Glass NM, Amber, 500 mL		
21E0244-14 F	Glass NM, Amber, 500 mL		
21E0244-14 G	Glass NM, Amber, 500 mL		
21E0244-14 H	VOA Vial, Clear, 40 mL, HCL		
21E0244-14 I	VOA Vial, Clear, 40 mL, HCL		
21E0244-14 J	VOA Vial, Clear, 40 mL, HCL		
21E0244-15 A	Large OJ, 1000 mL	> 2 Fail	①
21E0244-16 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2 Pass	
21E0244-16 B	Glass NM, Amber, 500 mL		
21E0244-16 C	Glass NM, Amber, 500 mL		
21E0244-16 D	Glass NM, Amber, 500 mL		
21E0244-16 E	Glass NM, Amber, 500 mL		
21E0244-16 F	VOA Vial, Clear, 40 mL, HCL		
21E0244-16 G	VOA Vial, Clear, 40 mL, HCL		
21E0244-16 H	VOA Vial, Clear, 40 mL, HCL		
21E0244-16 I	VOA Vial, Clear, 40 mL, HCL		
21E0244-16 J	VOA Vial, Clear, 40 mL, HCL		
21E0244-17 A	Large OJ, 1000 mL	> 2 Fail	①

KD

Preservation Confirmed By

5/21/21

Date

① Filtered at 0.45 um and
preserved to pH < 2.0 with
0.75ml conc. HNO₃ (J2314).
ml 05/21/21

Reviewed By

Date

Page 3 of 3



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-62-20211905

21E0244-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/19/2021 14:30

Instrument: NT2 Analyst: PKC

Analyzed: 05/24/2021 23:30

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-01 I

Preparation Batch: BJE0583

Sample Size: 10 mL

Prepared: 05/24/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	126	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	95.4	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	86.9	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	105	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-62-20211905

21E0244-01 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/19/2021 14:30

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 13:11

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0573 Prepared: 05/26/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0244-01 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0021 Cleaned: 02-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-01 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.003	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.002	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.003	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	0.034	ug/L	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	96.9	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	104	%	
Surrogate: Fluoranthene-d10				57-120 %	113	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-62-20211905
21E0244-01 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/19/2021 14:30

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 16:10

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0244-01 D 01

Preparation Batch: BJE0553

Sample Size: 500 mL

Prepared: 05/25/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			50-150 %	78.9	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-62-20211905
21E0244-01 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/19/2021 14:30

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 17:22

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0594 Prepared: 05/25/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0244-01 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0221 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-01 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0219 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-01 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0220 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-01 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	66.4	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	64.3	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	63.7	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	47.4	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-62-20211905
21E0244-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/19/2021 14:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:45

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-01 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	7.40	ug/L	
Chromium	7440-47-3	5	1.30	2.50	ND	ug/L	U
Cobalt	7440-48-4	1	0.0173	0.200	3.93	ug/L	
Iron	7439-89-6	5	91.0	180	1600	ug/L	D
Lead	7439-92-1	1	0.0513	0.100	0.185	ug/L	
Manganese	7439-96-5	5	0.710	2.50	313	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	5	0.278	1.00	5.60	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-62-20211905
21E0244-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 14:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:45

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-01 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	2.09	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	2.45	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	4.03	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.338	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	3.22	ug/L	J



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-62-20211905

21E0244-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/19/2021 14:30

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 12:59

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-01 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-62-20211905
21E0244-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/19/2021 14:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 01:40

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-02 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	5.37	ug/L	
Chromium, Dissolved	7440-47-3	5	1.30	2.50	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	3.42	ug/L	
Iron, Dissolved	7439-89-6	5	91.0	180	135	ug/L	J, D
Lead, Dissolved	7439-92-1	1	0.0513	0.100	0.0590	ug/L	J
Manganese, Dissolved	7439-96-5	5	0.710	2.50	279	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	5	0.278	1.00	3.93	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-62-20211905
21E0244-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 14:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 01:40

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-02 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	1.79	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	1.99	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	3.62	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.372	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-62-20211905

21E0244-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/19/2021 14:30

Instrument: HYDRA Analyst: ML

Analyzed: 06/14/2021 14:14

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-02 A 01

Preparation Batch: BJF0234

Sample Size: 20 mL

Filtration Batch: BJE0529

Prepared: 06/09/2021

Final Volume: 20 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-103-20211905
21E0244-03 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/19/2021 14:45

Instrument: NT2 Analyst: PKC

Analyzed: 05/24/2021 23:52

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-03 J

Preparation Batch: BJE0583

Sample Size: 10 mL

Prepared: 05/24/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>124</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>95.7</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>86.5</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>106</i>	<i>%</i>	



Analytical Report

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Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-103-20211905 21E0244-03 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/19/2021 14:45

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 13:43

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0573 Prepared: 05/26/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0244-03 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0021 Cleaned: 02-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-03 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.005	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.003	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.002	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	0.002	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	0.002	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	0.002	ug/L	J
Pyrene	129-00-0	1	0.001	0.010	0.002	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	0.0009	ug/L	J
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	0.064	ug/L	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10					42-120 %	61.3 %	
Surrogate: Dibenzo[a,h]anthracene-d14					29-120 %	67.2 %	
Surrogate: Fluoranthene-d10					57-120 %	72.6 %	


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-103-20211905
21E0244-03 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/19/2021 14:45

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 16:31

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0244-03 D 01

Preparation Batch: BJE0553

Sample Size: 500 mL

Prepared: 05/25/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			50-150 %	74.8	%	



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-103-20211905 21E0244-03 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/19/2021 14:45

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 17:44

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0594 Prepared: 05/25/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0244-03 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0221 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-03 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0219 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-03 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0220 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-03 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	58.9	%	
Surrogate: Tetrachlorometaxylene				32-120 %	55.8	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	55.3	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	41.4	%	



Analytical Report

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Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-103-20211905

21E0244-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/19/2021 14:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJF0146
Prepared: 06/07/2021

Sample Size: 25 mL

Final Volume: 25 mL

Extract ID: 21E0244-03 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	6.70	ug/L	
Chromium	7440-47-3	5	1.30	2.50	ND	ug/L	U
Cobalt	7440-48-4	1	0.0173	0.200	3.89	ug/L	
Iron	7439-89-6	5	91.0	180	848	ug/L	D
Lead	7439-92-1	1	0.0513	0.100	0.159	ug/L	
Manganese	7439-96-5	5	0.710	2.50	305	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	5	0.278	1.00	4.52	ug/L	D


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-103-20211905
21E0244-03 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 14:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-03 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	1.41	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	2.33	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	3.74	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.265	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	4.04	ug/L	J



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-103-20211905

21E0244-03 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/19/2021 14:45

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:13

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-03 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-103-20211905
21E0244-04 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/19/2021 14:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 01:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-04 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			5.26	ug/L	
Chromium, Dissolved	7440-47-3	5	1.30	2.50			ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200			3.32	ug/L	
Iron, Dissolved	7439-89-6	5	91.0	180			153	ug/L	J, D
Lead, Dissolved	7439-92-1	1	0.0513	0.100			0.0610	ug/L	J
Manganese, Dissolved	7439-96-5	5	0.710	2.50			277	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	5	0.278	1.00			3.71	ug/L	D


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-103-20211905
21E0244-04 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/19/2021 14:45

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 01:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-04 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	1.39	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	1.85	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	3.32	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.414	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-103-20211905
21E0244-04 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/19/2021 14:45

Instrument: HYDRA Analyst: ML

Analyzed: 06/14/2021 14:16

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-04 A 01

Preparation Batch: BJF0234

Sample Size: 20 mL

Filtration Batch: BJE0529

Prepared: 06/09/2021

Final Volume: 20 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000019	mg/L	J



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-73-20212005

21E0244-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/20/2021 08:35

Instrument: NT2 Analyst: PKC

Analyzed: 05/25/2021 17:00

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-05 H

Preparation Batch: BJE0603

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.06	ug/L	J
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	0.17	ug/L	J
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	114	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	100	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	99.7	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	105	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-73-20212005
21E0244-05 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/20/2021 08:35

Instrument: NT2 Analyst: PKC

Analyzed: 05/25/2021 17:00

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-05 H

Preparation Batch: BJE0603

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	752	ug/L	
HC ID: GRO						
Surrogate: Toluene-d8			80-120 %	100	%	
Surrogate: 4-Bromofluorobenzene			80-120 %	99.7	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-73-20212005

21E0244-05 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/20/2021 08:35

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 14:15

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0573 Prepared: 05/26/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0244-05 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0021 Cleaned: 02-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-05 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.005	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.016	ug/L	
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.009	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	0.007	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	0.007	ug/L	J
Fluoranthene	206-44-0	1	0.002	0.010	0.011	ug/L	
Pyrene	129-00-0	1	0.001	0.010	0.066	ug/L	
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	0.003	ug/L	J
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	0.006	ug/L	J
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	66.6	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	75.2	%	
Surrogate: Fluoranthene-d10				57-120 %	92.4	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-73-20212005
21E0244-05 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/20/2021 08:35

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 16:53

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0244-05 B 01

Preparation Batch: BJE0553

Sample Size: 500 mL

Prepared: 05/25/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	8.24	mg/L	E
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	1.10	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	70.6	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-73-20212005
21E0244-05 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/20/2021 08:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/15/2021 18:50

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0146 Sample Size: 25 mL
 Prepared: 06/07/2021 Final Volume: 25 mL

Extract ID: 21E0244-05 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Iron	7439-89-6	10	182	360	21400	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:34

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0146 Sample Size: 25 mL
 Prepared: 06/07/2021 Final Volume: 25 mL

Extract ID: 21E0244-05 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	2	0.228	1.00	6.85	ug/L	D
Chromium	7440-47-3	2	0.520	1.00	0.708	ug/L	J, D
Cobalt	7440-48-4	2	0.0346	0.400	7.40	ug/L	D
Lead	7439-92-1	2	0.103	0.200	0.148	ug/L	J, D
Manganese	7439-96-5	10	1.42	5.00	853	ug/L	D
Silver	7440-22-4	2	0.0440	0.400	0.0860	ug/L	J, D
Vanadium	7440-62-2	2	0.111	0.400	4.05	ug/L	D


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-73-20212005
21E0244-05 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 08:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-05 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	2	0.0746	0.400	6.45	ug/L	D
Cadmium	7440-43-9	2	0.0600	0.200	0.0620	ug/L	J, D
Copper	7440-50-8	2	0.346	1.00	23.9	ug/L	D
Nickel	7440-02-0	2	0.158	1.00	8.35	ug/L	D
Selenium	7782-49-2	2	0.358	1.00	1.24	ug/L	D
Zinc	7440-66-6	2	5.84	12.0	22.4	ug/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-73-20212005

21E0244-05 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/20/2021 08:35

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:15

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-05 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-73-20212005
21E0244-05RE1 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/20/2021 08:35

Instrument: FID4 Analyst: CTO

Analyzed: 05/28/2021 23:54

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF	Sample Size: 500 mL	Extract ID: 21E0244-05RE1 B 01
	Preparation Batch: BJE0553	Final Volume: 1 mL	
	Prepared: 05/25/2021		

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	5	0.500	6.42	mg/L	D
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	5	1.00	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	69.3	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-73-20212005
21E0244-06 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/20/2021 08:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 01:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-06 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	5.07	ug/L	
Chromium, Dissolved	7440-47-3	5	1.30	2.50	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	7.14	ug/L	
Iron, Dissolved	7439-89-6	5	33.2	100	10900	ug/L	D
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	5	0.710	2.50	926	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	5	0.278	1.00	0.640	ug/L	J, D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-73-20212005
21E0244-06 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 08:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 23:53

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-06 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	5	0.187	1.00	3.84	ug/L	D
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.380	ug/L	J
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	7.88	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	5.00	5.76	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-73-20212005

21E0244-06 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/20/2021 08:35

Instrument: HYDRA Analyst: ML

Analyzed: 06/14/2021 14:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-06 A 01

Preparation Batch: BJF0234

Sample Size: 20 mL

Filtration Batch: BJE0529

Prepared: 06/09/2021

Final Volume: 20 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000019	mg/L	J



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

TB-6-20212005
21E0244-07 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/20/2021 08:38

Instrument: NT2 Analyst: PKC

Analyzed: 05/25/2021 12:04

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-07 B

Preparation Batch: BJE0603

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	110	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	89.7	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

TB-6-20212005
21E0244-07 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/20/2021 08:38

Instrument: NT2 Analyst: PKC

Analyzed: 05/25/2021 12:04

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-07 B

Preparation Batch: BJE0603

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	89.7	%	



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-64-20212005

21E0244-08 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/20/2021 10:00

Instrument: NT2 Analyst: PKC

Analyzed: 05/25/2021 17:21

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-08 H

Preparation Batch: BJE0603

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	0.22	ug/L	
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.11	ug/L	J
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>					<i>80-129 %</i>	<i>111 %</i>	
<i>Surrogate: Toluene-d8</i>					<i>80-120 %</i>	<i>97.0 %</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>					<i>80-120 %</i>	<i>89.6 %</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					<i>80-120 %</i>	<i>104 %</i>	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-64-20212005

21E0244-08 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/20/2021 10:00

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 14:48

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0573 Prepared: 05/26/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0244-08 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0021 Cleaned: 02-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-08 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.007	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.003	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.003	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.007	ug/L	J
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	0.004	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	0.001	ug/L	J
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	0.006	ug/L	J
Pyrene	129-00-0	1	0.001	0.010	0.007	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	0.002	ug/L	J
Chrysene	218-01-9	1	0.0009	0.010	0.003	ug/L	J
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	0.002	ug/L	J
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	0.026	ug/L	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	67.1	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	69.8	%	
Surrogate: Fluoranthene-d10				57-120 %	75.3	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-64-20212005
21E0244-08 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/20/2021 10:00

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 17:14

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0244-08 D 01

Preparation Batch: BJE0553

Sample Size: 500 mL

Prepared: 05/25/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.156	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	73.7	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-64-20212005
21E0244-08 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/20/2021 10:00

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 18:05

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0594 Prepared: 05/25/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0244-08 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0221 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-08 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0219 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-08 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0220 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-08 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	69.3	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	66.4	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	65.4	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	46.9	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-64-20212005
21E0244-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/20/2021 10:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:39

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-08 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	2	0.228	1.00	51.3	ug/L	D
Chromium	7440-47-3	2	0.520	1.00	2.73	ug/L	D
Cobalt	7440-48-4	2	0.0346	0.400	0.532	ug/L	D
Iron	7439-89-6	10	182	360	14000	ug/L	D
Lead	7439-92-1	2	0.103	0.200	2.63	ug/L	D
Manganese	7439-96-5	10	1.42	5.00	794	ug/L	D
Silver	7440-22-4	2	0.0440	0.400	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	3.59	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-64-20212005
21E0244-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 10:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:39

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-08 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	2	0.0746	0.400	3.07	ug/L	D
Cadmium	7440-43-9	2	0.0600	0.200	0.100	ug/L	J, D
Copper	7440-50-8	2	0.346	1.00	6.72	ug/L	D
Nickel	7440-02-0	2	0.158	1.00	7.19	ug/L	D
Selenium	7782-49-2	2	0.358	1.00	0.530	ug/L	J, D
Zinc	7440-66-6	2	5.84	12.0	11.3	ug/L	J, D


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-64-20212005
21E0244-08 (Water)
Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/20/2021 10:00

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-08 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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Reported:
 13-Dec-2021 17:09

MW-64-20212005
21E0244-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/20/2021 10:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 01:35

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-09 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	6.48	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500	0.290	ug/L	J
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.243	ug/L	
Iron, Dissolved	7439-89-6	5	91.0	180	1740	ug/L	D
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	5	0.710	2.50	729	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.306	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-64-20212005
21E0244-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 10:00

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 01:35

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-09 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	1.33	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.46	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.454	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-64-20212005
21E0244-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/20/2021 10:00

Instrument: HYDRA Analyst: ML

Analyzed: 06/14/2021 14:21

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-09 A 01

Preparation Batch: BJF0234

Sample Size: 20 mL

Filtration Batch: BJE0529

Prepared: 06/09/2021

Final Volume: 20 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000018	mg/L	J


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-63-20212005
21E0244-10 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/20/2021 11:20

Instrument: NT2 Analyst: PKC

Analyzed: 05/25/2021 17:42

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-10 I

Preparation Batch: BJE0603

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	112	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	95.3	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	89.1	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-63-20212005

21E0244-10 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/20/2021 11:20

Instrument: NT10 Analyst: VTS

Analyzed: 06/02/2021 16:55

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJE0574
Prepared: 05/27/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21E0244-10 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	0.01	0.2	ND	ug/L	U
bis(2-chloroethyl) ether	111-44-4	1	0.03	0.2	ND	ug/L	U
2-Chlorophenol	95-57-8	1	0.03	0.2	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.03	0.2	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
Benzyl Alcohol	100-51-6	1	0.02	0.2	ND	ug/L	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	0.03	0.2	ND	ug/L	U
2-Methylphenol	95-48-7	1	0.03	0.2	ND	ug/L	U
Hexachloroethane	67-72-1	1	0.04	0.2	ND	ug/L	U
N-Nitroso-di-n-Propylamine	621-64-7	1	0.04	0.2	ND	ug/L	U
4-Methylphenol	106-44-5	1	0.03	0.2	ND	ug/L	U
Nitrobenzene	98-95-3	1	0.03	0.2	ND	ug/L	U
Isophorone	78-59-1	1	0.03	0.2	ND	ug/L	U
2-Nitrophenol	88-75-5	1	0.04	1.0	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Bis(2-Chloroethoxy)methane	111-91-1	1	0.03	0.2	ND	ug/L	U
2,4-Dichlorophenol	120-83-2	1	0.1	1.0	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.03	0.2	ND	ug/L	U
Naphthalene	91-20-3	1	0.03	0.2	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
4-Chloroaniline	106-47-8	1	0.04	1.0	ND	ug/L	U
Hexachlorobutadiene	87-68-3	1	0.04	0.2	ND	ug/L	U
4-Chloro-3-Methylphenol	59-50-7	1	0.1	1.0	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.03	0.2	ND	ug/L	U
Hexachlorocyclopentadiene	77-47-4	1	0.1	1.0	ND	ug/L	U
2,4,6-Trichlorophenol	88-06-2	1	0.2	1.0	ND	ug/L	U
2,4,5-Trichlorophenol	95-95-4	1	0.1	1.0	ND	ug/L	U
2-Chloronaphthalene	91-58-7	1	0.03	0.2	ND	ug/L	U
2-Nitroaniline	88-74-4	1	0.2	1.0	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.02	0.2	ND	ug/L	U
Dimethylphthalate	131-11-3	1	0.04	0.2	ND	ug/L	U
2,6-Dinitrotoluene	606-20-2	1	0.2	1.0	ND	ug/L	U
Acenaphthene	83-32-9	1	0.03	0.2	ND	ug/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-63-20212005

21E0244-10 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/20/2021 11:20

Instrument: NT10 Analyst: VTS

Analyzed: 06/02/2021 16:55

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
3-Nitroaniline	99-09-2	1	0.2	1.0	ND	ug/L	U
2,4-Dinitrophenol	51-28-5	1	0.2	2.0	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.02	0.2	ND	ug/L	U
4-Nitrophenol	100-02-7	1	0.06	1.0	ND	ug/L	U
2,4-Dinitrotoluene	121-14-2	1	0.1	1.0	ND	ug/L	U
Fluorene	86-73-7	1	0.02	0.2	ND	ug/L	U
4-Chlorophenylphenyl ether	7005-72-3	1	0.02	0.2	ND	ug/L	U
Diethyl phthalate	84-66-2	1	0.06	0.2	ND	ug/L	U
4-Nitroaniline	100-01-6	1	0.2	1.0	ND	ug/L	U
4,6-Dinitro-2-methylphenol	534-52-1	1	0.4	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
4-Bromophenyl phenyl ether	101-55-3	1	0.02	0.2	ND	ug/L	U
Hexachlorobenzene	118-74-1	1	0.04	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Phenanthrene	85-01-8	1	0.02	0.2	ND	ug/L	U
Anthracene	120-12-7	1	0.03	0.2	ND	ug/L	U
Carbazole	86-74-8	1	0.04	0.2	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Fluoranthene	206-44-0	1	0.03	0.2	ND	ug/L	U
Pyrene	129-00-0	1	0.03	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.04	0.2	ND	ug/L	U
3,3'-Dichlorobenzidine	91-94-1	1	0.3	1.0	ND	ug/L	U
Chrysene	218-01-9	1	0.04	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U
Di-n-Octylphthalate	117-84-0	1	0.05	0.2	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.08	0.4	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.05	0.2	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.06	0.2	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.07	0.2	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.04	0.2	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.03	0.2	ND	ug/L	U
Surrogate: 2-Fluorophenol				30-160 %	49.1	%	
Surrogate: Phenol-d5				30-160 %	31.5	%	
Surrogate: 2-Chlorophenol-d4				30-160 %	82.9	%	
Surrogate: 1,2-Dichlorobenzene-d4				30-160 %	68.9	%	
Surrogate: Nitrobenzene-d5				30-160 %	93.4	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-63-20212005

21E0244-10 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/20/2021 11:20

Instrument: NT10 Analyst: VTS

Analyzed: 06/02/2021 16:55

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
<i>Surrogate: 2-Fluorobiphenyl</i>		30-160 %	81.4	%	
<i>Surrogate: 2,4,6-Tribromophenol</i>		30-160 %	157	%	Q
<i>Surrogate: p-Terphenyl-d14</i>		30-160 %	95.2	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-63-20212005
21E0244-10 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/20/2021 11:20

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 17:35

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0244-10 D 01

Preparation Batch: BJE0553

Sample Size: 500 mL

Prepared: 05/25/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>75.0</i>	<i>%</i>	



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-63-20212005

21E0244-10 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/20/2021 11:20

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 18:26

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0594 Prepared: 05/25/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0244-10 C 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0221 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-10 C 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0219 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-10 C 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0220 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-10 C 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	69.1	%	
Surrogate: Tetrachlorometaxylene				32-120 %	64.7	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	66.0	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	48.5	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-63-20212005
21E0244-10 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/20/2021 11:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:55

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-10 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	3.65	ug/L	
Chromium	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt	7440-48-4	1	0.0173	0.200	0.555	ug/L	
Iron	7439-89-6	1	18.2	36.0	596	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese	7439-96-5	1	0.142	0.500	157	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.92	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-63-20212005
21E0244-10 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 11:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:55

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-10 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	2.37	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	1.69	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	1.85	ug/L	
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-63-20212005

21E0244-10 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/20/2021 11:20

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:20

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-10 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-63-20212005

21E0244-11 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/20/2021 11:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-11 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	3.25	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.537	ug/L	
Iron, Dissolved	7439-89-6	1	18.2	36.0	172	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500	166	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	1.44	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-63-20212005
21E0244-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 11:20

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-11 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	1.32	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	1.34	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.83	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U



Analytical Resources, LLC
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Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-63-20212005

21E0244-11 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/20/2021 11:20

Instrument: HYDRA Analyst: ML

Analyzed: 06/14/2021 14:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-11 A 01

Preparation Batch: BJF0234

Sample Size: 20 mL

Filtration Batch: BJE0529

Prepared: 06/09/2021

Final Volume: 20 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000029	mg/L	J



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-40-20212005

21E0244-12 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/20/2021 13:15

Instrument: NT2 Analyst: PKC

Analyzed: 05/25/2021 18:03

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-12 J

Preparation Batch: BJE0603

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	0.39	ug/L	
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	112	%	
Surrogate: Toluene-d8				80-120 %	95.3	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	90.2	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	101	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-40-20212005
21E0244-12 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/20/2021 13:15

Instrument: NT10 Analyst: VTS

Analyzed: 06/02/2021 17:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0244-12 F 01

Preparation Batch: BJE0574

Sample Size: 1000 mL

Prepared: 05/27/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	0.4	ug/L	B
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

46.5 %

Surrogate: Phenol-d5

30-160 %

31.2 %

Surrogate: 2-Chlorophenol-d4

30-160 %

77.0 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

61.7 %

Surrogate: Nitrobenzene-d5

30-160 %

87.1 %

Surrogate: 2-Fluorobiphenyl

30-160 %

74.5 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

146 %

Q

Surrogate: p-Terphenyl-d14

30-160 %

86.9 %


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-40-20212005
21E0244-12 (Water)
Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/20/2021 13:15

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 15:20

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF	Sample Size: 500 mL	Extract ID: 21E0244-12 D 01
	Preparation Batch: BJE0573	Final Volume: 0.5 mL	
	Prepared: 05/26/2021		
Sample Cleanup:	Cleanup Method: Silica Gel	Initial Volume: 0.5 mL	Extract ID: 21E0244-12 D 01
	Cleanup Batch: CJF0021	Final Volume: 0.5 mL	
	Cleaned: 02-Jun-2021		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.003	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.002	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.002	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.123	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	0.002	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	0.006	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
<i>Surrogate: 2-Methylnaphthalene-d10</i>					42-120 %	68.0 %	
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>					29-120 %	73.9 %	
<i>Surrogate: Fluoranthene-d10</i>					57-120 %	74.4 %	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-40-20212005
21E0244-12 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/20/2021 13:15

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 17:56

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0244-12 B 01

Preparation Batch: BJE0553

Sample Size: 500 mL

Prepared: 05/25/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.291	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	73.1	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-40-20212005
21E0244-12 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/20/2021 13:15

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:01

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0146 Sample Size: 25 mL
 Prepared: 06/07/2021 Final Volume: 25 mL

Extract ID: 21E0244-12 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Lead	7439-92-1	1	0.0513	0.100	0.129	ug/L	
Manganese	7439-96-5	10	1.42	5.00	863	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-40-20212005
21E0244-12 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 13:15

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:01

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0146 Sample Size: 25 mL
 Prepared: 06/07/2021 Final Volume: 25 mL

Extract ID: 21E0244-12 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	12.9	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	0.987	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	1.68	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.202	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-40-20212005

21E0244-12 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/20/2021 13:15

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:22

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-12 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-40-20212005
21E0244-13 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/20/2021 13:15

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-13 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	10	1.42	5.00	825	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-40-20212005
21E0244-13 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 13:15

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-13 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.961	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.558	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.235	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-40-20212005
21E0244-13 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/20/2021 13:15

Instrument: HYDRA Analyst: ML

Analyzed: 06/14/2021 14:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-13 A 01

Preparation Batch: BJF0234

Sample Size: 20 mL

Filtration Batch: BJE0529

Prepared: 06/09/2021

Final Volume: 20 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000125	mg/L	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-41-20212005

21E0244-14 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/20/2021 12:35

Instrument: NT2 Analyst: PKC

Analyzed: 05/25/2021 18:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-14 H

Preparation Batch: BJE0603

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	0.51	ug/L	
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	0.13	ug/L	J
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	114	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.5	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	89.4	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-41-20212005
21E0244-14 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/20/2021 12:35

Instrument: NT10 Analyst: VTS

Analyzed: 06/02/2021 18:13

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0244-14 F 01

Preparation Batch: BJE0574

Sample Size: 1000 mL

Prepared: 05/27/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	0.4	ug/L	B
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

51.7 %

Surrogate: Phenol-d5

30-160 %

35.4 %

Surrogate: 2-Chlorophenol-d4

30-160 %

80.1 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

65.2 %

Surrogate: Nitrobenzene-d5

30-160 %

93.9 %

Surrogate: 2-Fluorobiphenyl

30-160 %

78.5 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

152 %

Q

Surrogate: p-Terphenyl-d14

30-160 %

88.4 %



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-41-20212005

21E0244-14 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/20/2021 12:35

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 15:52

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0573 Prepared: 05/26/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0244-14 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0021 Cleaned: 02-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-14 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.008	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.002	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.019	ug/L	
Acenaphthylene	208-96-8	1	0.002	0.010	0.003	ug/L	J
Acenaphthene	83-32-9	1	0.003	0.010	1.43	ug/L	E
Dibenzofuran	132-64-9	1	0.002	0.010	0.002	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	0.354	ug/L	
Phenanthrene	85-01-8	1	0.001	0.010	0.060	ug/L	
Anthracene	120-12-7	1	0.001	0.010	0.002	ug/L	J
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	72.9	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	73.5	%	
Surrogate: Fluoranthene-d10				57-120 %	75.6	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-41-20212005
21E0244-14 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/20/2021 12:35

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 18:17

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0244-14 B 01

Preparation Batch: BJE0553

Sample Size: 500 mL

Prepared: 05/25/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.298	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	75.6	%	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-41-20212005
21E0244-14 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/20/2021 12:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:07

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-14 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Lead	7439-92-1	1	0.0513	0.100	0.149	ug/L	
Manganese	7439-96-5	10	1.42	5.00	807	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-41-20212005
21E0244-14 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 12:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:07

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-14 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	43.9	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	2.20	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	3.21	ug/L	
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-41-20212005

21E0244-14 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/20/2021 12:35

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-14 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-41-20212005 21E0244-14RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/20/2021 12:35

Instrument: NT11 Analyst: VTS

Analyzed: 06/08/2021 14:56

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0573 Prepared: 05/26/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0244-14RE1 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0021 Cleaned: 02-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-14RE1 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	2	0.003	0.020	0.007	ug/L	J, D
2-Methylnaphthalene	91-57-6	2	0.002	0.020	ND	ug/L	U
1-Methylnaphthalene	90-12-0	2	0.002	0.020	0.018	ug/L	J, D
Acenaphthylene	208-96-8	2	0.004	0.020	ND	ug/L	U
Acenaphthene	83-32-9	2	0.006	0.020	1.59	ug/L	D
Dibenzofuran	132-64-9	2	0.003	0.020	ND	ug/L	U
Fluorene	86-73-7	2	0.003	0.020	0.351	ug/L	D
Phenanthrene	85-01-8	2	0.003	0.020	0.059	ug/L	D
Anthracene	120-12-7	2	0.002	0.020	ND	ug/L	U
Carbazole	86-74-8	2	0.002	0.020	ND	ug/L	U
Fluoranthene	206-44-0	2	0.003	0.020	ND	ug/L	U
Pyrene	129-00-0	2	0.002	0.020	ND	ug/L	U
Benzo(a)anthracene	56-55-3	2	0.002	0.020	ND	ug/L	U
Chrysene	218-01-9	2	0.002	0.020	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	2	0.0009	0.020	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	2	0.006	0.020	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	2	0.004	0.020	ND	ug/L	U
Benzofluoranthenes, Total		2	0.007	0.020	ND	ug/L	U
Benzo(a)pyrene	50-32-8	2	0.005	0.020	ND	ug/L	U
Perylene	1985-5-0	2	0.012	0.020	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	2	0.002	0.020	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	2	0.003	0.020	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	2	0.003	0.020	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	71.9	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	53.1	%	
Surrogate: Fluoranthene-d10				57-120 %	72.4	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-41-20212005
21E0244-15 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/20/2021 12:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:35

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-15 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	10	1.42	5.00	743	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-41-20212005
21E0244-15 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 12:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:35

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-15 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	18.6	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.637	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-41-20212005
21E0244-15 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/20/2021 12:35

Instrument: HYDRA Analyst: ML

Analyzed: 06/14/2021 14:28

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-15 A 01

Preparation Batch: BJF0234

Sample Size: 20 mL

Filtration Batch: BJE0529

Prepared: 06/09/2021

Final Volume: 20 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000024	mg/L	J



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-74-20212005

21E0244-16 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/20/2021 14:30

Instrument: NT2 Analyst: PKC

Analyzed: 05/25/2021 18:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-16 F

Preparation Batch: BJE0603

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.11	ug/L	J
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>116</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>95.8</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>95.8</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>97.2</i>	<i>%</i>	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-74-20212005
21E0244-16 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/20/2021 14:30

Instrument: NT2 Analyst: PKC

Analyzed: 05/25/2021 18:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0244-16 F

Preparation Batch: BJE0603

Sample Size: 10 mL

Prepared: 05/25/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	95.8	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	95.8	%	



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-74-20212005

21E0244-16 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/20/2021 14:30

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 16:24

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0573 Prepared: 05/26/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0244-16 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0021 Cleaned: 02-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0244-16 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.005	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.005	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.005	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.348	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	0.002	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	62.0	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	62.5	%	
Surrogate: Fluoranthene-d10				57-120 %	70.9	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-74-20212005

21E0244-16 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/20/2021 14:30

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 18:39

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0244-16 B 01

Preparation Batch: BJE0553

Sample Size: 460 mL

Prepared: 05/25/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.109	0.340	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.217	0.250	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	81.3	%	


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 Project Manager: Meg Strong

Reported:
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MW-74-20212005
21E0244-16 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/20/2021 14:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:45

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-16 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	22.6	ug/L	
Chromium	7440-47-3	2	0.520	1.00	1.11	ug/L	D
Cobalt	7440-48-4	1	0.0173	0.200	0.495	ug/L	
Iron	7439-89-6	2	36.4	72.0	19800	ug/L	D
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	3.85	ug/L	D


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Reported:
 13-Dec-2021 17:09

MW-74-20212005
21E0244-16 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 14:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:45

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-16 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	5.90	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	0.174	ug/L	J
Nickel	7440-02-0	1	0.0792	0.500	0.836	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.286	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-74-20212005

21E0244-16 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/20/2021 14:30

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:27

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-16 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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Reported:
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MW-74-20212005
21E0244-16RE1 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/20/2021 14:30

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/09/2021 02:23

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0146 Sample Size: 25 mL
 Prepared: 06/07/2021 Final Volume: 25 mL

Extract ID: 21E0244-16RE1 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	20	2.84	10.0	3390	ug/L	D



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-74-20211905

21E0244-17 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/20/2021 08:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:40

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-17 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	6.57	ug/L	
Chromium, Dissolved	7440-47-3	5	1.30	2.50	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.454	ug/L	
Iron, Dissolved	7439-89-6	5	33.2	100	9440	ug/L	D
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	20	2.84	10.0	3250	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	5	0.278	1.00	0.690	ug/L	J, D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

MW-74-20211905
21E0244-17 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/20/2021 08:35

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 02:40

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0244-17 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	3.94	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.623	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

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Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

MW-74-20211905

21E0244-17 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/20/2021 08:35

Instrument: HYDRA Analyst: ML

Analyzed: 06/14/2021 14:00

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0244-17 A 01

Preparation Batch: BJF0234

Sample Size: 20 mL

Filtration Batch: BJE0529

Prepared: 06/09/2021

Final Volume: 20 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000019	mg/L	J



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0583 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0583-BLK1)						Prepared: 24-May-2021 Analyzed: 24-May-2021 16:47					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
1,1-Dichloroethene	ND	0.08	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Benzene	ND	0.05	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Toluene	ND	0.05	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
Ethylbenzene	ND	0.05	0.20	ug/L							U
m,p-Xylene	ND	0.14	0.40	ug/L							U
o-Xylene	ND	0.08	0.20	ug/L							U
Xylenes, total	ND	0.22	0.60	ug/L							U
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.24			ug/L	5.00		105	80-129			
<i>Surrogate: Toluene-d8</i>	4.87			ug/L	5.00		97.5	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	4.59			ug/L	5.00		91.8	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.08			ug/L	5.00		102	80-120			
LCS (BJE0583-BS1)						Prepared: 24-May-2021 Analyzed: 24-May-2021 15:25					
Vinyl Chloride	10.7	0.08	0.20	ug/L	10.0		107	66-133			
1,1-Dichloroethene	10.6	0.08	0.20	ug/L	10.0		106	69-135			
trans-1,2-Dichloroethene	10.1	0.07	0.20	ug/L	10.0		101	78-128			
cis-1,2-Dichloroethene	11.0	0.08	0.20	ug/L	10.0		110	80-121			
Benzene	11.0	0.05	0.20	ug/L	10.0		110	80-120			
Trichloroethene	10.7	0.07	0.20	ug/L	10.0		107	80-120			
Toluene	10.7	0.05	0.20	ug/L	10.0		107	80-120			
Tetrachloroethene	10.7	0.09	0.20	ug/L	10.0		107	80-120			
Ethylbenzene	11.0	0.05	0.20	ug/L	10.0		110	80-120			
m,p-Xylene	22.8	0.14	0.40	ug/L	20.0		114	80-121			
o-Xylene	10.2	0.08	0.20	ug/L	10.0		102	80-121			
Xylenes, total	33.0	0.22	0.60	ug/L	30.0		110	76-127			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.80			ug/L	5.00		96.0	80-129			
<i>Surrogate: Toluene-d8</i>	5.07			ug/L	5.00		101	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.07			ug/L	5.00		101	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.03			ug/L	5.00		101	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJE0583 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0583-BS01)						Prepared: 24-May-2021 Analyzed: 24-May-2021 16:06					
Vinyl Chloride	10.6	0.08	0.20	ug/L	10.0		106	66-133	0.41	30	
1,1-Dichloroethene	10.7	0.08	0.20	ug/L	10.0		107	69-135	0.23	30	
trans-1,2-Dichloroethene	10.1	0.07	0.20	ug/L	10.0		101	78-128	0.47	30	
cis-1,2-Dichloroethene	11.0	0.08	0.20	ug/L	10.0		110	80-121	0.31	30	
Benzene	10.9	0.05	0.20	ug/L	10.0		109	80-120	0.40	30	
Trichloroethene	10.7	0.07	0.20	ug/L	10.0		107	80-120	0.07	30	
Toluene	10.6	0.05	0.20	ug/L	10.0		106	80-120	0.59	30	
Tetrachloroethene	11.0	0.09	0.20	ug/L	10.0		110	80-120	2.61	30	
Ethylbenzene	11.2	0.05	0.20	ug/L	10.0		112	80-120	2.45	30	
m,p-Xylene	23.1	0.14	0.40	ug/L	20.0		116	80-121	1.47	30	
o-Xylene	10.3	0.08	0.20	ug/L	10.0		103	80-121	1.31	30	
Xylenes, total	33.4	0.22	0.60	ug/L	30.0		111	76-127	1.42	30	
Surrogate: 1,2-Dichloroethane-d4	4.79			ug/L	5.00		95.9	80-129			
Surrogate: Toluene-d8	5.01			ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.25			ug/L	5.00		105	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.97			ug/L	5.00		99.5	80-120			


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJE0603 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0603-BLK1)		Prepared: 25-May-2021 Analyzed: 25-May-2021 11:44								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.77		ug/L	5.00		95.4	80-120			
Surrogate: 4-Bromofluorobenzene	4.54		ug/L	5.00		90.9	80-120			
Blank (BJE0603-BLK2)		Prepared: 25-May-2021 Analyzed: 25-May-2021 11:44								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.33		ug/L	5.00		107	80-129			
Surrogate: Toluene-d8	4.77		ug/L	5.00		95.4	80-120			
Surrogate: 4-Bromofluorobenzene	4.54		ug/L	5.00		90.9	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.08		ug/L	5.00		102	80-120			
LCS (BJE0603-BS1)		Prepared: 25-May-2021 Analyzed: 25-May-2021 10:02								
Gasoline Range Organics (Tol-Nap)	1030	100	ug/L	1000		103	72-128			
Surrogate: Toluene-d8	5.02		ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	4.93		ug/L	5.00		98.6	80-120			
LCS (BJE0603-BS2)		Prepared: 25-May-2021 Analyzed: 25-May-2021 10:22								
Vinyl Chloride	10.9	0.08	0.20	ug/L	10.0	109	66-133			
1,1-Dichloroethene	11.0	0.08	0.20	ug/L	10.0	110	69-135			
trans-1,2-Dichloroethene	10.6	0.07	0.20	ug/L	10.0	106	78-128			
cis-1,2-Dichloroethene	10.9	0.08	0.20	ug/L	10.0	109	80-121			
Benzene	10.9	0.05	0.20	ug/L	10.0	109	80-120			
Trichloroethene	10.7	0.07	0.20	ug/L	10.0	107	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0603 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0603-BS2)					Prepared: 25-May-2021		Analyzed: 25-May-2021 10:22				
Toluene	10.6	0.05	0.20	ug/L	10.0		106	80-120			
Tetrachloroethene	10.8	0.09	0.20	ug/L	10.0		108	80-120			
Ethylbenzene	11.0	0.05	0.20	ug/L	10.0		110	80-120			
m,p-Xylene	23.0	0.14	0.40	ug/L	20.0		115	80-121			
o-Xylene	10.0	0.08	0.20	ug/L	10.0		100	80-121			
Xylenes, total	33.0	0.22	0.60	ug/L	30.0		110	76-127			
Surrogate: 1,2-Dichloroethane-d4	4.93			ug/L	5.00		98.7	80-129			
Surrogate: Toluene-d8	5.05			ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	5.13			ug/L	5.00		103	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.98			ug/L	5.00		99.6	80-120			
LCS Dup (BJE0603-BSD1)					Prepared: 25-May-2021		Analyzed: 25-May-2021 10:42				
Gasoline Range Organics (Tol-Nap)	1090		100	ug/L	1000		109	72-128	5.95	30	
Surrogate: Toluene-d8	5.05			ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	4.93			ug/L	5.00		98.7	80-120			
LCS Dup (BJE0603-BSD2)					Prepared: 25-May-2021		Analyzed: 25-May-2021 11:02				
Vinyl Chloride	11.3	0.08	0.20	ug/L	10.0		113	66-133	3.29	30	
1,1-Dichloroethene	11.4	0.08	0.20	ug/L	10.0		114	69-135	3.00	30	
trans-1,2-Dichloroethene	10.7	0.07	0.20	ug/L	10.0		107	78-128	1.68	30	
cis-1,2-Dichloroethene	11.4	0.08	0.20	ug/L	10.0		114	80-121	4.75	30	
Benzene	11.5	0.05	0.20	ug/L	10.0		115	80-120	4.96	30	
Trichloroethene	11.1	0.07	0.20	ug/L	10.0		111	80-120	4.19	30	
Toluene	11.2	0.05	0.20	ug/L	10.0		112	80-120	5.41	30	
Tetrachloroethene	11.2	0.09	0.20	ug/L	10.0		112	80-120	4.03	30	
Ethylbenzene	11.6	0.05	0.20	ug/L	10.0		116	80-120	4.97	30	
m,p-Xylene	24.1	0.14	0.40	ug/L	20.0		120	80-121	4.76	30	
o-Xylene	10.7	0.08	0.20	ug/L	10.0		107	80-121	6.03	30	
Xylenes, total	34.8	0.22	0.60	ug/L	30.0		116	76-127	5.15	30	
Surrogate: 1,2-Dichloroethane-d4	4.92			ug/L	5.00		98.4	80-129			
Surrogate: Toluene-d8	5.07			ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	4.95			ug/L	5.00		99.0	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.94			ug/L	5.00		98.8	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0574-BLK1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 15:00					
Phenol	ND	0.01	0.2	ug/L							U
bis(2-chloroethyl) ether	ND	0.03	0.2	ug/L							U
2-Chlorophenol	ND	0.03	0.2	ug/L							U
1,3-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
Benzyl Alcohol	ND	0.02	0.2	ug/L							U
2,2'-Oxybis(1-chloropropane)	ND	0.03	0.2	ug/L							U
2-Methylphenol	ND	0.03	0.2	ug/L							U
Hexachloroethane	ND	0.04	0.2	ug/L							U
N-Nitroso-di-n-Propylamine	ND	0.04	0.2	ug/L							U
4-Methylphenol	ND	0.03	0.2	ug/L							U
Nitrobenzene	ND	0.03	0.2	ug/L							U
Isophorone	ND	0.03	0.2	ug/L							U
2-Nitrophenol	ND	0.04	1.0	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Bis(2-Chloroethoxy)methane	ND	0.03	0.2	ug/L							U
2,4-Dichlorophenol	ND	0.1	1.0	ug/L							U
1,2,4-Trichlorobenzene	ND	0.03	0.2	ug/L							U
Naphthalene	ND	0.03	0.2	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
4-Chloroaniline	ND	0.04	1.0	ug/L							U
Hexachlorobutadiene	ND	0.04	0.2	ug/L							U
4-Chloro-3-Methylphenol	ND	0.1	1.0	ug/L							U
2-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Hexachlorocyclopentadiene	ND	0.1	1.0	ug/L							U
2,4,6-Trichlorophenol	ND	0.2	1.0	ug/L							U
2,4,5-Trichlorophenol	ND	0.1	1.0	ug/L							U
2-Chloronaphthalene	ND	0.03	0.2	ug/L							U
2-Nitroaniline	ND	0.2	1.0	ug/L							U
Acenaphthylene	ND	0.02	0.2	ug/L							U
Dimethylphthalate	ND	0.04	0.2	ug/L							U
2,6-Dinitrotoluene	ND	0.2	1.0	ug/L							U
Acenaphthene	ND	0.03	0.2	ug/L							U
3-Nitroaniline	ND	0.2	1.0	ug/L							U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0574-BLK1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 15:00					
2,4-Dinitrophenol	ND	0.2	2.0	ug/L							U
Dibenzofuran	ND	0.02	0.2	ug/L							U
4-Nitrophenol	ND	0.06	1.0	ug/L							U
2,4-Dinitrotoluene	ND	0.1	1.0	ug/L							U
Fluorene	ND	0.02	0.2	ug/L							U
4-Chlorophenylphenyl ether	ND	0.02	0.2	ug/L							U
Diethyl phthalate	ND	0.06	0.2	ug/L							U
4-Nitroaniline	ND	0.2	1.0	ug/L							U
4,6-Dinitro-2-methylphenol	ND	0.4	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
4-Bromophenyl phenyl ether	ND	0.02	0.2	ug/L							U
Hexachlorobenzene	ND	0.04	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Phenanthrene	ND	0.02	0.2	ug/L							U
Anthracene	ND	0.03	0.2	ug/L							U
Carbazole	ND	0.04	0.2	ug/L							U
Di-n-Butylphthalate	0.4	0.05	0.2	ug/L							
Fluoranthene	ND	0.03	0.2	ug/L							U
Pyrene	ND	0.03	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
Benzo(a)anthracene	ND	0.04	0.2	ug/L							U
3,3'-Dichlorobenzidine	ND	0.3	1.0	ug/L							U
Chrysene	ND	0.04	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
Di-n-Octylphthalate	ND	0.05	0.2	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.08	0.4	ug/L							U
Benzo(a)pyrene	ND	0.05	0.2	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.06	0.2	ug/L							U
Dibenzo(a,h)anthracene	ND	0.07	0.2	ug/L							U
Benzo(g,h,i)perylene	ND	0.04	0.2	ug/L							U
1-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Surrogate: 2-Fluorophenol	4.19			ug/L	7.50		55.9	30-160			
Surrogate: Phenol-d5	2.69			ug/L	7.50		35.8	30-160			
Surrogate: 2-Chlorophenol-d4	6.57			ug/L	7.50		87.6	30-160			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0574-BLK1)						Prepared: 27-May-2021	Analyzed: 02-Jun-2021 15:00				
Surrogate: 1,2-Dichlorobenzene-d4	3.54			ug/L	5.00		70.9	30-160			
Surrogate: Nitrobenzene-d5	4.86			ug/L	5.00		97.1	30-160			
Surrogate: 2-Fluorobiphenyl	4.30			ug/L	5.00		85.9	30-160			
Surrogate: 2,4,6-Tribromophenol	11.8			ug/L	7.50		157	30-160			Q
Surrogate: p-Terphenyl-d14	4.65			ug/L	5.00		93.1	30-160			
LCS (BJE0574-BS1)						Prepared: 27-May-2021	Analyzed: 02-Jun-2021 15:38				
Phenol	1.9	0.01	0.2	ug/L	5.00		38.9	30-160			
bis(2-chloroethyl) ether	4.6	0.03	0.2	ug/L	5.00		91.8	30-160			
2-Chlorophenol	3.9	0.03	0.2	ug/L	5.00		78.7	30-160			
1,3-Dichlorobenzene	3.6	0.03	0.2	ug/L	5.00		72.4	30-160			
1,4-Dichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.4	30-160			
1,2-Dichlorobenzene	3.6	0.03	0.2	ug/L	5.00		72.8	30-160			
Benzyl Alcohol	3.1	0.02	0.2	ug/L	5.00		61.4	30-160			
2,2'-Oxybis(1-chloropropane)	3.6	0.03	0.2	ug/L	5.00		72.4	30-160			
2-Methylphenol	3.4	0.03	0.2	ug/L	5.00		68.7	30-160			
Hexachloroethane	3.5	0.04	0.2	ug/L	5.00		69.5	30-160			
N-Nitroso-di-n-Propylamine	5.0	0.04	0.2	ug/L	5.00		99.1	30-160			
4-Methylphenol	3.5	0.03	0.2	ug/L	5.00		69.9	30-160			
Nitrobenzene	4.9	0.03	0.2	ug/L	5.00		97.6	30-160			
Isophorone	5.1	0.03	0.2	ug/L	5.00		102	30-160			
2-Nitrophenol	4.1	0.04	1.0	ug/L	5.00		82.0	30-160			
2,4-Dimethylphenol	10.1	0.3	1.0	ug/L	13.0		77.5	30-160			
Bis(2-Chloroethoxy)methane	4.3	0.03	0.2	ug/L	5.00		86.3	30-160			
2,4-Dichlorophenol	13.0	0.1	1.0	ug/L	13.0		100	30-160			
1,2,4-Trichlorobenzene	3.4	0.03	0.2	ug/L	5.00		68.5	30-160			
Naphthalene	4.3	0.03	0.2	ug/L	5.00		85.2	30-160			
Benzoic acid	9.9	0.1	2.0	ug/L	23.0		42.9	30-160			
4-Chloroaniline	2.0	0.04	1.0	ug/L	13.0		15.7	30-160			*
Hexachlorobutadiene	3.0	0.04	0.2	ug/L	5.00		60.8	30-160			
4-Chloro-3-Methylphenol	13.5	0.1	1.0	ug/L	13.0		104	30-160			
2-Methylnaphthalene	4.0	0.03	0.2	ug/L	5.00		79.9	30-160			
Hexachlorocyclopentadiene	9.4	0.1	1.0	ug/L	13.0		72.3	30-160			
2,4,6-Trichlorophenol	12.8	0.2	1.0	ug/L	13.0		98.4	30-160			
2,4,5-Trichlorophenol	12.4	0.1	1.0	ug/L	13.0		95.7	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0574-BS1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 15:38					
2-Chloronaphthalene	4.3	0.03	0.2	ug/L	5.00		85.9	30-160			
2-Nitroaniline	21.8	0.2	1.0	ug/L	13.0		168	30-160			*, Q
Acenaphthylene	4.1	0.02	0.2	ug/L	5.00		82.5	30-160			
Dimethylphthalate	4.6	0.04	0.2	ug/L	5.00		91.0	30-160			
2,6-Dinitrotoluene	15.3	0.2	1.0	ug/L	13.0		118	30-160			
Acenaphthene	4.4	0.03	0.2	ug/L	5.00		88.6	30-160			
3-Nitroaniline	15.6	0.2	1.0	ug/L	13.0		120	30-160			Q
2,4-Dinitrophenol	29.3	0.2	2.0	ug/L	23.0		128	30-160			
Dibenzofuran	4.5	0.02	0.2	ug/L	5.00		90.2	30-160			
4-Nitrophenol	7.0	0.06	1.0	ug/L	13.0		53.7	30-160			
2,4-Dinitrotoluene	16.6	0.1	1.0	ug/L	13.0		128	30-160			
Fluorene	4.4	0.02	0.2	ug/L	5.00		88.6	30-160			
4-Chlorophenylphenyl ether	3.4	0.02	0.2	ug/L	5.00		67.3	30-160			
Diethyl phthalate	4.7	0.06	0.2	ug/L	5.00		94.3	30-160			
4-Nitroaniline	14.5	0.2	1.0	ug/L	13.0		112	30-160			Q
4,6-Dinitro-2-methylphenol	27.3	0.4	2.0	ug/L	23.0		119	30-160			
N-Nitrosodiphenylamine	4.0	0.03	0.2	ug/L	5.00		80.7	30-160			
4-Bromophenyl phenyl ether	5.0	0.02	0.2	ug/L	5.00		100	30-160			
Hexachlorobenzene	5.8	0.04	0.2	ug/L	5.00		116	30-160			Q
Pentachlorophenol	15.6	0.1	1.0	ug/L	13.0		120	30-160			
Phenanthrene	4.7	0.02	0.2	ug/L	5.00		94.5	30-160			
Anthracene	4.4	0.03	0.2	ug/L	5.00		88.9	30-160			
Carbazole	4.6	0.04	0.2	ug/L	5.00		91.9	30-160			
Di-n-Butylphthalate	4.8	0.05	0.2	ug/L	5.00		95.2	30-160			B
Fluoranthene	4.5	0.03	0.2	ug/L	5.00		89.9	30-160			
Pyrene	4.4	0.03	0.2	ug/L	5.00		87.0	30-160			
Butylbenzylphthalate	5.2	0.07	0.2	ug/L	5.00		104	30-160			
Benzo(a)anthracene	4.1	0.04	0.2	ug/L	5.00		82.9	30-160			
3,3'-Dichlorobenzidine	6.5	0.3	1.0	ug/L	8.00		81.1	30-160			
Chrysene	4.1	0.04	0.2	ug/L	5.00		82.4	30-160			
bis(2-Ethylhexyl)phthalate	5.1	0.2	0.2	ug/L	5.00		102	30-160			
Di-n-Octylphthalate	4.3	0.05	0.2	ug/L	5.00		86.0	30-160			
Benzo(a)fluoranthene, Total	8.7	0.08	0.4	ug/L	10.0		87.2	30-160			
Benzo(a)pyrene	4.2	0.05	0.2	ug/L	5.00		84.3	30-160			
Indeno(1,2,3-cd)pyrene	4.8	0.06	0.2	ug/L	5.00		96.7	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0574-BS1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 15:38					
Dibenzo(a,h)anthracene	4.9	0.07	0.2	ug/L	5.00		98.3	30-160			
Benzo(g,h,i)perylene	4.8	0.04	0.2	ug/L	5.00		95.8	30-160			
1-Methylnaphthalene	4.2	0.03	0.2	ug/L	5.00		83.7	30-160			
Surrogate: 2-Fluorophenol	4.38			ug/L	7.50		58.3	30-160			
Surrogate: Phenol-d5	3.17			ug/L	7.50		42.2	30-160			
Surrogate: 2-Chlorophenol-d4	6.96			ug/L	7.50		92.7	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.58			ug/L	5.00		71.5	30-160			
Surrogate: Nitrobenzene-d5	5.08			ug/L	5.00		102	30-160			
Surrogate: 2-Fluorobiphenyl	4.49			ug/L	5.00		89.7	30-160			
Surrogate: 2,4,6-Tribromophenol	12.0			ug/L	7.50		160	30-160			Q
Surrogate: p-Terphenyl-d14	4.84			ug/L	5.00		96.8	30-160			
LCS Dup (BJE0574-BSD1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 16:17					
Phenol	1.8	0.01	0.2	ug/L	5.00		35.2	30-160	10.00	30	
bis(2-chloroethyl) ether	4.4	0.03	0.2	ug/L	5.00		87.6	30-160	4.77	30	
2-Chlorophenol	3.7	0.03	0.2	ug/L	5.00		74.8	30-160	5.18	30	
1,3-Dichlorobenzene	3.4	0.03	0.2	ug/L	5.00		68.9	30-160	4.93	30	
1,4-Dichlorobenzene	3.1	0.03	0.2	ug/L	5.00		61.6	30-160	7.38	30	
1,2-Dichlorobenzene	3.4	0.03	0.2	ug/L	5.00		69.0	30-160	5.50	30	
Benzyl Alcohol	2.8	0.02	0.2	ug/L	5.00		56.0	30-160	9.18	30	
2,2'-Oxybis(1-chloropropane)	3.4	0.03	0.2	ug/L	5.00		68.7	30-160	5.21	30	
2-Methylphenol	3.3	0.03	0.2	ug/L	5.00		66.5	30-160	3.30	30	
Hexachloroethane	3.2	0.04	0.2	ug/L	5.00		64.6	30-160	7.29	30	
N-Nitroso-di-n-Propylamine	4.8	0.04	0.2	ug/L	5.00		95.4	30-160	3.82	30	
4-Methylphenol	3.3	0.03	0.2	ug/L	5.00		65.8	30-160	6.11	30	
Nitrobenzene	4.6	0.03	0.2	ug/L	5.00		92.8	30-160	5.03	30	
Isophorone	4.8	0.03	0.2	ug/L	5.00		95.9	30-160	5.81	30	
2-Nitrophenol	3.9	0.04	1.0	ug/L	5.00		77.9	30-160	5.19	30	
2,4-Dimethylphenol	9.6	0.3	1.0	ug/L	13.0		73.5	30-160	5.34	30	
Bis(2-Chloroethoxy)methane	3.8	0.03	0.2	ug/L	5.00		76.8	30-160	11.60	30	
2,4-Dichlorophenol	10.9	0.1	1.0	ug/L	13.0		84.2	30-160	17.50	30	
1,2,4-Trichlorobenzene	3.2	0.03	0.2	ug/L	5.00		65.0	30-160	5.28	30	
Naphthalene	4.0	0.03	0.2	ug/L	5.00		79.7	30-160	6.58	30	
Benzoic acid	9.6	0.1	2.0	ug/L	23.0		41.9	30-160	2.36	30	
4-Chloroaniline	1.6	0.04	1.0	ug/L	13.0		12.6	30-160	21.80	30	*



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0574-BSD1)					Prepared: 27-May-2021 Analyzed: 02-Jun-2021 16:17						
Hexachlorobutadiene	2.9	0.04	0.2	ug/L	5.00		57.9	30-160	4.95	30	
4-Chloro-3-Methylphenol	12.2	0.1	1.0	ug/L	13.0		93.9	30-160	10.10	30	
2-Methylnaphthalene	3.8	0.03	0.2	ug/L	5.00		75.3	30-160	5.92	30	
Hexachlorocyclopentadiene	8.6	0.1	1.0	ug/L	13.0		66.3	30-160	8.63	30	
2,4,6-Trichlorophenol	11.6	0.2	1.0	ug/L	13.0		88.9	30-160	10.20	30	
2,4,5-Trichlorophenol	11.3	0.1	1.0	ug/L	13.0		87.1	30-160	9.37	30	
2-Chloronaphthalene	4.0	0.03	0.2	ug/L	5.00		80.4	30-160	6.67	30	
2-Nitroaniline	19.5	0.2	1.0	ug/L	13.0		150	30-160	11.00	30	Q
Acenaphthylene	3.8	0.02	0.2	ug/L	5.00		76.8	30-160	7.05	30	
Dimethylphthalate	4.2	0.04	0.2	ug/L	5.00		84.6	30-160	7.37	30	
2,6-Dinitrotoluene	14.4	0.2	1.0	ug/L	13.0		111	30-160	6.09	30	
Acenaphthene	4.1	0.03	0.2	ug/L	5.00		82.2	30-160	7.43	30	
3-Nitroaniline	13.4	0.2	1.0	ug/L	13.0		103	30-160	15.20	30	Q
2,4-Dinitrophenol	26.4	0.2	2.0	ug/L	23.0		115	30-160	10.70	30	
Dibenzofuran	4.2	0.02	0.2	ug/L	5.00		83.3	30-160	7.91	30	
4-Nitrophenol	6.2	0.06	1.0	ug/L	13.0		48.0	30-160	11.40	30	
2,4-Dinitrotoluene	15.0	0.1	1.0	ug/L	13.0		115	30-160	10.30	30	
Fluorene	4.2	0.02	0.2	ug/L	5.00		83.3	30-160	6.13	30	
4-Chlorophenylphenyl ether	3.3	0.02	0.2	ug/L	5.00		65.2	30-160	3.19	30	
Diethyl phthalate	4.4	0.06	0.2	ug/L	5.00		88.9	30-160	5.84	30	
4-Nitroaniline	13.8	0.2	1.0	ug/L	13.0		106	30-160	4.85	30	Q
4,6-Dinitro-2-methylphenol	25.3	0.4	2.0	ug/L	23.0		110	30-160	7.65	30	
N-Nitrosodiphenylamine	3.9	0.03	0.2	ug/L	5.00		77.3	30-160	4.32	30	
4-Bromophenyl phenyl ether	4.7	0.02	0.2	ug/L	5.00		93.7	30-160	6.75	30	
Hexachlorobenzene	5.4	0.04	0.2	ug/L	5.00		109	30-160	6.18	30	Q
Pentachlorophenol	14.5	0.1	1.0	ug/L	13.0		111	30-160	7.18	30	
Phenanthrene	4.3	0.02	0.2	ug/L	5.00		86.7	30-160	8.56	30	
Anthracene	4.2	0.03	0.2	ug/L	5.00		83.5	30-160	6.28	30	
Carbazole	4.3	0.04	0.2	ug/L	5.00		86.4	30-160	6.24	30	
Di-n-Butylphthalate	4.3	0.05	0.2	ug/L	5.00		87.0	30-160	9.02	30	B
Fluoranthene	4.4	0.03	0.2	ug/L	5.00		87.6	30-160	2.58	30	
Pyrene	4.2	0.03	0.2	ug/L	5.00		84.6	30-160	2.83	30	
Butylbenzylphthalate	4.9	0.07	0.2	ug/L	5.00		98.2	30-160	5.65	30	
Benzo(a)anthracene	4.1	0.04	0.2	ug/L	5.00		82.5	30-160	0.46	30	
3,3'-Dichlorobenzidine	6.0	0.3	1.0	ug/L	8.00		74.7	30-160	8.15	30	


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0574-BSD1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 16:17					
Chrysene	4.0	0.04	0.2	ug/L	5.00		80.5	30-160	2.34	30	
bis(2-Ethylhexyl)phthalate	4.8	0.2	0.2	ug/L	5.00		95.2	30-160	6.75	30	
Di-n-Octylphthalate	4.0	0.05	0.2	ug/L	5.00		79.7	30-160	7.58	30	
Benzo(a)fluoranthene, Total	8.4	0.08	0.4	ug/L	10.0		83.9	30-160	3.85	30	
Benzo(a)pyrene	4.0	0.05	0.2	ug/L	5.00		80.2	30-160	5.01	30	
Indeno(1,2,3-cd)pyrene	4.6	0.06	0.2	ug/L	5.00		92.1	30-160	4.93	30	
Dibenzo(a,h)anthracene	4.6	0.07	0.2	ug/L	5.00		92.4	30-160	6.15	30	
Benzo(g,h,i)perylene	4.6	0.04	0.2	ug/L	5.00		92.1	30-160	3.87	30	
1-Methylnaphthalene	4.0	0.03	0.2	ug/L	5.00		79.2	30-160	5.52	30	
Surrogate: 2-Fluorophenol	3.83			ug/L	7.50		51.0	30-160			
Surrogate: Phenol-d5	2.70			ug/L	7.50		36.0	30-160			
Surrogate: 2-Chlorophenol-d4	6.12			ug/L	7.50		81.5	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.18			ug/L	5.00		63.6	30-160			
Surrogate: Nitrobenzene-d5	4.54			ug/L	5.00		90.7	30-160			
Surrogate: 2-Fluorobiphenyl	3.88			ug/L	5.00		77.6	30-160			
Surrogate: 2,4,6-Tribromophenol	10.7			ug/L	7.50		143	30-160			Q
Surrogate: p-Terphenyl-d14	4.55			ug/L	5.00		90.9	30-160			


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 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0573 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0573-BLK1)						Prepared: 26-May-2021 Analyzed: 05-Jun-2021 11:34					
Naphthalene	0.003	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.002	0.001	0.010	ug/L							J
1-Methylnaphthalene	0.002	0.0009	0.010	ug/L							J
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	0.001	0.001	0.010	ug/L							J
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.004	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.160			ug/L	0.300		53.5	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.214			ug/L	0.300		71.3	29-120			
<i>Surrogate: Fluoranthene-d10</i>	0.200			ug/L	0.300		66.6	57-120			
LCS (BJE0573-BS1)						Prepared: 26-May-2021 Analyzed: 05-Jun-2021 12:06					
Naphthalene	0.210	0.001	0.010	ug/L	0.300		70.1	37-120			
2-Methylnaphthalene	0.204	0.001	0.010	ug/L	0.300		68.1	37-120			
1-Methylnaphthalene	0.203	0.0009	0.010	ug/L	0.300		67.7	29-120			
Acenaphthylene	0.197	0.002	0.010	ug/L	0.300		65.6	41-120			
Acenaphthene	0.209	0.003	0.010	ug/L	0.300		69.6	41-120			
Dibenzofuran	0.209	0.002	0.010	ug/L	0.300		69.5	38-120			
Fluorene	0.214	0.002	0.010	ug/L	0.300		71.5	43-120			


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 Project: Lower Duwamish
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Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0573 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0573-BS1)						Prepared: 26-May-2021 Analyzed: 05-Jun-2021 12:06					
Phenanthrene	0.219	0.001	0.010	ug/L	0.300		73.0	41-120			
Anthracene	0.203	0.001	0.010	ug/L	0.300		67.5	40-120			
Carbazole	0.230	0.001	0.010	ug/L	0.300		76.8	30-160			
Fluoranthene	0.232	0.002	0.010	ug/L	0.300		77.5	45-120			
Pyrene	0.224	0.001	0.010	ug/L	0.300		74.6	41-120			
Benzo(a)anthracene	0.225	0.0008	0.010	ug/L	0.300		74.9	42-120			
Chrysene	0.223	0.0009	0.010	ug/L	0.300		74.3	44-120			
Benzo(b)fluoranthene	0.237	0.0005	0.010	ug/L	0.300		78.9	44-120			
Benzo(k)fluoranthene	0.255	0.003	0.010	ug/L	0.300		85.1	50-120			
Benzo(j)fluoranthene	0.210	0.002	0.010	ug/L	0.300		69.9	39-160			
Benzofluoranthenes, Total	0.702	0.004	0.010	ug/L	0.900		78.0	46-120			
Benzo(a)pyrene	0.209	0.002	0.010	ug/L	0.300		69.6	35-120			
Perylene	0.170	0.006	0.010	ug/L	0.300		56.6	30-160			
Indeno(1,2,3-cd)pyrene	0.249	0.001	0.010	ug/L	0.300		83.1	37-120			
Dibenzo(a,h)anthracene	0.247	0.001	0.010	ug/L	0.300		82.4	34-120			
Benzo(g,h,i)perylene	0.284	0.001	0.010	ug/L	0.300		94.7	38-120			Q
Surrogate: 2-Methylnaphthalene-d10	0.196			ug/L	0.300		65.5	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.241			ug/L	0.300		80.2	29-120			
Surrogate: Fluoranthene-d10	0.220			ug/L	0.300		73.2	57-120			
LCS Dup (BJE0573-BS1)						Prepared: 26-May-2021 Analyzed: 05-Jun-2021 12:39					
Naphthalene	0.237	0.001	0.010	ug/L	0.300		79.1	37-120	12.10	30	
2-Methylnaphthalene	0.230	0.001	0.010	ug/L	0.300		76.6	37-120	11.70	30	
1-Methylnaphthalene	0.229	0.0009	0.010	ug/L	0.300		76.5	29-120	12.20	30	
Acenaphthylene	0.226	0.002	0.010	ug/L	0.300		75.5	41-120	14.00	30	
Acenaphthene	0.240	0.003	0.010	ug/L	0.300		80.1	41-120	13.90	30	
Dibenzofuran	0.238	0.002	0.010	ug/L	0.300		79.2	38-120	13.00	30	
Fluorene	0.244	0.002	0.010	ug/L	0.300		81.5	43-120	13.10	30	
Phenanthrene	0.245	0.001	0.010	ug/L	0.300		81.7	41-120	11.20	30	
Anthracene	0.229	0.001	0.010	ug/L	0.300		76.2	40-120	12.10	30	
Carbazole	0.248	0.001	0.010	ug/L	0.300		82.5	30-160	7.23	30	
Fluoranthene	0.255	0.002	0.010	ug/L	0.300		85.1	45-120	9.43	30	
Pyrene	0.247	0.001	0.010	ug/L	0.300		82.2	41-120	9.72	30	
Benzo(a)anthracene	0.249	0.0008	0.010	ug/L	0.300		83.1	42-120	10.30	30	
Chrysene	0.245	0.0009	0.010	ug/L	0.300		81.7	44-120	9.39	30	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0573 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0573-BS01)						Prepared: 26-May-2021 Analyzed: 05-Jun-2021 12:39					
Benzo(b)fluoranthene	0.266	0.0005	0.010	ug/L	0.300		88.6	44-120	11.60	30	
Benzo(k)fluoranthene	0.264	0.003	0.010	ug/L	0.300		88.0	50-120	3.35	30	
Benzo(j)fluoranthene	0.253	0.002	0.010	ug/L	0.300		84.4	39-160	18.80	30	
Benzofluoranthenes, Total	0.783	0.004	0.010	ug/L	0.900		87.0	46-120	11.00	30	
Benzo(a)pyrene	0.237	0.002	0.010	ug/L	0.300		79.1	35-120	12.80	30	
Perylene	0.203	0.006	0.010	ug/L	0.300		67.5	30-160	17.50	30	
Indeno(1,2,3-cd)pyrene	0.275	0.001	0.010	ug/L	0.300		91.5	37-120	9.68	30	
Dibenzo(a,h)anthracene	0.273	0.001	0.010	ug/L	0.300		90.9	34-120	9.88	30	
Benzo(g,h,i)perylene	0.316	0.001	0.010	ug/L	0.300		105	38-120	10.50	30	Q
Surrogate: 2-Methylnaphthalene-d10	0.215			ug/L	0.300		71.7	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.255			ug/L	0.300		85.1	29-120			
Surrogate: Fluoranthene-d10	0.231			ug/L	0.300		76.9	57-120			


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJE0553 - EPA 3510C SepF

Instrument: FID4 Analyst: CTO

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0553-BLK1)		Prepared: 25-May-2021 Analyzed: 26-May-2021 15:07							
Diesel Range Organics (C12-C24)	ND	0.100	mg/L						U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L						U
<i>Surrogate: o-Terphenyl</i>	0.158		mg/L	0.225	70.1	50-150			
LCS (BJE0553-BS1)		Prepared: 25-May-2021 Analyzed: 26-May-2021 15:28							
Diesel Range Organics (C12-C24)	2.42	0.100	mg/L	3.00	80.5	56-120			
<i>Surrogate: o-Terphenyl</i>	0.178		mg/L	0.225	79.1	50-150			
LCS Dup (BJE0553-BSD1)		Prepared: 25-May-2021 Analyzed: 26-May-2021 15:49							
Diesel Range Organics (C12-C24)	2.54	0.100	mg/L	3.00	84.5	56-120	4.85	30	
<i>Surrogate: o-Terphenyl</i>	0.184		mg/L	0.225	82.0	50-150			


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Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Aroclor PCB - Quality Control
Batch BJE0594 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0594-BLK1)						Prepared: 25-May-2021 Analyzed: 28-May-2021 15:57					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0141			ug/L	0.0200		70.5	29-120			
Surrogate: Tetrachlorometaxylene	0.0129			ug/L	0.0200		64.6	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0133			ug/L	0.0200		66.3	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00980			ug/L	0.0200		49.0	32-120			
LCS (BJE0594-BS1)						Prepared: 25-May-2021 Analyzed: 28-May-2021 16:18					
Aroclor 1016 [2C]	0.040	0.002	0.010	ug/L	0.0500		80.2	54-120			
Aroclor 1260	0.037	0.003	0.010	ug/L	0.0500		75.0	51-128			
Surrogate: Decachlorobiphenyl	0.0140			ug/L	0.0200		70.2	29-120			
Surrogate: Tetrachlorometaxylene	0.0137			ug/L	0.0200		68.6	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0131			ug/L	0.0200		65.5	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00994			ug/L	0.0200		49.7	32-120			
LCS Dup (BJE0594-BSD1)						Prepared: 25-May-2021 Analyzed: 28-May-2021 16:40					
Aroclor 1016 [2C]	0.040	0.002	0.010	ug/L	0.0500		80.6	54-120	0.52	30	
Aroclor 1260	0.039	0.003	0.010	ug/L	0.0500		77.6	51-128	3.40	30	
Surrogate: Decachlorobiphenyl	0.0139			ug/L	0.0200		69.5	29-120			
Surrogate: Tetrachlorometaxylene	0.0139			ug/L	0.0200		69.7	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0130			ug/L	0.0200		65.0	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0104			ug/L	0.0200		51.8	32-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0146 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0146-BLK1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 19:54						
Barium	135	ND	0.114	0.500	ug/L							U
Barium	137	ND	0.0765	0.500	ug/L							U
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
Cobalt	59	ND	0.0173	0.200	ug/L							U
Lead	208	ND	0.0513	0.100	ug/L							U
Manganese	55	ND	0.142	0.500	ug/L							U
Silver	107	ND	0.0220	0.200	ug/L							U
Vanadium	51a	ND	0.0556	0.200	ug/L							U
Vanadium	51b	ND	0.0521	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
Copper	63	ND	0.173	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0792	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Selenium	78	ND	0.179	0.500	ug/L							U
Zinc	66	ND	2.92	6.00	ug/L							U
Zinc	67	ND	0.940	6.00	ug/L							U
Blank (BJF0146-BLK2)						Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 21:26						
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U

LCS (BJF0146-BS1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 19:59						
Barium	135	24.4	0.114	0.500	ug/L	25.0		97.6	80-120			
Barium	137	24.5	0.0765	0.500	ug/L	25.0		97.9	80-120			
Chromium	52	25.0	0.260	0.500	ug/L	25.0		100	80-120			
Chromium	53	24.8	0.239	0.500	ug/L	25.0		99.0	80-120			
Cobalt	59	24.6	0.0173	0.200	ug/L	25.0		98.4	80-120			
Lead	208	24.8	0.0513	0.100	ug/L	25.0		99.0	80-120			
Manganese	55	24.5	0.142	0.500	ug/L	25.0		98.0	80-120			
Silver	107	24.7	0.0220	0.200	ug/L	25.0		98.9	80-120			
Vanadium	51a	24.5	0.0556	0.200	ug/L	25.0		97.9	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0146 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0146-BS1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 19:59						
Vanadium	51b	24.4	0.0521	0.200	ug/L	25.0		97.6	80-120			
Arsenic	75a	24.5	0.0373	0.200	ug/L	25.0		97.9	80-120			
Cadmium	111	24.7	0.0300	0.100	ug/L	25.0		98.7	80-120			
Cadmium	114	24.0	0.0400	0.100	ug/L	25.0		96.1	80-120			
Copper	63	24.6	0.173	0.500	ug/L	25.0		98.6	80-120			
Copper	65	24.7	0.350	0.500	ug/L	25.0		98.9	80-120			
Nickel	60	24.4	0.0792	0.500	ug/L	25.0		97.4	80-120			
Nickel	62	24.4	0.220	0.500	ug/L	25.0		97.5	80-120			
Selenium	78	75.5	0.179	0.500	ug/L	80.0		94.4	80-120			
Zinc	66	73.1	2.92	6.00	ug/L	80.0		91.4	80-120			
Zinc	67	66.7	0.940	6.00	ug/L	80.0		83.4	80-120			
LCS (BJF0146-BS2)						Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 21:31						
Iron	54	5280	18.2	36.0	ug/L	5000		106	80-120			
Iron	57	5140	6.63	36.0	ug/L	5000		103	80-120			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0195 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0195-BLK1)						Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 12:54					
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJF0195-BS1)						Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 12:57					
Mercury	0.00205	0.000013	0.000100	mg/L	0.00200		102	80-120			
Duplicate (BJF0195-DUP1)						Source: 21E0244-01 Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 13:01					
Mercury	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJF0195-MS1)						Source: 21E0244-01 Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 13:04					
Mercury	0.00108	0.000013	0.000100	mg/L	0.00100	ND	108	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJF0195-MSD1)						Source: 21E0244-01 Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 13:11					
Mercury	0.00103	0.000013	0.000100	mg/L	0.00100	ND	103	75-125	4.23	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0145 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0145-BLK1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 18:40						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Cobalt, Dissolved	59	ND	0.0173	0.200	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Manganese, Dissolved	55	0.176	0.142	0.500	ug/L							J
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	5.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	4.00	ug/L							U
Blank (BJF0145-BLK2)						Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 21:15						
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	6.63	20.0	ug/L							U

LCS (BJF0145-BS1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 18:45						
Barium, Dissolved	135	24.9	0.114	0.500	ug/L	25.0		99.6	80-120			
Barium, Dissolved	137	25.0	0.0765	0.500	ug/L	25.0		99.9	80-120			
Chromium, Dissolved	52	25.1	0.260	0.500	ug/L	25.0		100	80-120			
Cobalt, Dissolved	59	24.9	0.0173	0.200	ug/L	25.0		99.5	80-120			
Chromium, Dissolved	53	24.8	0.239	0.500	ug/L	25.0		99.2	80-120			
Lead, Dissolved	208	25.3	0.0513	0.100	ug/L	25.0		101	80-120			
Manganese, Dissolved	55	25.0	0.142	0.500	ug/L	25.0		99.8	80-120			
Silver, Dissolved	107	25.7	0.0220	0.200	ug/L	25.0		103	80-120			
Vanadium, Dissolved	51a	24.4	0.0556	0.200	ug/L	25.0		97.6	80-120			


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJJF0145 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0145-BS1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 18:45						
Vanadium, Dissolved	51b	24.3	0.0521	0.200	ug/L	25.0		97.3	80-120			
Arsenic, Dissolved	75a	23.3	0.0373	0.200	ug/L	25.0		93.4	80-120			
Cadmium, Dissolved	111	24.8	0.0300	0.100	ug/L	25.0		99.3	80-120			
Cadmium, Dissolved	114	24.6	0.0400	0.100	ug/L	25.0		98.5	80-120			
Copper, Dissolved	63	25.0	0.173	0.500	ug/L	25.0		99.9	80-120			
Copper, Dissolved	65	24.8	0.350	0.500	ug/L	25.0		99.4	80-120			
Nickel, Dissolved	60	24.5	0.0792	0.500	ug/L	25.0		97.9	80-120			
Nickel, Dissolved	62	25.6	0.220	0.500	ug/L	25.0		102	80-120			
Selenium, Dissolved	78	71.4	0.179	0.500	ug/L	80.0		89.3	80-120			
Zinc, Dissolved	66	72.6	2.92	5.00	ug/L	80.0		90.8	80-120			
Zinc, Dissolved	67	70.2	0.940	4.00	ug/L	80.0		87.8	80-120			
LCS (BJF0145-BS2)						Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 21:20						
Iron, Dissolved	54	5350	18.2	36.0	ug/L	5000		107	80-120			
Iron, Dissolved	57	5470	6.63	20.0	ug/L	5000		109	80-120			
Duplicate (BJF0145-DUP1)						Source: 21E0244-02 Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 01:45						
Barium, Dissolved	135	5.49	0.114	0.500	ug/L		5.37			2.06	20	
Cobalt, Dissolved	59	3.42	0.0173	0.200	ug/L		3.42			0.15	20	
Lead, Dissolved	208	0.0600	0.0513	0.100	ug/L		0.0590			1.68	20	J
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND					U
Arsenic, Dissolved	75a	1.75	0.0373	0.200	ug/L		1.79			2.37	20	
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L		ND					U
Copper, Dissolved	63	2.01	0.173	0.500	ug/L		1.99			0.70	20	
Nickel, Dissolved	60	3.55	0.0792	0.500	ug/L		3.62			1.84	20	
Selenium, Dissolved	78	0.289	0.179	0.500	ug/L		0.372			25.10	20	L, J
Zinc, Dissolved	66	ND	2.92	5.00	ug/L		ND					U
Duplicate (BJF0145-DUP2)						Source: 21E0244-02 Prepared: 07-Jun-2021 Analyzed: 11-Jun-2021 06:15						
Chromium, Dissolved	52	ND	1.30	2.50	ug/L		ND					U
Iron, Dissolved	54	142	91.0	180	ug/L		135			5.09	20	J, D
Manganese, Dissolved	55	280	0.710	2.50	ug/L		279			0.71	20	D
Vanadium, Dissolved	51a	4.06	0.278	1.00	ug/L		3.93			3.13	20	D
Matrix Spike (BJF0145-MS1)						Source: 21E0244-02 Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 01:51						
Barium, Dissolved	135	30.4	0.114	0.500	ug/L	25.0	5.37	100	75-125			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJF0145 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJF0145-MS1)		Source: 21E0244-02		Prepared: 07-Jun-2021		Analyzed: 08-Jun-2021 01:51						
Cobalt, Dissolved	59	29.3	0.0173	0.200	ug/L	25.0	3.42	103	75-125			
Lead, Dissolved	208	23.4	0.0513	0.100	ug/L	25.0	0.0590	93.4	75-125			
Silver, Dissolved	107	23.7	0.0220	0.200	ug/L	25.0	ND	94.7	75-125			
Arsenic, Dissolved	75a	23.8	0.0373	0.200	ug/L	25.0	1.79	88.2	75-125			
Cadmium, Dissolved	111	22.1	0.0300	0.100	ug/L	25.0	ND	88.4	75-125			
Copper, Dissolved	63	26.1	0.173	0.500	ug/L	25.0	1.99	96.4	75-125			
Nickel, Dissolved	60	28.3	0.0792	0.500	ug/L	25.0	3.62	98.8	75-125			
Selenium, Dissolved	78	62.0	0.179	0.500	ug/L	80.0	0.372	77.0	75-125			
Zinc, Dissolved	66	64.4	2.92	5.00	ug/L	80.0	ND	80.5	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0145-MS2)		Source: 21E0244-02		Prepared: 07-Jun-2021		Analyzed: 11-Jun-2021 06:20						
Chromium, Dissolved	52	24.8	1.30	2.50	ug/L	25.0	ND	99.1	75-125			D
Iron, Dissolved	54	5180	91.0	180	ug/L	5000	135	101	75-125			D
Manganese, Dissolved	55	294	0.710	2.50	ug/L	25.0	279	64.0	75-125			HC, D
Vanadium, Dissolved	51a	28.4	0.278	1.00	ug/L	25.0	3.93	97.8	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0145-MSD1)		Source: 21E0244-02		Prepared: 07-Jun-2021		Analyzed: 08-Jun-2021 01:57						
Barium, Dissolved	135	29.6	0.114	0.500	ug/L	25.0	5.37	96.7	75-125	2.93	20	
Cobalt, Dissolved	59	28.8	0.0173	0.200	ug/L	25.0	3.42	102	75-125	1.58	20	
Lead, Dissolved	208	23.6	0.0513	0.100	ug/L	25.0	0.0590	94.3	75-125	1.00	20	
Silver, Dissolved	107	23.6	0.0220	0.200	ug/L	25.0	ND	94.6	75-125	0.09	20	
Arsenic, Dissolved	75a	25.7	0.0373	0.200	ug/L	25.0	1.79	95.6	75-125	7.48	20	
Cadmium, Dissolved	111	24.4	0.0300	0.100	ug/L	25.0	ND	97.7	75-125	10.00	20	
Copper, Dissolved	63	26.9	0.173	0.500	ug/L	25.0	1.99	99.4	75-125	2.86	20	
Nickel, Dissolved	60	28.3	0.0792	0.500	ug/L	25.0	3.62	98.7	75-125	0.09	20	
Selenium, Dissolved	78	70.6	0.179	0.500	ug/L	80.0	0.372	87.8	75-125	13.00	20	
Zinc, Dissolved	66	71.1	2.92	5.00	ug/L	80.0	ND	88.9	75-125	9.91	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0145-MSD2)		Source: 21E0244-02		Prepared: 07-Jun-2021		Analyzed: 11-Jun-2021 06:27						
Chromium, Dissolved	52	24.1	1.30	2.50	ug/L	25.0	ND	96.5	75-125	2.72	20	D
Iron, Dissolved	54	5070	91.0	180	ug/L	5000	135	98.7	75-125	2.07	20	D
Manganese, Dissolved	55	294	0.710	2.50	ug/L	25.0	279	60.3	75-125	0.31	20	HC, D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJF0145 - REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJF0145-MSD2)			Source: 21E0244-02			Prepared: 07-Jun-2021			Analyzed: 11-Jun-2021 06:27			
Vanadium, Dissolved	51a	28.1	0.278	1.00	ug/L	25.0	3.93	96.8	75-125	0.85	20	D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 17:09

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0234 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0234-BLK1)						Prepared: 09-Jun-2021 Analyzed: 14-Jun-2021 13:55					
Mercury, Dissolved	0.000053	0.000013	0.000100	mg/L							J
LCS (BJF0234-BS1)						Prepared: 09-Jun-2021 Analyzed: 14-Jun-2021 13:57					
Mercury, Dissolved	0.00224	0.000013	0.000100	mg/L	0.00200		112	80-120			
Duplicate (BJF0234-DUP1)						Source: 21E0244-02 Prepared: 09-Jun-2021 Analyzed: 14-Jun-2021 14:07					
Mercury, Dissolved	0.000060	0.000013	0.000100	mg/L		ND					J
Matrix Spike (BJF0234-MS1)						Source: 21E0244-02 Prepared: 09-Jun-2021 Analyzed: 14-Jun-2021 14:09					
Mercury, Dissolved	0.000997	0.000013	0.000100	mg/L	0.00100	ND	99.7	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJF0234-MSD1)						Source: 21E0244-02 Prepared: 09-Jun-2021 Analyzed: 14-Jun-2021 14:11					
Mercury, Dissolved	0.000939	0.000013	0.000100	mg/L	0.00100	ND	93.9	75-125	6.06	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 17:09

Certified Analyses included in this Report

Analyte	Certifications
<i>EPA 6020B in Water</i>	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
<i>EPA 6020B UCT-KED in Water</i>	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP


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Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE


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Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE


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m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP
2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP


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2-Methylphenol	NELAP,DoD-ELAP
Hexachloroethane	NELAP,DoD-ELAP
N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP
Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP
2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP
2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP
2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP


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Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE


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Benzo(k)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Perylene	ADEC, NELAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP, NELAP, WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP, NELAP, WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP, NELAP, WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE, DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE, DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE, DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE, ADEC, DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE, DoD-ELAP



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Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
D1	Surrogate was not detected due to sample extract dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
L	Analyte concentration is ≤ 5 times the reporting limit and the replicate control limit defaults to $\pm$ RL instead of 20% RPD
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria ($< 20\%$ RSD, $< 20\%$ drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

14 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21E0260

Associated SDG ID(s)
N/A

Susan
Dunniho

Digitally signed by
Susan Dunniho
Date: 2021.12.15
14:43:00 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunniho For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21E0260		Turn-around Requested: Standard		Page: 1 of 1	
ARI Client Company: Shannon & Wilson, Inc.		Phone:		Date: 5/21/21	Ice Present?
Client Contact: Shoshono Howard				No. of Coolers:	Cooler Temps: 4.9; 6.0
Client Project Name: LDW		Analysis Requested			
Client Project #: 21-1-12596-012					
Samplers: CTC, BON, RBP		Notes/Comments			
Sample ID	Date	Time	Matrix	No. Containers	
TB-7-20212105	5/21/21	9:00	W	5	① Cadmium
MW-50-20212105	5/21/21	8:40	W	7	② Manganese
MW-51-20212105		10:27	W	9	③ Arsenic, Manganese,
MW-38-20212105		11:32	W	9	nickel, copper, Selenium, Zinc
MW-37-20212105		12:25	W	11	④ Arsenic, Barium, Chromium, Manganese,
MW-72-20212105		13:10	W	11	nickel, Cadmium, cobalt, copper, iron, lead,
MW-61-20212105		13:55	W	11	mercury, Selenium, Silver, Vanadium, Zinc
Comments/Special Instructions * Lab to filter for dissolved metals. * Refer to project methods and analyte list.					
Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)	
Printed Name: RYAN PETERSON		Printed Name: Dimitri Lomnadtze		Printed Name:	
Company: Shannon & Wilson		Company: ARI		Company:	
Date & Time: 5/21/21 1430		Date & Time: 05/21/21 1430		Date & Time:	



Analytical Resources, Incorporated
 Analytical Chemists and Consultants
 4611 South 134th Place, Suite 100
 Tukwila, WA 98168
 206-695-6200 206-695-6201 (fax)
 www.arilabs.com

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TB-7-20212105	21E0260-01	Water	21-May-2021 08:40	21-May-2021 14:30
MW-50-20212105	21E0260-02	Water	21-May-2021 08:40	21-May-2021 14:30
MW-50-20212105	21E0260-03	Water	21-May-2021 08:40	21-May-2021 14:30
MW-51-20212105	21E0260-04	Water	21-May-2021 10:27	21-May-2021 14:30
MW-38-20212105	21E0260-05	Water	21-May-2021 11:32	21-May-2021 14:30
MW-38-20212105	21E0260-06	Water	21-May-2021 11:32	21-May-2021 14:30
MW-37-20212105	21E0260-07	Water	21-May-2021 12:25	21-May-2021 14:30
MW-37-20212105	21E0260-08	Water	21-May-2021 12:25	21-May-2021 14:30
MW-72-20212105	21E0260-09	Water	21-May-2021 13:10	21-May-2021 14:30
MW-72-20212105	21E0260-10	Water	21-May-2021 13:10	21-May-2021 14:30
MW-61-20212105	21E0260-11	Water	21-May-2021 13:55	21-May-2021 14:30
MW-61-20212105	21E0260-12	Water	21-May-2021 13:55	21-May-2021 14:30



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish
Work Order: 21E0260

Sample receipt

Samples as listed on the preceding page were received 21-May-2021 14:30 under ARI work order 21E0260. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Gasoline by NWTPH-q (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except 2-Nitroaniline, 3-Nitroaniline, 4-Nitroaniline, Hexachlorobenzene and surrogate 2,4,6-Tribromophenol which were out of control high in the initial calibration verification (ICV). All samples which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except surrogate 2,4,6- Tribromophenol which was out of control high in the ICV and has been flagged.

The method blank(s) were clean at the reporting limits except Di-n-Butylphalate. All samples which contain analyte have been flagged with a "B" qualifier.

The blank spike (BS/LCS) percent recoveries were within control limits.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except Benzo(g,h,i)perylene which was out of control high in the initial calibration verification. All samples which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Total and Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0260-02 in Total Metals batch BJF0146. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits except Zinc RPD which has been flagged.

Total and Dissolved Mercury - EPA Method 7470/7471

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

REVISED to correct VOC list.



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon & Wilson Inc.

Project Name: LDW

COC No(s): _____ (NA)

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 21E0260

Tracking No: _____ (NA)

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? _____

YES (NO)

Were custody papers included with the cooler? _____

YES (YES) NO

Were custody papers properly filled out (ink, signed, etc.) _____

YES (YES) NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1430

44 6.0

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 5206

Cooler Accepted by: DL Date: 05/21/21 Time: 1430

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? _____

YES (NO)

What kind of packing material was used? ... Bubble Wrap (Wet Ice) Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? _____

NA (YES) NO

How were bottles sealed in plastic bags? _____

(Individually) Grouped Not

Did all bottles arrive in good condition (unbroken)? _____

(YES) NO

Were all bottle labels complete and legible? _____

(YES) NO

Did the number of containers listed on COC match with the number of containers received? _____

(YES) NO

Did all bottle labels and tags agree with custody papers? _____

(YES) NO

Were all bottles used correct for the requested analyses? _____

(YES) NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ...

NA (YES) NO

Were all VOC vials free of air bubbles? _____

NA (YES) NO

Was sufficient amount of sample sent in each bottle? _____

(YES) NO

Date VOC Trip Blank was made at ARI: _____

NA 5/19/21

Were the sample(s) split by ARI? (NA) YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: SC Date: 5/21/21 Time: 1511 Labels checked by: SC

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____

Date: _____



WORK ORDER

21E0260

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0260-01 A	VOA Vial, Clear, 40 mL, HCL		
21E0260-01 B	VOA Vial, Clear, 40 mL, HCL		
21E0260-01 C	VOA Vial, Clear, 40 mL, HCL		
21E0260-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0260-01 E	VOA Vial, Clear, 40 mL, HCL		
21E0260-02 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass (P)
21E0260-02 B	Glass NM, Amber, 1000 mL		
21E0260-02 C	Glass NM, Amber, 1000 mL		
21E0260-02 D	VOA Vial, Clear, 40 mL, HCL		
21E0260-02 E	VOA Vial, Clear, 40 mL, HCL		
21E0260-02 F	VOA Vial, Clear, 40 mL, HCL		
21E0260-03 A	Large OJ, 1000 mL	> 2	Fail (F)
21E0260-04 A	Glass NM, Amber, 1000 mL		
21E0260-04 B	Glass NM, Amber, 1000 mL		
21E0260-04 C	Glass NM, Amber, 500 mL		
21E0260-04 D	Glass NM, Amber, 500 mL		
21E0260-04 E	VOA Vial, Clear, 40 mL, HCL		
21E0260-04 F	VOA Vial, Clear, 40 mL, HCL		
21E0260-04 G	VOA Vial, Clear, 40 mL, HCL		
21E0260-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0260-04 I	VOA Vial, Clear, 40 mL, HCL		
21E0260-05 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0260-05 B	Glass NM, Amber, 500 mL		
21E0260-05 C	Glass NM, Amber, 500 mL		
21E0260-05 D	VOA Vial, Clear, 40 mL, HCL		
21E0260-05 E	VOA Vial, Clear, 40 mL, HCL		
21E0260-05 F	VOA Vial, Clear, 40 mL, HCL		
21E0260-05 G	VOA Vial, Clear, 40 mL, HCL		
21E0260-05 H	VOA Vial, Clear, 40 mL, HCL		
21E0260-06 A	Large OJ, 1000 mL	> 2	F
21E0260-07 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0260-07 B	Glass NM, Amber, 500 mL		
21E0260-07 C	Glass NM, Amber, 500 mL		
21E0260-07 D	Glass NM, Amber, 500 mL		
21E0260-07 E	Glass NM, Amber, 500 mL		



WORK ORDER

21E0260

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0260-07 F	VOA Vial, Clear, 40 mL, HCL		
21E0260-07 G	VOA Vial, Clear, 40 mL, HCL		
21E0260-07 H	VOA Vial, Clear, 40 mL, HCL		
21E0260-07 I	VOA Vial, Clear, 40 mL, HCL		
21E0260-07 J	VOA Vial, Clear, 40 mL, HCL		
21E0260-08 A	Large OJ, 1000 mL	> 2	F
21E0260-09 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0260-09 B	Glass NM, Amber, 500 mL		
21E0260-09 C	Glass NM, Amber, 500 mL		
21E0260-09 D	Glass NM, Amber, 500 mL		
21E0260-09 E	Glass NM, Amber, 500 mL		
21E0260-09 F	Glass NM, Amber, 500 mL		
21E0260-09 G	Glass NM, Amber, 500 mL		
21E0260-09 H	VOA Vial, Clear, 40 mL, HCL		
21E0260-09 I	VOA Vial, Clear, 40 mL, HCL		
21E0260-09 J	VOA Vial, Clear, 40 mL, HCL		
21E0260-10 A	Large OJ, 1000 mL	> 2	F
21E0260-11 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0260-11 B	Glass NM, Amber, 500 mL		
21E0260-11 C	Glass NM, Amber, 500 mL		
21E0260-11 D	Glass NM, Amber, 500 mL		
21E0260-11 E	Glass NM, Amber, 500 mL		
21E0260-11 F	VOA Vial, Clear, 40 mL, HCL		
21E0260-11 G	VOA Vial, Clear, 40 mL, HCL		
21E0260-11 H	VOA Vial, Clear, 40 mL, HCL		
21E0260-11 I	VOA Vial, Clear, 40 mL, HCL		
21E0260-11 J	VOA Vial, Clear, 40 mL, HCL		
21E0260-12 A	Large OJ, 1000 mL	> 2	F

SC

Preservation Confirmed By

5/21/21

Date



WORK ORDER

21E0260

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0260-01 A	VOA Vial, Clear, 40 mL, HCL		
21E0260-01 B	VOA Vial, Clear, 40 mL, HCL		
21E0260-01 C	VOA Vial, Clear, 40 mL, HCL		
21E0260-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0260-01 E	VOA Vial, Clear, 40 mL, HCL		
21E0260-02 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass (P)
21E0260-02 B	Glass NM, Amber, 1000 mL		
21E0260-02 C	Glass NM, Amber, 1000 mL		
21E0260-02 D	VOA Vial, Clear, 40 mL, HCL		
21E0260-02 E	VOA Vial, Clear, 40 mL, HCL		
21E0260-02 F	VOA Vial, Clear, 40 mL, HCL		
21E0260-03 A	Large OJ, 1000 mL	> 2	Fail (F) (1)
21E0260-04 A	Glass NM, Amber, 1000 mL		
21E0260-04 B	Glass NM, Amber, 1000 mL		
21E0260-04 C	Glass NM, Amber, 500 mL		
21E0260-04 D	Glass NM, Amber, 500 mL		
21E0260-04 E	VOA Vial, Clear, 40 mL, HCL		
21E0260-04 F	VOA Vial, Clear, 40 mL, HCL		
21E0260-04 G	VOA Vial, Clear, 40 mL, HCL		
21E0260-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0260-04 I	VOA Vial, Clear, 40 mL, HCL		
21E0260-05 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0260-05 B	Glass NM, Amber, 500 mL		
21E0260-05 C	Glass NM, Amber, 500 mL		
21E0260-05 D	VOA Vial, Clear, 40 mL, HCL		
21E0260-05 E	VOA Vial, Clear, 40 mL, HCL		
21E0260-05 F	VOA Vial, Clear, 40 mL, HCL		
21E0260-05 G	VOA Vial, Clear, 40 mL, HCL		
21E0260-05 H	VOA Vial, Clear, 40 mL, HCL		
21E0260-06 A	Large OJ, 1000 mL	> 2	F (1)
21E0260-07 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0260-07 B	Glass NM, Amber, 500 mL		
21E0260-07 C	Glass NM, Amber, 500 mL		
21E0260-07 D	Glass NM, Amber, 500 mL		
21E0260-07 E	Glass NM, Amber, 500 mL		



WORK ORDER

21E0260

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0260-07 F	VOA Vial, Clear, 40 mL, HCL		
21E0260-07 G	VOA Vial, Clear, 40 mL, HCL		
21E0260-07 H	VOA Vial, Clear, 40 mL, HCL		
21E0260-07 I	VOA Vial, Clear, 40 mL, HCL		
21E0260-07 J	VOA Vial, Clear, 40 mL, HCL		
21E0260-08 A	Large OJ, 1000 mL	> 2	F ①
21E0260-09 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	P
21E0260-09 B	Glass NM, Amber, 500 mL		
21E0260-09 C	Glass NM, Amber, 500 mL		
21E0260-09 D	Glass NM, Amber, 500 mL		
21E0260-09 E	Glass NM, Amber, 500 mL		
21E0260-09 F	Glass NM, Amber, 500 mL		
21E0260-09 G	Glass NM, Amber, 500 mL		
21E0260-09 H	VOA Vial, Clear, 40 mL, HCL		
21E0260-09 I	VOA Vial, Clear, 40 mL, HCL		
21E0260-09 J	VOA Vial, Clear, 40 mL, HCL		
21E0260-10 A	Large OJ, 1000 mL	> 2	F ①
21E0260-11 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	P
21E0260-11 B	Glass NM, Amber, 500 mL		
21E0260-11 C	Glass NM, Amber, 500 mL		
21E0260-11 D	Glass NM, Amber, 500 mL		
21E0260-11 E	Glass NM, Amber, 500 mL		
21E0260-11 F	VOA Vial, Clear, 40 mL, HCL		
21E0260-11 G	VOA Vial, Clear, 40 mL, HCL		
21E0260-11 H	VOA Vial, Clear, 40 mL, HCL		
21E0260-11 I	VOA Vial, Clear, 40 mL, HCL		
21E0260-11 J	VOA Vial, Clear, 40 mL, HCL		
21E0260-12 A	Large OJ, 1000 mL	> 2	F ①

SC

Preservation Confirmed By

5/21/21

Date

① Filtered at 0.45 um and
preserved to pH < 2.0 with 0.75 ml
Conc. HNO₃ (J2314). mL 05/20/21

Reviewed By

Date



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

TB-7-20212105
21E0260-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/21/2021 08:40

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 12:24

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-01 C

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	110	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	90.6	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	102	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

TB-7-20212105
21E0260-01 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/21/2021 08:40

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 12:24

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-01 C

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	90.6	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-50-20212105
21E0260-02 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/21/2021 08:40

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 13:48

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-02 D

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	2.96	ug/L	
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>					<i>80-129 %</i>	<i>116 %</i>	
<i>Surrogate: Toluene-d8</i>					<i>80-120 %</i>	<i>96.6 %</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>					<i>80-120 %</i>	<i>89.2 %</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					<i>80-120 %</i>	<i>104 %</i>	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-50-20212105
21E0260-02 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/21/2021 08:40

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 18:48

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0594 Prepared: 05/25/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0260-02 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0221 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0260-02 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0219 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0260-02 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0220 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0260-02 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	65.3	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	61.7	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	61.6	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	46.7	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-50-20212105
21E0260-02 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/21/2021 08:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 04:00

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-02 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-50-20212105
21E0260-03 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/21/2021 08:40

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/07/2021 23:07

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-03 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-51-20212105

21E0260-04 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/21/2021 10:27

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 14:09

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-04 F

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	0.56	ug/L	
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	0.42	ug/L	
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	119	%	
Surrogate: Toluene-d8				80-120 %	96.0	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	84.8	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	105	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-51-20212105
21E0260-04 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/21/2021 10:27

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 14:09

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-04 F

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	84.8	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-51-20212105

21E0260-04 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/21/2021 10:27

Instrument: NT10 Analyst: VTS

Analyzed: 06/02/2021 18:51

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJE0574
Prepared: 05/27/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21E0260-04 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	0.3	ug/L	B
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 % 47.6 %

Surrogate: Phenol-d5

30-160 % 30.7 %

Surrogate: 2-Chlorophenol-d4

30-160 % 81.6 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 % 66.3 %

Surrogate: Nitrobenzene-d5

30-160 % 91.4 %

Surrogate: 2-Fluorobiphenyl

30-160 % 78.8 %

Surrogate: 2,4,6-Tribromophenol

30-160 % 157 % Q

Surrogate: p-Terphenyl-d14

30-160 % 92.7 %



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-51-20212105

21E0260-04 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/21/2021 10:27

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 19:09

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0594 Prepared: 05/25/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0260-04 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0221 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0260-04 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0219 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0260-04 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0220 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0260-04 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	65.2	%	
Surrogate: Tetrachlorometaxylene				32-120 %	62.9	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	61.6	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	47.3	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-38-20212105
21E0260-05 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/21/2021 11:32

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 14:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-05 D

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>				80-120 %	95.4	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	86.3	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-38-20212105

21E0260-05 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/21/2021 11:32

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 14:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-05 D

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	95.4	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	86.3	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-38-20212105
21E0260-05 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/21/2021 11:32

Instrument: FID4 Analyst: CTO

Analyzed: 05/27/2021 17:55

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0260-05 B 01

Preparation Batch: BJE0570

Sample Size: 475 mL

Prepared: 05/26/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.105	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.211	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>66.0</i>	<i>%</i>	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-38-20212105
21E0260-05 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/21/2021 11:32

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 04:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-05 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	1	0.142	0.500	11.9	ug/L	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-38-20212105
21E0260-06 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/21/2021 11:32

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/07/2021 23:13

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-06 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	1	0.142	0.500	1.20	ug/L	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-37-20212105

21E0260-07 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/21/2021 12:25

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 14:51

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-07 H

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>122</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>96.2</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>84.7</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>106</i>	<i>%</i>	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-37-20212105
21E0260-07 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/21/2021 12:25

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 14:51

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-07 H

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	84.7	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-37-20212105

21E0260-07 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/21/2021 12:25

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 16:57

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0573 Prepared: 05/26/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0260-07 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0021 Cleaned: 02-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0260-07 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.004	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.002	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.001	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.242	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	0.001	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	63.6	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	71.5	%	
Surrogate: Fluoranthene-d10				57-120 %	76.7	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-37-20212105
21E0260-07 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/21/2021 12:25

Instrument: FID4 Analyst: CTO

Analyzed: 05/27/2021 18:16

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0260-07 B 01

Preparation Batch: BJE0570

Sample Size: 500 mL

Prepared: 05/26/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>60.9</i>	<i>%</i>	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-37-20212105
21E0260-07 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/21/2021 12:25

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 04:55

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-07 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	1	0.142	0.500	146	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-37-20212105
21E0260-07 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/21/2021 12:25

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 04:55

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-07 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	1.99	ug/L	
Copper	7440-50-8	1	0.173	0.500	9.75	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	12.2	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.589	ug/L	
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-37-20212105
21E0260-08 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/21/2021 12:25

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-08 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	1	0.142	0.500	138	ug/L	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-37-20212105
21E0260-08 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/21/2021 12:25

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-08 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	2.28	ug/L	
Copper, Dissolved	7440-50-8	1	0.173	0.500	9.52	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	11.3	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.432	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-72-20212105

21E0260-09 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/21/2021 13:10

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 15:13

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-09 H

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	125	%	
Surrogate: Toluene-d8				80-120 %	97.0	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	85.7	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	104	%	



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-72-20212105

21E0260-09 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/21/2021 13:10

Instrument: NT10 Analyst: VTS

Analyzed: 06/02/2021 19:30

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJE0574
Prepared: 05/27/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21E0260-09 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	0.01	0.2	ND	ug/L	U
bis(2-chloroethyl) ether	111-44-4	1	0.03	0.2	ND	ug/L	U
2-Chlorophenol	95-57-8	1	0.03	0.2	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.03	0.2	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
Benzyl Alcohol	100-51-6	1	0.02	0.2	ND	ug/L	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	0.03	0.2	ND	ug/L	U
2-Methylphenol	95-48-7	1	0.03	0.2	ND	ug/L	U
Hexachloroethane	67-72-1	1	0.04	0.2	ND	ug/L	U
N-Nitroso-di-n-Propylamine	621-64-7	1	0.04	0.2	ND	ug/L	U
4-Methylphenol	106-44-5	1	0.03	0.2	ND	ug/L	U
Nitrobenzene	98-95-3	1	0.03	0.2	ND	ug/L	U
Isophorone	78-59-1	1	0.03	0.2	ND	ug/L	U
2-Nitrophenol	88-75-5	1	0.04	1.0	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Bis(2-Chloroethoxy)methane	111-91-1	1	0.03	0.2	ND	ug/L	U
2,4-Dichlorophenol	120-83-2	1	0.1	1.0	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.03	0.2	ND	ug/L	U
Naphthalene	91-20-3	1	0.03	0.2	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
4-Chloroaniline	106-47-8	1	0.04	1.0	ND	ug/L	U
Hexachlorobutadiene	87-68-3	1	0.04	0.2	ND	ug/L	U
4-Chloro-3-Methylphenol	59-50-7	1	0.1	1.0	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.03	0.2	ND	ug/L	U
Hexachlorocyclopentadiene	77-47-4	1	0.1	1.0	ND	ug/L	U
2,4,6-Trichlorophenol	88-06-2	1	0.2	1.0	ND	ug/L	U
2,4,5-Trichlorophenol	95-95-4	1	0.1	1.0	ND	ug/L	U
2-Chloronaphthalene	91-58-7	1	0.03	0.2	ND	ug/L	U
2-Nitroaniline	88-74-4	1	0.2	1.0	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.02	0.2	ND	ug/L	U
Dimethylphthalate	131-11-3	1	0.04	0.2	ND	ug/L	U
2,6-Dinitrotoluene	606-20-2	1	0.2	1.0	ND	ug/L	U
Acenaphthene	83-32-9	1	0.03	0.2	ND	ug/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-72-20212105

21E0260-09 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/21/2021 13:10

Instrument: NT10 Analyst: VTS

Analyzed: 06/02/2021 19:30

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
3-Nitroaniline	99-09-2	1	0.2	1.0	ND	ug/L	U
2,4-Dinitrophenol	51-28-5	1	0.2	2.0	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.02	0.2	ND	ug/L	U
4-Nitrophenol	100-02-7	1	0.06	1.0	ND	ug/L	U
2,4-Dinitrotoluene	121-14-2	1	0.1	1.0	ND	ug/L	U
Fluorene	86-73-7	1	0.02	0.2	ND	ug/L	U
4-Chlorophenylphenyl ether	7005-72-3	1	0.02	0.2	ND	ug/L	U
Diethyl phthalate	84-66-2	1	0.06	0.2	ND	ug/L	U
4-Nitroaniline	100-01-6	1	0.2	1.0	ND	ug/L	U
4,6-Dinitro-2-methylphenol	534-52-1	1	0.4	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
4-Bromophenyl phenyl ether	101-55-3	1	0.02	0.2	ND	ug/L	U
Hexachlorobenzene	118-74-1	1	0.04	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Phenanthrene	85-01-8	1	0.02	0.2	ND	ug/L	U
Anthracene	120-12-7	1	0.03	0.2	ND	ug/L	U
Carbazole	86-74-8	1	0.04	0.2	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	0.4	ug/L	B
Fluoranthene	206-44-0	1	0.03	0.2	ND	ug/L	U
Pyrene	129-00-0	1	0.03	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.04	0.2	ND	ug/L	U
3,3'-Dichlorobenzidine	91-94-1	1	0.3	1.0	ND	ug/L	U
Chrysene	218-01-9	1	0.04	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U
Di-n-Octylphthalate	117-84-0	1	0.05	0.2	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.08	0.4	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.05	0.2	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.06	0.2	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.07	0.2	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.04	0.2	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.03	0.2	ND	ug/L	U
Surrogate: 2-Fluorophenol				30-160 %	49.0	%	
Surrogate: Phenol-d5				30-160 %	32.2	%	
Surrogate: 2-Chlorophenol-d4				30-160 %	81.1	%	
Surrogate: 1,2-Dichlorobenzene-d4				30-160 %	68.5	%	
Surrogate: Nitrobenzene-d5				30-160 %	98.5	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-72-20212105

21E0260-09 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/21/2021 13:10

Instrument: NT10 Analyst: VTS

Analyzed: 06/02/2021 19:30

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
<i>Surrogate: 2-Fluorobiphenyl</i>		30-160 %	84.0	%	
<i>Surrogate: 2,4,6-Tribromophenol</i>		30-160 %	162	%	*, Q
<i>Surrogate: p-Terphenyl-d14</i>		30-160 %	94.2	%	


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-72-20212105
21E0260-09 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/21/2021 13:10

Instrument: FID4 Analyst: CTO

Analyzed: 05/27/2021 18:37

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0260-09 B 01

Preparation Batch: BJE0570

Sample Size: 500 mL

Prepared: 05/26/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>71.7</i>	<i>%</i>	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-72-20212105
21E0260-09 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/21/2021 13:10

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 05:01

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0146 Sample Size: 25 mL
 Prepared: 06/07/2021 Final Volume: 25 mL

Extract ID: 21E0260-09 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	8.17	ug/L	
Chromium	7440-47-3	2	0.520	1.00	0.874	ug/L	J, D
Cobalt	7440-48-4	1	0.0173	0.200	2.58	ug/L	
Iron	7439-89-6	2	36.4	72.0	913	ug/L	D
Lead	7439-92-1	1	0.0513	0.100	0.137	ug/L	
Manganese	7439-96-5	2	0.284	1.00	315	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	2	0.111	0.400	9.21	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-72-20212105
21E0260-09 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/21/2021 13:10

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 05:01

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-09 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	8.25	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	0.0490	ug/L	J
Copper	7440-50-8	1	0.173	0.500	6.64	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	5.44	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.301	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-72-20212105

21E0260-09 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/21/2021 13:10

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:29

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0260-09 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-72-20212105
21E0260-10 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/21/2021 13:10

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:55

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-10 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			6.34	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500			0.683	ug/L	
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200			2.82	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100			ND	ug/L	U
Manganese, Dissolved	7439-96-5	5	0.710	2.50			324	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200			7.51	ug/L	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-72-20212105
21E0260-10 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/21/2021 13:10

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 03:55

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-10 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	9.11	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	0.0550	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500	5.70	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	5.27	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-72-20212105
21E0260-10 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/21/2021 13:10

Instrument: HYDRA Analyst: ML

Analyzed: 06/14/2021 14:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0260-10 A 01

Preparation Batch: BJF0234

Sample Size: 20 mL

Filtration Batch: BJE0529

Prepared: 06/09/2021

Final Volume: 20 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000132	mg/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-72-20212105
21E0260-10RE1 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/21/2021 13:10

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/09/2021 04:06

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0260-10RE1 A 02
	Preparation Batch: BJF0145	Filtration Batch: BJE0529
	Prepared: 06/07/2021	Filtration Date: 05/21/2021 14:13
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Iron, Dissolved	7439-89-6	1	18.2	36.0	517	ug/L	



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-61-20212105

21E0260-11 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/21/2021 13:55

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 15:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-11 G

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	126	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.9	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	84.7	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	105	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-61-20212105
21E0260-11 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/21/2021 13:55

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 15:34

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0260-11 G

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.9	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	84.6	%	



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-61-20212105

21E0260-11 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/21/2021 13:55

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 17:29

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0573 Prepared: 05/26/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0260-11 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0021 Cleaned: 02-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0260-11 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.005	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.003	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.005	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	0.004	ug/L	J
Acenaphthene	83-32-9	1	0.003	0.010	0.218	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	0.004	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	0.006	ug/L	J
Phenanthrene	85-01-8	1	0.001	0.010	0.004	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	0.002	ug/L	J
Pyrene	129-00-0	1	0.001	0.010	0.004	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	69.2	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	75.7	%	
Surrogate: Fluoranthene-d10				57-120 %	83.4	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-61-20212105
21E0260-11 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/21/2021 13:55

Instrument: FID4 Analyst: CTO

Analyzed: 05/27/2021 18:59

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0260-11 B 01

Preparation Batch: BJE0570

Sample Size: 500 mL

Prepared: 05/26/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.342	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	0.340	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	73.9	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-61-20212105
21E0260-11 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/21/2021 13:55

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 05:07

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0146 Sample Size: 25 mL
 Prepared: 06/07/2021 Final Volume: 25 mL

Extract ID: 21E0260-11 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	8.57	ug/L	
Chromium	7440-47-3	1	0.260	0.500	0.637	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	2.47	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.180	ug/L	
Manganese	7439-96-5	5	0.710	2.50	666	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	0.0230	ug/L	J
Vanadium	7440-62-2	1	0.0556	0.200	2.20	ug/L	


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Reported:
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MW-61-20212105
21E0260-11 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/21/2021 13:55

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 05:07

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-11 A 01

Preparation Batch: BJF0146

Sample Size: 25 mL

Prepared: 06/07/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	1.21	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	0.0570	ug/L	J
Copper	7440-50-8	1	0.173	0.500	6.85	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	5.69	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.472	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-61-20212105

21E0260-11 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/21/2021 13:55

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:32

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0260-11 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-61-20212105
21E0260-11RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/21/2021 13:55

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/09/2021 04:12

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJF0146 Sample Size: 25 mL
Prepared: 06/07/2021 Final Volume: 25 mL

Extract ID: 21E0260-11RE1 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Iron	7439-89-6	1	18.2	36.0	278	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-61-20212105
21E0260-12 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/21/2021 13:55

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 04:45

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-12 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			7.52	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500			0.420	ug/L	J
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200			2.40	ug/L	
Iron, Dissolved	7439-89-6	2	36.4	72.0			111	ug/L	D
Lead, Dissolved	7439-92-1	1	0.0513	0.100			ND	ug/L	U
Manganese, Dissolved	7439-96-5	5	0.710	2.50			661	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200			1.60	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

MW-61-20212105
21E0260-12 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/21/2021 13:55

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/08/2021 04:45

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0260-12 A 02

Preparation Batch: BJF0145

Sample Size: 25 mL

Filtration Batch: BJE0529

Prepared: 06/07/2021

Final Volume: 25 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	1.06	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	0.0500	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500	6.16	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	5.62	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.296	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

MW-61-20212105

21E0260-12 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/21/2021 13:55

Instrument: HYDRA Analyst: ML

Analyzed: 06/14/2021 14:37

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0260-12 A 01

Preparation Batch: BJF0234

Sample Size: 20 mL

Filtration Batch: BJE0529

Prepared: 06/09/2021

Final Volume: 20 mL

Filtration Date: 05/21/2021 14:13

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000104	mg/L	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJE0654 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0654-BLK1)		Prepared: 26-May-2021 Analyzed: 26-May-2021 11:42								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.80		ug/L	5.00		96.0	80-120			
Surrogate: 4-Bromofluorobenzene	4.61		ug/L	5.00		92.3	80-120			
Blank (BJE0654-BLK2)		Prepared: 26-May-2021 Analyzed: 26-May-2021 11:42								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.41		ug/L	5.00		108	80-129			
Surrogate: Toluene-d8	4.80		ug/L	5.00		96.0	80-120			
Surrogate: 4-Bromofluorobenzene	4.61		ug/L	5.00		92.1	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.06		ug/L	5.00		101	80-120			
LCS (BJE0654-BS1)		Prepared: 26-May-2021 Analyzed: 26-May-2021 10:00								
Gasoline Range Organics (Tol-Nap)	1060	100	ug/L	1000		106	72-128			
Surrogate: Toluene-d8	5.05		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	4.99		ug/L	5.00		99.9	80-120			
LCS (BJE0654-BS2)		Prepared: 26-May-2021 Analyzed: 26-May-2021 10:21								
Vinyl Chloride	10.9	0.08	0.20	ug/L	10.0	109	66-133			
1,1-Dichloroethene	11.2	0.08	0.20	ug/L	10.0	112	69-135			
trans-1,2-Dichloroethene	10.7	0.07	0.20	ug/L	10.0	107	78-128			
cis-1,2-Dichloroethene	11.2	0.08	0.20	ug/L	10.0	112	80-121			
Benzene	11.1	0.05	0.20	ug/L	10.0	111	80-120			
Trichloroethene	10.8	0.07	0.20	ug/L	10.0	108	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0654 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0654-BS2)						Prepared: 26-May-2021 Analyzed: 26-May-2021 10:21					
Toluene	10.8	0.05	0.20	ug/L	10.0		108	80-120			
Tetrachloroethene	11.2	0.09	0.20	ug/L	10.0		112	80-120			
Ethylbenzene	11.4	0.05	0.20	ug/L	10.0		114	80-120			
m,p-Xylene	23.7	0.14	0.40	ug/L	20.0		118	80-121			
o-Xylene	10.5	0.08	0.20	ug/L	10.0		105	80-121			
Xylenes, total	34.2	0.22	0.60	ug/L	30.0		114	76-127			
Surrogate: 1,2-Dichloroethane-d4	4.89			ug/L	5.00		97.7	80-129			
Surrogate: Toluene-d8	5.02			ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.09			ug/L	5.00		102	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.98			ug/L	5.00		99.7	80-120			
LCS Dup (BJE0654-BSD1)						Prepared: 26-May-2021 Analyzed: 26-May-2021 10:41					
Gasoline Range Organics (Tol-Nap)	1100		100	ug/L	1000		110	72-128	3.27	30	
Surrogate: Toluene-d8	5.09			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	5.01			ug/L	5.00		100	80-120			
LCS Dup (BJE0654-BSD2)						Prepared: 26-May-2021 Analyzed: 26-May-2021 11:01					
Vinyl Chloride	11.0	0.08	0.20	ug/L	10.0		110	66-133	0.52	30	
1,1-Dichloroethene	11.1	0.08	0.20	ug/L	10.0		111	69-135	0.50	30	
trans-1,2-Dichloroethene	10.6	0.07	0.20	ug/L	10.0		106	78-128	0.56	30	
cis-1,2-Dichloroethene	11.4	0.08	0.20	ug/L	10.0		114	80-121	1.32	30	
Benzene	11.3	0.05	0.20	ug/L	10.0		113	80-120	1.70	30	
Trichloroethene	11.0	0.07	0.20	ug/L	10.0		110	80-120	2.08	30	
Toluene	11.0	0.05	0.20	ug/L	10.0		110	80-120	1.50	30	
Tetrachloroethene	11.0	0.09	0.20	ug/L	10.0		110	80-120	2.07	30	
Ethylbenzene	11.2	0.05	0.20	ug/L	10.0		112	80-120	1.89	30	
m,p-Xylene	23.5	0.14	0.40	ug/L	20.0		117	80-121	0.85	30	
o-Xylene	10.3	0.08	0.20	ug/L	10.0		103	80-121	1.53	30	
Xylenes, total	33.8	0.22	0.60	ug/L	30.0		113	76-127	1.06	30	
Surrogate: 1,2-Dichloroethane-d4	4.98			ug/L	5.00		99.6	80-129			
Surrogate: Toluene-d8	5.11			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	5.00			ug/L	5.00		99.9	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.96			ug/L	5.00		99.2	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0574-BLK1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 15:00					
Phenol	ND	0.01	0.2	ug/L							U
bis(2-chloroethyl) ether	ND	0.03	0.2	ug/L							U
2-Chlorophenol	ND	0.03	0.2	ug/L							U
1,3-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
Benzyl Alcohol	ND	0.02	0.2	ug/L							U
2,2'-Oxybis(1-chloropropane)	ND	0.03	0.2	ug/L							U
2-Methylphenol	ND	0.03	0.2	ug/L							U
Hexachloroethane	ND	0.04	0.2	ug/L							U
N-Nitroso-di-n-Propylamine	ND	0.04	0.2	ug/L							U
4-Methylphenol	ND	0.03	0.2	ug/L							U
Nitrobenzene	ND	0.03	0.2	ug/L							U
Isophorone	ND	0.03	0.2	ug/L							U
2-Nitrophenol	ND	0.04	1.0	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Bis(2-Chloroethoxy)methane	ND	0.03	0.2	ug/L							U
2,4-Dichlorophenol	ND	0.1	1.0	ug/L							U
1,2,4-Trichlorobenzene	ND	0.03	0.2	ug/L							U
Naphthalene	ND	0.03	0.2	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
4-Chloroaniline	ND	0.04	1.0	ug/L							U
Hexachlorobutadiene	ND	0.04	0.2	ug/L							U
4-Chloro-3-Methylphenol	ND	0.1	1.0	ug/L							U
2-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Hexachlorocyclopentadiene	ND	0.1	1.0	ug/L							U
2,4,6-Trichlorophenol	ND	0.2	1.0	ug/L							U
2,4,5-Trichlorophenol	ND	0.1	1.0	ug/L							U
2-Chloronaphthalene	ND	0.03	0.2	ug/L							U
2-Nitroaniline	ND	0.2	1.0	ug/L							U
Acenaphthylene	ND	0.02	0.2	ug/L							U
Dimethylphthalate	ND	0.04	0.2	ug/L							U
2,6-Dinitrotoluene	ND	0.2	1.0	ug/L							U
Acenaphthene	ND	0.03	0.2	ug/L							U
3-Nitroaniline	ND	0.2	1.0	ug/L							U


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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0574-BLK1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 15:00					
2,4-Dinitrophenol	ND	0.2	2.0	ug/L							U
Dibenzofuran	ND	0.02	0.2	ug/L							U
4-Nitrophenol	ND	0.06	1.0	ug/L							U
2,4-Dinitrotoluene	ND	0.1	1.0	ug/L							U
Fluorene	ND	0.02	0.2	ug/L							U
4-Chlorophenylphenyl ether	ND	0.02	0.2	ug/L							U
Diethyl phthalate	ND	0.06	0.2	ug/L							U
4-Nitroaniline	ND	0.2	1.0	ug/L							U
4,6-Dinitro-2-methylphenol	ND	0.4	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
4-Bromophenyl phenyl ether	ND	0.02	0.2	ug/L							U
Hexachlorobenzene	ND	0.04	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Phenanthrene	ND	0.02	0.2	ug/L							U
Anthracene	ND	0.03	0.2	ug/L							U
Carbazole	ND	0.04	0.2	ug/L							U
Di-n-Butylphthalate	0.4	0.05	0.2	ug/L							
Fluoranthene	ND	0.03	0.2	ug/L							U
Pyrene	ND	0.03	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
Benzo(a)anthracene	ND	0.04	0.2	ug/L							U
3,3'-Dichlorobenzidine	ND	0.3	1.0	ug/L							U
Chrysene	ND	0.04	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
Di-n-Octylphthalate	ND	0.05	0.2	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.08	0.4	ug/L							U
Benzo(a)pyrene	ND	0.05	0.2	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.06	0.2	ug/L							U
Dibenzo(a,h)anthracene	ND	0.07	0.2	ug/L							U
Benzo(g,h,i)perylene	ND	0.04	0.2	ug/L							U
1-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Surrogate: 2-Fluorophenol	4.19			ug/L	7.50		55.9	30-160			
Surrogate: Phenol-d5	2.69			ug/L	7.50		35.8	30-160			
Surrogate: 2-Chlorophenol-d4	6.57			ug/L	7.50		87.6	30-160			


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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0574-BLK1)						Prepared: 27-May-2021	Analyzed: 02-Jun-2021 15:00				
Surrogate: 1,2-Dichlorobenzene-d4	3.54			ug/L	5.00		70.9	30-160			
Surrogate: Nitrobenzene-d5	4.86			ug/L	5.00		97.1	30-160			
Surrogate: 2-Fluorobiphenyl	4.30			ug/L	5.00		85.9	30-160			
Surrogate: 2,4,6-Tribromophenol	11.8			ug/L	7.50		157	30-160			Q
Surrogate: p-Terphenyl-d14	4.65			ug/L	5.00		93.1	30-160			
LCS (BJE0574-BS1)						Prepared: 27-May-2021	Analyzed: 02-Jun-2021 15:38				
Phenol	1.9	0.01	0.2	ug/L	5.00		38.9	30-160			
bis(2-chloroethyl) ether	4.6	0.03	0.2	ug/L	5.00		91.8	30-160			
2-Chlorophenol	3.9	0.03	0.2	ug/L	5.00		78.7	30-160			
1,3-Dichlorobenzene	3.6	0.03	0.2	ug/L	5.00		72.4	30-160			
1,4-Dichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.4	30-160			
1,2-Dichlorobenzene	3.6	0.03	0.2	ug/L	5.00		72.8	30-160			
Benzyl Alcohol	3.1	0.02	0.2	ug/L	5.00		61.4	30-160			
2,2'-Oxybis(1-chloropropane)	3.6	0.03	0.2	ug/L	5.00		72.4	30-160			
2-Methylphenol	3.4	0.03	0.2	ug/L	5.00		68.7	30-160			
Hexachloroethane	3.5	0.04	0.2	ug/L	5.00		69.5	30-160			
N-Nitroso-di-n-Propylamine	5.0	0.04	0.2	ug/L	5.00		99.1	30-160			
4-Methylphenol	3.5	0.03	0.2	ug/L	5.00		69.9	30-160			
Nitrobenzene	4.9	0.03	0.2	ug/L	5.00		97.6	30-160			
Isophorone	5.1	0.03	0.2	ug/L	5.00		102	30-160			
2-Nitrophenol	4.1	0.04	1.0	ug/L	5.00		82.0	30-160			
2,4-Dimethylphenol	10.1	0.3	1.0	ug/L	13.0		77.5	30-160			
Bis(2-Chloroethoxy)methane	4.3	0.03	0.2	ug/L	5.00		86.3	30-160			
2,4-Dichlorophenol	13.0	0.1	1.0	ug/L	13.0		100	30-160			
1,2,4-Trichlorobenzene	3.4	0.03	0.2	ug/L	5.00		68.5	30-160			
Naphthalene	4.3	0.03	0.2	ug/L	5.00		85.2	30-160			
Benzoic acid	9.9	0.1	2.0	ug/L	23.0		42.9	30-160			
4-Chloroaniline	2.0	0.04	1.0	ug/L	13.0		15.7	30-160			*
Hexachlorobutadiene	3.0	0.04	0.2	ug/L	5.00		60.8	30-160			
4-Chloro-3-Methylphenol	13.5	0.1	1.0	ug/L	13.0		104	30-160			
2-Methylnaphthalene	4.0	0.03	0.2	ug/L	5.00		79.9	30-160			
Hexachlorocyclopentadiene	9.4	0.1	1.0	ug/L	13.0		72.3	30-160			
2,4,6-Trichlorophenol	12.8	0.2	1.0	ug/L	13.0		98.4	30-160			
2,4,5-Trichlorophenol	12.4	0.1	1.0	ug/L	13.0		95.7	30-160			


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
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Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0574-BS1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 15:38					
2-Chloronaphthalene	4.3	0.03	0.2	ug/L	5.00		85.9	30-160			
2-Nitroaniline	21.8	0.2	1.0	ug/L	13.0		168	30-160			*, Q
Acenaphthylene	4.1	0.02	0.2	ug/L	5.00		82.5	30-160			
Dimethylphthalate	4.6	0.04	0.2	ug/L	5.00		91.0	30-160			
2,6-Dinitrotoluene	15.3	0.2	1.0	ug/L	13.0		118	30-160			
Acenaphthene	4.4	0.03	0.2	ug/L	5.00		88.6	30-160			
3-Nitroaniline	15.6	0.2	1.0	ug/L	13.0		120	30-160			Q
2,4-Dinitrophenol	29.3	0.2	2.0	ug/L	23.0		128	30-160			
Dibenzofuran	4.5	0.02	0.2	ug/L	5.00		90.2	30-160			
4-Nitrophenol	7.0	0.06	1.0	ug/L	13.0		53.7	30-160			
2,4-Dinitrotoluene	16.6	0.1	1.0	ug/L	13.0		128	30-160			
Fluorene	4.4	0.02	0.2	ug/L	5.00		88.6	30-160			
4-Chlorophenylphenyl ether	3.4	0.02	0.2	ug/L	5.00		67.3	30-160			
Diethyl phthalate	4.7	0.06	0.2	ug/L	5.00		94.3	30-160			
4-Nitroaniline	14.5	0.2	1.0	ug/L	13.0		112	30-160			Q
4,6-Dinitro-2-methylphenol	27.3	0.4	2.0	ug/L	23.0		119	30-160			
N-Nitrosodiphenylamine	4.0	0.03	0.2	ug/L	5.00		80.7	30-160			
4-Bromophenyl phenyl ether	5.0	0.02	0.2	ug/L	5.00		100	30-160			
Hexachlorobenzene	5.8	0.04	0.2	ug/L	5.00		116	30-160			Q
Pentachlorophenol	15.6	0.1	1.0	ug/L	13.0		120	30-160			
Phenanthrene	4.7	0.02	0.2	ug/L	5.00		94.5	30-160			
Anthracene	4.4	0.03	0.2	ug/L	5.00		88.9	30-160			
Carbazole	4.6	0.04	0.2	ug/L	5.00		91.9	30-160			
Di-n-Butylphthalate	4.8	0.05	0.2	ug/L	5.00		95.2	30-160			B
Fluoranthene	4.5	0.03	0.2	ug/L	5.00		89.9	30-160			
Pyrene	4.4	0.03	0.2	ug/L	5.00		87.0	30-160			
Butylbenzylphthalate	5.2	0.07	0.2	ug/L	5.00		104	30-160			
Benzo(a)anthracene	4.1	0.04	0.2	ug/L	5.00		82.9	30-160			
3,3'-Dichlorobenzidine	6.5	0.3	1.0	ug/L	8.00		81.1	30-160			
Chrysene	4.1	0.04	0.2	ug/L	5.00		82.4	30-160			
bis(2-Ethylhexyl)phthalate	5.1	0.2	0.2	ug/L	5.00		102	30-160			
Di-n-Octylphthalate	4.3	0.05	0.2	ug/L	5.00		86.0	30-160			
Benzo(a)fluoranthene, Total	8.7	0.08	0.4	ug/L	10.0		87.2	30-160			
Benzo(a)pyrene	4.2	0.05	0.2	ug/L	5.00		84.3	30-160			
Indeno(1,2,3-cd)pyrene	4.8	0.06	0.2	ug/L	5.00		96.7	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0574-BS1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 15:38					
Dibenzo(a,h)anthracene	4.9	0.07	0.2	ug/L	5.00		98.3	30-160			
Benzo(g,h,i)perylene	4.8	0.04	0.2	ug/L	5.00		95.8	30-160			
1-Methylnaphthalene	4.2	0.03	0.2	ug/L	5.00		83.7	30-160			
Surrogate: 2-Fluorophenol	4.38			ug/L	7.50		58.3	30-160			
Surrogate: Phenol-d5	3.17			ug/L	7.50		42.2	30-160			
Surrogate: 2-Chlorophenol-d4	6.96			ug/L	7.50		92.7	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.58			ug/L	5.00		71.5	30-160			
Surrogate: Nitrobenzene-d5	5.08			ug/L	5.00		102	30-160			
Surrogate: 2-Fluorobiphenyl	4.49			ug/L	5.00		89.7	30-160			
Surrogate: 2,4,6-Tribromophenol	12.0			ug/L	7.50		160	30-160			Q
Surrogate: p-Terphenyl-d14	4.84			ug/L	5.00		96.8	30-160			
LCS Dup (BJE0574-BSD1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 16:17					
Phenol	1.8	0.01	0.2	ug/L	5.00		35.2	30-160	10.00	30	
bis(2-chloroethyl) ether	4.4	0.03	0.2	ug/L	5.00		87.6	30-160	4.77	30	
2-Chlorophenol	3.7	0.03	0.2	ug/L	5.00		74.8	30-160	5.18	30	
1,3-Dichlorobenzene	3.4	0.03	0.2	ug/L	5.00		68.9	30-160	4.93	30	
1,4-Dichlorobenzene	3.1	0.03	0.2	ug/L	5.00		61.6	30-160	7.38	30	
1,2-Dichlorobenzene	3.4	0.03	0.2	ug/L	5.00		69.0	30-160	5.50	30	
Benzyl Alcohol	2.8	0.02	0.2	ug/L	5.00		56.0	30-160	9.18	30	
2,2'-Oxybis(1-chloropropane)	3.4	0.03	0.2	ug/L	5.00		68.7	30-160	5.21	30	
2-Methylphenol	3.3	0.03	0.2	ug/L	5.00		66.5	30-160	3.30	30	
Hexachloroethane	3.2	0.04	0.2	ug/L	5.00		64.6	30-160	7.29	30	
N-Nitroso-di-n-Propylamine	4.8	0.04	0.2	ug/L	5.00		95.4	30-160	3.82	30	
4-Methylphenol	3.3	0.03	0.2	ug/L	5.00		65.8	30-160	6.11	30	
Nitrobenzene	4.6	0.03	0.2	ug/L	5.00		92.8	30-160	5.03	30	
Isophorone	4.8	0.03	0.2	ug/L	5.00		95.9	30-160	5.81	30	
2-Nitrophenol	3.9	0.04	1.0	ug/L	5.00		77.9	30-160	5.19	30	
2,4-Dimethylphenol	9.6	0.3	1.0	ug/L	13.0		73.5	30-160	5.34	30	
Bis(2-Chloroethoxy)methane	3.8	0.03	0.2	ug/L	5.00		76.8	30-160	11.60	30	
2,4-Dichlorophenol	10.9	0.1	1.0	ug/L	13.0		84.2	30-160	17.50	30	
1,2,4-Trichlorobenzene	3.2	0.03	0.2	ug/L	5.00		65.0	30-160	5.28	30	
Naphthalene	4.0	0.03	0.2	ug/L	5.00		79.7	30-160	6.58	30	
Benzoic acid	9.6	0.1	2.0	ug/L	23.0		41.9	30-160	2.36	30	
4-Chloroaniline	1.6	0.04	1.0	ug/L	13.0		12.6	30-160	21.80	30	*



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0574-BSD1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 16:17					
Hexachlorobutadiene	2.9	0.04	0.2	ug/L	5.00		57.9	30-160	4.95	30	
4-Chloro-3-Methylphenol	12.2	0.1	1.0	ug/L	13.0		93.9	30-160	10.10	30	
2-Methylnaphthalene	3.8	0.03	0.2	ug/L	5.00		75.3	30-160	5.92	30	
Hexachlorocyclopentadiene	8.6	0.1	1.0	ug/L	13.0		66.3	30-160	8.63	30	
2,4,6-Trichlorophenol	11.6	0.2	1.0	ug/L	13.0		88.9	30-160	10.20	30	
2,4,5-Trichlorophenol	11.3	0.1	1.0	ug/L	13.0		87.1	30-160	9.37	30	
2-Chloronaphthalene	4.0	0.03	0.2	ug/L	5.00		80.4	30-160	6.67	30	
2-Nitroaniline	19.5	0.2	1.0	ug/L	13.0		150	30-160	11.00	30	Q
Acenaphthylene	3.8	0.02	0.2	ug/L	5.00		76.8	30-160	7.05	30	
Dimethylphthalate	4.2	0.04	0.2	ug/L	5.00		84.6	30-160	7.37	30	
2,6-Dinitrotoluene	14.4	0.2	1.0	ug/L	13.0		111	30-160	6.09	30	
Acenaphthene	4.1	0.03	0.2	ug/L	5.00		82.2	30-160	7.43	30	
3-Nitroaniline	13.4	0.2	1.0	ug/L	13.0		103	30-160	15.20	30	Q
2,4-Dinitrophenol	26.4	0.2	2.0	ug/L	23.0		115	30-160	10.70	30	
Dibenzofuran	4.2	0.02	0.2	ug/L	5.00		83.3	30-160	7.91	30	
4-Nitrophenol	6.2	0.06	1.0	ug/L	13.0		48.0	30-160	11.40	30	
2,4-Dinitrotoluene	15.0	0.1	1.0	ug/L	13.0		115	30-160	10.30	30	
Fluorene	4.2	0.02	0.2	ug/L	5.00		83.3	30-160	6.13	30	
4-Chlorophenylphenyl ether	3.3	0.02	0.2	ug/L	5.00		65.2	30-160	3.19	30	
Diethyl phthalate	4.4	0.06	0.2	ug/L	5.00		88.9	30-160	5.84	30	
4-Nitroaniline	13.8	0.2	1.0	ug/L	13.0		106	30-160	4.85	30	Q
4,6-Dinitro-2-methylphenol	25.3	0.4	2.0	ug/L	23.0		110	30-160	7.65	30	
N-Nitrosodiphenylamine	3.9	0.03	0.2	ug/L	5.00		77.3	30-160	4.32	30	
4-Bromophenyl phenyl ether	4.7	0.02	0.2	ug/L	5.00		93.7	30-160	6.75	30	
Hexachlorobenzene	5.4	0.04	0.2	ug/L	5.00		109	30-160	6.18	30	Q
Pentachlorophenol	14.5	0.1	1.0	ug/L	13.0		111	30-160	7.18	30	
Phenanthrene	4.3	0.02	0.2	ug/L	5.00		86.7	30-160	8.56	30	
Anthracene	4.2	0.03	0.2	ug/L	5.00		83.5	30-160	6.28	30	
Carbazole	4.3	0.04	0.2	ug/L	5.00		86.4	30-160	6.24	30	
Di-n-Butylphthalate	4.3	0.05	0.2	ug/L	5.00		87.0	30-160	9.02	30	B
Fluoranthene	4.4	0.03	0.2	ug/L	5.00		87.6	30-160	2.58	30	
Pyrene	4.2	0.03	0.2	ug/L	5.00		84.6	30-160	2.83	30	
Butylbenzylphthalate	4.9	0.07	0.2	ug/L	5.00		98.2	30-160	5.65	30	
Benzo(a)anthracene	4.1	0.04	0.2	ug/L	5.00		82.5	30-160	0.46	30	
3,3'-Dichlorobenzidine	6.0	0.3	1.0	ug/L	8.00		74.7	30-160	8.15	30	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0574 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0574-BSD1)						Prepared: 27-May-2021 Analyzed: 02-Jun-2021 16:17					
Chrysene	4.0	0.04	0.2	ug/L	5.00		80.5	30-160	2.34	30	
bis(2-Ethylhexyl)phthalate	4.8	0.2	0.2	ug/L	5.00		95.2	30-160	6.75	30	
Di-n-Octylphthalate	4.0	0.05	0.2	ug/L	5.00		79.7	30-160	7.58	30	
Benzo(a)fluoranthene, Total	8.4	0.08	0.4	ug/L	10.0		83.9	30-160	3.85	30	
Benzo(a)pyrene	4.0	0.05	0.2	ug/L	5.00		80.2	30-160	5.01	30	
Indeno(1,2,3-cd)pyrene	4.6	0.06	0.2	ug/L	5.00		92.1	30-160	4.93	30	
Dibenzo(a,h)anthracene	4.6	0.07	0.2	ug/L	5.00		92.4	30-160	6.15	30	
Benzo(g,h,i)perylene	4.6	0.04	0.2	ug/L	5.00		92.1	30-160	3.87	30	
1-Methylnaphthalene	4.0	0.03	0.2	ug/L	5.00		79.2	30-160	5.52	30	
Surrogate: 2-Fluorophenol	3.83			ug/L	7.50		51.0	30-160			
Surrogate: Phenol-d5	2.70			ug/L	7.50		36.0	30-160			
Surrogate: 2-Chlorophenol-d4	6.12			ug/L	7.50		81.5	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.18			ug/L	5.00		63.6	30-160			
Surrogate: Nitrobenzene-d5	4.54			ug/L	5.00		90.7	30-160			
Surrogate: 2-Fluorobiphenyl	3.88			ug/L	5.00		77.6	30-160			
Surrogate: 2,4,6-Tribromophenol	10.7			ug/L	7.50		143	30-160			Q
Surrogate: p-Terphenyl-d14	4.55			ug/L	5.00		90.9	30-160			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0573 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0573-BLK1)						Prepared: 26-May-2021 Analyzed: 05-Jun-2021 11:34					
Naphthalene	0.003	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.002	0.001	0.010	ug/L							J
1-Methylnaphthalene	0.002	0.0009	0.010	ug/L							J
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	0.001	0.001	0.010	ug/L							J
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.004	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.160			ug/L	0.300		53.5	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.214			ug/L	0.300		71.3	29-120			
<i>Surrogate: Fluoranthene-d10</i>	0.200			ug/L	0.300		66.6	57-120			

LCS (BJE0573-BS1)						Prepared: 26-May-2021 Analyzed: 05-Jun-2021 12:06					
Naphthalene	0.210	0.001	0.010	ug/L	0.300		70.1	37-120			
2-Methylnaphthalene	0.204	0.001	0.010	ug/L	0.300		68.1	37-120			
1-Methylnaphthalene	0.203	0.0009	0.010	ug/L	0.300		67.7	29-120			
Acenaphthylene	0.197	0.002	0.010	ug/L	0.300		65.6	41-120			
Acenaphthene	0.209	0.003	0.010	ug/L	0.300		69.6	41-120			
Dibenzofuran	0.209	0.002	0.010	ug/L	0.300		69.5	38-120			
Fluorene	0.214	0.002	0.010	ug/L	0.300		71.5	43-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0573 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0573-BS1)						Prepared: 26-May-2021 Analyzed: 05-Jun-2021 12:06					
Phenanthrene	0.219	0.001	0.010	ug/L	0.300		73.0	41-120			
Anthracene	0.203	0.001	0.010	ug/L	0.300		67.5	40-120			
Carbazole	0.230	0.001	0.010	ug/L	0.300		76.8	30-160			
Fluoranthene	0.232	0.002	0.010	ug/L	0.300		77.5	45-120			
Pyrene	0.224	0.001	0.010	ug/L	0.300		74.6	41-120			
Benzo(a)anthracene	0.225	0.0008	0.010	ug/L	0.300		74.9	42-120			
Chrysene	0.223	0.0009	0.010	ug/L	0.300		74.3	44-120			
Benzo(b)fluoranthene	0.237	0.0005	0.010	ug/L	0.300		78.9	44-120			
Benzo(k)fluoranthene	0.255	0.003	0.010	ug/L	0.300		85.1	50-120			
Benzo(j)fluoranthene	0.210	0.002	0.010	ug/L	0.300		69.9	39-160			
Benzofluoranthenes, Total	0.702	0.004	0.010	ug/L	0.900		78.0	46-120			
Benzo(a)pyrene	0.209	0.002	0.010	ug/L	0.300		69.6	35-120			
Perylene	0.170	0.006	0.010	ug/L	0.300		56.6	30-160			
Indeno(1,2,3-cd)pyrene	0.249	0.001	0.010	ug/L	0.300		83.1	37-120			
Dibenzo(a,h)anthracene	0.247	0.001	0.010	ug/L	0.300		82.4	34-120			
Benzo(g,h,i)perylene	0.284	0.001	0.010	ug/L	0.300		94.7	38-120			Q
Surrogate: 2-Methylnaphthalene-d10	0.196			ug/L	0.300		65.5	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.241			ug/L	0.300		80.2	29-120			
Surrogate: Fluoranthene-d10	0.220			ug/L	0.300		73.2	57-120			
LCS Dup (BJE0573-BS1)						Prepared: 26-May-2021 Analyzed: 05-Jun-2021 12:39					
Naphthalene	0.237	0.001	0.010	ug/L	0.300		79.1	37-120	12.10	30	
2-Methylnaphthalene	0.230	0.001	0.010	ug/L	0.300		76.6	37-120	11.70	30	
1-Methylnaphthalene	0.229	0.0009	0.010	ug/L	0.300		76.5	29-120	12.20	30	
Acenaphthylene	0.226	0.002	0.010	ug/L	0.300		75.5	41-120	14.00	30	
Acenaphthene	0.240	0.003	0.010	ug/L	0.300		80.1	41-120	13.90	30	
Dibenzofuran	0.238	0.002	0.010	ug/L	0.300		79.2	38-120	13.00	30	
Fluorene	0.244	0.002	0.010	ug/L	0.300		81.5	43-120	13.10	30	
Phenanthrene	0.245	0.001	0.010	ug/L	0.300		81.7	41-120	11.20	30	
Anthracene	0.229	0.001	0.010	ug/L	0.300		76.2	40-120	12.10	30	
Carbazole	0.248	0.001	0.010	ug/L	0.300		82.5	30-160	7.23	30	
Fluoranthene	0.255	0.002	0.010	ug/L	0.300		85.1	45-120	9.43	30	
Pyrene	0.247	0.001	0.010	ug/L	0.300		82.2	41-120	9.72	30	
Benzo(a)anthracene	0.249	0.0008	0.010	ug/L	0.300		83.1	42-120	10.30	30	
Chrysene	0.245	0.0009	0.010	ug/L	0.300		81.7	44-120	9.39	30	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0573 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0573-BS01)						Prepared: 26-May-2021 Analyzed: 05-Jun-2021 12:39					
Benzo(b)fluoranthene	0.266	0.0005	0.010	ug/L	0.300		88.6	44-120	11.60	30	
Benzo(k)fluoranthene	0.264	0.003	0.010	ug/L	0.300		88.0	50-120	3.35	30	
Benzo(j)fluoranthene	0.253	0.002	0.010	ug/L	0.300		84.4	39-160	18.80	30	
Benzo(a)fluoranthene, Total	0.783	0.004	0.010	ug/L	0.900		87.0	46-120	11.00	30	
Benzo(a)pyrene	0.237	0.002	0.010	ug/L	0.300		79.1	35-120	12.80	30	
Perylene	0.203	0.006	0.010	ug/L	0.300		67.5	30-160	17.50	30	
Indeno(1,2,3-cd)pyrene	0.275	0.001	0.010	ug/L	0.300		91.5	37-120	9.68	30	
Dibenzo(a,h)anthracene	0.273	0.001	0.010	ug/L	0.300		90.9	34-120	9.88	30	
Benzo(g,h,i)perylene	0.316	0.001	0.010	ug/L	0.300		105	38-120	10.50	30	Q
Surrogate: 2-Methylnaphthalene-d10	0.215			ug/L	0.300		71.7	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.255			ug/L	0.300		85.1	29-120			
Surrogate: Fluoranthene-d10	0.231			ug/L	0.300		76.9	57-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC

Petroleum Hydrocarbons - Quality Control

Batch BJE0570 - EPA 3510C SepF

Instrument: FID4 Analyst: CTO

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0570-BLK1)		Prepared: 26-May-2021 Analyzed: 27-May-2021 11:37								
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
Surrogate: o-Terphenyl	0.177		mg/L	0.225		78.7	50-150			
Blank (BJE0570-BLK2)		Prepared: 26-May-2021 Analyzed: 16-Jun-2021 20:55								
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
Surrogate: o-Terphenyl	0.148		mg/L	0.225		65.6	50-150			
LCS (BJE0570-BS1)		Prepared: 26-May-2021 Analyzed: 27-May-2021 11:58								
Diesel Range Organics (C12-C24)	2.68	0.100	mg/L	3.00		89.3	56-120			
Surrogate: o-Terphenyl	0.200		mg/L	0.225		88.8	50-150			
LCS (BJE0570-BS2)		Prepared: 26-May-2021 Analyzed: 16-Jun-2021 21:16								
Diesel Range Organics (C12-C24)	1.94	0.100	mg/L	3.00		64.6	56-120			
Surrogate: o-Terphenyl	0.153		mg/L	0.225		68.1	50-150			
LCS Dup (BJE0570-BSD1)		Prepared: 26-May-2021 Analyzed: 27-May-2021 12:19								
Diesel Range Organics (C12-C24)	2.45	0.100	mg/L	3.00		81.5	56-120	9.09	30	
Surrogate: o-Terphenyl	0.182		mg/L	0.225		80.8	50-150			
LCS Dup (BJE0570-BSD2)		Prepared: 26-May-2021 Analyzed: 16-Jun-2021 21:37								
Diesel Range Organics (C12-C24)	1.96	0.100	mg/L	3.00		65.5	56-120	1.38	30	
Surrogate: o-Terphenyl	0.153		mg/L	0.225		67.9	50-150			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Aroclor PCB - Quality Control
Batch BJE0594 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0594-BLK1)						Prepared: 25-May-2021 Analyzed: 28-May-2021 15:57					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0141			ug/L	0.0200		70.5	29-120			
Surrogate: Tetrachlorometaxylene	0.0129			ug/L	0.0200		64.6	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0133			ug/L	0.0200		66.3	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00980			ug/L	0.0200		49.0	32-120			
LCS (BJE0594-BS1)						Prepared: 25-May-2021 Analyzed: 28-May-2021 16:18					
Aroclor 1016 [2C]	0.040	0.002	0.010	ug/L	0.0500		80.2	54-120			
Aroclor 1260	0.037	0.003	0.010	ug/L	0.0500		75.0	51-128			
Surrogate: Decachlorobiphenyl	0.0140			ug/L	0.0200		70.2	29-120			
Surrogate: Tetrachlorometaxylene	0.0137			ug/L	0.0200		68.6	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0131			ug/L	0.0200		65.5	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00994			ug/L	0.0200		49.7	32-120			
LCS Dup (BJE0594-BSD1)						Prepared: 25-May-2021 Analyzed: 28-May-2021 16:40					
Aroclor 1016 [2C]	0.040	0.002	0.010	ug/L	0.0500		80.6	54-120	0.52	30	
Aroclor 1260	0.039	0.003	0.010	ug/L	0.0500		77.6	51-128	3.40	30	
Surrogate: Decachlorobiphenyl	0.0139			ug/L	0.0200		69.5	29-120			
Surrogate: Tetrachlorometaxylene	0.0139			ug/L	0.0200		69.7	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0130			ug/L	0.0200		65.0	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0104			ug/L	0.0200		51.8	32-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJF0146 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0146-BLK1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 19:54						
Barium	135	ND	0.114	0.500	ug/L							U
Barium	137	ND	0.0765	0.500	ug/L							U
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
Cobalt	59	ND	0.0173	0.200	ug/L							U
Lead	208	ND	0.0513	0.100	ug/L							U
Manganese	55	ND	0.142	0.500	ug/L							U
Silver	107	ND	0.0220	0.200	ug/L							U
Vanadium	51a	ND	0.0556	0.200	ug/L							U
Vanadium	51b	ND	0.0521	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
Copper	63	ND	0.173	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0792	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Selenium	78	ND	0.179	0.500	ug/L							U
Zinc	66	ND	2.92	6.00	ug/L							U
Zinc	67	ND	0.940	6.00	ug/L							U
Blank (BJF0146-BLK2)						Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 21:26						
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U

LCS (BJF0146-BS1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 19:59						
Barium	135	24.4	0.114	0.500	ug/L	25.0		97.6	80-120			
Barium	137	24.5	0.0765	0.500	ug/L	25.0		97.9	80-120			
Chromium	52	25.0	0.260	0.500	ug/L	25.0		100	80-120			
Chromium	53	24.8	0.239	0.500	ug/L	25.0		99.0	80-120			
Cobalt	59	24.6	0.0173	0.200	ug/L	25.0		98.4	80-120			
Lead	208	24.8	0.0513	0.100	ug/L	25.0		99.0	80-120			
Manganese	55	24.5	0.142	0.500	ug/L	25.0		98.0	80-120			
Silver	107	24.7	0.0220	0.200	ug/L	25.0		98.9	80-120			
Vanadium	51a	24.5	0.0556	0.200	ug/L	25.0		97.9	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0146 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0146-BS1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 19:59						
Vanadium	51b	24.4	0.0521	0.200	ug/L	25.0		97.6	80-120			
Arsenic	75a	24.5	0.0373	0.200	ug/L	25.0		97.9	80-120			
Cadmium	111	24.7	0.0300	0.100	ug/L	25.0		98.7	80-120			
Cadmium	114	24.0	0.0400	0.100	ug/L	25.0		96.1	80-120			
Copper	63	24.6	0.173	0.500	ug/L	25.0		98.6	80-120			
Copper	65	24.7	0.350	0.500	ug/L	25.0		98.9	80-120			
Nickel	60	24.4	0.0792	0.500	ug/L	25.0		97.4	80-120			
Nickel	62	24.4	0.220	0.500	ug/L	25.0		97.5	80-120			
Selenium	78	75.5	0.179	0.500	ug/L	80.0		94.4	80-120			
Zinc	66	73.1	2.92	6.00	ug/L	80.0		91.4	80-120			
Zinc	67	66.7	0.940	6.00	ug/L	80.0		83.4	80-120			
LCS (BJF0146-BS2)						Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 21:31						
Iron	54	5280	18.2	36.0	ug/L	5000		106	80-120			
Iron	57	5140	6.63	36.0	ug/L	5000		103	80-120			
Duplicate (BJF0146-DUP1)						Source: 21E0260-02 Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 04:06						
Barium	135	4.33	0.114	0.500	ug/L		4.35			0.35	20	
Cobalt	59	0.0660	0.0173	0.200	ug/L		0.0690			4.44	20	J
Lead	208	ND	0.0513	0.100	ug/L		ND					U
Silver	107	ND	0.0220	0.200	ug/L		ND					U
Arsenic	75a	0.152	0.0373	0.200	ug/L		0.153			0.66	20	J
Cadmium	111	ND	0.0300	0.100	ug/L		ND					U
Copper	63	ND	0.173	0.500	ug/L		ND					U
Nickel	60	0.225	0.0792	0.500	ug/L		0.188			17.90	20	J
Selenium	78	0.261	0.179	0.500	ug/L		ND					J
Zinc	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJF0146-DUP2)						Source: 21E0260-02 Prepared: 07-Jun-2021 Analyzed: 11-Jun-2021 07:19						
Chromium	52	ND	1.30	2.50	ug/L		ND					U
Iron	54	2830	91.0	180	ug/L		2920			3.14	20	D
Manganese	55	242	0.710	2.50	ug/L		241			0.09	20	D
Vanadium	51a	4.32	0.278	1.00	ug/L		4.30			0.58	20	D
Matrix Spike (BJF0146-MS1)						Source: 21E0260-02 Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 04:11						
Barium	135	28.5	0.114	0.500	ug/L	25.0	4.35	96.6	75-125			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJF0146 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJF0146-MS1)		Source: 21E0260-02			Prepared: 07-Jun-2021		Analyzed: 08-Jun-2021 04:11					
Cobalt	59	24.6	0.0173	0.200	ug/L	25.0	0.0690	97.9	75-125			
Lead	208	22.6	0.0513	0.100	ug/L	25.0	ND	90.3	75-125			
Silver	107	23.3	0.0220	0.200	ug/L	25.0	ND	93.2	75-125			
Arsenic	75a	23.8	0.0373	0.200	ug/L	25.0	0.153	94.6	75-125			
Cadmium	111	22.9	0.0300	0.100	ug/L	25.0	ND	91.4	75-125			
Copper	63	23.2	0.173	0.500	ug/L	25.0	ND	92.8	75-125			
Nickel	60	24.4	0.0792	0.500	ug/L	25.0	0.188	97.0	75-125			
Selenium	78	67.8	0.179	0.500	ug/L	80.0	ND	84.8	75-125			
Zinc	66	68.1	2.92	6.00	ug/L	80.0	ND	85.1	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0146-MS2)		Source: 21E0260-02			Prepared: 07-Jun-2021		Analyzed: 11-Jun-2021 07:25					
Chromium	52	24.9	1.30	2.50	ug/L	25.0	ND	99.7	75-125			D
Iron	54	7400	91.0	180	ug/L	5000	2920	89.6	75-125			D
Manganese	55	256	0.710	2.50	ug/L	25.0	241	56.6	75-125			HC, D
Vanadium	51a	28.4	0.278	1.00	ug/L	25.0	4.30	96.5	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0146-MSD1)		Source: 21E0260-02			Prepared: 07-Jun-2021		Analyzed: 08-Jun-2021 04:18					
Barium	135	29.0	0.114	0.500	ug/L	25.0	4.35	98.5	75-125	1.67	20	
Cobalt	59	24.7	0.0173	0.200	ug/L	25.0	0.0690	98.5	75-125	0.52	20	
Lead	208	23.0	0.0513	0.100	ug/L	25.0	ND	92.0	75-125	1.86	20	
Silver	107	23.7	0.0220	0.200	ug/L	25.0	ND	94.8	75-125	1.71	20	
Arsenic	75a	23.2	0.0373	0.200	ug/L	25.0	0.153	92.1	75-125	2.66	20	
Cadmium	111	23.7	0.0300	0.100	ug/L	25.0	ND	94.6	75-125	3.42	20	
Copper	63	23.3	0.173	0.500	ug/L	25.0	ND	93.4	75-125	0.62	20	
Nickel	60	24.1	0.0792	0.500	ug/L	25.0	0.188	95.7	75-125	1.28	20	
Selenium	78	69.7	0.179	0.500	ug/L	80.0	ND	87.1	75-125	2.66	20	
Zinc	66	89.0	2.92	6.00	ug/L	80.0	ND	111	75-125	26.60	20	*

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0146-MSD2)		Source: 21E0260-02			Prepared: 07-Jun-2021		Analyzed: 11-Jun-2021 07:30					
Chromium	52	24.9	1.30	2.50	ug/L	25.0	ND	99.5	75-125	0.20	20	D
Iron	54	7680	91.0	180	ug/L	5000	2920	95.4	75-125	3.83	20	D
Manganese	55	266	0.710	2.50	ug/L	25.0	241	100	75-125	4.16	20	HC, D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJF0146 - REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJF0146-MSD2)			Source: 21E0260-02			Prepared: 07-Jun-2021			Analyzed: 11-Jun-2021 07:30			
Vanadium	51a	28.3	0.278	1.00	ug/L	25.0	4.30	96.1	75-125	0.34	20	D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJF0195 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0195-BLK1)					Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 12:54					
Mercury	ND	0.000013	0.000100	mg/L						U
LCS (BJF0195-BS1)					Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 12:57					
Mercury	0.00205	0.000013	0.000100	mg/L	0.00200		102	80-120		


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0145 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0145-BLK1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 18:40						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Cobalt, Dissolved	59	ND	0.0173	0.200	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Manganese, Dissolved	55	0.176	0.142	0.500	ug/L							J
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	5.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	4.00	ug/L							U
Blank (BJF0145-BLK2)						Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 21:15						
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	6.63	20.0	ug/L							U

LCS (BJF0145-BS1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 18:45						
Barium, Dissolved	135	24.9	0.114	0.500	ug/L	25.0		99.6	80-120			
Barium, Dissolved	137	25.0	0.0765	0.500	ug/L	25.0		99.9	80-120			
Chromium, Dissolved	52	25.1	0.260	0.500	ug/L	25.0		100	80-120			
Cobalt, Dissolved	59	24.9	0.0173	0.200	ug/L	25.0		99.5	80-120			
Chromium, Dissolved	53	24.8	0.239	0.500	ug/L	25.0		99.2	80-120			
Lead, Dissolved	208	25.3	0.0513	0.100	ug/L	25.0		101	80-120			
Manganese, Dissolved	55	25.0	0.142	0.500	ug/L	25.0		99.8	80-120			
Silver, Dissolved	107	25.7	0.0220	0.200	ug/L	25.0		103	80-120			
Vanadium, Dissolved	51a	24.4	0.0556	0.200	ug/L	25.0		97.6	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0145 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0145-BS1)						Prepared: 07-Jun-2021 Analyzed: 07-Jun-2021 18:45						
Vanadium, Dissolved	51b	24.3	0.0521	0.200	ug/L	25.0		97.3	80-120			
Arsenic, Dissolved	75a	23.3	0.0373	0.200	ug/L	25.0		93.4	80-120			
Cadmium, Dissolved	111	24.8	0.0300	0.100	ug/L	25.0		99.3	80-120			
Cadmium, Dissolved	114	24.6	0.0400	0.100	ug/L	25.0		98.5	80-120			
Copper, Dissolved	63	25.0	0.173	0.500	ug/L	25.0		99.9	80-120			
Copper, Dissolved	65	24.8	0.350	0.500	ug/L	25.0		99.4	80-120			
Nickel, Dissolved	60	24.5	0.0792	0.500	ug/L	25.0		97.9	80-120			
Nickel, Dissolved	62	25.6	0.220	0.500	ug/L	25.0		102	80-120			
Selenium, Dissolved	78	71.4	0.179	0.500	ug/L	80.0		89.3	80-120			
Zinc, Dissolved	66	72.6	2.92	5.00	ug/L	80.0		90.8	80-120			
Zinc, Dissolved	67	70.2	0.940	4.00	ug/L	80.0		87.8	80-120			
LCS (BJF0145-BS2)						Prepared: 07-Jun-2021 Analyzed: 08-Jun-2021 21:20						
Iron, Dissolved	54	5350	18.2	36.0	ug/L	5000		107	80-120			
Iron, Dissolved	57	5470	6.63	20.0	ug/L	5000		109	80-120			



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:05

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJF0234 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0234-BLK1)						Prepared: 09-Jun-2021 Analyzed: 14-Jun-2021 13:55					
Mercury, Dissolved	0.000053	0.000013	0.000100	mg/L							J
LCS (BJF0234-BS1)						Prepared: 09-Jun-2021 Analyzed: 14-Jun-2021 13:57					
Mercury, Dissolved	0.00224	0.000013	0.000100	mg/L	0.00200		112	80-120			



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
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14-Dec-2021 12:05

Certified Analyses included in this Report

Analyte	Certifications
EPA 6020B in Water	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
EPA 6020B UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP


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Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
Mercury	WADOE,NELAP,DoD-ELAP

EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE


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m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP
2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP


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2-Methylphenol	NELAP,DoD-ELAP
Hexachloroethane	NELAP,DoD-ELAP
N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP
Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP
2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP
2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP
2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP


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Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE


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Benzo(k)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Perylene	ADEC, NELAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP, NELAP, WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP, NELAP, WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP, NELAP, WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE, DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE, DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE, DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE, ADEC, DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE, DoD-ELAP



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Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
D1	Surrogate was not detected due to sample extract dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

30 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21E0290

Associated SDG ID(s)
N/A

Susan
Dunnihoo

Digitally signed by
Susan Dunnihoo
Date: 2021.12.30
10:28:34 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunnihoo For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21E0290		Turn-around Requested: Standard		Page: 1 of 1		
ARI Client Company: Shannon & Wilson		Phone:		Date: 5/24/21	Ice Present? Yes	
Client Contact: Shoshana Howard				No. of Coolers: 4	Cooler Temps: See CRF	
Client Project Name: LDW				Analysis Requested		
Client Project #: 21-1-12596		Samplers: CRZ + RRP		Notes/Comments		
Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested	Notes/Comments
					T-H-G T-PH-DX GTEX H-VOCs MTBE PAMS Full CRZ VOCs Limited VOCs PCBs Aroclors Metals (Total H-DX)	
TB-8-20212405	5/24/21	1005	W	5	X X	① Arsenic, barium, chromium, manganese, nickel, cadmium, cobalt, copper, iron, lead, mercury, selenium, silver, vanadium, zinc
MW-75-20212405		0820	W	11	X X X	② manganese, mercury
MW-44-20212405		0940	W	9	X X X	③ manganese
MW-43-20212405		1035	W	9	X X X	④ chromium, manganese, mercury
MW-42-20212405		1140	W	9	X X X	⑤ Arsenic
MW-54-20212405		1235	W	13	X X X	
MW-67-20212405		1345	W	12	X X X	
MW-32-20212405		1440	W	10	X X	
MW-102-20212405		1455	W	10	X X	
Comments/Special Instructions * Lab to filter for dissolved metals * Refer to project methods and analysis lists		Relinquished by: (Signature) <i>[Signature]</i> Printed Name: RYAN PETERSON Company: Shannon & Wilson Date & Time: 5/24/21 1535		Received by: (Signature) <i>[Signature]</i> Printed Name: Jacob Walter Company: ARZ Date & Time: 05/24/2021 1535		
		Relinquished by: (Signature) Printed Name: Company: Date & Time:		Received by: (Signature) Printed Name: Company: Date & Time:		

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TB-8-20212405	21E0290-01	Water	24-May-2021 08:20	24-May-2021 15:35
MW-75-20212405	21E0290-02	Water	24-May-2021 08:20	24-May-2021 15:35
MW-75-20212405	21E0290-03	Water	24-May-2021 08:20	24-May-2021 15:35
MW-44-20212405	21E0290-04	Water	24-May-2021 09:40	24-May-2021 15:35
MW-44-20212405	21E0290-05	Water	24-May-2021 09:40	24-May-2021 15:35
MW-43-20212405	21E0290-06	Water	24-May-2021 10:35	24-May-2021 15:35
MW-43-20212405	21E0290-07	Water	24-May-2021 10:35	24-May-2021 15:35
MW-42-20212405	21E0290-08	Water	24-May-2021 11:40	24-May-2021 15:35
MW-42-20212405	21E0290-09	Water	24-May-2021 11:40	24-May-2021 15:35
MW-54-20212405	21E0290-10	Water	24-May-2021 12:35	24-May-2021 15:35
MW-54-20212405	21E0290-11	Water	24-May-2021 12:35	24-May-2021 15:35
MW-67-20212405	21E0290-12	Water	24-May-2021 13:45	24-May-2021 15:35
MW-67-20212405	21E0290-13	Water	24-May-2021 13:45	24-May-2021 15:35
MW-32-20212405	21E0290-14	Water	24-May-2021 14:40	24-May-2021 15:35
MW-32-20212405	21E0290-15	Water	24-May-2021 14:40	24-May-2021 15:35
MW-102-20212405	21E0290-16	Water	24-May-2021 14:55	24-May-2021 15:35
MW-102-20212405	21E0290-17	Water	24-May-2021 14:55	24-May-2021 15:35



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Reported:
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Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish
Work Order: 21E0290

Sample receipt

Samples as listed on the preceding page were received 24-May-2021 15:35 under ARI work order 21E0290. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Gasoline by NWTPH-q (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except 1,2-Dichloroethane-d4 which was out of control high in sample 21E0290-04 and has been flagged.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except 4-Chlorophenylphenyl ether which was out of control low and N-Nitroso-di-n-Propylamine, 2-Nitroaniline, 3-Nitroaniline, Diethyl Phthalate, Hexachlorobenzene and surrogate 2,4,6-Tribromophenol which were out of control high. All samples which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except 2,4,6- Tribromophenol which was out of control high in the initial calibration verification (ICV) and Phenol-d5 was out of control low in samples 21E0290-02, 21E0290-10, 21E0290-12, 21E0290-14 and 21E0290-16. All deviations have been flagged.

The method blank(s) were clean at the reporting limits except bis(2-Ethylhexyl)phthalate. All samples which contain analyte have been flagged with a "B" qualifier.

The blank spike (BS/LCS) percent recoveries were within control limits except 4-Chloroaniline which was out of control low and 2-Nitroaniline which was out of control high. Deviations have been flagged.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

The blank spike (BS/LCS) percent recoveries were within control limits.

Total and Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0290-08 in Total Metals batch BJJF0278, in association with sample 21E0290-12 in Total Metals batch BJJF0279, in association with sample 21E0290-03 in Dissolved Metals batch BJJF0327 and in association with sample 21E0290-13RE1 in Dissolved Zinc batch BJJF0430. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits except Total Copper which has been flagged. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries RPD were within advisory control limits except Total Manganese MSD percent recovery which was out of control low and has been flagged.

Total Mercury - EPA Method 7470

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Dissolved Mercury - EPA Method 7470



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

The sample(s) were digested and analyzed outside the recommended holding times. The mercury instrument was having issues after a power outage and despite daily troubleshooting we were down for two weeks. All samples were digested within hold time but we were unable to meet holding time in house. Due to analyst oversight insufficient hold time was remaining to deliver to the subcontract lab in time for them to analyze in hold. The samples were subcontracted to Fremont Analytical for analysis. The Fremont report is included in its entirety. Data has been flagged with a "H" qualifier.



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon & Wilson

Project Name: LD

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 21E0290

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1535 4.4 5.1 5.6 1.8

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 5206

Cooler Accepted by: TC Date: 05/24/21 Time: 1535

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not JS

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI: NA 5/20/21

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: SC Date: 5/25/21 Time: 0905 Labels checked by: SC

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____



WORK ORDER

21E0290

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0290-01 A	VOA Vial, Clear, 40 mL, HCL		
21E0290-01 B	VOA Vial, Clear, 40 mL, HCL		
21E0290-01 C	VOA Vial, Clear, 40 mL, HCL		
21E0290-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0290-01 E	VOA Vial, Clear, 40 mL, HCL		
21E0290-02 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass (P)
21E0290-02 B	Glass NM, Amber, 1000 mL		
21E0290-02 C	Glass NM, Amber, 1000 mL		
21E0290-02 D	Glass NM, Amber, 500 mL		
21E0290-02 E	Glass NM, Amber, 500 mL		
21E0290-02 F	Glass NM, Amber, 500 mL		
21E0290-02 G	Glass NM, Amber, 500 mL		
21E0290-02 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-02 I	VOA Vial, Clear, 40 mL, HCL		
21E0290-02 J	VOA Vial, Clear, 40 mL, HCL		
21E0290-03 A	Large OJ, 1000 mL	> 2	Fail (F)
21E0290-04 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-04 B	Glass NM, Amber, 1000 mL		
21E0290-04 C	Glass NM, Amber, 1000 mL		
21E0290-04 D	Glass NM, Amber, 500 mL		
21E0290-04 E	Glass NM, Amber, 500 mL		
21E0290-04 F	VOA Vial, Clear, 40 mL, HCL		
21E0290-04 G	VOA Vial, Clear, 40 mL, HCL		
21E0290-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-05 A	Large OJ, 1000 mL	> 2	F
21E0290-06 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-06 B	Glass NM, Amber, 1000 mL		
21E0290-06 C	Glass NM, Amber, 1000 mL		
21E0290-06 D	Glass NM, Amber, 500 mL		
21E0290-06 E	Glass NM, Amber, 500 mL		
21E0290-06 F	VOA Vial, Clear, 40 mL, HCL		
21E0290-06 G	VOA Vial, Clear, 40 mL, HCL		
21E0290-06 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-07 A	Large OJ, 1000 mL	> 2	F
21E0290-08 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P



WORK ORDER

21E0290

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0290-08 B	Glass NM, Amber, 1000 mL		
21E0290-08 C	Glass NM, Amber, 1000 mL		
21E0290-08 D	Glass NM, Amber, 500 mL		
21E0290-08 E	Glass NM, Amber, 500 mL		
21E0290-08 F	VOA Vial, Clear, 40 mL, HCL		
21E0290-08 G	VOA Vial, Clear, 40 mL, HCL		
21E0290-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-09 A	Large OJ, 1000 mL	> 2	F
21E0290-10 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-10 B	Glass NM, Amber, 1000 mL		
21E0290-10 C	Glass NM, Amber, 1000 mL		
21E0290-10 D	Glass NM, Amber, 500 mL		
21E0290-10 E	Glass NM, Amber, 500 mL		
21E0290-10 F	Glass NM, Amber, 500 mL		
21E0290-10 G	Glass NM, Amber, 500 mL		
21E0290-10 H	Glass NM, Amber, 500 mL		
21E0290-10 I	Glass NM, Amber, 500 mL		
21E0290-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0290-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0290-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0290-11 A	Large OJ, 1000 mL	> 2	F
21E0290-12 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-12 B	Glass NM, Amber, 1000 mL		
21E0290-12 C	Glass NM, Amber, 1000 mL		
21E0290-12 D	Glass NM, Amber, 500 mL		
21E0290-12 E	Glass NM, Amber, 500 mL		
21E0290-12 F	Glass NM, Amber, 500 mL		
21E0290-12 G	Glass NM, Amber, 500 mL		
21E0290-12 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-12 I	VOA Vial, Clear, 40 mL, HCL		
21E0290-12 J	VOA Vial, Clear, 40 mL, HCL		
21E0290-13 A	Large OJ, 1000 mL	> 2	F
21E0290-14 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-14 B	Glass NM, Amber, 500 mL		
21E0290-14 C	Glass NM, Amber, 500 mL		
21E0290-14 D	Glass NM, Amber, 500 mL		
21E0290-14 E	Glass NM, Amber, 500 mL		



WORK ORDER

21E0290

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0290-14 F	Glass NM, Amber, 500 mL		
21E0290-14 G	Glass NM, Amber, 500 mL		
21E0290-14 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-14 I	VOA Vial, Clear, 40 mL, HCL	Bubbles	
21E0290-15 A	Large OJ, 1000 mL	> 2	F
21E0290-16 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-16 B	Glass NM, Amber, 500 mL		
21E0290-16 C	Glass NM, Amber, 500 mL		
21E0290-16 D	Glass NM, Amber, 500 mL		
21E0290-16 E	Glass NM, Amber, 500 mL		
21E0290-16 F	Glass NM, Amber, 500 mL		
21E0290-16 G	Glass NM, Amber, 500 mL		
21E0290-16 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-16 I	VOA Vial, Clear, 40 mL, HCL		
21E0290-17 A	Large OJ, 1000 mL	> 2	F

SC
Preservation Confirmed By

5/25/21
Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Printed: 5/25/2021 10:12:33AM

WORK ORDER

21E0290

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0290-08 B	Glass NM, Amber, 1000 mL		
21E0290-08 C	Glass NM, Amber, 1000 mL		
21E0290-08 D	Glass NM, Amber, 500 mL		
21E0290-08 E	Glass NM, Amber, 500 mL		
21E0290-08 F	VOA Vial, Clear, 40 mL, HCL		
21E0290-08 G	VOA Vial, Clear, 40 mL, HCL		
21E0290-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-09 A	Large OJ, 1000 mL	> 2	F ①
21E0290-10 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-10 B	Glass NM, Amber, 1000 mL		
21E0290-10 C	Glass NM, Amber, 1000 mL		
21E0290-10 D	Glass NM, Amber, 500 mL		
21E0290-10 E	Glass NM, Amber, 500 mL		
21E0290-10 F	Glass NM, Amber, 500 mL		
21E0290-10 G	Glass NM, Amber, 500 mL		
21E0290-10 H	Glass NM, Amber, 500 mL		
21E0290-10 I	Glass NM, Amber, 500 mL		
21E0290-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0290-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0290-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0290-11 A	Large OJ, 1000 mL	> 2	F ①
21E0290-12 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-12 B	Glass NM, Amber, 1000 mL		
21E0290-12 C	Glass NM, Amber, 1000 mL		
21E0290-12 D	Glass NM, Amber, 500 mL		
21E0290-12 E	Glass NM, Amber, 500 mL		
21E0290-12 F	Glass NM, Amber, 500 mL		
21E0290-12 G	Glass NM, Amber, 500 mL		
21E0290-12 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-12 I	VOA Vial, Clear, 40 mL, HCL		
21E0290-12 J	VOA Vial, Clear, 40 mL, HCL		
21E0290-13 A	Large OJ, 1000 mL	> 2	F ①
21E0290-14 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-14 B	Glass NM, Amber, 500 mL		
21E0290-14 C	Glass NM, Amber, 500 mL		
21E0290-14 D	Glass NM, Amber, 500 mL		
21E0290-14 E	Glass NM, Amber, 500 mL		

Reviewed By

Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Printed: 5/25/2021 10:12:33AM

WORK ORDER

21E0290

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0290-01 A	VOA Vial, Clear, 40 mL, HCL		
21E0290-01 B	VOA Vial, Clear, 40 mL, HCL		
21E0290-01 C	VOA Vial, Clear, 40 mL, HCL		
21E0290-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0290-01 E	VOA Vial, Clear, 40 mL, HCL		
21E0290-02 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass (P)
21E0290-02 B	Glass NM, Amber, 1000 mL		
21E0290-02 C	Glass NM, Amber, 1000 mL		
21E0290-02 D	Glass NM, Amber, 500 mL		
21E0290-02 E	Glass NM, Amber, 500 mL		
21E0290-02 F	Glass NM, Amber, 500 mL		
21E0290-02 G	Glass NM, Amber, 500 mL		
21E0290-02 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-02 I	VOA Vial, Clear, 40 mL, HCL		
21E0290-02 J	VOA Vial, Clear, 40 mL, HCL		
21E0290-03 A	Large OJ, 1000 mL	> 2	Fail (F) ①
21E0290-04 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-04 B	Glass NM, Amber, 1000 mL		
21E0290-04 C	Glass NM, Amber, 1000 mL		
21E0290-04 D	Glass NM, Amber, 500 mL		
21E0290-04 E	Glass NM, Amber, 500 mL		
21E0290-04 F	VOA Vial, Clear, 40 mL, HCL		
21E0290-04 G	VOA Vial, Clear, 40 mL, HCL		
21E0290-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-05 A	Large OJ, 1000 mL	> 2	F ①
21E0290-06 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P
21E0290-06 B	Glass NM, Amber, 1000 mL		
21E0290-06 C	Glass NM, Amber, 1000 mL		
21E0290-06 D	Glass NM, Amber, 500 mL		
21E0290-06 E	Glass NM, Amber, 500 mL		
21E0290-06 F	VOA Vial, Clear, 40 mL, HCL		
21E0290-06 G	VOA Vial, Clear, 40 mL, HCL		
21E0290-06 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-07 A	Large OJ, 1000 mL	> 2	F ①
21E0290-08 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	P

Reviewed By

Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Printed: 5/25/2021 10:12:33AM

WORK ORDER

21E0290

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0290-14 F	Glass NM, Amber, 500 mL		
21E0290-14 G	Glass NM, Amber, 500 mL		
21E0290-14 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-14 I	VOA Vial, Clear, 40 mL, HCL	Bubbles	
21E0290-15 A	Large OJ, 1000 mL	> 2	F ①
21E0290-16 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	P
21E0290-16 B	Glass NM, Amber, 500 mL		
21E0290-16 C	Glass NM, Amber, 500 mL		
21E0290-16 D	Glass NM, Amber, 500 mL		
21E0290-16 E	Glass NM, Amber, 500 mL		
21E0290-16 F	Glass NM, Amber, 500 mL		
21E0290-16 G	Glass NM, Amber, 500 mL		
21E0290-16 H	VOA Vial, Clear, 40 mL, HCL		
21E0290-16 I	VOA Vial, Clear, 40 mL, HCL		
21E0290-17 A	Large OJ, 1000 mL	> 2	F ①

SC
Preservation Confirmed By

5/25/21
Date

① Filtered at 0.45um and preserved
to pH < 2.0 with 0.75ml conc.
HNO₃ (J2314). ml 05/25/21

Reviewed By

Date

**Fremont**
Analytical

3600 Fremont Ave. N.

Seattle, WA 98103

T: (206) 352-3790

F: (206) 352-7178

info@fremontanalytical.com

Analytical Resources Inc.

Shelly Fishel

4611 South 134th Place, Ste 100

Tukwila, WA 98168

RE: 21E0290**Work Order Number: 2106380**

June 29, 2021

Attention Shelly Fishel:

Fremont Analytical, Inc. received 5 sample(s) on 6/21/2021 for the analyses presented in the following report.

Dissolved Mercury by EPA Method 7470

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

CC:

Sub Data

*DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910*

Original

www.fremontanalytical.com



Date: 06/29/2021

CLIENT: Analytical Resources Inc.
Project: 21E0290
Work Order: 2106380

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2106380-001	21E0290-03	05/24/2021 8:20 AM	06/21/2021 4:40 PM
2106380-002	21E0290-05	05/24/2021 9:40 AM	06/21/2021 4:40 PM
2106380-003	21E0290-09	05/24/2021 11:40 AM	06/21/2021 4:40 PM
2106380-004	21E0290-11	05/24/2021 12:35 PM	06/21/2021 4:40 PM
2106380-005	21E0290-13	05/24/2021 1:45 PM	06/21/2021 4:40 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original



Case Narrative

WO#: 2106380

Date: 6/29/2021

CLIENT: Analytical Resources Inc.**Project:** 21E0290

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.



Qualifiers & Acronyms

WO#: 2106380

Date Reported: 6/29/2021

Qualifiers:

- * - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit
- R - High relative percent difference observed

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate

Originalwww.fremontanalytical.com



Analytical Report

Work Order: 2106380

Date Reported: 6/29/2021

CLIENT: Analytical Resources Inc.

Project: 21E0290

Lab ID: 2106380-001

Client Sample ID: 21E0290-03

Collection Date: 5/24/2021 8:20:00 AM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:38:40 PM
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Lab ID: 2106380-002

Client Sample ID: 21E0290-05

Collection Date: 5/24/2021 9:40:00 AM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:19:58 PM
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Lab ID: 2106380-003

Client Sample ID: 21E0290-09

Collection Date: 5/24/2021 11:40:00 AM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:21:41 PM
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Lab ID: 2106380-004

Client Sample ID: 21E0290-11

Collection Date: 5/24/2021 12:35:00 PM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:23:22 PM
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Original



Analytical Report

Work Order: **2106380**
Date Reported: **6/29/2021**

CLIENT: Analytical Resources Inc.
Project: 21E0290

Lab ID: 2106380-005

Collection Date: 5/24/2021 1:45:00 PM

Client Sample ID: 21E0290-13

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:25:04 PM
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Date: 6/29/2021

Work Order: 2106380
 CLIENT: Analytical Resources Inc.
 Project: 21E0290

QC SUMMARY REPORT

Dissolved Mercury by EPA Method 7470

Sample ID: MB-32808		SampType: MBLK		Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281			
Client ID: MBLKW		Batch ID: 32808					Analysis Date: 6/29/2021			SeqNo: 1378985		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.100

Sample ID: LCS-32808		SampType: LCS			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: LCSW		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378986				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.84 0.100 2.500 0 114 80 120

Sample ID: 2106413-004ADUP		SampType: DUP			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378988				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.100 0 0

Sample ID: 2106413-004AMS		SampType: MS			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378989				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.53 0.100 2.500 0 101 70 130

Sample ID: 2106413-004AMSD		SampType: MSD			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021					SeqNo: 1378990		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.67 0.100 2.500 0 107 70 130 2.530 5.38 20



Date: 6/29/2021

Work Order: 2106380
CLIENT: Analytical Resources Inc.
Project: 21E0290

QC SUMMARY REPORT

Dissolved Mercury by EPA Method 7470

Sample ID: MB-32829FB		SampType: MBLK		Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: MBLKW		Batch ID: 32808		Analysis Date: 6/29/2021			SeqNo: 1379012				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury	ND	0.100									
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NOTES:
 Filter Blank



Sample Log-In Check List

Client Name: **ARI**
 Logged by: **Gabrielle Coeuille**

Work Order Number: **2106380**
 Date Received: **6/21/2021 4:40:00 PM**

Chain of Custody

1. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
 2. How was the sample delivered? Courier

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
 4. Shipping container/cooler in good condition? Yes ☒ No ☐
 5. Custody Seals present on shipping container/cooler?
 (Refer to comments for Custody Seals not intact) Yes ☒ No ☐ Not Present ☐
 6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
 7. Were all items received at a temperature of >2°C to 6°C * Yes ☒ No ☐ NA ☐
 8. Sample(s) in proper container(s)? Yes ☒ No ☐
 9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
 10. Are samples properly preserved? Yes ☒ No ☐
 11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
 12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☒
 13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
 14. Does paperwork match bottle labels? Yes ☒ No ☐
 15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
 16. Is it clear what analyses were requested? Yes ☒ No ☐
 17. Were all holding times able to be met? Yes ☐ No ☒

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☒ No ☐ NA ☐

Person Notified:	<u>Shelly Fishel</u>	Date:	<u>6/22/2021</u>
By Whom:	<u>Gabrielle Coeuille</u>	Via:	☒ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	<u>Ok to proceed out of hold?</u>		
Client Instructions:	<u>Proceed.</u>		

19. Additional remarks:

Item Information

Item #	Temp °C
Sample	5.1

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Original



SUBCONTRACT ORDER
To: Fremont Analytical
ARI Work Order: 21E0290

2106380

SENDING LABORATORY:

Analytical Resources, Inc.
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6201
Project Manager: Shelly Fishel
E-Mail: shelly.fishel@arilabs.com

RECEIVING LABORATORY:

Fremont Analytical
3600 Fremont Avenue N.
Seattle, WA 98103
Phone: (206) 352-3790
Fax: (206) 352-7178

PLEASE SEND DATA TO subdata@arilabs.com

Analysis	Due	Expires	Sub Laboratory ID	Comments
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Sample ID: 21E0290-03

Sampled: 05/24/21 08:20 Matrix: Water

Met Diss 7470A Hg 06/09/21 06/21/21 08:20

Containers Supplied:

Sample ID: 21E0290-05

Sampled: 05/24/21 09:40 Matrix: Water

Met Diss 7470A Hg 06/09/21 06/21/21 09:40

Containers Supplied:

Sample ID: 21E0290-09

Sampled: 05/24/21 11:40 Matrix: Water

Met Diss 7470A Hg 06/09/21 06/21/21 11:40

Containers Supplied:

Sample ID: 21E0290-11

Sampled: 05/24/21 12:35 Matrix: Water

Met Diss 7470A Hg 06/09/21 06/21/21 12:35

Containers Supplied:

5 day TAT
pdf ! EDP SLF 6/21/2021
Lab to filter ✓

Jacob Walter 06/21/2021 1620

6/21/21 1640

Released By

Date

Received By

Date

Released By

Date

Received By

Date

Printed: 6/21/2021 12:49:27PM



Analytical Resources, Incorporated
Analytical Chemists and Consultants

SUBCONTRACT ORDER
To: Fremont Analytical
ARI Work Order: 21E0290

2106380

Analysis	Due	Expires	Sub Laboratory ID	Comments
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Sample ID: 21E0290-13

Sampled: 05/24/21 13:45 Matrix: Water

Met Diss 7470A Hg 06/09/21 06/21/21 13:45

Containers Supplied:

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Released By

Date

Received By

Date

Released By

Date

Received By

Date

Printed: 6/21/2021 12:49:27PM

Page 11 of 11
Page 2 of 2



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

TB-8-20212405
21E0290-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/24/2021 08:20

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 12:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0290-01 A

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>113</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>96.7</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>87.7</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>102</i>	<i>%</i>	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

TB-8-20212405
21E0290-01 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/24/2021 08:20

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 12:44

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0290-01 A

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.7	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	85.9	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-75-20212405
21E0290-02 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/24/2021 08:20

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 16:16

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0290-02 I

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>127</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>96.2</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>84.3</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>104</i>	<i>%</i>	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-75-20212405

21E0290-02 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/24/2021 08:20

Instrument: NT10 Analyst: VTS

Analyzed: 06/03/2021 18:34

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJE0646
Prepared: 05/27/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21E0290-02 C 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	0.01	0.2	ND	ug/L	U
bis(2-chloroethyl) ether	111-44-4	1	0.03	0.2	ND	ug/L	U
2-Chlorophenol	95-57-8	1	0.03	0.2	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.03	0.2	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
Benzyl Alcohol	100-51-6	1	0.02	0.2	ND	ug/L	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	0.03	0.2	ND	ug/L	U
2-Methylphenol	95-48-7	1	0.03	0.2	ND	ug/L	U
Hexachloroethane	67-72-1	1	0.04	0.2	ND	ug/L	U
N-Nitroso-di-n-Propylamine	621-64-7	1	0.04	0.2	ND	ug/L	U
4-Methylphenol	106-44-5	1	0.03	0.2	ND	ug/L	U
Nitrobenzene	98-95-3	1	0.03	0.2	ND	ug/L	U
Isophorone	78-59-1	1	0.03	0.2	ND	ug/L	U
2-Nitrophenol	88-75-5	1	0.04	1.0	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Bis(2-Chloroethoxy)methane	111-91-1	1	0.03	0.2	ND	ug/L	U
2,4-Dichlorophenol	120-83-2	1	0.1	1.0	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.03	0.2	ND	ug/L	U
Naphthalene	91-20-3	1	0.03	0.2	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
4-Chloroaniline	106-47-8	1	0.04	1.0	ND	ug/L	U
Hexachlorobutadiene	87-68-3	1	0.04	0.2	ND	ug/L	U
4-Chloro-3-Methylphenol	59-50-7	1	0.1	1.0	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.03	0.2	ND	ug/L	U
Hexachlorocyclopentadiene	77-47-4	1	0.1	1.0	ND	ug/L	U
2,4,6-Trichlorophenol	88-06-2	1	0.2	1.0	ND	ug/L	U
2,4,5-Trichlorophenol	95-95-4	1	0.1	1.0	ND	ug/L	U
2-Chloronaphthalene	91-58-7	1	0.03	0.2	ND	ug/L	U
2-Nitroaniline	88-74-4	1	0.2	1.0	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.02	0.2	ND	ug/L	U
Dimethylphthalate	131-11-3	1	0.04	0.2	ND	ug/L	U
2,6-Dinitrotoluene	606-20-2	1	0.2	1.0	ND	ug/L	U
Acenaphthene	83-32-9	1	0.03	0.2	ND	ug/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-75-20212405

21E0290-02 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/24/2021 08:20

Instrument: NT10 Analyst: VTS

Analyzed: 06/03/2021 18:34

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
3-Nitroaniline	99-09-2	1	0.2	1.0	ND	ug/L	U
2,4-Dinitrophenol	51-28-5	1	0.2	2.0	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.02	0.2	ND	ug/L	U
4-Nitrophenol	100-02-7	1	0.06	1.0	ND	ug/L	U
2,4-Dinitrotoluene	121-14-2	1	0.1	1.0	ND	ug/L	U
Fluorene	86-73-7	1	0.02	0.2	ND	ug/L	U
4-Chlorophenylphenyl ether	7005-72-3	1	0.02	0.2	ND	ug/L	U
Diethyl phthalate	84-66-2	1	0.06	0.2	ND	ug/L	U
4-Nitroaniline	100-01-6	1	0.2	1.0	ND	ug/L	U
4,6-Dinitro-2-methylphenol	534-52-1	1	0.4	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
4-Bromophenyl phenyl ether	101-55-3	1	0.02	0.2	ND	ug/L	U
Hexachlorobenzene	118-74-1	1	0.04	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Phenanthrene	85-01-8	1	0.02	0.2	ND	ug/L	U
Anthracene	120-12-7	1	0.03	0.2	ND	ug/L	U
Carbazole	86-74-8	1	0.04	0.2	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	1.1	ug/L	
Fluoranthene	206-44-0	1	0.03	0.2	ND	ug/L	U
Pyrene	129-00-0	1	0.03	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.04	0.2	ND	ug/L	U
3,3'-Dichlorobenzidine	91-94-1	1	0.3	1.0	ND	ug/L	U
Chrysene	218-01-9	1	0.04	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	0.2	ug/L	B
Di-n-Octylphthalate	117-84-0	1	0.05	0.2	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.08	0.4	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.05	0.2	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.06	0.2	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.07	0.2	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.04	0.2	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.03	0.2	ND	ug/L	U
Surrogate: 2-Fluorophenol					30-160 %	41.5 %	
Surrogate: Phenol-d5					30-160 %	26.0 %	*
Surrogate: 2-Chlorophenol-d4					30-160 %	74.4 %	
Surrogate: 1,2-Dichlorobenzene-d4					30-160 %	63.8 %	
Surrogate: Nitrobenzene-d5					30-160 %	89.0 %	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-75-20212405

21E0290-02 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/24/2021 08:20

Instrument: NT10 Analyst: VTS

Analyzed: 06/03/2021 18:34

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: 2-Fluorobiphenyl		30-160 %	75.1	%	
Surrogate: 2,4,6-Tribromophenol		30-160 %	138	%	Q
Surrogate: p-Terphenyl-d14		30-160 %	83.2	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-75-20212405
21E0290-02 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/24/2021 08:20

Instrument: FID4 Analyst: CTO

Analyzed: 06/03/2021 18:00

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-02 D 01

Preparation Batch: BJE0643

Sample Size: 500 mL

Prepared: 05/28/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			50-150 %	82.2	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-75-20212405
21E0290-02 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/24/2021 08:20

Instrument: ECD7 Analyst: JGR

Analyzed: 06/05/2021 19:55

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0645 Prepared: 05/28/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0290-02 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0033 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-02 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0031 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-02 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0032 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-02 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U

Surrogate: Decachlorobiphenyl

29-120 % 90.6 %

Surrogate: Tetrachlorometaxylene

32-120 % 86.4 %

Surrogate: Decachlorobiphenyl [2C]

29-120 % 89.2 %

Surrogate: Tetrachlorometaxylene [2C]

32-120 % 64.7 %


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-75-20212405
21E0290-02 (Water)
Metals and Metallic Compounds

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 08:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/19/2021 02:55

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0279 Sample Size: 25 mL
 Prepared: 06/18/2021 Final Volume: 25 mL

Extract ID: 21E0290-02 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.605	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	0.637	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	4.05	ug/L	
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	3.69	ug/L	J


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-75-20212405
21E0290-02 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/24/2021 08:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/19/2021 02:55

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-02 A 01

Preparation Batch: BJF0279

Sample Size: 25 mL

Prepared: 06/18/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	16.2	ug/L	
Chromium	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt	7440-48-4	1	0.0173	0.200	2.03	ug/L	
Iron	7439-89-6	10	182	360	39700	ug/L	D
Lead	7439-92-1	1	0.0513	0.100	0.125	ug/L	
Manganese	7439-96-5	10	1.42	5.00	1790	ug/L	D
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	0.319	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-75-20212405

21E0290-02 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/24/2021 08:20

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:39

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0290-02 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-75-20212405
21E0290-03 (Water)
Metals and Metallic Compounds (dissolved)

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 08:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/15/2021 02:47

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0327 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

 Extract ID: 21E0290-03 A 02
 Filtration Batch: BJE0634
 Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.162	ug/L	J
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.207	ug/L	J
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	3.76	ug/L	
Selenium, Dissolved	7782-49-2	2	0.358	1.00	ND	ug/L	U


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-75-20212405
21E0290-03 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/24/2021 08:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/15/2021 02:47

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-03 A 02

Preparation Batch: BJF0327

Sample Size: 25 mL

Filtration Batch: BJE0634

Prepared: 06/14/2021

Final Volume: 25 mL

Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			15.4	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500			ND	ug/L	U
Cobalt, Dissolved	7440-48-4	2	0.0346	0.400			1.84	ug/L	D
Iron, Dissolved	7439-89-6	20	364	720			22800	ug/L	D
Lead, Dissolved	7439-92-1	1	0.0513	0.100			ND	ug/L	U
Manganese, Dissolved	7439-96-5	20	2.84	10.0			1750	ug/L	D
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200			ND	ug/L	U



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Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-75-20212405
21E0290-03RE1 (Water)

Metals and Metallic Compounds (dissolved)

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 08:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 21:02

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0290-03RE1 A 03
	Preparation Batch: BJF0430	Filtration Batch: BJE0634
	Prepared: 06/16/2021	Filtration Date: 05/25/2021 15:47
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Zinc, Dissolved	7440-66-6	1	2.92	6.00	3.84	ug/L	J



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-44-20212405

21E0290-04 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/24/2021 09:40

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 16:37

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0290-04 G

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>131</i>	<i>%</i>	<i>*</i>
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>95.1</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>84.6</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>107</i>	<i>%</i>	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-44-20212405
21E0290-04 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/24/2021 09:40

Instrument: FID4 Analyst: CTO

Analyzed: 06/03/2021 18:21

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-04 D 01

Preparation Batch: BJE0643

Sample Size: 500 mL

Prepared: 05/28/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			50-150 %	83.4	%	


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-44-20212405
21E0290-04 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/24/2021 09:40

Instrument: ECD7 Analyst: JGR

Analyzed: 06/05/2021 20:15

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0645 Prepared: 05/28/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0290-04 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0033 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-04 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0031 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-04 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0032 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-04 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	87.7	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	85.8	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	87.0	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	63.7	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-44-20212405

21E0290-04 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/24/2021 09:40

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 02:33

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21E0290-04 A 01

Preparation Batch: BJF0278

Sample Size: 25 mL

Prepared: 06/14/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	10	1.42	5.00	855	ug/L	D



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-44-20212405

21E0290-04 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/24/2021 09:40

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:41

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0290-04 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-44-20212405
21E0290-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/24/2021 09:40

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 02:36

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-05 A 02

Preparation Batch: BJF0327

Sample Size: 25 mL

Filtration Batch: BJE0634

Prepared: 06/14/2021

Final Volume: 25 mL

Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	10	1.42	5.00	808	ug/L	D



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-43-20212405

21E0290-06 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/24/2021 10:35

Instrument: NT2 Analyst: PKC

Analyzed: 05/26/2021 16:58

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0290-06 G

Preparation Batch: BJE0654

Sample Size: 10 mL

Prepared: 05/26/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	0.43	ug/L	
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	0.22	ug/L	
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	0.12	ug/L	J
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>					<i>80-129 %</i>	<i>125 %</i>	
<i>Surrogate: Toluene-d8</i>					<i>80-120 %</i>	<i>96.3 %</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>					<i>80-120 %</i>	<i>85.7 %</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					<i>80-120 %</i>	<i>108 %</i>	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-43-20212405
21E0290-06 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/24/2021 10:35

Instrument: FID4 Analyst: CTO

Analyzed: 06/03/2021 18:42

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-06 D 01

Preparation Batch: BJE0643

Sample Size: 500 mL

Prepared: 05/28/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.143	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	82.0	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-43-20212405
21E0290-06 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/24/2021 10:35

Instrument: ECD7 Analyst: JGR

Analyzed: 06/05/2021 20:36

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0645 Prepared: 05/28/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0290-06 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0033 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-06 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0031 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-06 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0032 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-06 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	88.9	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	87.3	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	88.3	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	66.4	%	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-43-20212405
21E0290-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/24/2021 10:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 04:12

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-06 A 01

Preparation Batch: BJF0278

Sample Size: 25 mL

Prepared: 06/14/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	2	0.284	1.00	201	ug/L	D


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-43-20212405
21E0290-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/24/2021 10:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 04:16

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-07 A 02

Preparation Batch: BJF0327

Sample Size: 25 mL

Filtration Batch: BJE0634

Prepared: 06/14/2021

Final Volume: 25 mL

Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	2	0.284	1.00	179	ug/L	D



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-42-20212405

21E0290-08 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/24/2021 11:40

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 15:10

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0290-08 G

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>119</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>94.8</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>86.4</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>105</i>	<i>%</i>	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-42-20212405
21E0290-08 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/24/2021 11:40

Instrument: FID4 Analyst: CTO

Analyzed: 06/03/2021 19:04

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-08 D 01

Preparation Batch: BJE0643

Sample Size: 500 mL

Prepared: 05/28/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			50-150 %	75.6	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-42-20212405
21E0290-08 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/24/2021 11:40

Instrument: ECD7 Analyst: JGR

Analyzed: 06/05/2021 20:57

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0645 Prepared: 05/28/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0290-08 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0033 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-08 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0031 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-08 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0032 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-08 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	93.7	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	81.3	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	92.2	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	64.8	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-42-20212405
21E0290-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/24/2021 11:40

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/15/2021 04:05

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0278 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0290-08 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium	7440-47-3	1	0.260	0.500	10.5	ug/L	
Manganese	7439-96-5	1	0.142	0.500	30.5	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-42-20212405

21E0290-08 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/24/2021 11:40

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:43

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0290-08 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-42-20212405
21E0290-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/24/2021 11:40

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 04:19

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-09 A 02

Preparation Batch: BJF0327

Sample Size: 25 mL

Filtration Batch: BJE0634

Prepared: 06/14/2021

Final Volume: 25 mL

Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium, Dissolved	7440-47-3	2	0.520	1.00	5.29	ug/L	D
Manganese, Dissolved	7439-96-5	2	0.284	1.00	24.2	ug/L	D



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-54-20212405

21E0290-10 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/24/2021 12:35

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 15:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0290-10 L

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>115</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>97.1</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>87.8</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>104</i>	<i>%</i>	


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-54-20212405
21E0290-10 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/24/2021 12:35

Instrument: NT10 Analyst: VTS

Analyzed: 06/03/2021 19:12

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-10 C 01

Preparation Batch: BJE0646

Sample Size: 1000 mL

Prepared: 05/27/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

42.4 %

Surrogate: Phenol-d5

30-160 %

27.1 %

*

Surrogate: 2-Chlorophenol-d4

30-160 %

76.5 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

67.0 %

Surrogate: Nitrobenzene-d5

30-160 %

91.0 %

Surrogate: 2-Fluorobiphenyl

30-160 %

76.2 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

148 %

Q

Surrogate: p-Terphenyl-d14

30-160 %

90.3 %



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-54-20212405

21E0290-10 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/24/2021 12:35

Instrument: NT11 Analyst: VTS

Analyzed: 06/08/2021 21:27

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0647 Prepared: 05/28/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0290-10 E 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0040 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-10 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.003	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.002	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.002	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	62.6	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	66.6	%	
Surrogate: Fluoranthene-d10				57-120 %	79.4	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-54-20212405
21E0290-10 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/24/2021 12:35

Instrument: FID4 Analyst: CTO

Analyzed: 06/03/2021 19:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-10 D 01

Preparation Batch: BJE0643

Sample Size: 500 mL

Prepared: 05/28/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			50-150 %	72.9	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-54-20212405
21E0290-10 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/24/2021 12:35

Instrument: ECD7 Analyst: JGR

Analyzed: 06/05/2021 21:18

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0645 Prepared: 05/28/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0290-10 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0033 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-10 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0031 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-10 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0032 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-10 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U

Surrogate: Decachlorobiphenyl

29-120 % 93.1 %

Surrogate: Tetrachlorometaxylene

32-120 % 84.0 %

Surrogate: Decachlorobiphenyl [2C]

29-120 % 94.6 %

Surrogate: Tetrachlorometaxylene [2C]

32-120 % 63.5 %


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-54-20212405
21E0290-10 (Water)
Metals and Metallic Compounds

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 12:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/19/2021 03:21

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0279 Sample Size: 25 mL
 Prepared: 06/18/2021 Final Volume: 25 mL

Extract ID: 21E0290-10 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	4.04	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	1.02	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	0.440	ug/L	J
Selenium	7782-49-2	1	0.179	0.500	1.28	ug/L	
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-54-20212405
21E0290-10 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/24/2021 12:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/19/2021 03:21

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-10 A 01

Preparation Batch: BJF0279

Sample Size: 25 mL

Prepared: 06/18/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	10.3	ug/L	
Chromium	7440-47-3	1	0.260	0.500	0.417	ug/L	J
Cobalt	7440-48-4	1	0.0173	0.200	0.0840	ug/L	J
Iron	7439-89-6	1	18.2	36.0	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese	7439-96-5	1	0.142	0.500	45.1	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	11.4	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-54-20212405

21E0290-10 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/24/2021 12:35

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:45

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0290-10 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-54-20212405
21E0290-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 12:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 21:06

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0327 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

 Extract ID: 21E0290-11 A 02
 Filtration Batch: BJE0634
 Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	3.88	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.768	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.413	ug/L	J
Selenium, Dissolved	7782-49-2	1	0.179	0.500	1.16	ug/L	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-54-20212405
21E0290-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/24/2021 12:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 21:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-11 A 02

Preparation Batch: BJF0327

Sample Size: 25 mL

Filtration Batch: BJE0634

Prepared: 06/14/2021

Final Volume: 25 mL

Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	9.55	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.0760	ug/L	J
Iron, Dissolved	7439-89-6	1	18.2	36.0	ND	ug/L	U
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500	34.2	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	10.5	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-54-20212405
21E0290-11RE1 (Water)

Metals and Metallic Compounds (dissolved)

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 12:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 21:13

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0290-11RE1 A 03
	Preparation Batch: BJF0430	Filtration Batch: BJE0634
	Prepared: 06/16/2021	Filtration Date: 05/25/2021 15:47
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Zinc, Dissolved	7440-66-6	1	2.92	6.00	55.8	ug/L	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-67-20212405
21E0290-12 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/24/2021 13:45

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 15:51

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0290-12 J

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	0.18	ug/L	J
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	118	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	94.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	83.3	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	105	%	



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-67-20212405

21E0290-12 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/24/2021 13:45

Instrument: NT10 Analyst: VTS

Analyzed: 06/03/2021 19:50

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJE0646
Prepared: 05/27/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21E0290-12 C 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	0.01	0.2	ND	ug/L	U
bis(2-chloroethyl) ether	111-44-4	1	0.03	0.2	ND	ug/L	U
2-Chlorophenol	95-57-8	1	0.03	0.2	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.03	0.2	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
Benzyl Alcohol	100-51-6	1	0.02	0.2	ND	ug/L	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	0.03	0.2	ND	ug/L	U
2-Methylphenol	95-48-7	1	0.03	0.2	ND	ug/L	U
Hexachloroethane	67-72-1	1	0.04	0.2	ND	ug/L	U
N-Nitroso-di-n-Propylamine	621-64-7	1	0.04	0.2	ND	ug/L	U
4-Methylphenol	106-44-5	1	0.03	0.2	ND	ug/L	U
Nitrobenzene	98-95-3	1	0.03	0.2	ND	ug/L	U
Isophorone	78-59-1	1	0.03	0.2	ND	ug/L	U
2-Nitrophenol	88-75-5	1	0.04	1.0	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Bis(2-Chloroethoxy)methane	111-91-1	1	0.03	0.2	ND	ug/L	U
2,4-Dichlorophenol	120-83-2	1	0.1	1.0	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.03	0.2	ND	ug/L	U
Naphthalene	91-20-3	1	0.03	0.2	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
4-Chloroaniline	106-47-8	1	0.04	1.0	ND	ug/L	U
Hexachlorobutadiene	87-68-3	1	0.04	0.2	ND	ug/L	U
4-Chloro-3-Methylphenol	59-50-7	1	0.1	1.0	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.03	0.2	ND	ug/L	U
Hexachlorocyclopentadiene	77-47-4	1	0.1	1.0	ND	ug/L	U
2,4,6-Trichlorophenol	88-06-2	1	0.2	1.0	ND	ug/L	U
2,4,5-Trichlorophenol	95-95-4	1	0.1	1.0	ND	ug/L	U
2-Chloronaphthalene	91-58-7	1	0.03	0.2	ND	ug/L	U
2-Nitroaniline	88-74-4	1	0.2	1.0	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.02	0.2	ND	ug/L	U
Dimethylphthalate	131-11-3	1	0.04	0.2	ND	ug/L	U
2,6-Dinitrotoluene	606-20-2	1	0.2	1.0	ND	ug/L	U
Acenaphthene	83-32-9	1	0.03	0.2	ND	ug/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-67-20212405

21E0290-12 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/24/2021 13:45

Instrument: NT10 Analyst: VTS

Analyzed: 06/03/2021 19:50

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
3-Nitroaniline	99-09-2	1	0.2	1.0	ND	ug/L	U
2,4-Dinitrophenol	51-28-5	1	0.2	2.0	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.02	0.2	ND	ug/L	U
4-Nitrophenol	100-02-7	1	0.06	1.0	ND	ug/L	U
2,4-Dinitrotoluene	121-14-2	1	0.1	1.0	ND	ug/L	U
Fluorene	86-73-7	1	0.02	0.2	ND	ug/L	U
4-Chlorophenylphenyl ether	7005-72-3	1	0.02	0.2	ND	ug/L	U
Diethyl phthalate	84-66-2	1	0.06	0.2	0.1	ug/L	J
4-Nitroaniline	100-01-6	1	0.2	1.0	ND	ug/L	U
4,6-Dinitro-2-methylphenol	534-52-1	1	0.4	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
4-Bromophenyl phenyl ether	101-55-3	1	0.02	0.2	ND	ug/L	U
Hexachlorobenzene	118-74-1	1	0.04	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Phenanthrene	85-01-8	1	0.02	0.2	ND	ug/L	U
Anthracene	120-12-7	1	0.03	0.2	ND	ug/L	U
Carbazole	86-74-8	1	0.04	0.2	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	0.1	ug/L	J
Fluoranthene	206-44-0	1	0.03	0.2	ND	ug/L	U
Pyrene	129-00-0	1	0.03	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.04	0.2	ND	ug/L	U
3,3'-Dichlorobenzidine	91-94-1	1	0.3	1.0	ND	ug/L	U
Chrysene	218-01-9	1	0.04	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U
Di-n-Octylphthalate	117-84-0	1	0.05	0.2	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.08	0.4	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.05	0.2	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.06	0.2	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.07	0.2	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.04	0.2	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.03	0.2	ND	ug/L	U
Surrogate: 2-Fluorophenol				30-160 %	40.7	%	
Surrogate: Phenol-d5				30-160 %	25.7	%	*
Surrogate: 2-Chlorophenol-d4				30-160 %	72.7	%	
Surrogate: 1,2-Dichlorobenzene-d4				30-160 %	64.0	%	
Surrogate: Nitrobenzene-d5				30-160 %	87.4	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-67-20212405

21E0290-12 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/24/2021 13:45

Instrument: NT10 Analyst: VTS

Analyzed: 06/03/2021 19:50

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
<i>Surrogate: 2-Fluorobiphenyl</i>		30-160 %	73.8	%	
<i>Surrogate: 2,4,6-Tribromophenol</i>		30-160 %	143	%	Q
<i>Surrogate: p-Terphenyl-d14</i>		30-160 %	85.8	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-67-20212405
21E0290-12 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/24/2021 13:45

Instrument: FID4 Analyst: CTO

Analyzed: 06/03/2021 19:46

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-12 D 01

Preparation Batch: BJE0643

Sample Size: 500 mL

Prepared: 05/28/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>73.5</i>	<i>%</i>	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-67-20212405
21E0290-12 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/24/2021 13:45

Instrument: ECD7 Analyst: JGR

Analyzed: 06/05/2021 21:39

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0645 Prepared: 05/28/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0290-12 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0033 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-12 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0031 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-12 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0032 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-12 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	90.9	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	89.5	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	88.4	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	64.9	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-67-20212405
21E0290-12 (Water)
Metals and Metallic Compounds

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 13:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 18:25

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0279 Sample Size: 25 mL
 Prepared: 06/18/2021 Final Volume: 25 mL

Extract ID: 21E0290-12 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	0.708	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	0.0390	ug/L	J
Copper	7440-50-8	1	0.173	0.500	2.34	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	1.22	ug/L	
Selenium	7782-49-2	1	0.179	0.500	1.13	ug/L	
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-67-20212405
21E0290-12 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/24/2021 13:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 18:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-12 A 01

Preparation Batch: BJF0279

Sample Size: 25 mL

Prepared: 06/18/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	8.37	ug/L	
Chromium	7440-47-3	1	0.260	0.500	1.06	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	0.251	ug/L	
Iron	7439-89-6	1	18.2	36.0	157	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0550	ug/L	J
Manganese	7439-96-5	1	0.142	0.500	29.1	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	3.11	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-67-20212405

21E0290-12 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/24/2021 13:45

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:48

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0290-12 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-67-20212405
21E0290-13 (Water)
Metals and Metallic Compounds (dissolved)

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 13:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 21:12

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-13 A 02

Preparation Batch: BJF0327

Sample Size: 25 mL

Filtration Batch: BJE0634

Prepared: 06/14/2021

Final Volume: 25 mL

Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.626	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	0.0490	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500	2.14	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.08	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	1.16	ug/L	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-67-20212405
21E0290-13 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/24/2021 13:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 21:12

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-13 A 02

Preparation Batch: BJF0327

Sample Size: 25 mL

Filtration Batch: BJE0634

Prepared: 06/14/2021

Final Volume: 25 mL

Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			7.75	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500			0.715	ug/L	
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200			0.180	ug/L	J
Iron, Dissolved	7439-89-6	1	18.2	36.0			ND	ug/L	U
Lead, Dissolved	7439-92-1	1	0.0513	0.100			ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500			29.9	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200			2.59	ug/L	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-67-20212405
21E0290-13RE1 (Water)
Metals and Metallic Compounds (dissolved)

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 13:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 21:08

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0290-13RE1 A 03
	Preparation Batch: BJF0430	Filtration Batch: BJE0634
	Prepared: 06/16/2021	Filtration Date: 05/25/2021 15:47
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-32-20212405
21E0290-14 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/24/2021 14:40

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 16:11

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0290-14 H

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.8	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	88.4	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-32-20212405
21E0290-14 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/24/2021 14:40

Instrument: NT10 Analyst: VTS

Analyzed: 06/03/2021 20:27

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-14 C 01

Preparation Batch: BJE0646

Sample Size: 1000 mL

Prepared: 05/27/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	0.9	ug/L	
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

40.7 %

Surrogate: Phenol-d5

30-160 %

25.9 %

*

Surrogate: 2-Chlorophenol-d4

30-160 %

70.1 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

60.0 %

Surrogate: Nitrobenzene-d5

30-160 %

81.9 %

Surrogate: 2-Fluorobiphenyl

30-160 %

70.3 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

122 %

Q

Surrogate: p-Terphenyl-d14

30-160 %

76.6 %



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-32-20212405

21E0290-14 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/24/2021 14:40

Instrument: NT11 Analyst: VTS

Analyzed: 06/08/2021 22:00

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0647 Prepared: 05/28/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0290-14 E 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0040 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-14 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.001	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.001	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	0.002	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	62.9	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	60.7	%	
Surrogate: Fluoranthene-d10				57-120 %	75.1	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-32-20212405
21E0290-14 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/24/2021 14:40

Instrument: FID4 Analyst: CTO

Analyzed: 06/03/2021 20:07

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-14 B 01

Preparation Batch: BJE0643

Sample Size: 500 mL

Prepared: 05/28/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.253	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	70.0	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-32-20212405

21E0290-14 (Water)

Metals and Metallic Compounds

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 14:40

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/15/2021 04:50

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BJF0278 Sample Size: 25 mL
Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0290-14 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	28.2	ug/L	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-32-20212405
21E0290-15 (Water)
Metals and Metallic Compounds (dissolved)

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 14:40

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/15/2021 02:39

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-15 A 02

Preparation Batch: BJF0327

Sample Size: 25 mL

Filtration Batch: BJE0634

Prepared: 06/14/2021

Final Volume: 25 mL

Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	3.76	ug/L	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-102-20212405
21E0290-16 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/24/2021 14:55

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 16:32

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0290-16 H

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	97.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	86.8	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-102-20212405
21E0290-16 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/24/2021 14:55

Instrument: NT10 Analyst: VTS

Analyzed: 06/03/2021 21:05

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-16 C 01

Preparation Batch: BJE0646

Sample Size: 1000 mL

Prepared: 05/27/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	1.1	ug/L	
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

42.0 %

Surrogate: Phenol-d5

30-160 %

28.0 %

*

Surrogate: 2-Chlorophenol-d4

30-160 %

69.8 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

58.6 %

Surrogate: Nitrobenzene-d5

30-160 %

81.6 %

Surrogate: 2-Fluorobiphenyl

30-160 %

70.8 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

128 %

Q

Surrogate: p-Terphenyl-d14

30-160 %

79.7 %



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-102-20212405 21E0290-16 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/24/2021 14:55

Instrument: NT11 Analyst: VTS

Analyzed: 06/08/2021 22:32

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0647 Prepared: 05/28/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0290-16 E 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0040 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0290-16 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.001	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.002	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.002	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.004	ug/L	J
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	0.002	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	70.5	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	73.0	%	
Surrogate: Fluoranthene-d10				57-120 %	85.6	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-102-20212405
21E0290-16 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/24/2021 14:55

Instrument: FID4 Analyst: CTO

Analyzed: 06/03/2021 20:28

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0290-16 B 01

Preparation Batch: BJE0643

Sample Size: 500 mL

Prepared: 05/28/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.366	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	77.4	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

MW-102-20212405

21E0290-16 (Water)

Metals and Metallic Compounds

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 14:55

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/15/2021 04:55

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
Preparation Batch: BJF0278 Sample Size: 25 mL
Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0290-16 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	28.9	ug/L	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

MW-102-20212405
21E0290-17 (Water)
Metals and Metallic Compounds (dissolved)

Method: *** DEFAULT SPECIFIC MET

Sampled: 05/24/2021 14:55

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/15/2021 02:43

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0290-17 A 02

Preparation Batch: BJF0327

Sample Size: 25 mL

Filtration Batch: BJE0634

Prepared: 06/14/2021

Final Volume: 25 mL

Filtration Date: 05/25/2021 15:47

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	3.79	ug/L	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJE0654 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0654-BLK1)		Prepared: 26-May-2021 Analyzed: 26-May-2021 11:42								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.80		ug/L	5.00		96.0	80-120			
Surrogate: 4-Bromofluorobenzene	4.61		ug/L	5.00		92.3	80-120			
Blank (BJE0654-BLK2)		Prepared: 26-May-2021 Analyzed: 26-May-2021 11:42								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.41		ug/L	5.00		108	80-129			
Surrogate: Toluene-d8	4.80		ug/L	5.00		96.0	80-120			
Surrogate: 4-Bromofluorobenzene	4.61		ug/L	5.00		92.1	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.06		ug/L	5.00		101	80-120			
LCS (BJE0654-BS1)		Prepared: 26-May-2021 Analyzed: 26-May-2021 10:00								
Gasoline Range Organics (Tol-Nap)	1060	100	ug/L	1000		106	72-128			
Surrogate: Toluene-d8	5.05		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	4.99		ug/L	5.00		99.9	80-120			
LCS (BJE0654-BS2)		Prepared: 26-May-2021 Analyzed: 26-May-2021 10:21								
Vinyl Chloride	10.9	0.08	0.20	ug/L	10.0	109	66-133			
1,1-Dichloroethene	11.2	0.08	0.20	ug/L	10.0	112	69-135			
trans-1,2-Dichloroethene	10.7	0.07	0.20	ug/L	10.0	107	78-128			
cis-1,2-Dichloroethene	11.2	0.08	0.20	ug/L	10.0	112	80-121			
Benzene	11.1	0.05	0.20	ug/L	10.0	111	80-120			
Trichloroethene	10.8	0.07	0.20	ug/L	10.0	108	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0654 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0654-BS2)						Prepared: 26-May-2021 Analyzed: 26-May-2021 10:21					
Toluene	10.8	0.05	0.20	ug/L	10.0		108	80-120			
Tetrachloroethene	11.2	0.09	0.20	ug/L	10.0		112	80-120			
Ethylbenzene	11.4	0.05	0.20	ug/L	10.0		114	80-120			
m,p-Xylene	23.7	0.14	0.40	ug/L	20.0		118	80-121			
o-Xylene	10.5	0.08	0.20	ug/L	10.0		105	80-121			
Xylenes, total	34.2	0.22	0.60	ug/L	30.0		114	76-127			
Surrogate: 1,2-Dichloroethane-d4	4.89			ug/L	5.00		97.7	80-129			
Surrogate: Toluene-d8	5.02			ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.09			ug/L	5.00		102	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.98			ug/L	5.00		99.7	80-120			
LCS Dup (BJE0654-BSD1)						Prepared: 26-May-2021 Analyzed: 26-May-2021 10:41					
Gasoline Range Organics (Tol-Nap)	1100		100	ug/L	1000		110	72-128	3.27	30	
Surrogate: Toluene-d8	5.09			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	5.01			ug/L	5.00		100	80-120			
LCS Dup (BJE0654-BSD2)						Prepared: 26-May-2021 Analyzed: 26-May-2021 11:01					
Vinyl Chloride	11.0	0.08	0.20	ug/L	10.0		110	66-133	0.52	30	
1,1-Dichloroethene	11.1	0.08	0.20	ug/L	10.0		111	69-135	0.50	30	
trans-1,2-Dichloroethene	10.6	0.07	0.20	ug/L	10.0		106	78-128	0.56	30	
cis-1,2-Dichloroethene	11.4	0.08	0.20	ug/L	10.0		114	80-121	1.32	30	
Benzene	11.3	0.05	0.20	ug/L	10.0		113	80-120	1.70	30	
Trichloroethene	11.0	0.07	0.20	ug/L	10.0		110	80-120	2.08	30	
Toluene	11.0	0.05	0.20	ug/L	10.0		110	80-120	1.50	30	
Tetrachloroethene	11.0	0.09	0.20	ug/L	10.0		110	80-120	2.07	30	
Ethylbenzene	11.2	0.05	0.20	ug/L	10.0		112	80-120	1.89	30	
m,p-Xylene	23.5	0.14	0.40	ug/L	20.0		117	80-121	0.85	30	
o-Xylene	10.3	0.08	0.20	ug/L	10.0		103	80-121	1.53	30	
Xylenes, total	33.8	0.22	0.60	ug/L	30.0		113	76-127	1.06	30	
Surrogate: 1,2-Dichloroethane-d4	4.98			ug/L	5.00		99.6	80-129			
Surrogate: Toluene-d8	5.11			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	5.00			ug/L	5.00		99.9	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.96			ug/L	5.00		99.2	80-120			


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJE0692 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0692-BLK1)		Prepared: 28-May-2021 Analyzed: 28-May-2021 11:18								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.83		ug/L	5.00		96.6	80-120			
Surrogate: 4-Bromofluorobenzene	4.66		ug/L	5.00		93.1	80-120			
Blank (BJE0692-BLK2)		Prepared: 28-May-2021 Analyzed: 28-May-2021 11:18								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.18		ug/L	5.00		104	80-129			
Surrogate: Toluene-d8	4.83		ug/L	5.00		96.6	80-120			
Surrogate: 4-Bromofluorobenzene	4.66		ug/L	5.00		93.1	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.00		ug/L	5.00		100	80-120			
LCS (BJE0692-BS1)		Prepared: 28-May-2021 Analyzed: 28-May-2021 09:37								
Gasoline Range Organics (Tol-Nap)	1000	100	ug/L	1000		100	72-128			
Surrogate: Toluene-d8	5.04		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	5.04		ug/L	5.00		101	80-120			
LCS (BJE0692-BS2)		Prepared: 28-May-2021 Analyzed: 28-May-2021 09:57								
Vinyl Chloride	10.1	0.08	0.20	ug/L	10.0	101	66-133			
1,1-Dichloroethene	10.4	0.08	0.20	ug/L	10.0	104	69-135			
trans-1,2-Dichloroethene	9.98	0.07	0.20	ug/L	10.0	99.8	78-128			
cis-1,2-Dichloroethene	10.4	0.08	0.20	ug/L	10.0	104	80-121			
Benzene	10.5	0.05	0.20	ug/L	10.0	105	80-120			
Trichloroethene	10.2	0.07	0.20	ug/L	10.0	102	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0692 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0692-BS2)					Prepared: 28-May-2021		Analyzed: 28-May-2021 09:57				
Toluene	10.2	0.05	0.20	ug/L	10.0		102	80-120			
Tetrachloroethene	10.4	0.09	0.20	ug/L	10.0		104	80-120			
Ethylbenzene	10.7	0.05	0.20	ug/L	10.0		107	80-120			
m,p-Xylene	22.2	0.14	0.40	ug/L	20.0		111	80-121			
o-Xylene	9.90	0.08	0.20	ug/L	10.0		99.0	80-121			
Xylenes, total	32.1	0.22	0.60	ug/L	30.0		107	76-127			
Surrogate: 1,2-Dichloroethane-d4	4.78			ug/L	5.00		95.6	80-129			
Surrogate: Toluene-d8	5.00			ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.08			ug/L	5.00		102	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.93			ug/L	5.00		98.6	80-120			
LCS Dup (BJE0692-BSD1)					Prepared: 28-May-2021		Analyzed: 28-May-2021 10:18				
Gasoline Range Organics (Tol-Nap)	986		100	ug/L	1000		98.6	72-128	1.72	30	
Surrogate: Toluene-d8	5.08			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	5.04			ug/L	5.00		101	80-120			
LCS Dup (BJE0692-BSD2)					Prepared: 28-May-2021		Analyzed: 28-May-2021 10:38				
Vinyl Chloride	10.2	0.08	0.20	ug/L	10.0		102	66-133	1.11	30	
1,1-Dichloroethene	10.3	0.08	0.20	ug/L	10.0		103	69-135	0.66	30	
trans-1,2-Dichloroethene	10.1	0.07	0.20	ug/L	10.0		101	78-128	0.88	30	
cis-1,2-Dichloroethene	10.6	0.08	0.20	ug/L	10.0		106	80-121	2.16	30	
Benzene	10.7	0.05	0.20	ug/L	10.0		107	80-120	1.08	30	
Trichloroethene	10.4	0.07	0.20	ug/L	10.0		104	80-120	2.03	30	
Toluene	10.3	0.05	0.20	ug/L	10.0		103	80-120	1.14	30	
Tetrachloroethene	10.4	0.09	0.20	ug/L	10.0		104	80-120	0.44	30	
Ethylbenzene	10.7	0.05	0.20	ug/L	10.0		107	80-120	0.38	30	
m,p-Xylene	22.3	0.14	0.40	ug/L	20.0		111	80-121	0.36	30	
o-Xylene	9.84	0.08	0.20	ug/L	10.0		98.4	80-121	0.54	30	
Xylenes, total	32.1	0.22	0.60	ug/L	30.0		107	76-127	0.08	30	
Surrogate: 1,2-Dichloroethane-d4	4.75			ug/L	5.00		95.1	80-129			
Surrogate: Toluene-d8	5.02			ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.06			ug/L	5.00		101	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.95			ug/L	5.00		99.0	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0646 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0646-BLK1)						Prepared: 27-May-2021 Analyzed: 03-Jun-2021 16:40					
Phenol	ND	0.01	0.2	ug/L							U
bis(2-chloroethyl) ether	ND	0.03	0.2	ug/L							U
2-Chlorophenol	ND	0.03	0.2	ug/L							U
1,3-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
Benzyl Alcohol	ND	0.02	0.2	ug/L							U
2,2'-Oxybis(1-chloropropane)	ND	0.03	0.2	ug/L							U
2-Methylphenol	ND	0.03	0.2	ug/L							U
Hexachloroethane	ND	0.04	0.2	ug/L							U
N-Nitroso-di-n-Propylamine	ND	0.04	0.2	ug/L							U
4-Methylphenol	ND	0.03	0.2	ug/L							U
Nitrobenzene	ND	0.03	0.2	ug/L							U
Isophorone	ND	0.03	0.2	ug/L							U
2-Nitrophenol	ND	0.04	1.0	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Bis(2-Chloroethoxy)methane	ND	0.03	0.2	ug/L							U
2,4-Dichlorophenol	ND	0.1	1.0	ug/L							U
1,2,4-Trichlorobenzene	ND	0.03	0.2	ug/L							U
Naphthalene	ND	0.03	0.2	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
4-Chloroaniline	ND	0.04	1.0	ug/L							U
Hexachlorobutadiene	ND	0.04	0.2	ug/L							U
4-Chloro-3-Methylphenol	ND	0.1	1.0	ug/L							U
2-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Hexachlorocyclopentadiene	ND	0.1	1.0	ug/L							U
2,4,6-Trichlorophenol	ND	0.2	1.0	ug/L							U
2,4,5-Trichlorophenol	ND	0.1	1.0	ug/L							U
2-Chloronaphthalene	ND	0.03	0.2	ug/L							U
2-Nitroaniline	ND	0.2	1.0	ug/L							U
Acenaphthylene	ND	0.02	0.2	ug/L							U
Dimethylphthalate	ND	0.04	0.2	ug/L							U
2,6-Dinitrotoluene	ND	0.2	1.0	ug/L							U
Acenaphthene	ND	0.03	0.2	ug/L							U
3-Nitroaniline	ND	0.2	1.0	ug/L							U


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 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0646 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0646-BLK1)						Prepared: 27-May-2021 Analyzed: 03-Jun-2021 16:40					
2,4-Dinitrophenol	ND	0.2	2.0	ug/L							U
Dibenzofuran	ND	0.02	0.2	ug/L							U
4-Nitrophenol	ND	0.06	1.0	ug/L							U
2,4-Dinitrotoluene	ND	0.1	1.0	ug/L							U
Fluorene	ND	0.02	0.2	ug/L							U
4-Chlorophenylphenyl ether	ND	0.02	0.2	ug/L							U
Diethyl phthalate	ND	0.06	0.2	ug/L							U
4-Nitroaniline	ND	0.2	1.0	ug/L							U
4,6-Dinitro-2-methylphenol	ND	0.4	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
4-Bromophenyl phenyl ether	ND	0.02	0.2	ug/L							U
Hexachlorobenzene	ND	0.04	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Phenanthrene	ND	0.02	0.2	ug/L							U
Anthracene	ND	0.03	0.2	ug/L							U
Carbazole	ND	0.04	0.2	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Fluoranthene	ND	0.03	0.2	ug/L							U
Pyrene	ND	0.03	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
Benzo(a)anthracene	ND	0.04	0.2	ug/L							U
3,3'-Dichlorobenzidine	ND	0.3	1.0	ug/L							U
Chrysene	ND	0.04	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	0.5	0.2	0.2	ug/L							
Di-n-Octylphthalate	ND	0.05	0.2	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.08	0.4	ug/L							U
Benzo(a)pyrene	ND	0.05	0.2	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.06	0.2	ug/L							U
Dibenzo(a,h)anthracene	ND	0.07	0.2	ug/L							U
Benzo(g,h,i)perylene	ND	0.04	0.2	ug/L							U
1-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Surrogate: 2-Fluorophenol	3.72			ug/L	7.50		49.6	30-160			
Surrogate: Phenol-d5	2.43			ug/L	7.50		32.4	30-160			
Surrogate: 2-Chlorophenol-d4	6.01			ug/L	7.50		80.1	30-160			


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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0646 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0646-BLK1)						Prepared: 27-May-2021 Analyzed: 03-Jun-2021 16:40					
Surrogate: 1,2-Dichlorobenzene-d4	3.16			ug/L	5.00		63.1	30-160			
Surrogate: Nitrobenzene-d5	4.47			ug/L	5.00		89.4	30-160			
Surrogate: 2-Fluorobiphenyl	3.79			ug/L	5.00		75.9	30-160			
Surrogate: 2,4,6-Tribromophenol	10.5			ug/L	7.50		140	30-160			Q
Surrogate: p-Terphenyl-d14	4.50			ug/L	5.00		89.9	30-160			
LCS (BJE0646-BS1)						Prepared: 27-May-2021 Analyzed: 03-Jun-2021 17:18					
Phenol	1.7	0.01	0.2	ug/L	5.00		34.2	30-160			
bis(2-chloroethyl) ether	4.2	0.03	0.2	ug/L	5.00		83.0	30-160			
2-Chlorophenol	3.4	0.03	0.2	ug/L	5.00		68.3	30-160			
1,3-Dichlorobenzene	3.1	0.03	0.2	ug/L	5.00		62.8	30-160			
1,4-Dichlorobenzene	2.9	0.03	0.2	ug/L	5.00		58.4	30-160			
1,2-Dichlorobenzene	3.1	0.03	0.2	ug/L	5.00		62.6	30-160			
Benzyl Alcohol	2.7	0.02	0.2	ug/L	5.00		54.6	30-160			
2,2'-Oxybis(1-chloropropane)	3.3	0.03	0.2	ug/L	5.00		65.5	30-160			
2-Methylphenol	3.1	0.03	0.2	ug/L	5.00		62.1	30-160			
Hexachloroethane	3.0	0.04	0.2	ug/L	5.00		60.6	30-160			
N-Nitroso-di-n-Propylamine	4.8	0.04	0.2	ug/L	5.00		95.6	30-160			Q
4-Methylphenol	3.1	0.03	0.2	ug/L	5.00		62.9	30-160			
Nitrobenzene	4.5	0.03	0.2	ug/L	5.00		90.0	30-160			
Isophorone	4.6	0.03	0.2	ug/L	5.00		92.9	30-160			
2-Nitrophenol	3.6	0.04	1.0	ug/L	5.00		72.0	30-160			
2,4-Dimethylphenol	11.2	0.3	1.0	ug/L	13.0		86.5	30-160			
Bis(2-Chloroethoxy)methane	3.9	0.03	0.2	ug/L	5.00		77.0	30-160			
2,4-Dichlorophenol	11.0	0.1	1.0	ug/L	13.0		84.5	30-160			
1,2,4-Trichlorobenzene	3.0	0.03	0.2	ug/L	5.00		59.6	30-160			
Naphthalene	3.7	0.03	0.2	ug/L	5.00		74.5	30-160			
Benzoic acid	11.1	0.1	2.0	ug/L	23.0		48.3	30-160			
4-Chloroaniline	2.1	0.04	1.0	ug/L	13.0		16.1	30-160			*
Hexachlorobutadiene	2.6	0.04	0.2	ug/L	5.00		52.7	30-160			
4-Chloro-3-Methylphenol	13.0	0.1	1.0	ug/L	13.0		100	30-160			
2-Methylnaphthalene	3.5	0.03	0.2	ug/L	5.00		70.5	30-160			
Hexachlorocyclopentadiene	6.9	0.1	1.0	ug/L	13.0		53.4	30-160			
2,4,6-Trichlorophenol	12.0	0.2	1.0	ug/L	13.0		92.4	30-160			
2,4,5-Trichlorophenol	11.7	0.1	1.0	ug/L	13.0		90.1	30-160			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0646 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0646-BS1)					Prepared: 27-May-2021 Analyzed: 03-Jun-2021 17:18						
2-Chloronaphthalene	3.7	0.03	0.2	ug/L	5.00		74.8	30-160			
2-Nitroaniline	20.9	0.2	1.0	ug/L	13.0		161	30-160			*, Q
Acenaphthylene	3.7	0.02	0.2	ug/L	5.00		74.7	30-160			
Dimethylphthalate	4.1	0.04	0.2	ug/L	5.00		81.5	30-160			
2,6-Dinitrotoluene	14.6	0.2	1.0	ug/L	13.0		113	30-160			
Acenaphthene	3.9	0.03	0.2	ug/L	5.00		78.8	30-160			
3-Nitroaniline	14.5	0.2	1.0	ug/L	13.0		111	30-160			Q
2,4-Dinitrophenol	21.6	0.2	2.0	ug/L	23.0		93.8	30-160			
Dibenzofuran	3.9	0.02	0.2	ug/L	5.00		78.5	30-160			
4-Nitrophenol	6.6	0.06	1.0	ug/L	13.0		51.1	30-160			
2,4-Dinitrotoluene	15.2	0.1	1.0	ug/L	13.0		117	30-160			
Fluorene	4.0	0.02	0.2	ug/L	5.00		79.5	30-160			
4-Chlorophenylphenyl ether	3.1	0.02	0.2	ug/L	5.00		61.7	30-160			Q
Diethyl phthalate	4.2	0.06	0.2	ug/L	5.00		84.3	30-160			Q
4-Nitroaniline	14.6	0.2	1.0	ug/L	13.0		112	30-160			
4,6-Dinitro-2-methylphenol	24.4	0.4	2.0	ug/L	23.0		106	30-160			
N-Nitrosodiphenylamine	4.0	0.03	0.2	ug/L	5.00		79.2	30-160			
4-Bromophenyl phenyl ether	4.3	0.02	0.2	ug/L	5.00		86.2	30-160			
Hexachlorobenzene	4.9	0.04	0.2	ug/L	5.00		97.1	30-160			Q
Pentachlorophenol	13.3	0.1	1.0	ug/L	13.0		103	30-160			
Phenanthrene	4.2	0.02	0.2	ug/L	5.00		83.4	30-160			
Anthracene	4.0	0.03	0.2	ug/L	5.00		79.9	30-160			
Carbazole	4.0	0.04	0.2	ug/L	5.00		79.6	30-160			
Di-n-Butylphthalate	4.1	0.05	0.2	ug/L	5.00		82.2	30-160			
Fluoranthene	4.1	0.03	0.2	ug/L	5.00		82.1	30-160			
Pyrene	4.0	0.03	0.2	ug/L	5.00		79.5	30-160			
Butylbenzylphthalate	4.7	0.07	0.2	ug/L	5.00		93.3	30-160			
Benzo(a)anthracene	3.8	0.04	0.2	ug/L	5.00		75.1	30-160			
3,3'-Dichlorobenzidine	8.0	0.3	1.0	ug/L	8.00		99.7	30-160			
Chrysene	3.8	0.04	0.2	ug/L	5.00		76.7	30-160			
bis(2-Ethylhexyl)phthalate	4.6	0.2	0.2	ug/L	5.00		91.1	30-160			B
Di-n-Octylphthalate	3.9	0.05	0.2	ug/L	5.00		78.0	30-160			
Benzo(a)fluoranthene, Total	7.5	0.08	0.4	ug/L	10.0		75.0	30-160			
Benzo(a)pyrene	3.7	0.05	0.2	ug/L	5.00		75.0	30-160			
Indeno(1,2,3-cd)pyrene	4.4	0.06	0.2	ug/L	5.00		87.1	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJE0646 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0646-BS1)						Prepared: 27-May-2021 Analyzed: 03-Jun-2021 17:18					
Dibenzo(a,h)anthracene	4.5	0.07	0.2	ug/L	5.00		90.2	30-160			
Benzo(g,h,i)perylene	4.3	0.04	0.2	ug/L	5.00		86.2	30-160			
1-Methylnaphthalene	3.7	0.03	0.2	ug/L	5.00		73.3	30-160			
Surrogate: 2-Fluorophenol	4.29			ug/L	7.50		57.2	30-160			
Surrogate: Phenol-d5	2.96			ug/L	7.50		39.5	30-160			
Surrogate: 2-Chlorophenol-d4	6.65			ug/L	7.50		88.7	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.51			ug/L	5.00		70.2	30-160			
Surrogate: Nitrobenzene-d5	5.17			ug/L	5.00		103	30-160			
Surrogate: 2-Fluorobiphenyl	4.32			ug/L	5.00		86.3	30-160			
Surrogate: 2,4,6-Tribromophenol	11.1			ug/L	7.50		148	30-160			Q
Surrogate: p-Terphenyl-d14	5.07			ug/L	5.00		101	30-160			
LCS Dup (BJE0646-BSD1)						Prepared: 27-May-2021 Analyzed: 03-Jun-2021 17:56					
Phenol	1.8	0.01	0.2	ug/L	5.00		36.3	30-160	5.86	30	
bis(2-chloroethyl) ether	4.2	0.03	0.2	ug/L	5.00		84.1	30-160	1.35	30	
2-Chlorophenol	3.6	0.03	0.2	ug/L	5.00		71.4	30-160	4.44	30	
1,3-Dichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.5	30-160	5.79	30	
1,4-Dichlorobenzene	3.0	0.03	0.2	ug/L	5.00		60.1	30-160	2.81	30	
1,2-Dichlorobenzene	3.3	0.03	0.2	ug/L	5.00		65.1	30-160	3.96	30	
Benzyl Alcohol	3.0	0.02	0.2	ug/L	5.00		59.3	30-160	8.35	30	
2,2'-Oxybis(1-chloropropane)	3.4	0.03	0.2	ug/L	5.00		67.2	30-160	2.69	30	
2-Methylphenol	3.3	0.03	0.2	ug/L	5.00		65.3	30-160	4.98	30	
Hexachloroethane	3.1	0.04	0.2	ug/L	5.00		62.2	30-160	2.66	30	
N-Nitroso-di-n-Propylamine	4.9	0.04	0.2	ug/L	5.00		98.5	30-160	3.02	30	Q
4-Methylphenol	3.2	0.03	0.2	ug/L	5.00		64.2	30-160	2.13	30	
Nitrobenzene	4.7	0.03	0.2	ug/L	5.00		93.6	30-160	4.00	30	
Isophorone	4.8	0.03	0.2	ug/L	5.00		96.3	30-160	3.56	30	
2-Nitrophenol	3.9	0.04	1.0	ug/L	5.00		77.2	30-160	6.99	30	
2,4-Dimethylphenol	11.1	0.3	1.0	ug/L	13.0		85.7	30-160	0.88	30	
Bis(2-Chloroethoxy)methane	4.0	0.03	0.2	ug/L	5.00		79.8	30-160	3.56	30	
2,4-Dichlorophenol	11.1	0.1	1.0	ug/L	13.0		85.0	30-160	0.68	30	
1,2,4-Trichlorobenzene	3.2	0.03	0.2	ug/L	5.00		63.3	30-160	6.11	30	
Naphthalene	3.9	0.03	0.2	ug/L	5.00		78.5	30-160	5.33	30	
Benzoic acid	11.4	0.1	2.0	ug/L	23.0		49.7	30-160	2.76	30	
4-Chloroaniline	2.2	0.04	1.0	ug/L	13.0		16.6	30-160	2.74	30	*



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJE0646 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0646-BSD1)						Prepared: 27-May-2021 Analyzed: 03-Jun-2021 17:56					
Hexachlorobutadiene	2.8	0.04	0.2	ug/L	5.00		57.0	30-160	7.78	30	
4-Chloro-3-Methylphenol	12.9	0.1	1.0	ug/L	13.0		99.2	30-160	0.75	30	
2-Methylnaphthalene	3.7	0.03	0.2	ug/L	5.00		73.2	30-160	3.71	30	
Hexachlorocyclopentadiene	7.6	0.1	1.0	ug/L	13.0		58.3	30-160	8.82	30	
2,4,6-Trichlorophenol	12.1	0.2	1.0	ug/L	13.0		93.4	30-160	1.14	30	
2,4,5-Trichlorophenol	11.8	0.1	1.0	ug/L	13.0		91.0	30-160	1.03	30	
2-Chloronaphthalene	3.9	0.03	0.2	ug/L	5.00		77.6	30-160	3.70	30	
2-Nitroaniline	20.8	0.2	1.0	ug/L	13.0		160	30-160	0.32	30	Q
Acenaphthylene	3.9	0.02	0.2	ug/L	5.00		77.3	30-160	3.35	30	
Dimethylphthalate	4.3	0.04	0.2	ug/L	5.00		85.3	30-160	4.60	30	
2,6-Dinitrotoluene	14.6	0.2	1.0	ug/L	13.0		113	30-160	0.04	30	
Acenaphthene	4.1	0.03	0.2	ug/L	5.00		82.4	30-160	4.48	30	
3-Nitroaniline	14.6	0.2	1.0	ug/L	13.0		113	30-160	1.19	30	Q
2,4-Dinitrophenol	22.3	0.2	2.0	ug/L	23.0		97.1	30-160	3.51	30	
Dibenzofuran	4.0	0.02	0.2	ug/L	5.00		80.7	30-160	2.78	30	
4-Nitrophenol	6.8	0.06	1.0	ug/L	13.0		52.5	30-160	2.55	30	
2,4-Dinitrotoluene	14.7	0.1	1.0	ug/L	13.0		113	30-160	3.13	30	
Fluorene	3.5	0.02	0.2	ug/L	5.00		71.0	30-160	11.30	30	
4-Chlorophenylphenyl ether	3.2	0.02	0.2	ug/L	5.00		64.1	30-160	3.84	30	Q
Diethyl phthalate	5.1	0.06	0.2	ug/L	5.00		103	30-160	19.80	30	Q
4-Nitroaniline	14.0	0.2	1.0	ug/L	13.0		108	30-160	4.36	30	
4,6-Dinitro-2-methylphenol	24.4	0.4	2.0	ug/L	23.0		106	30-160	0.01	30	
N-Nitrosodiphenylamine	4.1	0.03	0.2	ug/L	5.00		81.5	30-160	2.83	30	
4-Bromophenyl phenyl ether	4.6	0.02	0.2	ug/L	5.00		91.4	30-160	5.86	30	
Hexachlorobenzene	5.2	0.04	0.2	ug/L	5.00		104	30-160	7.12	30	Q
Pentachlorophenol	13.8	0.1	1.0	ug/L	13.0		106	30-160	3.11	30	
Phenanthrene	4.4	0.02	0.2	ug/L	5.00		88.9	30-160	6.35	30	
Anthracene	4.3	0.03	0.2	ug/L	5.00		85.4	30-160	6.67	30	
Carbazole	4.2	0.04	0.2	ug/L	5.00		85.0	30-160	6.58	30	
Di-n-Butylphthalate	4.3	0.05	0.2	ug/L	5.00		86.5	30-160	5.17	30	
Fluoranthene	4.3	0.03	0.2	ug/L	5.00		85.8	30-160	4.38	30	
Pyrene	4.2	0.03	0.2	ug/L	5.00		83.6	30-160	4.99	30	
Butylbenzylphthalate	5.1	0.07	0.2	ug/L	5.00		103	30-160	9.86	30	
Benzo(a)anthracene	3.9	0.04	0.2	ug/L	5.00		78.6	30-160	4.67	30	
3,3'-Dichlorobenzidine	7.7	0.3	1.0	ug/L	8.00		96.4	30-160	3.40	30	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
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Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0646 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0646-BSD1)						Prepared: 27-May-2021 Analyzed: 03-Jun-2021 17:56					
Chrysene	4.0	0.04	0.2	ug/L	5.00		79.1	30-160	3.10	30	
bis(2-Ethylhexyl)phthalate	4.9	0.2	0.2	ug/L	5.00		97.5	30-160	6.89	30	B
Di-n-Octylphthalate	4.1	0.05	0.2	ug/L	5.00		81.4	30-160	4.23	30	
Benzo(a)fluoranthene, Total	8.1	0.08	0.4	ug/L	10.0		80.6	30-160	7.20	30	
Benzo(a)pyrene	4.0	0.05	0.2	ug/L	5.00		79.5	30-160	5.89	30	
Indeno(1,2,3-cd)pyrene	4.7	0.06	0.2	ug/L	5.00		94.0	30-160	7.60	30	
Dibenzo(a,h)anthracene	4.8	0.07	0.2	ug/L	5.00		95.1	30-160	5.33	30	
Benzo(g,h,i)perylene	4.6	0.04	0.2	ug/L	5.00		91.6	30-160	6.01	30	
1-Methylnaphthalene	3.9	0.03	0.2	ug/L	5.00		77.2	30-160	5.18	30	
Surrogate: 2-Fluorophenol	3.97			ug/L	7.50		53.0	30-160			
Surrogate: Phenol-d5	2.85			ug/L	7.50		38.0	30-160			
Surrogate: 2-Chlorophenol-d4	6.18			ug/L	7.50		82.3	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.19			ug/L	5.00		63.8	30-160			
Surrogate: Nitrobenzene-d5	4.77			ug/L	5.00		95.5	30-160			
Surrogate: 2-Fluorobiphenyl	4.09			ug/L	5.00		81.8	30-160			
Surrogate: 2,4,6-Tribromophenol	10.4			ug/L	7.50		139	30-160			Q
Surrogate: p-Terphenyl-d14	4.61			ug/L	5.00		92.3	30-160			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0647 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0647-BLK1)						Prepared: 28-May-2021 Analyzed: 08-Jun-2021 19:49					
Naphthalene	0.003	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.003	0.001	0.010	ug/L							J
1-Methylnaphthalene	0.002	0.0009	0.010	ug/L							J
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
Surrogate: 2-Methylnaphthalene-d10	0.169			ug/L	0.300		56.2	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.182			ug/L	0.300		60.7	29-120			
Surrogate: Fluoranthene-d10	0.205			ug/L	0.300		68.4	57-120			

LCS (BJE0647-BS1)						Prepared: 28-May-2021 Analyzed: 08-Jun-2021 20:21					
Naphthalene	0.178	0.001	0.010	ug/L	0.300		59.4	37-120			
2-Methylnaphthalene	0.179	0.001	0.010	ug/L	0.300		59.7	37-120			
1-Methylnaphthalene	0.179	0.0009	0.010	ug/L	0.300		59.8	29-120			
Acenaphthylene	0.179	0.002	0.010	ug/L	0.300		59.6	41-120			
Acenaphthene	0.185	0.003	0.010	ug/L	0.300		61.7	41-120			
Dibenzofuran	0.181	0.002	0.010	ug/L	0.300		60.4	38-120			
Fluorene	0.191	0.002	0.010	ug/L	0.300		63.8	43-120			


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Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0647 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0647-BS1)						Prepared: 28-May-2021	Analyzed: 08-Jun-2021 20:21				
Phenanthrene	0.187	0.001	0.010	ug/L	0.300		62.2	41-120			
Anthracene	0.180	0.001	0.010	ug/L	0.300		60.1	40-120			
Carbazole	0.201	0.001	0.010	ug/L	0.300		67.1	30-160			
Fluoranthene	0.200	0.002	0.010	ug/L	0.300		66.5	45-120			
Pyrene	0.197	0.001	0.010	ug/L	0.300		65.7	41-120			
Benzo(a)anthracene	0.199	0.0008	0.010	ug/L	0.300		66.4	42-120			
Chrysene	0.189	0.0009	0.010	ug/L	0.300		62.9	44-120			
Benzo(b)fluoranthene	0.214	0.0005	0.010	ug/L	0.300		71.4	44-120			
Benzo(k)fluoranthene	0.198	0.003	0.010	ug/L	0.300		66.0	50-120			
Benzo(j)fluoranthene	0.175	0.002	0.010	ug/L	0.300		58.2	39-160			
Benzofluoranthenes, Total	0.587	0.004	0.010	ug/L	0.900		65.2	46-120			
Benzo(a)pyrene	0.178	0.002	0.010	ug/L	0.300		59.5	35-120			
Perylene	0.172	0.006	0.010	ug/L	0.300		57.4	30-160			
Indeno(1,2,3-cd)pyrene	0.184	0.001	0.010	ug/L	0.300		61.2	37-120			
Dibenzo(a,h)anthracene	0.180	0.001	0.010	ug/L	0.300		60.1	34-120			
Benzo(g,h,i)perylene	0.213	0.001	0.010	ug/L	0.300		70.9	38-120			
Surrogate: 2-Methylnaphthalene-d10	0.184			ug/L	0.300		61.4	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.191			ug/L	0.300		63.8	29-120			
Surrogate: Fluoranthene-d10	0.208			ug/L	0.300		69.4	57-120			
LCS Dup (BJE0647-BSD1)						Prepared: 28-May-2021	Analyzed: 08-Jun-2021 20:54				
Naphthalene	0.208	0.001	0.010	ug/L	0.300		69.3	37-120	15.30	30	
2-Methylnaphthalene	0.209	0.001	0.010	ug/L	0.300		69.7	37-120	15.50	30	
1-Methylnaphthalene	0.208	0.0009	0.010	ug/L	0.300		69.5	29-120	15.00	30	
Acenaphthylene	0.207	0.002	0.010	ug/L	0.300		69.1	41-120	14.80	30	
Acenaphthene	0.216	0.003	0.010	ug/L	0.300		72.0	41-120	15.40	30	
Dibenzofuran	0.210	0.002	0.010	ug/L	0.300		69.9	38-120	14.60	30	
Fluorene	0.219	0.002	0.010	ug/L	0.300		72.9	43-120	13.30	30	
Phenanthrene	0.215	0.001	0.010	ug/L	0.300		71.8	41-120	14.30	30	
Anthracene	0.220	0.001	0.010	ug/L	0.300		73.3	40-120	19.90	30	
Carbazole	0.231	0.001	0.010	ug/L	0.300		77.0	30-160	13.70	30	
Fluoranthene	0.230	0.002	0.010	ug/L	0.300		76.7	45-120	14.10	30	
Pyrene	0.227	0.001	0.010	ug/L	0.300		75.7	41-120	14.10	30	
Benzo(a)anthracene	0.232	0.0008	0.010	ug/L	0.300		77.3	42-120	15.10	30	
Chrysene	0.217	0.0009	0.010	ug/L	0.300		72.3	44-120	13.80	30	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0647 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0647-BS01)						Prepared: 28-May-2021 Analyzed: 08-Jun-2021 20:54					
Benzo(b)fluoranthene	0.219	0.0005	0.010	ug/L	0.300		73.1	44-120	2.29	30	
Benzo(k)fluoranthene	0.257	0.003	0.010	ug/L	0.300		85.5	50-120	25.70	30	
Benzo(j)fluoranthene	0.206	0.002	0.010	ug/L	0.300		68.7	39-160	16.60	30	
Benzofluoranthenes, Total	0.682	0.004	0.010	ug/L	0.900		75.8	46-120	15.00	30	
Benzo(a)pyrene	0.221	0.002	0.010	ug/L	0.300		73.7	35-120	21.30	30	
Perylene	0.205	0.006	0.010	ug/L	0.300		68.5	30-160	17.60	30	
Indeno(1,2,3-cd)pyrene	0.216	0.001	0.010	ug/L	0.300		72.1	37-120	16.20	30	
Dibenzo(a,h)anthracene	0.212	0.001	0.010	ug/L	0.300		70.6	34-120	16.10	30	
Benzo(g,h,i)perylene	0.248	0.001	0.010	ug/L	0.300		82.7	38-120	15.40	30	
Surrogate: 2-Methylnaphthalene-d10	0.200			ug/L	0.300		66.8	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.209			ug/L	0.300		69.5	29-120			
Surrogate: Fluoranthene-d10	0.228			ug/L	0.300		76.0	57-120			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJE0643 - EPA 3510C SepF

Instrument: FID4 Analyst: CTO

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0643-BLK1)									
				Prepared: 28-May-2021 Analyzed: 03-Jun-2021 16:35					
Diesel Range Organics (C12-C24)	ND	0.100	mg/L						U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L						U
<i>Surrogate: o-Terphenyl</i>	0.176		mg/L	0.225	78.3	50-150			
LCS (BJE0643-BS1)									
				Prepared: 28-May-2021 Analyzed: 03-Jun-2021 16:56					
Diesel Range Organics (C12-C24)	2.65	0.100	mg/L	3.00	88.4	56-120			
<i>Surrogate: o-Terphenyl</i>	0.195		mg/L	0.225	86.7	50-150			
LCS Dup (BJE0643-BSD1)									
				Prepared: 28-May-2021 Analyzed: 03-Jun-2021 17:17					
Diesel Range Organics (C12-C24)	2.27	0.100	mg/L	3.00	75.5	56-120	15.70	30	
<i>Surrogate: o-Terphenyl</i>	0.168		mg/L	0.225	74.8	50-150			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC

Aroclor PCB - Quality Control

Batch BJE0645 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0645-BLK1)						Prepared: 28-May-2021 Analyzed: 05-Jun-2021 18:52					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0170			ug/L	0.0200		84.8	29-120			
Surrogate: Tetrachlorometaxylene	0.0174			ug/L	0.0200		87.0	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0163			ug/L	0.0200		81.4	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0126			ug/L	0.0200		63.1	32-120			
LCS (BJE0645-BS1)						Prepared: 28-May-2021 Analyzed: 05-Jun-2021 19:13					
Aroclor 1016	0.044	0.002	0.010	ug/L	0.0500		88.9	54-120			
Aroclor 1260	0.047	0.003	0.010	ug/L	0.0500		94.5	51-128			
Surrogate: Decachlorobiphenyl	0.0175			ug/L	0.0200		87.6	29-120			
Surrogate: Tetrachlorometaxylene	0.0161			ug/L	0.0200		80.3	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0163			ug/L	0.0200		81.7	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0118			ug/L	0.0200		59.0	32-120			
LCS Dup (BJE0645-BSD1)						Prepared: 28-May-2021 Analyzed: 05-Jun-2021 19:34					
Aroclor 1016	0.046	0.002	0.010	ug/L	0.0500		92.2	54-120	3.73	30	
Aroclor 1260	0.047	0.003	0.010	ug/L	0.0500		93.0	51-128	1.55	30	
Surrogate: Decachlorobiphenyl	0.0172			ug/L	0.0200		85.8	29-120			
Surrogate: Tetrachlorometaxylene	0.0165			ug/L	0.0200		82.3	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0165			ug/L	0.0200		82.4	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0125			ug/L	0.0200		62.7	32-120			



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJF0195 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0195-BLK1)						Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 12:54				
Mercury	ND	0.000013	0.000100	mg/L						U
LCS (BJF0195-BS1)						Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 12:57				
Mercury	0.00205	0.000013	0.000100	mg/L	0.00200		102	80-120		



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJF0278 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0278-BLK1)						Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 01:33					
Arsenic		ND	0.0373	0.200	ug/L						U
Chromium	52	ND	0.260	0.500	ug/L						U
Chromium	53	ND	0.239	0.500	ug/L						U
Manganese	55	ND	0.142	0.500	ug/L						U
LCS (BJF0278-BS1)						Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 01:37					
Arsenic		23.9	0.0373	0.200	ug/L	25.0	95.7	80-120			
Chromium	52	25.2	0.260	0.500	ug/L	25.0	101	80-120			
Chromium	53	25.4	0.239	0.500	ug/L	25.0	102	80-120			
Manganese	55	26.4	0.142	0.500	ug/L	25.0	106	80-120			
Duplicate (BJF0278-DUP1)						Source: 21E0290-08 Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 04:10					
Arsenic		3.67	0.0373	0.200	ug/L	3.62			1.29	20	
Chromium	52	10.4	0.260	0.500	ug/L	10.5			0.49	20	
Manganese	55	30.5	0.142	0.500	ug/L	30.5			0.09	20	
Matrix Spike (BJF0278-MS1)						Source: 21E0290-08 Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 04:14					
Arsenic		27.2	0.0373	0.200	ug/L	25.0	3.62	94.4	75-125		
Chromium	52	30.7	0.260	0.500	ug/L	25.0	10.5	81.1	75-125		
Manganese	55	50.0	0.142	0.500	ug/L	25.0	30.5	77.8	75-125		
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJF0278-MSD1)						Source: 21E0290-08 Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 04:20					
Arsenic		27.7	0.0373	0.200	ug/L	25.0	3.62	96.2	75-125	1.64	20
Chromium	52	30.7	0.260	0.500	ug/L	25.0	10.5	80.8	75-125	0.25	20
Manganese	55	49.1	0.142	0.500	ug/L	25.0	30.5	74.1	75-125	1.88	20
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0279 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0279-BLK1)						Prepared: 18-Jun-2021 Analyzed: 18-Jun-2021 18:03					
Arsenic	ND	0.0373	0.200	ug/L							U
Cadmium	ND	0.0300	0.100	ug/L							U
Cadmium	ND	0.0400	0.100	ug/L							U
Copper	ND	0.173	0.500	ug/L							U
Copper	ND	0.350	0.500	ug/L							U
Nickel	0.100	0.0792	0.500	ug/L							J
Nickel	ND	0.220	0.500	ug/L							U
Selenium	ND	0.179	0.500	ug/L							U
Zinc	ND	2.92	6.00	ug/L							U
Zinc	2.48	0.940	6.00	ug/L							J
Barium	135	ND	0.114	0.500	ug/L						U
Barium	137	ND	0.0765	0.500	ug/L						U
Chromium	52	ND	0.260	0.500	ug/L						U
Chromium	53	ND	0.239	0.500	ug/L						U
Cobalt	59	ND	0.0173	0.200	ug/L						U
Iron	54	ND	18.2	36.0	ug/L						U
Iron	57	ND	6.63	36.0	ug/L						U
Lead	208	ND	0.0513	0.100	ug/L						U
Manganese	55	0.210	0.142	0.500	ug/L						J
Silver	107	ND	0.0220	0.200	ug/L						U
Vanadium	51a	ND	0.0556	0.200	ug/L						U
Vanadium	51b	ND	0.0521	0.200	ug/L						U

LCS (BJF0279-BS1)						Prepared: 18-Jun-2021 Analyzed: 18-Jun-2021 17:57					
Arsenic		25.1	0.0373	0.200	ug/L	25.0		101	80-120		
Cadmium		26.0	0.0300	0.100	ug/L	25.0		104	80-120		
Cadmium		25.6	0.0400	0.100	ug/L	25.0		102	80-120		
Copper		25.1	0.173	0.500	ug/L	25.0		100	80-120		
Copper		25.1	0.350	0.500	ug/L	25.0		101	80-120		
Nickel		25.4	0.0792	0.500	ug/L	25.0		102	80-120		
Nickel		25.3	0.220	0.500	ug/L	25.0		101	80-120		
Selenium		82.2	0.179	0.500	ug/L	80.0		103	80-120		
Zinc		83.8	2.92	6.00	ug/L	80.0		105	80-120		
Zinc		78.4	0.940	6.00	ug/L	80.0		98.0	80-120		
Barium	135	25.0	0.114	0.500	ug/L	25.0		100	80-120		


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJJ0279 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0279-BS1)						Prepared: 18-Jun-2021 Analyzed: 18-Jun-2021 17:57						
Barium	137	24.9	0.0765	0.500	ug/L	25.0		99.5	80-120			
Chromium	52	24.9	0.260	0.500	ug/L	25.0		99.5	80-120			
Chromium	53	25.0	0.239	0.500	ug/L	25.0		100	80-120			
Cobalt	59	25.5	0.0173	0.200	ug/L	25.0		102	80-120			
Iron	54	4910	18.2	36.0	ug/L	5000		98.2	80-120			
Iron	57	4920	6.63	36.0	ug/L	5000		98.4	80-120			
Lead	208	25.7	0.0513	0.100	ug/L	25.0		103	80-120			
Manganese	55	25.5	0.142	0.500	ug/L	25.0		102	80-120			
Silver	107	24.8	0.0220	0.200	ug/L	25.0		99.1	80-120			
Vanadium	51a	24.5	0.0556	0.200	ug/L	25.0		98.2	80-120			
Vanadium	51b	24.6	0.0521	0.200	ug/L	25.0		98.4	80-120			
Duplicate (BJF0279-DUP1)						Source: 21E0290-12 Prepared: 18-Jun-2021 Analyzed: 18-Jun-2021 18:33						
Arsenic		0.723	0.0373	0.200	ug/L		0.708			2.10	20	
Cadmium		0.0430	0.0300	0.100	ug/L		0.0390			9.76	20	J
Copper		3.02	0.173	0.500	ug/L		2.34			25.30	20	*, L
Nickel		1.21	0.0792	0.500	ug/L		1.22			0.66	20	
Selenium		1.21	0.179	0.500	ug/L		1.13			6.60	20	
Zinc		ND	2.92	6.00	ug/L		ND					U
Barium	135	8.46	0.114	0.500	ug/L		8.37			1.08	20	
Chromium	52	1.09	0.260	0.500	ug/L		1.06			2.80	20	
Cobalt	59	0.259	0.0173	0.200	ug/L		0.251			3.14	20	
Iron	54	156	18.2	36.0	ug/L		157			0.90	20	
Lead	208	0.0680	0.0513	0.100	ug/L		0.0550			21.10	20	L, J
Manganese	55	29.5	0.142	0.500	ug/L		29.1			1.19	20	
Silver	107	ND	0.0220	0.200	ug/L		ND					U
Vanadium	51a	3.15	0.0556	0.200	ug/L		3.11			1.09	20	
Matrix Spike (BJF0279-MS1)						Source: 21E0290-12 Prepared: 18-Jun-2021 Analyzed: 18-Jun-2021 18:38						
Arsenic		26.1	0.0373	0.200	ug/L	25.0	0.708	102	75-125			
Cadmium		25.0	0.0300	0.100	ug/L	25.0	0.0390	99.7	75-125			
Copper		26.9	0.173	0.500	ug/L	25.0	2.34	98.3	75-125			
Nickel		26.3	0.0792	0.500	ug/L	25.0	1.22	100	75-125			
Selenium		79.7	0.179	0.500	ug/L	80.0	1.13	98.2	75-125			
Zinc		77.1	2.92	6.00	ug/L	80.0	ND	96.4	75-125			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJF0279 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJF0279-MS1)		Source: 21E0290-12			Prepared: 18-Jun-2021		Analyzed: 18-Jun-2021 18:38					
Barium	135	34.3	0.114	0.500	ug/L	25.0	8.37	104	75-125			
Chromium	52	22.7	0.260	0.500	ug/L	25.0	1.06	86.5	75-125			
Cobalt	59	26.2	0.0173	0.200	ug/L	25.0	0.251	104	75-125			
Iron	54	4380	18.2	36.0	ug/L	5000	157	84.5	75-125			
Lead	208	25.6	0.0513	0.100	ug/L	25.0	0.0550	102	75-125			
Manganese	55	51.6	0.142	0.500	ug/L	25.0	29.1	89.8	75-125			
Silver	107	24.2	0.0220	0.200	ug/L	25.0	ND	96.8	75-125			
Vanadium	51a	24.5	0.0556	0.200	ug/L	25.0	3.11	85.4	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0279-MSD1)		Source: 21E0290-12			Prepared: 18-Jun-2021		Analyzed: 18-Jun-2021 18:43					
Arsenic		26.3	0.0373	0.200	ug/L	25.0	0.708	102	75-125	0.67	20	
Cadmium		25.4	0.0300	0.100	ug/L	25.0	0.0390	101	75-125	1.74	20	
Copper		27.2	0.173	0.500	ug/L	25.0	2.34	99.3	75-125	0.96	20	
Nickel		26.8	0.0792	0.500	ug/L	25.0	1.22	102	75-125	1.97	20	
Selenium		82.0	0.179	0.500	ug/L	80.0	1.13	101	75-125	2.88	20	
Zinc		78.8	2.92	6.00	ug/L	80.0	ND	98.5	75-125	2.08	20	
Barium	135	35.2	0.114	0.500	ug/L	25.0	8.37	107	75-125	2.67	20	
Chromium	52	23.0	0.260	0.500	ug/L	25.0	1.06	87.8	75-125	1.44	20	
Cobalt	59	26.2	0.0173	0.200	ug/L	25.0	0.251	104	75-125	0.15	20	
Iron	54	4400	18.2	36.0	ug/L	5000	157	84.9	75-125	0.46	20	
Lead	208	25.4	0.0513	0.100	ug/L	25.0	0.0550	101	75-125	0.79	20	
Manganese	55	52.3	0.142	0.500	ug/L	25.0	29.1	92.8	75-125	1.45	20	
Silver	107	24.8	0.0220	0.200	ug/L	25.0	ND	99.3	75-125	2.53	20	
Vanadium	51a	24.9	0.0556	0.200	ug/L	25.0	3.11	87.3	75-125	1.87	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJF0327 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0327-BLK1)						Prepared: 14-Jun-2021 Analyzed: 14-Jun-2021 22:15					
Arsenic, Dissolved	ND	0.0373	0.200	ug/L							U
Cadmium, Dissolved	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	ND	0.0400	0.100	ug/L							U
Copper, Dissolved	ND	0.173	0.500	ug/L							U
Copper, Dissolved	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	ND	0.220	0.500	ug/L							U
Barium, Dissolved	135	ND	0.114	0.500	ug/L						U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L						U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L						U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L						U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L						U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L						U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L						U
Blank (BJF0327-BLK2)						Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 16:48					
Selenium, Dissolved	ND	0.179	0.500	ug/L							U
Cobalt, Dissolved	59	ND	0.0173	0.200	ug/L						U
Iron, Dissolved	54	ND	18.2	36.0	ug/L						U
Iron, Dissolved	57	ND	6.63	20.0	ug/L						U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L						U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L						U
LCS (BJF0327-BS1)						Prepared: 14-Jun-2021 Analyzed: 14-Jun-2021 22:19					
Arsenic, Dissolved	23.7	0.0373	0.200	ug/L	25.0		94.9	80-120			
Cadmium, Dissolved	24.3	0.0300	0.100	ug/L	25.0		97.3	80-120			
Cadmium, Dissolved	24.7	0.0400	0.100	ug/L	25.0		99.0	80-120			
Copper, Dissolved	25.3	0.173	0.500	ug/L	25.0		101	80-120			
Copper, Dissolved	24.8	0.350	0.500	ug/L	25.0		99.4	80-120			
Nickel, Dissolved	25.1	0.0792	0.500	ug/L	25.0		100	80-120			
Nickel, Dissolved	25.4	0.220	0.500	ug/L	25.0		102	80-120			
Barium, Dissolved	135	22.7	0.114	0.500	ug/L		90.8	80-120			
Barium, Dissolved	137	23.0	0.0765	0.500	ug/L		91.8	80-120			
Chromium, Dissolved	52	24.5	0.260	0.500	ug/L		98.1	80-120			
Chromium, Dissolved	53	24.8	0.239	0.500	ug/L		99.3	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0327 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0327-BS1)						Prepared: 14-Jun-2021 Analyzed: 14-Jun-2021 22:19						
Lead, Dissolved	208	25.1	0.0513	0.100	ug/L	25.0		100	80-120			
Manganese, Dissolved	55	25.4	0.142	0.500	ug/L	25.0		101	80-120			
Silver, Dissolved	107	22.7	0.0220	0.200	ug/L	25.0		90.7	80-120			
LCS (BJF0327-BS2)						Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 16:53						
Selenium, Dissolved		71.6	0.179	0.500	ug/L	80.0		89.5	80-120			
Cobalt, Dissolved	59	24.3	0.0173	0.200	ug/L	25.0		97.3	80-120			
Iron, Dissolved	54	5210	18.2	36.0	ug/L	5000		104	80-120			
Iron, Dissolved	57	5220	6.63	20.0	ug/L	5000		104	80-120			
Vanadium, Dissolved	51a	24.5	0.0556	0.200	ug/L	25.0		98.0	80-120			
Vanadium, Dissolved	51b	24.4	0.0521	0.200	ug/L	25.0		97.5	80-120			
Duplicate (BJF0327-DUP1)						Source: 21E0290-03 Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 02:52						
Arsenic, Dissolved		0.169	0.0373	0.200	ug/L		0.162			4.23	20	J
Cadmium, Dissolved		ND	0.0300	0.100	ug/L		ND					U
Copper, Dissolved		0.281	0.173	0.500	ug/L		0.207			30.30	20	L, J
Nickel, Dissolved		3.64	0.0792	0.500	ug/L		3.76			3.14	20	
Zinc, Dissolved		3.56	2.92	6.00	ug/L		3.45			3.17	20	J
Barium, Dissolved	135	14.5	0.114	0.500	ug/L		15.4			6.05	20	
Chromium, Dissolved	52	ND	0.260	0.500	ug/L		ND					U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L		ND					U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND					U
Duplicate (BJF0327-DUP2)						Source: 21E0290-03 Prepared: 14-Jun-2021 Analyzed: 16-Jun-2021 02:44						
Iron, Dissolved	54	23200	364	720	ug/L		22800			1.38	20	D
Manganese, Dissolved	55	1710	2.84	10.0	ug/L		1750			2.61	20	D
Duplicate (BJF0327-DUP3)						Source: 21E0290-03 Prepared: 14-Jun-2021 Analyzed: 17-Jun-2021 00:09						
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L		ND					U
Duplicate (BJF0327-DUP4)						Source: 21E0290-03 Prepared: 14-Jun-2021 Analyzed: 18-Jun-2021 03:24						
Selenium, Dissolved		ND	0.358	1.00	ug/L		ND					U
Cobalt, Dissolved	59	1.87	0.0346	0.400	ug/L		1.84			1.51	20	D
Matrix Spike (BJF0327-MS1)						Source: 21E0290-03 Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 02:56						
Arsenic, Dissolved		23.8	0.0373	0.200	ug/L	25.0	0.162	94.7	75-125			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJJ0327 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJF0327-MS1)		Source: 21E0290-03		Prepared: 14-Jun-2021		Analyzed: 15-Jun-2021 02:56					
Cadmium, Dissolved	23.2	0.0300	0.100	ug/L	25.0	ND	92.7	75-125			
Copper, Dissolved	24.1	0.173	0.500	ug/L	25.0	0.207	95.5	75-125			
Nickel, Dissolved	28.4	0.0792	0.500	ug/L	25.0	3.76	98.8	75-125			
Barium, Dissolved	135	37.1	0.114	0.500	ug/L	25.0	15.4	86.6	75-125		
Chromium, Dissolved	52	21.5	0.260	0.500	ug/L	25.0	ND	86.0	75-125		
Lead, Dissolved	208	23.9	0.0513	0.100	ug/L	25.0	ND	95.5	75-125		
Silver, Dissolved	107	19.8	0.0220	0.200	ug/L	25.0	ND	79.0	75-125		

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0327-MS2)		Source: 21E0290-03		Prepared: 14-Jun-2021		Analyzed: 16-Jun-2021 02:48					
Iron, Dissolved	54	28700	364	720	ug/L	5000	22800	117	75-125		D
Manganese, Dissolved	55	1770	2.84	10.0	ug/L	25.0	1750	68.8	75-125		HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0327-MS3)		Source: 21E0290-03		Prepared: 14-Jun-2021		Analyzed: 17-Jun-2021 00:14					
Vanadium, Dissolved	51a	20.2	0.0556	0.200	ug/L	25.0	ND	80.6	75-125		

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0327-MS4)		Source: 21E0290-03		Prepared: 14-Jun-2021		Analyzed: 18-Jun-2021 03:29					
Selenium, Dissolved		72.3	0.358	1.00	ug/L	80.0	ND	90.3	75-125		D
Cobalt, Dissolved	59	26.5	0.0346	0.400	ug/L	25.0	1.84	98.8	75-125		D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0327-MSD1)		Source: 21E0290-03		Prepared: 14-Jun-2021		Analyzed: 15-Jun-2021 03:02					
Arsenic, Dissolved		23.7	0.0373	0.200	ug/L	25.0	0.162	94.1	75-125	0.61	20
Cadmium, Dissolved		23.1	0.0300	0.100	ug/L	25.0	ND	92.4	75-125	0.28	20
Copper, Dissolved		24.0	0.173	0.500	ug/L	25.0	0.207	95.2	75-125	0.33	20
Nickel, Dissolved		28.1	0.0792	0.500	ug/L	25.0	3.76	97.2	75-125	1.39	20
Barium, Dissolved	135	36.5	0.114	0.500	ug/L	25.0	15.4	84.6	75-125	1.38	20
Chromium, Dissolved	52	21.1	0.260	0.500	ug/L	25.0	ND	84.6	75-125	1.70	20
Lead, Dissolved	208	24.0	0.0513	0.100	ug/L	25.0	ND	96.0	75-125	0.51	20
Silver, Dissolved	107	19.7	0.0220	0.200	ug/L	25.0	ND	78.7	75-125	0.35	20

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0327-MSD2)		Source: 21E0290-03		Prepared: 14-Jun-2021		Analyzed: 16-Jun-2021 02:53					
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 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0327 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJF0327-MSD2)		Source: 21E0290-03		Prepared: 14-Jun-2021		Analyzed: 16-Jun-2021 02:53						
Iron, Dissolved	54	28700	364	720	ug/L	5000	22800	117	75-125	0.04	20	D
Manganese, Dissolved	55	1750	2.84	10.0	ug/L	25.0	1750	-17.5	75-125	1.23	20	HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0327-MSD3)		Source: 21E0290-03		Prepared: 14-Jun-2021		Analyzed: 17-Jun-2021 00:20						
Vanadium, Dissolved	51a	20.2	0.0556	0.200	ug/L	25.0	ND	81.0	75-125	0.43	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0327-MSD4)		Source: 21E0290-03		Prepared: 14-Jun-2021		Analyzed: 18-Jun-2021 03:35						
Selenium, Dissolved		70.5	0.358	1.00	ug/L	80.0	ND	88.1	75-125	2.53	20	D
Cobalt, Dissolved	59	26.3	0.0346	0.400	ug/L	25.0	1.84	97.8	75-125	0.87	20	D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0430 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0430-BLK1)						Prepared: 16-Jun-2021 Analyzed: 16-Jun-2021 19:41					
Zinc, Dissolved	ND	2.92	6.00	ug/L							U
Zinc, Dissolved	1.71	0.940	6.00	ug/L							J
LCS (BJF0430-BS1)						Prepared: 16-Jun-2021 Analyzed: 16-Jun-2021 19:46					
Zinc, Dissolved	76.2	2.92	6.00	ug/L	80.0		95.2	80-120			
Zinc, Dissolved	72.2	0.940	6.00	ug/L	80.0		90.2	80-120			
Duplicate (BJF0430-DUP1)						Source: 21E0290-13RE1 Prepared: 16-Jun-2021 Analyzed: 17-Jun-2021 21:18					
Zinc, Dissolved	ND	2.92	6.00	ug/L		ND					U
Matrix Spike (BJF0430-MS1)						Source: 21E0290-13RE1 Prepared: 16-Jun-2021 Analyzed: 17-Jun-2021 21:23					
Zinc, Dissolved	69.8	2.92	6.00	ug/L	80.0	ND	87.2	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJF0430-MSD1)						Source: 21E0290-13RE1 Prepared: 16-Jun-2021 Analyzed: 17-Jun-2021 21:28					
Zinc, Dissolved	67.0	2.92	6.00	ug/L	80.0	ND	83.8	75-125	3.99	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
30-Dec-2021 10:05

Certified Analyses included in this Report

Analyte	Certifications
*** DEFAULT SPECIFIC METHOD *** in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP
EPA 6020B in Water	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC


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Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
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EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE


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 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 30-Dec-2021 10:05

1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE


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o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP
2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP
2-Methylphenol	NELAP,DoD-ELAP


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Hexachloroethane	NELAP,DoD-ELAP
N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP
Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP
2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP
2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP
2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP
Pentachlorophenol	NELAP,DoD-ELAP


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Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(k)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE


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Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Perylene	ADEC, NELAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP, NELAP, WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP, NELAP, WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP, NELAP, WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE, DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE, DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE, DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE, ADEC, DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE, DoD-ELAP



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Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
L	Analyte concentration is ≤ 5 times the reporting limit and the replicate control limit defaults to $\pm$ RL instead of 20% RPD
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria ($<20\%$ RSD, $<20\%$ drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
Y1	Raised reporting limit due to interference
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

14 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21E0302

Associated SDG ID(s)
N/A

Susan Dunnihoo

Digitally signed by Susan
Dunnihoo
Date: 2021.12.15 14:45:02 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

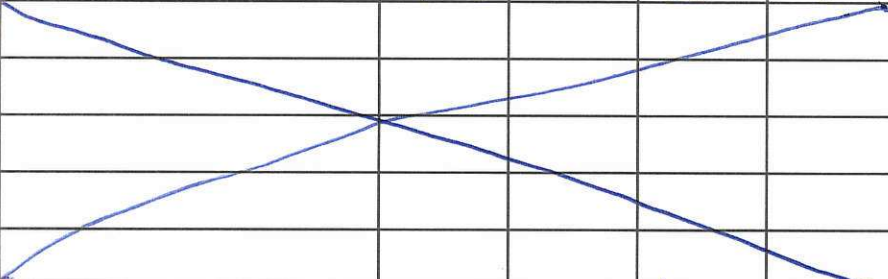
Analytical Resources, LLC

Susan Dunnihoo For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21E0302		Turn-around Requested: Standard		Page: 1 of 1		 Analytical Resources, Incorporated Analytical Chemists and Consultants 4611 South 134th Place, Suite 100 Tukwila, WA 98168 206-695-6200 206-695-6201 (fax) www.arilabs.com																
ARI Client Company: Shannon & Wilson, Inc.		Phone:		Date: 5/25				Ice Present?														
Client Contact: Shoshana Howard				No. of Coolers:				Cooler Temps: 2.8; 1.1														
Client Project Name: LDW				Analysis Requested																		
Client Project #: 21-1-12596		Samplers: CTC, BON						Notes/Comments														
Sample ID	Date	Time	Matrix	No. Containers	TPH-G	TPH-Dx	BTEX	HVOCs	MTBE	PAHs	SVOCs (Full List)	SVOCs (Limited)	PCBs (Areculars)	Metals (Total & Diss.)	Hardness							
EB-2-20212505	5/25	1145	W	15	X	X	X	X	X	X	X	X	X	X				⊗ As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn				
TB-9-20212505	5/25	1235	W	5	X		X	X	X													
MW-53-20212505	5/25	1320	W	13		X	X	X		X	X	X	X	X	X							
MW-10R-20212505	5/25	1500	W	11		X	X	X		X			X	X								
MW-11-20212505	5/25	1625	W	9	X	X			X					X				As, Mn				
																						
Comments/Special Instructions					Relinquished by: (Signature) 		Received by: (Signature) 		Relinquished by: (Signature)		Received by: (Signature)											
					Printed Name: Christian Canfield		Printed Name: Dimitri Lominadze		Printed Name:		Printed Name:											
					Company: Shannon & Wilson, Inc.		Company: ARI		Company:		Company:											
					Date & Time: 5/25/21 1655		Date & Time: 05/25/21 1655		Date & Time:		Date & Time:											

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.



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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
EB-2-20212505	21E0302-01	Water	25-May-2021 11:45	25-May-2021 16:55
EB-2-20212505	21E0302-02	Water	25-May-2021 11:45	25-May-2021 16:55
TB-9-20212505	21E0302-03	Water	25-May-2021 11:45	25-May-2021 16:55
MW-53-20212505	21E0302-04	Water	25-May-2021 13:20	25-May-2021 16:55
MW-53-20212505	21E0302-05	Water	25-May-2021 13:20	25-May-2021 16:55
MW-10R-20212505	21E0302-06	Water	25-May-2021 15:00	25-May-2021 16:55
MW-10R-20212505	21E0302-07	Water	25-May-2021 15:00	25-May-2021 16:55
MW-11-20212505	21E0302-08	Water	25-May-2021 16:25	25-May-2021 16:55
MW-11-20212505	21E0302-09	Water	25-May-2021 16:25	25-May-2021 16:55



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Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish
Work Order: 21E0302

Sample receipt

Samples as listed on the preceding page were received 25-May-2021 16:55 under ARI work order 21E0302. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Gasoline by NWTPH-q (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.



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Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except surrogate 2,4,6- Tribromophenol which was out of control high in the initial calibration verification (ICV). All samples which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except Phenol-d5 which was out of control low in sample 21E0302-01 and surrogate 2,4,6-Tribromophenol which was out of control high. Deviations have been flagged.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Total Metals - EPA Method 6020B


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The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Total Mercury - EPA Method 7470/

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0302-02 in batch BJF0273. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

Dissolved Mercury - EPA Method 7470

The sample(s) were digested and analyzed outside the recommended holding times. The samples had been prepared in-house. The instrument was not operational for two weeks. Due to analyst miscalculation hold time was exceeded. Data is flagged. Due to equipment issue the samples were subcontracted to Fremont Analytical for Dissolved Mercury analysis. The Fremont report is included in its entirety.

REVISED to correct VOA lists and total metals for MW-53.



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon & Wilson

Project Name: LDW

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 21E0302

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1655 2.8 1.1

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO

Cooler Accepted by: DL Date: 05/25/21 Time: 1655

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI: NA 5/24/21

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: SC Date: 5/26/21 Time: 0824 5/24/21 Labels checked by: SC

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____



WORK ORDER

21E0302

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0302-01 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0302-01 B	Glass NM, Amber, 1000 mL		
21E0302-01 C	Glass NM, Amber, 1000 mL		
21E0302-01 D	Glass NM, Amber, 500 mL		
21E0302-01 E	Glass NM, Amber, 500 mL		
21E0302-01 F	Glass NM, Amber, 500 mL		
21E0302-01 G	Glass NM, Amber, 500 mL		
21E0302-01 H	Glass NM, Amber, 500 mL		
21E0302-01 I	Glass NM, Amber, 500 mL		
21E0302-01 J	VOA Vial, Clear, 40 mL, HCL		
21E0302-01 K	VOA Vial, Clear, 40 mL, HCL		
21E0302-01 L	VOA Vial, Clear, 40 mL, HCL		
21E0302-01 M	VOA Vial, Clear, 40 mL, HCL		
21E0302-01 N	VOA Vial, Clear, 40 mL, HCL		
21E0302-02 A	Large OJ, 1000 mL	> 2	Fail
21E0302-03 A	VOA Vial, Clear, 40 mL, HCL		
21E0302-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0302-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0302-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0302-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0302-04 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0302-04 B	Glass NM, Amber, 1000 mL		
21E0302-04 C	Glass NM, Amber, 1000 mL		
21E0302-04 D	Glass NM, Amber, 500 mL		
21E0302-04 E	Glass NM, Amber, 500 mL		
21E0302-04 F	Glass NM, Amber, 500 mL		
21E0302-04 G	Glass NM, Amber, 500 mL		
21E0302-04 H	Glass NM, Amber, 500 mL		
21E0302-04 I	Glass NM, Amber, 500 mL		
21E0302-04 J	VOA Vial, Clear, 40 mL, HCL		
21E0302-04 K	VOA Vial, Clear, 40 mL, HCL		
21E0302-04 L	VOA Vial, Clear, 40 mL, HCL		
21E0302-05 A	Large OJ, 1000 mL	> 2	Fail
21E0302-06 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0302-06 B	Glass NM, Amber, 1000 mL		



WORK ORDER

21E0302

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0302-06 C	Glass NM, Amber, 1000 mL		
21E0302-06 D	Glass NM, Amber, 500 mL		
21E0302-06 E	Glass NM, Amber, 500 mL		
21E0302-06 F	Glass NM, Amber, 500 mL		
21E0302-06 G	Glass NM, Amber, 500 mL		
21E0302-06 H	VOA Vial, Clear, 40 mL, HCL		
21E0302-06 I	VOA Vial, Clear, 40 mL, HCL		
21E0302-06 J	VOA Vial, Clear, 40 mL, HCL		
21E0302-07 A	Large OJ, 1000 mL	> 2	Fail
21E0302-08 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0302-08 B	Glass NM, Amber, 500 mL		
21E0302-08 C	Glass NM, Amber, 500 mL		
21E0302-08 D	VOA Vial, Clear, 40 mL, HCL		
21E0302-08 E	VOA Vial, Clear, 40 mL, HCL		
21E0302-08 F	VOA Vial, Clear, 40 mL, HCL		
21E0302-08 G	VOA Vial, Clear, 40 mL, HCL		
21E0302-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0302-09 A	Large OJ, 1000 mL	> 2	Fail

SC
Preservation Confirmed By

5/26/21
Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Printed: 5/26/2021 9:17:17AM

WORK ORDER

21E0302

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0302-01 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0302-01 B	Glass NM, Amber, 1000 mL		
21E0302-01 C	Glass NM, Amber, 1000 mL		
21E0302-01 D	Glass NM, Amber, 500 mL		
21E0302-01 E	Glass NM, Amber, 500 mL		
21E0302-01 F	Glass NM, Amber, 500 mL		
21E0302-01 G	Glass NM, Amber, 500 mL		
21E0302-01 H	Glass NM, Amber, 500 mL		
21E0302-01 I	Glass NM, Amber, 500 mL		
21E0302-01 J	VOA Vial, Clear, 40 mL, HCL		
21E0302-01 K	VOA Vial, Clear, 40 mL, HCL		
21E0302-01 L	VOA Vial, Clear, 40 mL, HCL		
21E0302-01 M	VOA Vial, Clear, 40 mL, HCL		
21E0302-01 N	VOA Vial, Clear, 40 mL, HCL		
21E0302-02 A	Large OJ, 1000 mL	> 2	Fail ①
21E0302-03 A	VOA Vial, Clear, 40 mL, HCL		
21E0302-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0302-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0302-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0302-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0302-04 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0302-04 B	Glass NM, Amber, 1000 mL		
21E0302-04 C	Glass NM, Amber, 1000 mL		
21E0302-04 D	Glass NM, Amber, 500 mL		
21E0302-04 E	Glass NM, Amber, 500 mL		
21E0302-04 F	Glass NM, Amber, 500 mL		
21E0302-04 G	Glass NM, Amber, 500 mL		
21E0302-04 H	Glass NM, Amber, 500 mL		
21E0302-04 I	Glass NM, Amber, 500 mL		
21E0302-04 J	VOA Vial, Clear, 40 mL, HCL		
21E0302-04 K	VOA Vial, Clear, 40 mL, HCL		
21E0302-04 L	VOA Vial, Clear, 40 mL, HCL		
21E0302-05 A	Large OJ, 1000 mL	> 2	Fail ①
21E0302-06 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0302-06 B	Glass NM, Amber, 1000 mL		

Reviewed By

Date

Page 1 of 2



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Printed: 5/26/2021 9:17:17AM

WORK ORDER

21E0302

Client: Shannon & Wilson, Inc		Project Manager: Shelly Fishel	
Project: Lower Duwamish		Project Number: Lower Duwamish	
21E0302-06 C	Glass NM, Amber, 1000 mL		
21E0302-06 D	Glass NM, Amber, 500 mL		
21E0302-06 E	Glass NM, Amber, 500 mL		
21E0302-06 F	Glass NM, Amber, 500 mL		
21E0302-06 G	Glass NM, Amber, 500 mL		
21E0302-06 H	VOA Vial, Clear, 40 mL, HCL		
21E0302-06 I	VOA Vial, Clear, 40 mL, HCL		
21E0302-06 J	VOA Vial, Clear, 40 mL, HCL		
21E0302-07 A	Large OJ, 1000 mL	> 2	Fail ①
21E0302-08 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	Pass
21E0302-08 B	Glass NM, Amber, 500 mL		
21E0302-08 C	Glass NM, Amber, 500 mL		
21E0302-08 D	VOA Vial, Clear, 40 mL, HCL		
21E0302-08 E	VOA Vial, Clear, 40 mL, HCL		
21E0302-08 F	VOA Vial, Clear, 40 mL, HCL		
21E0302-08 G	VOA Vial, Clear, 40 mL, HCL		
21E0302-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0302-09 A	Large OJ, 1000 mL	> 2	Fail ①

SC
Preservation Confirmed By

5/26/21
Date

① Filtered on 045um and
preserved to pH < 2.0 with
0.75ml conc. HNO₃ (52314).
m 05126121

Reviewed By

Date

Page 2 of 2

**Fremont**
Analytical

3600 Fremont Ave. N.

Seattle, WA 98103

T: (206) 352-3790

F: (206) 352-7178

info@fremontanalytical.com

Analytical Resources Inc.

Shelly Fishel

4611 South 134th Place, Ste 100

Tukwila, WA 98168

RE: 21E0302**Work Order Number: 2106378**

June 29, 2021

Attention Shelly Fishel:

Fremont Analytical, Inc. received 3 sample(s) on 6/21/2021 for the analyses presented in the following report.

Dissolved Mercury by EPA Method 7470

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

CC:

Sub Data

*DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910*

Original

www.fremontanalytical.com



Date: 06/29/2021

CLIENT: Analytical Resources Inc.
Project: 21E0302
Work Order: 2106378

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2106378-001	21E0302-02	05/25/2021 11:45 AM	06/21/2021 4:40 PM
2106378-002	21E0302-05	05/25/2021 1:20 PM	06/21/2021 4:40 PM
2106378-003	21E0302-07	05/25/2021 3:00 PM	06/21/2021 4:40 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original



Case Narrative

WO#: 2106378

Date: 6/29/2021

CLIENT: Analytical Resources Inc.**Project:** 21E0302

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.



Qualifiers & Acronyms

WO#: 2106378

Date Reported: 6/29/2021

Qualifiers:

- * - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit
- R - High relative percent difference observed

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate

Original

www.fremontanalytical.com



Analytical Report

Work Order: **2106378**
Date Reported: **6/29/2021**

CLIENT: Analytical Resources Inc.
Project: 21E0302

Lab ID: 2106378-001

Collection Date: 5/25/2021 11:45:00 AM

Client Sample ID: 21E0302-02

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:33:34 PM
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Lab ID: 2106378-002

Collection Date: 5/25/2021 1:20:00 PM

Client Sample ID: 21E0302-05

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:35:16 PM
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Lab ID: 2106378-003

Collection Date: 5/25/2021 3:00:00 PM

Client Sample ID: 21E0302-07

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:36:58 PM
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Date: 6/29/2021

Work Order: 2106378
 CLIENT: Analytical Resources Inc.
 Project: 21E0302

QC SUMMARY REPORT

Dissolved Mercury by EPA Method 7470

Sample ID: MB-32808		SampType: MBLK		Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281			
Client ID: MBLKW		Batch ID: 32808					Analysis Date: 6/29/2021			SeqNo: 1378985		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.100

Sample ID: LCS-32808		SampType: LCS			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: LCSW		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378986				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.84 0.100 2.500 0 114 80 120

Sample ID: 2106413-004ADUP		SampType: DUP			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378988				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.100 0 0

Sample ID: 2106413-004AMS		SampType: MS			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378989				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.53 0.100 2.500 0 101 70 130

Sample ID: 2106413-004AMSD		SampType: MSD			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021					SeqNo: 1378990		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.67 0.100 2.500 0 107 70 130 2.530 5.38 20



Date: 6/29/2021

Work Order: 2106378
CLIENT: Analytical Resources Inc.
Project: 21E0302

QC SUMMARY REPORT

Dissolved Mercury by EPA Method 7470

Sample ID: MB-32829FB		SampType: MBLK		Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: MBLKW		Batch ID: 32808		Analysis Date: 6/29/2021						SeqNo: 1379012	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury	ND	0.100									
---------	----	-------	--	--	--	--	--	--	--	--	--

NOTES:
 Filter Blank



Sample Log-In Check List

Client Name: **ARI**
 Logged by: **Gabrielle Coeuille**

Work Order Number: **2106378**
 Date Received: **6/21/2021 4:40:00 PM**

Chain of Custody

1. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
 2. How was the sample delivered? Courier

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
 4. Shipping container/cooler in good condition? Yes ☒ No ☐
 5. Custody Seals present on shipping container/cooler?
 (Refer to comments for Custody Seals not intact) Yes ☒ No ☐ Not Present ☐
 6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
 7. Were all items received at a temperature of >2°C to 6°C * Yes ☒ No ☐ NA ☐
 8. Sample(s) in proper container(s)? Yes ☒ No ☐
 9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
 10. Are samples properly preserved? Yes ☒ No ☐
 11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
 12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☒
 13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
 14. Does paperwork match bottle labels? Yes ☒ No ☐
 15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
 16. Is it clear what analyses were requested? Yes ☒ No ☐
 17. Were all holding times able to be met? Yes ☐ No ☒

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☒ No ☐ NA ☐

Person Notified:	Shelly Fishel	Date:	6/22/2021
By Whom:	Gabrielle Coeuille	Via:	☒ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	Ok to proceed out of hold?		
Client Instructions:	Proceed.		

19. Additional remarks:

Item Information

Item #	Temp °C
Sample	5.1

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Original



SUBCONTRACT ORDER
To: Fremont Analytical
ARI Work Order: 21E0302

2104378

SENDING LABORATORY:

Analytical Resources, Inc.
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6201
Project Manager: Shelly Fishel
E-Mail: shelly.fishel@arilabs.com

RECEIVING LABORATORY:

Fremont Analytical
3600 Fremont Avenue N.
Seattle, WA 98103
Phone: (206) 352-3790
Fax: (206) 352-7178

PLEASE SEND DATA TO subdata@arilabs.com

Analysis	Due	Expires	Sub Laboratory ID	Comments
Sample ID: 21E0302-02				
Sampled: 05/25/21 11:45 Matrix: Water				
Met Diss 7470A Hg	06/10/21	06/22/21 11:45		
Containers Supplied:				
Sample ID: 21E0302-05				
Sampled: 05/25/21 13:20 Matrix: Water				
Met Diss 7470A Hg	06/10/21	06/22/21 13:20		
Containers Supplied:				
Sample ID: 21E0302-07				
Sampled: 05/25/21 15:00 Matrix: Water				
Met Diss 7470A Hg	06/10/21	06/22/21 15:00		
Containers Supplied:				

5-day TAT
pdf: add
SLF 6/21/2021

Jacob Walter 06/21/2021

1620

6/21/21 1640

Released By

Date

Received By

Date

Released By

Date

Received By

Date

Printed: 6/21/2021 12:50:24PM

Page 9 of 9

Page 1 of 1



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

EB-2-20212505 21E0302-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/25/2021 11:45

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 12:41

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0302-01 M

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	108	%	
Surrogate: Toluene-d8				80-120 %	96.7	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	88.0	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	102	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

EB-2-20212505
21E0302-01 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/25/2021 11:45

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 12:41

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0302-01 M

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.7	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	88.0	%	


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

EB-2-20212505
21E0302-01 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/25/2021 11:45

Instrument: NT10 Analyst: VTS

Analyzed: 06/04/2021 19:12

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: EPA 3510C SepF
 Preparation Batch: BJF0002
 Prepared: 06/01/2021

 Sample Size: 1000 mL
 Final Volume: 1 mL

Extract ID: 21E0302-01 C 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 % 46.7 %

Surrogate: Phenol-d5

30-160 % 29.6 %

*

Surrogate: 2-Chlorophenol-d4

30-160 % 73.2 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 % 55.6 %

Surrogate: Nitrobenzene-d5

30-160 % 87.3 %

Surrogate: 2-Fluorobiphenyl

30-160 % 69.7 %

Surrogate: 2,4,6-Tribromophenol

30-160 % 130 %

Q

Surrogate: p-Terphenyl-d14

30-160 % 76.5 %



Analytical Report

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Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

EB-2-20212505 21E0302-01 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/25/2021 11:45

Instrument: NT11 Analyst: VTS

Analyzed: 06/08/2021 13:18

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0736 Prepared: 06/01/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0302-01 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0041 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-01 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.001	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	61.6	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	62.1	%	
Surrogate: Fluoranthene-d10				57-120 %	77.1	%	


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Reported:
 14-Dec-2021 12:15

EB-2-20212505
21E0302-01 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/25/2021 11:45

Instrument: FID4 Analyst: CTO

Analyzed: 06/04/2021 23:28

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0302-01 D 01

Preparation Batch: BJE0726

Sample Size: 500 mL

Prepared: 06/01/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>78.1</i>	<i>%</i>	


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Reported:
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EB-2-20212505
21E0302-01 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/25/2021 11:45

Instrument: ECD7 Analyst: JGR

Analyzed: 06/04/2021 23:50

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0731 Prepared: 06/01/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0302-01 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0039 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-01 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0037 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-01 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0038 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-01 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U

Surrogate: Decachlorobiphenyl

29-120 % 82.4 %

Surrogate: Tetrachlorometaxylene

32-120 % 95.4 %

Surrogate: Decachlorobiphenyl [2C]

29-120 % 80.0 %

Surrogate: Tetrachlorometaxylene [2C]

32-120 % 67.5 %


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Reported:
 14-Dec-2021 12:15

EB-2-20212505
21E0302-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/25/2021 11:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/19/2021 03:27

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0279 Sample Size: 25 mL
 Prepared: 06/18/2021 Final Volume: 25 mL

Extract ID: 21E0302-01 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	ND	ug/L	U
Chromium	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt	7440-48-4	1	0.0173	0.200	ND	ug/L	U
Iron	7439-89-6	1	18.2	36.0	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese	7439-96-5	1	0.142	0.500	ND	ug/L	U
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	ND	ug/L	U


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Reported:
 14-Dec-2021 12:15

EB-2-20212505
21E0302-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/25/2021 11:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/19/2021 03:27

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0279 Sample Size: 25 mL
 Prepared: 06/18/2021 Final Volume: 25 mL

Extract ID: 21E0302-01 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	ND	ug/L	U
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0792	0.500	ND	ug/L	U
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

EB-2-20212505
21E0302-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/25/2021 11:45

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0302-01 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

EB-2-20212505
21E0302-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/25/2021 11:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 05:27

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix Extract ID: 21E0302-02 A 02
Preparation Batch: BJF0273 Sample Size: 25 mL Filtration Batch: BJE0662
Prepared: 06/11/2021 Final Volume: 25 mL Filtration Date: 05/26/2021 13:16

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.114	0.500	ND	ug/L	U
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	ND	ug/L	U
Iron, Dissolved	7439-89-6	1	18.2	36.0	ND	ug/L	U
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/23/2021 20:07

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix Extract ID: 21E0302-02 A 02
Preparation Batch: BJF0273 Sample Size: 25 mL Filtration Batch: BJE0662
Prepared: 06/11/2021 Final Volume: 25 mL Filtration Date: 05/26/2021 13:16

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U


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 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

EB-2-20212505
21E0302-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/25/2021 11:45

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 07:31

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0273 Sample Size: 25 mL
 Prepared: 06/11/2021 Final Volume: 25 mL

 Extract ID: 21E0302-02 A 02
 Filtration Batch: BJE0662
 Filtration Date: 05/26/2021 13:16

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	ND	ug/L	U
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	ND	ug/L	U
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Report

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Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

TB-9-20212505
21E0302-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/25/2021 11:45

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 12:00

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0302-03 C

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	105	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	95.4	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	90.7	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	102	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

TB-9-20212505
21E0302-03 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/25/2021 11:45

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 12:00

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0302-03 C

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	95.4	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	90.7	%	



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-53-20212505

21E0302-04 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/25/2021 13:20

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 16:52

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0302-04 K

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	0.11	ug/L	J
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				<i>80-129 %</i>	<i>120</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>96.0</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>84.9</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>104</i>	<i>%</i>	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-53-20212505
21E0302-04 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/25/2021 13:20

Instrument: NT10 Analyst: VTS

Analyzed: 06/04/2021 19:49

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0302-04 C 01

Preparation Batch: BJF0002

Sample Size: 1000 mL

Prepared: 06/01/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

50.9 %

Surrogate: Phenol-d5

30-160 %

31.7 %

Surrogate: 2-Chlorophenol-d4

30-160 %

77.9 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

58.2 %

Surrogate: Nitrobenzene-d5

30-160 %

91.5 %

Surrogate: 2-Fluorobiphenyl

30-160 %

70.1 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

141 %

Q

Surrogate: p-Terphenyl-d14

30-160 %

82.7 %



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-53-20212505

21E0302-04 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/25/2021 13:20

Instrument: NT11 Analyst: VTS

Analyzed: 06/08/2021 13:50

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0736 Prepared: 06/01/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0302-04 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0041 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-04 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.001	0.010	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	0.002	ug/L	J
Pyrene	129-00-0	1	0.001	0.010	0.004	ug/L	J
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10					42-120 %	66.9 %	
Surrogate: Dibenzo[a,h]anthracene-d14					29-120 %	70.2 %	
Surrogate: Fluoranthene-d10					57-120 %	80.3 %	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-53-20212505
21E0302-04 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/25/2021 13:20

Instrument: FID4 Analyst: CTO

Analyzed: 06/04/2021 23:49

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0302-04 D 01

Preparation Batch: BJE0726

Sample Size: 500 mL

Prepared: 06/01/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>75.5</i>	<i>%</i>	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-53-20212505

21E0302-04 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/25/2021 13:20

Instrument: ECD7 Analyst: JGR

Analyzed: 06/05/2021 00:10

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0731 Prepared: 06/01/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0302-04 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0039 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-04 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0037 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-04 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0038 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-04 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	79.8	%	
Surrogate: Tetrachlorometaxylene				32-120 %	82.7	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	77.3	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	58.5	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-53-20212505

21E0302-04 (Water)

Metals and Metallic Compounds

Method: [CALC]

Sampled: 05/25/2021 13:20

Instrument: [CALC] Analyst: MCB

Analyzed: 06/18/2021 18:15

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: [CALC]

Extract ID: 21E0302-04

Preparation Batch: [CALC]

Prepared: 06/18/2021

Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness		1	0.0824	53.1	mg/L CaCO ₃	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-53-20212505
21E0302-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/25/2021 13:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 18:15

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0279 Sample Size: 25 mL
 Prepared: 06/18/2021 Final Volume: 25 mL

Extract ID: 21E0302-04 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	2.82	ug/L	
Chromium	7440-47-3	1	0.260	0.500	0.306	ug/L	J
Cobalt	7440-48-4	1	0.0173	0.200	0.0940	ug/L	J
Iron	7439-89-6	1	18.2	36.0	3800	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Magnesium	7439-95-4	1	2.22	20.0	12900	ug/L	
Manganese	7439-96-5	1	0.142	0.500	117	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.28	ug/L	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-53-20212505
21E0302-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/25/2021 13:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 18:15

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0279 Sample Size: 25 mL
 Prepared: 06/18/2021 Final Volume: 25 mL

Extract ID: 21E0302-04 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.393	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0792	0.500	0.478	ug/L	J
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-53-20212505

21E0302-04 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/25/2021 13:20

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:52

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0302-04 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-53-20212505
21E0302-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/25/2021 13:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 05:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0302-05 A 02

Preparation Batch: BJF0273

Sample Size: 25 mL

Filtration Batch: BJE0662

Prepared: 06/11/2021

Final Volume: 25 mL

Filtration Date: 05/26/2021 13:16

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500			2.40	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500			ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200			0.101	ug/L	J
Iron, Dissolved	7439-89-6	1	18.2	36.0			3720	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100			ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500			118	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200			ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200			1.11	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-53-20212505

21E0302-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/25/2021 13:20

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 05:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0302-05 A 02

Preparation Batch: BJF0273

Sample Size: 25 mL

Filtration Batch: BJE0662

Prepared: 06/11/2021

Final Volume: 25 mL

Filtration Date: 05/26/2021 13:16

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.335	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.511	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-10R-20212505 21E0302-06 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/25/2021 15:00

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 17:13

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0302-06 1

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	122	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	95.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	85.0	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	105	%	



Analytical Report

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400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-10R-20212505 21E0302-06 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/25/2021 15:00

Instrument: NT11 Analyst: VTS

Analyzed: 06/08/2021 14:23

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0736 Prepared: 06/01/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0302-06 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0041 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-06 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.001	0.010	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10					42-120 %	66.2 %	
Surrogate: Dibenzo[a,h]anthracene-d14					29-120 %	65.3 %	
Surrogate: Fluoranthene-d10					57-120 %	79.0 %	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-10R-20212505
21E0302-06 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/25/2021 15:00

Instrument: FID4 Analyst: CTO

Analyzed: 06/05/2021 00:10

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0302-06 D 01

Preparation Batch: BJE0726

Sample Size: 500 mL

Prepared: 06/01/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>77.2</i>	<i>%</i>	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-10R-20212505 21E0302-06 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/25/2021 15:00

Instrument: ECD7 Analyst: JGR

Analyzed: 06/05/2021 00:31

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0731 Prepared: 06/01/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0302-06 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0039 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-06 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0037 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-06 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0038 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0302-06 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	85.2	%	
Surrogate: Tetrachlorometaxylene				32-120 %	89.1	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	84.0	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	64.0	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-10R-20212505
21E0302-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/25/2021 15:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/19/2021 03:33

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0302-06 A 01

Preparation Batch: BJF0279

Sample Size: 25 mL

Prepared: 06/18/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	4.98	ug/L	
Chromium	7440-47-3	1	0.260	0.500	0.404	ug/L	J
Cobalt	7440-48-4	1	0.0173	0.200	0.306	ug/L	
Iron	7439-89-6	1	18.2	36.0	2960	ug/L	
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese	7439-96-5	1	0.142	0.500	183	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	1.08	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-10R-20212505
21E0302-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/25/2021 15:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/19/2021 03:33

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0279 Sample Size: 25 mL
 Prepared: 06/18/2021 Final Volume: 25 mL

Extract ID: 21E0302-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.651	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	0.976	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	0.898	ug/L	
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-10R-20212505
21E0302-06 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/25/2021 15:00

Instrument: HYDRA Analyst: ML

Analyzed: 06/09/2021 13:55

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0302-06 A

Preparation Batch: BJF0195

Sample Size: 20 mL

Prepared: 06/08/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	ND	mg/L	U



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-10R-20212505
21E0302-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/25/2021 15:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 05:10

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21E0302-07 A 02

Preparation Batch: BJF0273

Sample Size: 25 mL

Filtration Batch: BJE0662

Prepared: 06/11/2021

Final Volume: 25 mL

Filtration Date: 05/26/2021 13:16

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	3.83	ug/L	
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.301	ug/L	
Iron, Dissolved	7439-89-6	1	18.2	36.0	2610	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500	206	ug/L	
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.564	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-10R-20212505
21E0302-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/25/2021 15:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 05:10

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0273 Sample Size: 25 mL
 Prepared: 06/11/2021 Final Volume: 25 mL

 Extract ID: 21E0302-07 A 02
 Filtration Batch: BJE0662
 Filtration Date: 05/26/2021 13:16

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.504	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.466	ug/L	J
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.01	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-11-20212505
21E0302-08 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/25/2021 16:25

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 17:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0302-08 E

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	122	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	85.2	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	105	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-11-20212505
21E0302-08 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/25/2021 16:25

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 17:34

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0302-08 E

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	96.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	85.2	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-11-20212505
21E0302-08 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/25/2021 16:25

Instrument: FID4 Analyst: CTO

Analyzed: 06/05/2021 00:31

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0302-08 B 01

Preparation Batch: BJE0726

Sample Size: 500 mL

Prepared: 06/01/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.206	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	77.0	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-11-20212505
21E0302-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/25/2021 16:25

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 04:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0302-08 A 01

Preparation Batch: BJF0278

Sample Size: 25 mL

Prepared: 06/14/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	20	2.84	10.0	1600	ug/L	D



Analytical Resources, LLC
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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

MW-11-20212505

21E0302-08 (Water)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/25/2021 16:25

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/15/2021 05:41

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJF0278 Sample Size: 25 mL
Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0302-08 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	7.06	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-11-20212505
21E0302-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/25/2021 16:25

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 04:31

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0302-09 A 02

Preparation Batch: BJF0273

Sample Size: 25 mL

Filtration Batch: BJE0662

Prepared: 06/11/2021

Final Volume: 25 mL

Filtration Date: 05/26/2021 13:16

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	20	2.84	10.0	1620	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

MW-11-20212505
21E0302-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/25/2021 16:25

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/16/2021 07:27

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0302-09 A 02

Preparation Batch: BJF0273

Sample Size: 25 mL

Filtration Batch: BJE0662

Prepared: 06/11/2021

Final Volume: 25 mL

Filtration Date: 05/26/2021 13:16

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	5.75	ug/L	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJE0692 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0692-BLK1)		Prepared: 28-May-2021 Analyzed: 28-May-2021 11:18								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.83		ug/L	5.00		96.6	80-120			
Surrogate: 4-Bromofluorobenzene	4.66		ug/L	5.00		93.1	80-120			

Blank (BJE0692-BLK2)		Prepared: 28-May-2021 Analyzed: 28-May-2021 11:18								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Methyl tert-butyl Ether	ND	0.14	0.50	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.18		ug/L	5.00		104	80-129			
Surrogate: Toluene-d8	4.83		ug/L	5.00		96.6	80-120			
Surrogate: 4-Bromofluorobenzene	4.66		ug/L	5.00		93.1	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.00		ug/L	5.00		100	80-120			

LCS (BJE0692-BS1)		Prepared: 28-May-2021 Analyzed: 28-May-2021 09:37								
Gasoline Range Organics (Tol-Nap)	1000	100	ug/L	1000		100	72-128			
Surrogate: Toluene-d8	5.04		ug/L	5.00		101	80-120			
Surrogate: 4-Bromofluorobenzene	5.04		ug/L	5.00		101	80-120			

LCS (BJE0692-BS2)		Prepared: 28-May-2021 Analyzed: 28-May-2021 09:57								
Vinyl Chloride	10.1	0.08	0.20	ug/L	10.0	101	66-133			
1,1-Dichloroethene	10.4	0.08	0.20	ug/L	10.0	104	69-135			
trans-1,2-Dichloroethene	9.98	0.07	0.20	ug/L	10.0	99.8	78-128			
cis-1,2-Dichloroethene	10.4	0.08	0.20	ug/L	10.0	104	80-121			
Benzene	10.5	0.05	0.20	ug/L	10.0	105	80-120			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0692 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0692-BS2)						Prepared: 28-May-2021 Analyzed: 28-May-2021 09:57					
Trichloroethene	10.2	0.07	0.20	ug/L	10.0		102	80-120			
Toluene	10.2	0.05	0.20	ug/L	10.0		102	80-120			
Tetrachloroethene	10.4	0.09	0.20	ug/L	10.0		104	80-120			
Ethylbenzene	10.7	0.05	0.20	ug/L	10.0		107	80-120			
m,p-Xylene	22.2	0.14	0.40	ug/L	20.0		111	80-121			
o-Xylene	9.90	0.08	0.20	ug/L	10.0		99.0	80-121			
Xylenes, total	32.1	0.22	0.60	ug/L	30.0		107	76-127			
Methyl tert-butyl Ether	9.89	0.14	0.50	ug/L	10.0		98.9	71-132			
Surrogate: 1,2-Dichloroethane-d4	4.78			ug/L	5.00		95.6	80-129			
Surrogate: Toluene-d8	5.00			ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.08			ug/L	5.00		102	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.93			ug/L	5.00		98.6	80-120			
LCS Dup (BJE0692-BSD1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 10:18					
Gasoline Range Organics (Tol-Nap)	986		100	ug/L	1000		98.6	72-128	1.72	30	
Surrogate: Toluene-d8	5.08			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	5.04			ug/L	5.00		101	80-120			
LCS Dup (BJE0692-BSD2)						Prepared: 28-May-2021 Analyzed: 28-May-2021 10:38					
Vinyl Chloride	10.2	0.08	0.20	ug/L	10.0		102	66-133	1.11	30	
1,1-Dichloroethene	10.3	0.08	0.20	ug/L	10.0		103	69-135	0.66	30	
trans-1,2-Dichloroethene	10.1	0.07	0.20	ug/L	10.0		101	78-128	0.88	30	
cis-1,2-Dichloroethene	10.6	0.08	0.20	ug/L	10.0		106	80-121	2.16	30	
Benzene	10.7	0.05	0.20	ug/L	10.0		107	80-120	1.08	30	
Trichloroethene	10.4	0.07	0.20	ug/L	10.0		104	80-120	2.03	30	
Toluene	10.3	0.05	0.20	ug/L	10.0		103	80-120	1.14	30	
Tetrachloroethene	10.4	0.09	0.20	ug/L	10.0		104	80-120	0.44	30	
Ethylbenzene	10.7	0.05	0.20	ug/L	10.0		107	80-120	0.38	30	
m,p-Xylene	22.3	0.14	0.40	ug/L	20.0		111	80-121	0.36	30	
o-Xylene	9.84	0.08	0.20	ug/L	10.0		98.4	80-121	0.54	30	
Xylenes, total	32.1	0.22	0.60	ug/L	30.0		107	76-127	0.08	30	
Methyl tert-butyl Ether	10.7	0.14	0.50	ug/L	10.0		107	71-132	8.26	30	
Surrogate: 1,2-Dichloroethane-d4	4.75			ug/L	5.00		95.1	80-129			
Surrogate: Toluene-d8	5.02			ug/L	5.00		100	80-120			



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0692 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0692-BSD2)					Prepared: 28-May-2021		Analyzed: 28-May-2021 10:38				
Surrogate: 4-Bromofluorobenzene	5.06			ug/L	5.00		101	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.95			ug/L	5.00		99.0	80-120			


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJF0002 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0002-BLK1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 17:20					
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
<i>Surrogate: 2-Fluorophenol</i>	3.30			ug/L	7.50		44.0	30-160			
<i>Surrogate: Phenol-d5</i>	2.30			ug/L	7.50		30.7	30-160			
<i>Surrogate: 2-Chlorophenol-d4</i>	5.29			ug/L	7.50		70.5	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	2.46			ug/L	5.00		49.2	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	3.99			ug/L	5.00		79.7	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	3.13			ug/L	5.00		62.6	30-160			
<i>Surrogate: 2,4,6-Tribromophenol</i>	9.04			ug/L	7.50		121	30-160			Q
<i>Surrogate: p-Terphenyl-d14</i>	3.89			ug/L	5.00		77.7	30-160			
LCS (BJF0002-BS1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 17:57					
1,4-Dichlorobenzene	2.4	0.03	0.2	ug/L	5.00		48.3	30-160			
1,2-Dichlorobenzene	2.7	0.03	0.2	ug/L	5.00		53.2	30-160			
2,4-Dimethylphenol	7.7	0.3	1.0	ug/L	13.0		59.1	30-160			
Benzoic acid	8.3	0.1	2.0	ug/L	23.0		35.9	30-160			
N-Nitrosodiphenylamine	3.4	0.03	0.2	ug/L	5.00		67.3	30-160			
Pentachlorophenol	10.8	0.1	1.0	ug/L	13.0		83.2	30-160			
Di-n-Butylphthalate	3.9	0.05	0.2	ug/L	5.00		78.0	30-160			
Butylbenzylphthalate	4.1	0.07	0.2	ug/L	5.00		81.9	30-160			
bis(2-Ethylhexyl)phthalate	4.2	0.2	0.2	ug/L	5.00		83.0	30-160			
<i>Surrogate: 2-Fluorophenol</i>	3.81			ug/L	7.50		50.8	30-160			
<i>Surrogate: Phenol-d5</i>	2.78			ug/L	7.50		37.1	30-160			
<i>Surrogate: 2-Chlorophenol-d4</i>	5.87			ug/L	7.50		78.3	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	2.82			ug/L	5.00		56.5	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	4.74			ug/L	5.00		94.8	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	3.85			ug/L	5.00		77.1	30-160			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJF0002 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0002-BS1)						Prepared: 01-Jun-2021	Analyzed: 04-Jun-2021 17:57				
Surrogate: 2,4,6-Tribromophenol	10.5			ug/L	7.50		140	30-160			Q
Surrogate: p-Terphenyl-d14	4.27			ug/L	5.00		85.4	30-160			
LCS Dup (BJF0002-BSD1)						Prepared: 01-Jun-2021	Analyzed: 04-Jun-2021 18:35				
1,4-Dichlorobenzene	2.4	0.03	0.2	ug/L	5.00		48.0	30-160	0.66	30	
1,2-Dichlorobenzene	2.7	0.03	0.2	ug/L	5.00		53.2	30-160	0.12	30	
2,4-Dimethylphenol	9.5	0.3	1.0	ug/L	13.0		73.0	30-160	21.10	30	
Benzoic acid	9.5	0.1	2.0	ug/L	23.0		41.2	30-160	13.70	30	
N-Nitrosodiphenylamine	3.6	0.03	0.2	ug/L	5.00		72.6	30-160	7.67	30	
Pentachlorophenol	11.1	0.1	1.0	ug/L	13.0		85.3	30-160	2.57	30	
Di-n-Butylphthalate	3.9	0.05	0.2	ug/L	5.00		78.3	30-160	0.34	30	
Butylbenzylphthalate	4.3	0.07	0.2	ug/L	5.00		86.1	30-160	5.01	30	
bis(2-Ethylhexyl)phthalate	4.2	0.2	0.2	ug/L	5.00		83.1	30-160	0.11	30	
Surrogate: 2-Fluorophenol	3.81			ug/L	7.50		50.8	30-160			
Surrogate: Phenol-d5	2.60			ug/L	7.50		34.6	30-160			
Surrogate: 2-Chlorophenol-d4	5.68			ug/L	7.50		75.7	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	2.77			ug/L	5.00		55.4	30-160			
Surrogate: Nitrobenzene-d5	4.58			ug/L	5.00		91.7	30-160			
Surrogate: 2-Fluorobiphenyl	3.67			ug/L	5.00		73.5	30-160			
Surrogate: 2,4,6-Tribromophenol	10.2			ug/L	7.50		136	30-160			Q
Surrogate: p-Terphenyl-d14	4.16			ug/L	5.00		83.3	30-160			


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0736 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0736-BLK1)						Prepared: 01-Jun-2021 Analyzed: 08-Jun-2021 12:13					
Naphthalene	ND	0.001	0.010	ug/L							U
2-Methylnaphthalene	ND	0.001	0.010	ug/L							U
1-Methylnaphthalene	ND	0.0009	0.010	ug/L							U
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.004	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
Surrogate: 2-Methylnaphthalene-d10	0.160			ug/L	0.300		53.3	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.168			ug/L	0.300		56.0	29-120			
Surrogate: Fluoranthene-d10	0.211			ug/L	0.300		70.4	57-120			
LCS (BJE0736-BS1)						Prepared: 01-Jun-2021 Analyzed: 08-Jun-2021 12:45					
Naphthalene	0.211	0.001	0.010	ug/L	0.300		70.3	37-120			
2-Methylnaphthalene	0.207	0.001	0.010	ug/L	0.300		68.9	37-120			
1-Methylnaphthalene	0.206	0.0009	0.010	ug/L	0.300		68.6	29-120			
Acenaphthylene	0.198	0.002	0.010	ug/L	0.300		66.1	41-120			
Acenaphthene	0.215	0.003	0.010	ug/L	0.300		71.6	41-120			
Dibenzofuran	0.210	0.002	0.010	ug/L	0.300		70.0	38-120			
Fluorene	0.216	0.002	0.010	ug/L	0.300		72.0	43-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0736 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJE0736-BS1)						Prepared: 01-Jun-2021 Analyzed: 08-Jun-2021 12:45					
Phenanthrene	0.221	0.001	0.010	ug/L	0.300		73.8	41-120			
Anthracene	0.214	0.001	0.010	ug/L	0.300		71.5	40-120			
Carbazole	0.241	0.001	0.010	ug/L	0.300		80.4	30-160			
Fluoranthene	0.245	0.002	0.010	ug/L	0.300		81.8	45-120			
Pyrene	0.244	0.001	0.010	ug/L	0.300		81.2	41-120			
Benzo(a)anthracene	0.242	0.0008	0.010	ug/L	0.300		80.7	42-120			
Chrysene	0.228	0.0009	0.010	ug/L	0.300		75.9	44-120			
Benzo(b)fluoranthene	0.242	0.0005	0.010	ug/L	0.300		80.6	44-120			
Benzo(k)fluoranthene	0.242	0.003	0.010	ug/L	0.300		80.5	50-120			
Benzo(j)fluoranthene	0.236	0.002	0.010	ug/L	0.300		78.8	39-160			
Benzofluoranthenes, Total	0.720	0.004	0.010	ug/L	0.900		80.0	46-120			
Benzo(a)pyrene	0.231	0.002	0.010	ug/L	0.300		77.0	35-120			
Perylene	0.220	0.006	0.010	ug/L	0.300		73.3	30-160			
Indeno(1,2,3-cd)pyrene	0.218	0.001	0.010	ug/L	0.300		72.8	37-120			
Dibenzo(a,h)anthracene	0.211	0.001	0.010	ug/L	0.300		70.3	34-120			
Benzo(g,h,i)perylene	0.258	0.001	0.010	ug/L	0.300		86.1	38-120			
Surrogate: 2-Methylnaphthalene-d10	0.202			ug/L	0.300		67.2	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.210			ug/L	0.300		70.0	29-120			
Surrogate: Fluoranthene-d10	0.244			ug/L	0.300		81.2	57-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJE0726 - EPA 3510C SepF

Instrument: FID4 Analyst: CTO

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0726-BLK1)									
				Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 22:24					
Diesel Range Organics (C12-C24)	ND	0.100	mg/L						U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L						U
<i>Surrogate: o-Terphenyl</i>	0.148		mg/L	0.225	65.7	50-150			
LCS (BJE0726-BS1)									
				Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 22:45					
Diesel Range Organics (C12-C24)	2.04	0.100	mg/L	3.00	67.9	56-120			
<i>Surrogate: o-Terphenyl</i>	0.170		mg/L	0.225	75.7	50-150			
LCS Dup (BJE0726-BSD1)									
				Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 23:07					
Diesel Range Organics (C12-C24)	2.14	0.100	mg/L	3.00	71.3	56-120	4.81	30	
<i>Surrogate: o-Terphenyl</i>	0.173		mg/L	0.225	77.1	50-150			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Aroclor PCB - Quality Control
Batch BJE0731 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0731-BLK1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 22:47					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0180			ug/L	0.0200		90.2	29-120			
Surrogate: Tetrachlorometaxylene	0.0181			ug/L	0.0200		90.5	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0174			ug/L	0.0200		87.0	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0137			ug/L	0.0200		68.6	32-120			
LCS (BJE0731-BS1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 23:08					
Aroclor 1016	0.051	0.002	0.010	ug/L	0.0500		103	54-120			
Aroclor 1260	0.050	0.003	0.010	ug/L	0.0500		100	51-128			
Surrogate: Decachlorobiphenyl	0.0177			ug/L	0.0200		88.6	29-120			
Surrogate: Tetrachlorometaxylene	0.0194			ug/L	0.0200		96.8	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0171			ug/L	0.0200		85.4	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0137			ug/L	0.0200		68.4	32-120			
LCS Dup (BJE0731-BSD1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 23:29					
Aroclor 1016	0.048	0.002	0.010	ug/L	0.0500		96.1	54-120	6.44	30	
Aroclor 1260	0.049	0.003	0.010	ug/L	0.0500		97.9	51-128	2.60	30	
Surrogate: Decachlorobiphenyl	0.0165			ug/L	0.0200		82.4	29-120			
Surrogate: Tetrachlorometaxylene	0.0182			ug/L	0.0200		90.8	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0158			ug/L	0.0200		79.0	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0136			ug/L	0.0200		68.1	32-120			



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJF0195 - TWM EPA 7470A

Instrument: HYDRA Analyst: ML

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0195-BLK1)						Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 12:54				
Mercury	ND	0.000013	0.000100	mg/L						U
LCS (BJF0195-BS1)						Prepared: 08-Jun-2021 Analyzed: 09-Jun-2021 12:57				
Mercury	0.00205	0.000013	0.000100	mg/L	0.00200		102	80-120		


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0278 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0278-BLK1)						Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 01:33						
Manganese	55	ND	0.142	0.500	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
LCS (BJF0278-BS1)						Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 01:37						
Manganese	55	26.4	0.142	0.500	ug/L	25.0		106	80-120			
Arsenic	75a	23.9	0.0373	0.200	ug/L	25.0		95.7	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0279 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0279-BLK1)						Prepared: 18-Jun-2021 Analyzed: 18-Jun-2021 18:03						
Barium	135	ND	0.114	0.500	ug/L							U
Barium	137	ND	0.0765	0.500	ug/L							U
Calcium	44	ND	11.1	50.0	ug/L							U
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
Cobalt	59	ND	0.0173	0.200	ug/L							U
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U
Lead	208	ND	0.0513	0.100	ug/L							U
Magnesium	24	ND	2.22	20.0	ug/L							U
Manganese	55	0.210	0.142	0.500	ug/L							J
Silver	107	ND	0.0220	0.200	ug/L							U
Vanadium	51a	ND	0.0556	0.200	ug/L							U
Vanadium	51b	ND	0.0521	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
Copper	63	ND	0.173	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	0.100	0.0792	0.500	ug/L							J
Nickel	62	ND	0.220	0.500	ug/L							U
Selenium	78	ND	0.179	0.500	ug/L							U
Zinc	66	ND	2.92	6.00	ug/L							U
Zinc	67	2.48	0.940	6.00	ug/L							J

LCS (BJF0279-BS1)						Prepared: 18-Jun-2021 Analyzed: 18-Jun-2021 17:57						
Barium	135	25.0	0.114	0.500	ug/L	25.0		100	80-120			
Barium	137	24.9	0.0765	0.500	ug/L	25.0		99.5	80-120			
Calcium	44	4960	11.1	50.0	ug/L	5000		99.2	80-120			
Chromium	52	24.9	0.260	0.500	ug/L	25.0		99.5	80-120			
Chromium	53	25.0	0.239	0.500	ug/L	25.0		100	80-120			
Cobalt	59	25.5	0.0173	0.200	ug/L	25.0		102	80-120			
Iron	54	4910	18.2	36.0	ug/L	5000		98.2	80-120			
Iron	57	4920	6.63	36.0	ug/L	5000		98.4	80-120			
Lead	208	25.7	0.0513	0.100	ug/L	25.0		103	80-120			


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 Project: Lower Duwamish
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Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0279 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0279-BS1)						Prepared: 18-Jun-2021 Analyzed: 18-Jun-2021 17:57						
Magnesium	24	4950	2.22	20.0	ug/L	5000		98.9	80-120			
Manganese	55	25.5	0.142	0.500	ug/L	25.0		102	80-120			
Silver	107	24.8	0.0220	0.200	ug/L	25.0		99.1	80-120			
Vanadium	51a	24.5	0.0556	0.200	ug/L	25.0		98.2	80-120			
Vanadium	51b	24.6	0.0521	0.200	ug/L	25.0		98.4	80-120			
Arsenic	75a	25.1	0.0373	0.200	ug/L	25.0		101	80-120			
Cadmium	111	26.0	0.0300	0.100	ug/L	25.0		104	80-120			
Cadmium	114	25.6	0.0400	0.100	ug/L	25.0		102	80-120			
Copper	63	25.1	0.173	0.500	ug/L	25.0		100	80-120			
Copper	65	25.1	0.350	0.500	ug/L	25.0		101	80-120			
Nickel	60	25.4	0.0792	0.500	ug/L	25.0		102	80-120			
Nickel	62	25.3	0.220	0.500	ug/L	25.0		101	80-120			
Selenium	78	82.2	0.179	0.500	ug/L	80.0		103	80-120			
Zinc	66	83.8	2.92	6.00	ug/L	80.0		105	80-120			
Zinc	67	78.4	0.940	6.00	ug/L	80.0		98.0	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0273 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0273-BLK1)						Prepared: 11-Jun-2021 Analyzed: 15-Jun-2021 22:21						
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	6.63	20.0	ug/L							U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	6.00	ug/L							U
Blank (BJF0273-BLK2)						Prepared: 11-Jun-2021 Analyzed: 16-Jun-2021 20:56						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Cobalt, Dissolved	59	ND	0.0173	0.200	ug/L							U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
LCS (BJF0273-BS1)						Prepared: 11-Jun-2021 Analyzed: 15-Jun-2021 22:24						
Chromium, Dissolved	52	25.0	0.260	0.500	ug/L	25.0		99.9	80-120			
Chromium, Dissolved	53	25.6	0.239	0.500	ug/L	25.0		102	80-120			
Iron, Dissolved	54	5220	18.2	36.0	ug/L	5000		104	80-120			
Iron, Dissolved	57	5250	6.63	20.0	ug/L	5000		105	80-120			
Lead, Dissolved	208	24.8	0.0513	0.100	ug/L	25.0		99.2	80-120			
Manganese, Dissolved	55	25.9	0.142	0.500	ug/L	25.0		104	80-120			
Arsenic, Dissolved	75a	24.8	0.0373	0.200	ug/L	25.0		99.3	80-120			
Copper, Dissolved	63	25.6	0.173	0.500	ug/L	25.0		102	80-120			
Copper, Dissolved	65	25.4	0.350	0.500	ug/L	25.0		102	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJJ0273 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0273-BS1)						Prepared: 11-Jun-2021 Analyzed: 15-Jun-2021 22:24						
Zinc, Dissolved	66	78.1	2.92	6.00	ug/L	80.0		97.7	80-120			
Zinc, Dissolved	67	75.2	0.940	6.00	ug/L	80.0		94.0	80-120			
LCS (BJF0273-BS2)						Prepared: 11-Jun-2021 Analyzed: 16-Jun-2021 21:00						
Barium, Dissolved	135	25.0	0.114	0.500	ug/L	25.0		100	80-120			
Barium, Dissolved	137	24.6	0.0765	0.500	ug/L	25.0		98.4	80-120			
Cobalt, Dissolved	59	25.6	0.0173	0.200	ug/L	25.0		102	80-120			
Silver, Dissolved	107	26.0	0.0220	0.200	ug/L	25.0		104	80-120			
Vanadium, Dissolved	51a	24.7	0.0556	0.200	ug/L	25.0		99.0	80-120			
Vanadium, Dissolved	51b	24.7	0.0521	0.200	ug/L	25.0		99.0	80-120			
Cadmium, Dissolved	111	25.4	0.0300	0.100	ug/L	25.0		101	80-120			
Cadmium, Dissolved	114	25.2	0.0400	0.100	ug/L	25.0		101	80-120			
Nickel, Dissolved	60	25.3	0.0792	0.500	ug/L	25.0		101	80-120			
Nickel, Dissolved	62	25.5	0.220	0.500	ug/L	25.0		102	80-120			
Selenium, Dissolved	78	75.1	0.179	0.500	ug/L	80.0		93.8	80-120			
Duplicate (BJF0273-DUP2)						Source: 21E0302-02 Prepared: 11-Jun-2021 Analyzed: 16-Jun-2021 07:35						
Chromium, Dissolved	52	ND	0.260	0.500	ug/L		ND					U
Iron, Dissolved	54	ND	18.2	36.0	ug/L		ND					U
Lead, Dissolved	208	ND	0.0513	0.100	ug/L		ND					U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L		ND					U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L		ND					U
Copper, Dissolved	63	ND	0.173	0.500	ug/L		ND					U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJF0273-DUP4)						Source: 21E0302-02 Prepared: 11-Jun-2021 Analyzed: 17-Jun-2021 05:31						
Barium, Dissolved	135	ND	0.114	0.500	ug/L		ND					U
Cobalt, Dissolved	59	ND	0.0173	0.200	ug/L		ND					U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L		ND					U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L		ND					U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L		ND					U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L		ND					U
Matrix Spike (BJF0273-MS2)						Source: 21E0302-02 Prepared: 11-Jun-2021 Analyzed: 16-Jun-2021 07:39						
Chromium, Dissolved	52	24.5	0.260	0.500	ug/L	25.0	ND	98.2	75-125			
Iron, Dissolved	54	5000	18.2	36.0	ug/L	5000	ND	100	75-125			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0273 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJF0273-MS2)		Source: 21E0302-02			Prepared: 11-Jun-2021		Analyzed: 16-Jun-2021 07:39					
Lead, Dissolved	208	24.3	0.0513	0.100	ug/L	25.0	ND	97.2	75-125			
Manganese, Dissolved	55	25.5	0.142	0.500	ug/L	25.0	ND	102	75-125			
Arsenic, Dissolved	75a	24.4	0.0373	0.200	ug/L	25.0	ND	97.5	75-125			
Copper, Dissolved	63	25.1	0.173	0.500	ug/L	25.0	ND	100	75-125			
Zinc, Dissolved	66	76.3	2.92	6.00	ug/L	80.0	ND	95.3	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0273-MS4)		Source: 21E0302-02			Prepared: 11-Jun-2021		Analyzed: 17-Jun-2021 05:36					
Barium, Dissolved	135	23.2	0.114	0.500	ug/L	25.0	ND	92.6	75-125			
Cobalt, Dissolved	59	26.5	0.0173	0.200	ug/L	25.0	ND	106	75-125			
Vanadium, Dissolved	51a	23.5	0.0556	0.200	ug/L	25.0	ND	94.0	75-125			
Cadmium, Dissolved	111	25.2	0.0300	0.100	ug/L	25.0	ND	101	75-125			
Nickel, Dissolved	60	26.1	0.0792	0.500	ug/L	25.0	ND	104	75-125			
Selenium, Dissolved	78	73.3	0.179	0.500	ug/L	80.0	ND	91.6	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0273-MSD2)		Source: 21E0302-02			Prepared: 11-Jun-2021		Analyzed: 16-Jun-2021 07:44					
Chromium, Dissolved	52	25.3	0.260	0.500	ug/L	25.0	ND	101	75-125	3.16	20	
Iron, Dissolved	54	5170	18.2	36.0	ug/L	5000	ND	103	75-125	3.25	20	
Lead, Dissolved	208	25.4	0.0513	0.100	ug/L	25.0	ND	101	75-125	4.31	20	
Manganese, Dissolved	55	26.3	0.142	0.500	ug/L	25.0	ND	105	75-125	3.27	20	
Arsenic, Dissolved	75a	24.7	0.0373	0.200	ug/L	25.0	ND	98.9	75-125	1.47	20	
Copper, Dissolved	63	26.2	0.173	0.500	ug/L	25.0	ND	105	75-125	4.24	20	
Zinc, Dissolved	66	80.2	2.92	6.00	ug/L	80.0	ND	100	75-125	5.01	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0273-MSD4)		Source: 21E0302-02			Prepared: 11-Jun-2021		Analyzed: 17-Jun-2021 05:41					
Barium, Dissolved	135	23.6	0.114	0.500	ug/L	25.0	ND	94.3	75-125	1.79	20	
Cobalt, Dissolved	59	27.5	0.0173	0.200	ug/L	25.0	ND	110	75-125	3.56	20	
Vanadium, Dissolved	51a	24.6	0.0556	0.200	ug/L	25.0	ND	98.5	75-125	4.73	20	
Cadmium, Dissolved	111	26.4	0.0300	0.100	ug/L	25.0	ND	105	75-125	4.47	20	
Nickel, Dissolved	60	27.0	0.0792	0.500	ug/L	25.0	ND	108	75-125	3.43	20	
Selenium, Dissolved	78	74.1	0.179	0.500	ug/L	80.0	ND	92.6	75-125	1.14	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0273 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS2 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BJF0273-DUP6)			Source: 21E0302-02			Prepared: 11-Jun-2021			Analyzed: 23-Jun-2021 20:14			
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND					U

Matrix Spike (BJF0273-MS6)			Source: 21E0302-02			Prepared: 11-Jun-2021			Analyzed: 23-Jun-2021 20:18			
Silver, Dissolved	107	26.2	0.0220	0.200	ug/L	25.0	ND	105	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0273-MSD6)			Source: 21E0302-02			Prepared: 11-Jun-2021			Analyzed: 23-Jun-2021 20:23			
Silver, Dissolved	107	26.3	0.0220	0.200	ug/L	25.0	ND	105	75-125	0.33	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

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14-Dec-2021 12:15

Certified Analyses included in this Report

Analyte	Certifications
EPA 6020B in Water	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Calcium-44	NELAP,DoD-ELAP,WADOE
Cobalt-59	DoD-ELAP,NELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Magnesium-24	NELAP,DoD-ELAP,WADOE
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
EPA 6020B UCT-KED in Water	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP


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Zinc-66	WADOE,WA-DW,DoD-ELAP
Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 7470A in Water

Mercury	WADOE,NELAP,DoD-ELAP
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EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE


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Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE


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Reported:
 14-Dec-2021 12:15

1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:15

2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP
2-Methylphenol	NELAP,DoD-ELAP
Hexachloroethane	NELAP,DoD-ELAP
N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP
Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP
2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP
2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP
2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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Hexachlorobenzene	NELAP,DoD-ELAP
Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)fluoranthene, Total	NELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE


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Benzo(b)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(k)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(j)fluoranthene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Perylene	ADEC, NELAP
Indeno(1,2,3-cd)pyrene	ADEC, DoD-ELAP, NELAP, WADOE
Dibenzo(a,h)anthracene	ADEC, DoD-ELAP, NELAP, WADOE
Benzo(g,h,i)perylene	ADEC, DoD-ELAP, NELAP, WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP, NELAP, WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP, NELAP, WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP, NELAP, WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP, NELAP, WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP, NELAP, WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP, NELAP, WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP, NELAP, WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP, NELAP, WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP, NELAP, WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP, NELAP, WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP, NELAP, WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP, NELAP, WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP, NELAP, WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP, NELAP, WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE, DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE, DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE, DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE, ADEC, DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE, DoD-ELAP



Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:15

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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Project: Lower Duwamish
Project Number: Lower Duwamish
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Notes and Definitions

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
D1	Surrogate was not detected due to sample extract dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
J	Estimated concentration value detected below the reporting limit.
P1	The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
Y1	Raised reporting limit due to interference
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

14 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21E0323

Associated SDG ID(s)
N/A

Susan
Dunniho

Digitally signed by Susan
Dunniho
Date: 2021.12.15
14:48:47 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunniho For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Analytical Resources, Incorporated
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Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

21E0323 ARISample FINAL 14 Dec 2021 1225 - Page 2 of 49



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-7-20212705	21E0323-01	Water	27-May-2021 10:55	27-May-2021 12:25
MW-7-20212705	21E0323-02	Water	27-May-2021 10:55	27-May-2021 12:25
MW-47-20212705	21E0323-03	Water	27-May-2021 11:50	27-May-2021 12:25
MW-47-20212705	21E0323-04	Water	27-May-2021 11:50	27-May-2021 12:25
TB-10-20212705	21E0323-05	Water	27-May-2021 10:55	27-May-2021 12:25



Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish
Work Order: 21E0323

Sample receipt

Samples as listed on the preceding page were received 27-May-2021 12:25 under ARI work order 21E0323. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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Initial and continuing calibrations were within method requirements except N-Nitroso-di-propylamine, 2-Nitroaniline, 3-Nitroaniline, Diethyl Phthalate, Hexachlorobenzene and surrogate 2,4,6- Tribromophenol which were out of control high. All samples which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except 2,4,6- Tribromophenol which was out of control high in the initial calibration verification (ICV) and has been flagged.

The method blank(s) were clean at the reporting limits.

The blank spike/blank spike duplicate (BS/BSD aka LCS/LCSD) percent recoveries were within control limits except 4-Chloroaniline and Hexachlorocyclopentadiene which were out of control low. The LCS/LCSD relative percent difference (RPD) were within control limits except 3,3'-Dichlorobenzidine. Deviations have been flagged within the QC section of this report.

Total Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0323-01 in batch BJF0554. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits except Nickel MS percent recovery which was out of control high and has been flagged.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0323-01 in batch BJE0706. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Dissolved Metals - EPA Method 6020B



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0323-02 in batch BJE0388 and in association with sample 21E0323-02RE1 in batch BJF0662. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Mercury - EPA Method 7470

Due to ARI instrument issues the samples were subcontracted to Fremont Analytical for Total and Dissolved Mercury . Due to Fremont workload issues the Dissolved Mercury was not analyzed within hold time and has been flagged. The Fremont report is included in its entirety.

REVISED to correct VOA and metals lists.



WORK ORDER

21E0323

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Analysis	Due	TAT	Expires	Comments
Met Diss 7470A Hg	06/11/2021	10	6/24/2021	
Met Diss 6020B - Ba	06/11/2021	10	11/23/2021	
Met Diss 6020B - Cd UCT	06/11/2021	10	11/23/2021	
21E0323-05 TB-10-20212705 [Water] Sampled 27-May-2021 10:55				
8260D VOA	06/11/2021	10	6/10/2021	

Preservation Confirmation

Container ID	Container Type	pH	
21E0323-01 A	HDPE NM, 1000 mL, 1:1 HNO3	4.2	Pass
21E0323-01 B	HDPE NM, 500 mL		
21E0323-02 A	Large OJ, 1000 mL	7.2	Fail
21E0323-03 A	HDPE NM, 500 mL, 1:1 HNO3	4.2	Pass
21E0323-03 B	HDPE NM, 500 mL		
21E0323-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0323-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0323-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0323-03 F	Glass NM, Amber, 1000 mL		
21E0323-03 G	Glass NM, Amber, 1000 mL		
21E0323-03 H	Glass NM, Amber, 500 mL		
21E0323-03 I	Glass NM, Amber, 500 mL		
21E0323-04 A	HDPE NM, 500 mL	7.2	Fail
21E0323-05 A	VOA Vial, Clear, 40 mL, HCL		
21E0323-05 B	VOA Vial, Clear, 40 mL, HCL		
21E0323-05 C	VOA Vial, Clear, 40 mL, HCL		
21E0323-05 D	VOA Vial, Clear, 40 mL, HCL		
21E0323-05 E	VOA Vial, Clear, 40 mL, HCL		

SB
Preservation Confirmed By

05/27/2021
Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon & Wilson

Project Name: LOW

COC No(s): NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: NA

Assigned ARI Job No: 21E0323

Tracking No: NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1225 3.9

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 826

Cooler Accepted by: JSW Date: 05/27/2021 Time: 1225

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: NA

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? JSW YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI... NA 05/20/2021

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JSW Date: 05/27/2021 Time: 1232 Labels checked by: JSW

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

1 vial for Sample MW-47-20210705 was received w/ hairline fracture all the way around container. Sample volume was able to trickle out, container will be disposed accordingly

By: JSW Date: 05/27/2021



WORK ORDER

21E0323

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Analysis	Due	TAT	Expires	Comments
Met Diss 7470A Hg	06/11/2021	10	6/24/2021	
Met Diss 6020B - Ba	06/11/2021	10	11/23/2021	
Met Diss 6020B - Cd UCT	06/11/2021	10	11/23/2021	
21E0323-05 TB-10-20212705 [Water] Sampled 27-May-2021 10:55				
8260D VOA	06/11/2021	10	6/10/2021	

Preservation Confirmation

Container ID	Container Type	pH	
21E0323-01 A	HDPE NM, 1000 mL, 1:1 HNO ₃	<2	Pass
21E0323-01 B	HDPE NM, 500 mL		
21E0323-02 A	Large OJ, 1000 mL	>2	Fail ①
21E0323-03 A	HDPE NM, 500 mL, 1:1 HNO ₃	<2	Pass
21E0323-03 B	HDPE NM, 500 mL		
21E0323-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0323-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0323-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0323-03 F	Glass NM, Amber, 1000 mL		
21E0323-03 G	Glass NM, Amber, 1000 mL		
21E0323-03 H	Glass NM, Amber, 500 mL		
21E0323-03 I	Glass NM, Amber, 500 mL		
21E0323-04 A	HDPE NM, 500 mL	>2	Fail ①
21E0323-05 A	VOA Vial, Clear, 40 mL, HCL		
21E0323-05 B	VOA Vial, Clear, 40 mL, HCL		
21E0323-05 C	VOA Vial, Clear, 40 mL, HCL		
21E0323-05 D	VOA Vial, Clear, 40 mL, HCL		
21E0323-05 E	VOA Vial, Clear, 40 mL, HCL		

Preservation Confirmed By SB

Date

05/27/2021 ① Filtered at 0.45 um and
preserved to pH <2.0 with
0.75ml conc. HNO₃ (J2314)
ml 05/27/21

Reviewed By

Date

**Fremont**
Analytical

3600 Fremont Ave. N.

Seattle, WA 98103

T: (206) 352-3790

F: (206) 352-7178

info@fremontanalytical.com

Analytical Resources Inc.

Shelly Fishel

4611 South 134th Place, Ste 100

Tukwila, WA 98168

RE: 21E0323**Work Order Number: 2106377**

June 29, 2021

Attention Shelly Fishel:

Fremont Analytical, Inc. received 4 sample(s) on 6/21/2021 for the analyses presented in the following report.

Dissolved Mercury by EPA Method 7470***Mercury by EPA Method 7470***

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

CC:
Sub Data

*DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910*

Original

www.fremontanalytical.com



Date: 06/29/2021

CLIENT: Analytical Resources Inc.
Project: 21E0323
Work Order: 2106377

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2106377-001	21E0323-01	05/27/2021 10:55 AM	06/21/2021 4:40 PM
2106377-002	21E0323-02	05/27/2021 10:55 AM	06/21/2021 4:40 PM
2106377-003	21E0323-03	05/27/2021 11:50 AM	06/21/2021 4:40 PM
2106377-004	21E0323-04	05/27/2021 11:50 AM	06/21/2021 4:40 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original



Case Narrative

WO#: 2106377

Date: 6/29/2021

CLIENT: Analytical Resources Inc.**Project:** 21E0323

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.



Qualifiers & Acronyms

WO#: 2106377

Date Reported: 6/29/2021

Qualifiers:

- * - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit
- R - High relative percent difference observed

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate

Originalwww.fremontanalytical.com



Analytical Report

Work Order: **2106377**
 Date Reported: **6/29/2021**

CLIENT: Analytical Resources Inc.
Project: 21E0323

Lab ID: 2106377-001 **Collection Date:** 5/27/2021 10:55:00 AM
Client Sample ID: 21E0323-01 **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Mercury by EPA Method 7470

Batch ID: 32769 Analyst: LB

Mercury	ND	0.100		µg/L	1	6/24/2021 4:25:36 PM
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Lab ID: 2106377-002 **Collection Date:** 5/27/2021 10:55:00 AM
Client Sample ID: 21E0323-02 **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Dissolved Mercury by EPA Method 7470

Batch ID: 32808 Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:30:09 PM
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Lab ID: 2106377-003 **Collection Date:** 5/27/2021 11:50:00 AM
Client Sample ID: 21E0323-03 **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Mercury by EPA Method 7470

Batch ID: 32769 Analyst: LB

Mercury	ND	0.100		µg/L	1	6/24/2021 4:27:18 PM
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Lab ID: 2106377-004 **Collection Date:** 5/27/2021 11:50:00 AM
Client Sample ID: 21E0323-04 **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Dissolved Mercury by EPA Method 7470

Batch ID: 32808 Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:31:51 PM
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Original



Date: 6/29/2021

Work Order: 2106377
 CLIENT: Analytical Resources Inc.
 Project: 21E0323

QC SUMMARY REPORT

Mercury by EPA Method 7470

Sample ID: MB-32769		SampType: MBLK		Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202			
Client ID: MBLKW		Batch ID: 32769					Analysis Date: 6/24/2021			SeqNo: 1376867		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.100

Sample ID: LCS-32769		SampType: LCS			Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202		
Client ID: LCSW		Batch ID: 32769			Analysis Date: 6/24/2021			SeqNo: 1376868				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.31 0.100 2.500 0 92.4 20 120

Sample ID: 2106373-001ADUP		SampType: DUP			Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202		
Client ID: BATCH		Batch ID: 32769			Analysis Date: 6/24/2021					SeqNo: 1376870		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 1.00 0 20

Sample ID: 2106373-001AMS		SampType: MS			Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202		
Client ID: BATCH		Batch ID: 32769			Analysis Date: 6/24/2021			SeqNo: 1376871				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 1.00 25.00 0 0 70 130 S

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample ID: 2106373-001AMSD		SampType: MSD			Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202		
Client ID: BATCH		Batch ID: 32769			Analysis Date: 6/24/2021					SeqNo: 1376872		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 1.00 25.00 0 0 70 130 0 20 S

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.



Date: 6/29/2021

Work Order: 2106377
 CLIENT: Analytical Resources Inc.
 Project: 21E0323

QC SUMMARY REPORT

Dissolved Mercury by EPA Method 7470

Sample ID: MB-32808		SampType: MBLK			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: MBLKW		Batch ID: 32808			Analysis Date: 6/29/2021					SeqNo: 1378985		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.100

Sample ID: LCS-32808		SampType: LCS			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: LCSW		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378986				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.84 0.100 2.500 0 114 80 120

Sample ID: 2106413-004ADUP		SampType: DUP			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378988				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.100 0 0

Sample ID: 2106413-004AMS		SampType: MS			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021				SeqNo: 1378989			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.53 0.100 2.500 0 101 70 130

Sample ID: 2106413-004AMSD		SampType: MSD			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021					SeqNo: 1378990		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.67 0.100 2.500 0 107 70 130 2.530 5.38 20



Sample Log-In Check List

Client Name: **ARI**Work Order Number: **2106377**Logged by: **Gabrielle Coeulle**Date Received: **6/21/2021 4:40:00 PM**

Chain of Custody

1. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
2. How was the sample delivered? Courier

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
4. Shipping container/cooler in good condition? Yes ☒ No ☐
5. Custody Seals present on shipping container/cooler?
(Refer to comments for Custody Seals not intact) Yes ☒ No ☐ Not Present ☐
6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
7. Were all items received at a temperature of >2°C to 6°C * Yes ☒ No ☐ NA ☐
8. Sample(s) in proper container(s)? Yes ☒ No ☐
9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
10. Are samples properly preserved? Yes ☒ No ☐
11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☒
13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
14. Does paperwork match bottle labels? Yes ☒ No ☐
15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
16. Is it clear what analyses were requested? Yes ☒ No ☐
17. Were all holding times able to be met? Yes ☐ No ☒

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☐ No ☐ NA ☒

Person Notified:		Date:	
By Whom:		Via:	☐ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:			
Client Instructions:			

19. Additional remarks:

Item Information

Item #	Temp °C
Sample 1	5.1

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

Original



Analytical Resources, Incorporated
Analytical Chemists and Consultants

SUBCONTRACT ORDER
To: Fremont Analytical
ARI Work Order: 21E0323

2106377

SENDING LABORATORY:

Analytical Resources, Inc.
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6201
Project Manager: Shelly Fishel
E-Mail: shelly.fishel@arilabs.com

RECEIVING LABORATORY:

Fremont Analytical
3600 Fremont Avenue N.
Seattle, WA 98103
Phone: (206) 352-3790
Fax: (206) 352-7178

PLEASE SEND DATA TO subdata@arilabs.com

Analysis	Due	Expires	Sub Laboratory ID	Comments
----------	-----	---------	-------------------	----------

Sample ID: 21E0323-01

Sampled: 05/27/21 10:55 Matrix: Water

Met 7470A Hg 06/11/21 06/24/21 10:55

Containers Supplied:

21E0323-01 C
HDPE NM, 500 mL, 1:1 HNO3

Sample ID: 21E0323-02

Sampled: 05/27/21 10:55 Matrix: Water

Met Diss 7470A Hg 06/11/21 06/24/21 10:55

Containers Supplied:

21E0323-02 B
HDPE NM, 500 mL, 1:1 HNO3

Sample ID: 21E0323-03

Sampled: 05/27/21 11:50 Matrix: Water

Met 7470A Hg 06/11/21 06/24/21 11:50

Containers Supplied:

21E0323-03 J
HDPE NM, 500 mL, 1:1 HNO3

Sample ID: 21E0323-04

Sampled: 05/27/21 11:50 Matrix: Water

Met Diss 7470A Hg 06/11/21 06/24/21 11:50

Containers Supplied:

21E0323-04 B
HDPE NM, 500 mL, 1:1 HNO3

Dissolved Hg has been filtered

5 day TAT
POF: EDO SLF 06/21/2021

06/21/2021 1620

Released By

Date

Received By

Date

Released By

Date

Received By

Date

Printed: 06/21/2021 14:32:05

Page 9 of 9

Page 1 of 1



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

MW-7-20212705

21E0323-01 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/27/2021 10:55

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/23/2021 20:28

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0323-01 A 01

Preparation Batch: BJF0554

Sample Size: 25 mL

Prepared: 06/21/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium	7440-47-3	1	0.260	0.500	0.833	ug/L	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

MW-7-20212705

21E0323-01 (Water)

Wet Chemistry

Method: SM 3500-Cr B-09

Sampled: 05/27/2021 10:55

Instrument: UV1800-2 Analyst: CDE

Analyzed: 05/27/2021 18:29

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0323-01 B 01

Preparation Batch: BJE0706

Sample Size: 40 mL

Prepared: 05/27/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Hexavalent Chromium	1854-02-99	1.25	0.013	0.013	ND	mg/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:25

MW-7-20212705
21E0323-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/27/2021 10:55

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/19/2021 03:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0323-02 A 02

Preparation Batch: BJF0388

Sample Size: 25 mL

Filtration Batch: BJE0704

Prepared: 06/18/2021

Final Volume: 25 mL

Filtration Date: 05/27/2021 16:46

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

MW-47-20212705

21E0323-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/27/2021 11:50

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 18:36

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0323-03 D

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	0.11	ug/L	J
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	126	%	
Surrogate: Toluene-d8				80-120 %	96.3	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	83.0	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	106	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

MW-47-20212705

21E0323-03 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/27/2021 11:50

Instrument: NT10 Analyst: VTS

Analyzed: 06/04/2021 20:27

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJF0002
Prepared: 06/01/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21E0323-03 G 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	0.01	0.2	ND	ug/L	U
bis(2-chloroethyl) ether	111-44-4	1	0.03	0.2	ND	ug/L	U
2-Chlorophenol	95-57-8	1	0.03	0.2	ND	ug/L	U
1,3-Dichlorobenzene	541-73-1	1	0.03	0.2	ND	ug/L	U
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
Benzyl Alcohol	100-51-6	1	0.02	0.2	ND	ug/L	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	0.03	0.2	ND	ug/L	U
2-Methylphenol	95-48-7	1	0.03	0.2	ND	ug/L	U
Hexachloroethane	67-72-1	1	0.04	0.2	ND	ug/L	U
N-Nitroso-di-n-Propylamine	621-64-7	1	0.04	0.2	ND	ug/L	U
4-Methylphenol	106-44-5	1	0.03	0.2	ND	ug/L	U
Nitrobenzene	98-95-3	1	0.03	0.2	ND	ug/L	U
Isophorone	78-59-1	1	0.03	0.2	ND	ug/L	U
2-Nitrophenol	88-75-5	1	0.04	1.0	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Bis(2-Chloroethoxy)methane	111-91-1	1	0.03	0.2	ND	ug/L	U
2,4-Dichlorophenol	120-83-2	1	0.1	1.0	ND	ug/L	U
1,2,4-Trichlorobenzene	120-82-1	1	0.03	0.2	ND	ug/L	U
Naphthalene	91-20-3	1	0.03	0.2	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
4-Chloroaniline	106-47-8	1	0.04	1.0	ND	ug/L	U
Hexachlorobutadiene	87-68-3	1	0.04	0.2	ND	ug/L	U
4-Chloro-3-Methylphenol	59-50-7	1	0.1	1.0	ND	ug/L	U
2-Methylnaphthalene	91-57-6	1	0.03	0.2	ND	ug/L	U
Hexachlorocyclopentadiene	77-47-4	1	0.1	1.0	ND	ug/L	U
2,4,6-Trichlorophenol	88-06-2	1	0.2	1.0	ND	ug/L	U
2,4,5-Trichlorophenol	95-95-4	1	0.1	1.0	ND	ug/L	U
2-Chloronaphthalene	91-58-7	1	0.03	0.2	ND	ug/L	U
2-Nitroaniline	88-74-4	1	0.2	1.0	ND	ug/L	U
Acenaphthylene	208-96-8	1	0.02	0.2	ND	ug/L	U
Dimethylphthalate	131-11-3	1	0.04	0.2	ND	ug/L	U
2,6-Dinitrotoluene	606-20-2	1	0.2	1.0	ND	ug/L	U
Acenaphthene	83-32-9	1	0.03	0.2	0.7	ug/L	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

MW-47-20212705

21E0323-03 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/27/2021 11:50

Instrument: NT10 Analyst: VTS

Analyzed: 06/04/2021 20:27

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
3-Nitroaniline	99-09-2	1	0.2	1.0	ND	ug/L	U
2,4-Dinitrophenol	51-28-5	1	0.2	2.0	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.02	0.2	ND	ug/L	U
4-Nitrophenol	100-02-7	1	0.06	1.0	ND	ug/L	U
2,4-Dinitrotoluene	121-14-2	1	0.1	1.0	ND	ug/L	U
Fluorene	86-73-7	1	0.02	0.2	ND	ug/L	U
4-Chlorophenylphenyl ether	7005-72-3	1	0.02	0.2	ND	ug/L	U
Diethyl phthalate	84-66-2	1	0.06	0.2	ND	ug/L	U
4-Nitroaniline	100-01-6	1	0.2	1.0	ND	ug/L	U
4,6-Dinitro-2-methylphenol	534-52-1	1	0.4	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
4-Bromophenyl phenyl ether	101-55-3	1	0.02	0.2	ND	ug/L	U
Hexachlorobenzene	118-74-1	1	0.04	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Phenanthrene	85-01-8	1	0.02	0.2	ND	ug/L	U
Anthracene	120-12-7	1	0.03	0.2	ND	ug/L	U
Carbazole	86-74-8	1	0.04	0.2	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Fluoranthene	206-44-0	1	0.03	0.2	ND	ug/L	U
Pyrene	129-00-0	1	0.03	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.04	0.2	ND	ug/L	U
3,3'-Dichlorobenzidine	91-94-1	1	0.3	1.0	ND	ug/L	U
Chrysene	218-01-9	1	0.04	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U
Di-n-Octylphthalate	117-84-0	1	0.05	0.2	ND	ug/L	U
Benzo(a)fluoranthene, Total		1	0.08	0.4	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.05	0.2	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.06	0.2	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.07	0.2	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.04	0.2	ND	ug/L	U
1-Methylnaphthalene	90-12-0	1	0.03	0.2	ND	ug/L	U
Surrogate: 2-Fluorophenol				30-160 %	49.6	%	
Surrogate: Phenol-d5				30-160 %	33.2	%	
Surrogate: 2-Chlorophenol-d4				30-160 %	77.8	%	
Surrogate: 1,2-Dichlorobenzene-d4				30-160 %	55.0	%	
Surrogate: Nitrobenzene-d5				30-160 %	96.0	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

MW-47-20212705

21E0323-03 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/27/2021 11:50

Instrument: NT10 Analyst: VTS

Analyzed: 06/04/2021 20:27

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorobiphenyl		30-160 %	73.0	%	
Surrogate: 2,4,6-Tribromophenol		30-160 %	149	%	Q
Surrogate: p-Terphenyl-d14		30-160 %	84.2	%	



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Reported:
14-Dec-2021 12:25

MW-47-20212705

21E0323-03 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/27/2021 11:50

Instrument: ECD7 Analyst: JGR

Analyzed: 06/05/2021 00:52

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0731 Prepared: 06/01/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0323-03 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0039 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0323-03 F 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0037 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0323-03 F 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0038 Cleaned: 03-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0323-03 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	87.6	%	
Surrogate: Tetrachlorometaxylene				32-120 %	87.2	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	88.1	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	66.4	%	



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Reported:
14-Dec-2021 12:25

MW-47-20212705

21E0323-03 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/27/2021 11:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/23/2021 20:21

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix

Extract ID: 21E0323-03 A 01

Preparation Batch: BJF0554

Sample Size: 25 mL

Prepared: 06/21/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium	7440-47-3	1	0.260	0.500	0.511	ug/L	



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Analytical Chemists and Consultants

Analytical Report

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Project: Lower Duwamish
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Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

MW-47-20212705

21E0323-03 (Water)

Wet Chemistry

Method: SM 3500-Cr B-09

Sampled: 05/27/2021 11:50

Instrument: UV1800-2 Analyst: CDE

Analyzed: 05/27/2021 18:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0323-03 B 01

Preparation Batch: BJE0706

Sample Size: 40 mL

Prepared: 05/27/2021

Final Volume: 50 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Hexavalent Chromium	1854-02-99	1.25	0.013	0.013	ND	mg/L	U



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Analytical Report

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Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

MW-47-20212705

21E0323-04 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/27/2021 11:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/19/2021 03:39

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0323-04 A 02

Preparation Batch: BJF0388

Sample Size: 25 mL

Filtration Batch: BJE0704

Prepared: 06/18/2021

Final Volume: 25 mL

Filtration Date: 05/27/2021 16:46

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U



Analytical Report

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Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

TB-10-20212705

21E0323-05 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/27/2021 10:55

Instrument: NT2 Analyst: PKC

Analyzed: 05/28/2021 18:15

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0323-05 B

Preparation Batch: BJE0692

Sample Size: 10 mL

Prepared: 05/28/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Surrogate: 1,2-Dichloroethane-d4				80-129 %	128	%	
Surrogate: Toluene-d8				80-120 %	96.7	%	
Surrogate: 4-Bromofluorobenzene				80-120 %	84.4	%	
Surrogate: 1,2-Dichlorobenzene-d4				80-120 %	103	%	



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0692 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: PKC

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0692-BLK2)						Prepared: 28-May-2021 Analyzed: 28-May-2021 11:18					
Vinyl Chloride	ND	0.08	0.20	ug/L							U
1,1-Dichloroethene	ND	0.08	0.20	ug/L							U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L							U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L							U
Trichloroethene	ND	0.07	0.20	ug/L							U
Tetrachloroethene	ND	0.09	0.20	ug/L							U
Surrogate: 1,2-Dichloroethane-d4	5.18			ug/L	5.00		104	80-129			
Surrogate: Toluene-d8	4.83			ug/L	5.00		96.6	80-120			
Surrogate: 4-Bromofluorobenzene	4.66			ug/L	5.00		93.1	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.00			ug/L	5.00		100	80-120			
LCS (BJE0692-BS2)						Prepared: 28-May-2021 Analyzed: 28-May-2021 09:57					
Vinyl Chloride	10.1	0.08	0.20	ug/L	10.0		101	66-133			
1,1-Dichloroethene	10.4	0.08	0.20	ug/L	10.0		104	69-135			
trans-1,2-Dichloroethene	9.98	0.07	0.20	ug/L	10.0		99.8	78-128			
cis-1,2-Dichloroethene	10.4	0.08	0.20	ug/L	10.0		104	80-121			
Trichloroethene	10.2	0.07	0.20	ug/L	10.0		102	80-120			
Tetrachloroethene	10.4	0.09	0.20	ug/L	10.0		104	80-120			
Surrogate: 1,2-Dichloroethane-d4	4.78			ug/L	5.00		95.6	80-129			
Surrogate: Toluene-d8	5.00			ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.08			ug/L	5.00		102	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.93			ug/L	5.00		98.6	80-120			
LCS Dup (BJE0692-BSD2)						Prepared: 28-May-2021 Analyzed: 28-May-2021 10:38					
Vinyl Chloride	10.2	0.08	0.20	ug/L	10.0		102	66-133	1.11	30	
1,1-Dichloroethene	10.3	0.08	0.20	ug/L	10.0		103	69-135	0.66	30	
trans-1,2-Dichloroethene	10.1	0.07	0.20	ug/L	10.0		101	78-128	0.88	30	
cis-1,2-Dichloroethene	10.6	0.08	0.20	ug/L	10.0		106	80-121	2.16	30	
Trichloroethene	10.4	0.07	0.20	ug/L	10.0		104	80-120	2.03	30	
Tetrachloroethene	10.4	0.09	0.20	ug/L	10.0		104	80-120	0.44	30	
Surrogate: 1,2-Dichloroethane-d4	4.75			ug/L	5.00		95.1	80-129			
Surrogate: Toluene-d8	5.02			ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.06			ug/L	5.00		101	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.95			ug/L	5.00		99.0	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:25

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJF0002 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0002-BLK1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 17:20					
Phenol	ND	0.01	0.2	ug/L							U
bis(2-chloroethyl) ether	ND	0.03	0.2	ug/L							U
2-Chlorophenol	ND	0.03	0.2	ug/L							U
1,3-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
Benzyl Alcohol	ND	0.02	0.2	ug/L							U
2,2'-Oxybis(1-chloropropane)	ND	0.03	0.2	ug/L							U
2-Methylphenol	ND	0.03	0.2	ug/L							U
Hexachloroethane	ND	0.04	0.2	ug/L							U
N-Nitroso-di-n-Propylamine	ND	0.04	0.2	ug/L							U
4-Methylphenol	ND	0.03	0.2	ug/L							U
Nitrobenzene	ND	0.03	0.2	ug/L							U
Isophorone	ND	0.03	0.2	ug/L							U
2-Nitrophenol	ND	0.04	1.0	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Bis(2-Chloroethoxy)methane	ND	0.03	0.2	ug/L							U
2,4-Dichlorophenol	ND	0.1	1.0	ug/L							U
1,2,4-Trichlorobenzene	ND	0.03	0.2	ug/L							U
Naphthalene	ND	0.03	0.2	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
4-Chloroaniline	ND	0.04	1.0	ug/L							U
Hexachlorobutadiene	ND	0.04	0.2	ug/L							U
4-Chloro-3-Methylphenol	ND	0.1	1.0	ug/L							U
2-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Hexachlorocyclopentadiene	ND	0.1	1.0	ug/L							U
2,4,6-Trichlorophenol	ND	0.2	1.0	ug/L							U
2,4,5-Trichlorophenol	ND	0.1	1.0	ug/L							U
2-Chloronaphthalene	ND	0.03	0.2	ug/L							U
2-Nitroaniline	ND	0.2	1.0	ug/L							U
Acenaphthylene	ND	0.02	0.2	ug/L							U
Dimethylphthalate	ND	0.04	0.2	ug/L							U
2,6-Dinitrotoluene	ND	0.2	1.0	ug/L							U
Acenaphthene	ND	0.03	0.2	ug/L							U
3-Nitroaniline	ND	0.2	1.0	ug/L							U


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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJF0002 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0002-BLK1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 17:20					
2,4-Dinitrophenol	ND	0.2	2.0	ug/L							U
Dibenzofuran	ND	0.02	0.2	ug/L							U
4-Nitrophenol	ND	0.06	1.0	ug/L							U
2,4-Dinitrotoluene	ND	0.1	1.0	ug/L							U
Fluorene	ND	0.02	0.2	ug/L							U
4-Chlorophenylphenyl ether	ND	0.02	0.2	ug/L							U
Diethyl phthalate	ND	0.06	0.2	ug/L							U
4-Nitroaniline	ND	0.2	1.0	ug/L							U
4,6-Dinitro-2-methylphenol	ND	0.4	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
4-Bromophenyl phenyl ether	ND	0.02	0.2	ug/L							U
Hexachlorobenzene	ND	0.04	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Phenanthrene	ND	0.02	0.2	ug/L							U
Anthracene	ND	0.03	0.2	ug/L							U
Carbazole	ND	0.04	0.2	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Fluoranthene	ND	0.03	0.2	ug/L							U
Pyrene	ND	0.03	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
Benzo(a)anthracene	ND	0.04	0.2	ug/L							U
3,3'-Dichlorobenzidine	ND	0.3	1.0	ug/L							U
Chrysene	ND	0.04	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
Di-n-Octylphthalate	ND	0.05	0.2	ug/L							U
Benzo(a)fluoranthene, Total	ND	0.08	0.4	ug/L							U
Benzo(a)pyrene	ND	0.05	0.2	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.06	0.2	ug/L							U
Dibenzo(a,h)anthracene	ND	0.07	0.2	ug/L							U
Benzo(g,h,i)perylene	ND	0.04	0.2	ug/L							U
1-Methylnaphthalene	ND	0.03	0.2	ug/L							U
Surrogate: 2-Fluorophenol	3.30			ug/L	7.50		44.0	30-160			
Surrogate: Phenol-d5	2.30			ug/L	7.50		30.7	30-160			
Surrogate: 2-Chlorophenol-d4	5.29			ug/L	7.50		70.5	30-160			


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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJF0002 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0002-BLK1)						Prepared: 01-Jun-2021	Analyzed: 04-Jun-2021 17:20				
Surrogate: 1,2-Dichlorobenzene-d4	2.46			ug/L	5.00		49.2	30-160			
Surrogate: Nitrobenzene-d5	3.99			ug/L	5.00		79.7	30-160			
Surrogate: 2-Fluorobiphenyl	3.13			ug/L	5.00		62.6	30-160			
Surrogate: 2,4,6-Tribromophenol	9.04			ug/L	7.50		121	30-160			Q
Surrogate: p-Terphenyl-d14	3.89			ug/L	5.00		77.7	30-160			
LCS (BJF0002-BS1)						Prepared: 01-Jun-2021	Analyzed: 04-Jun-2021 17:57				
Phenol	1.6	0.01	0.2	ug/L	5.00		32.1	30-160			
bis(2-chloroethyl) ether	3.7	0.03	0.2	ug/L	5.00		74.6	30-160			
2-Chlorophenol	3.1	0.03	0.2	ug/L	5.00		61.6	30-160			
1,3-Dichlorobenzene	2.6	0.03	0.2	ug/L	5.00		51.7	30-160			
1,4-Dichlorobenzene	2.4	0.03	0.2	ug/L	5.00		48.3	30-160			
1,2-Dichlorobenzene	2.7	0.03	0.2	ug/L	5.00		53.2	30-160			
Benzyl Alcohol	2.5	0.02	0.2	ug/L	5.00		50.2	30-160			
2,2'-Oxybis(1-chloropropane)	3.0	0.03	0.2	ug/L	5.00		60.0	30-160			
2-Methylphenol	2.7	0.03	0.2	ug/L	5.00		54.3	30-160			
Hexachloroethane	2.4	0.04	0.2	ug/L	5.00		48.9	30-160			
N-Nitroso-di-n-Propylamine	3.8	0.04	0.2	ug/L	5.00		75.8	30-160			Q
4-Methylphenol	2.8	0.03	0.2	ug/L	5.00		55.5	30-160			
Nitrobenzene	4.2	0.03	0.2	ug/L	5.00		84.6	30-160			
Isophorone	4.2	0.03	0.2	ug/L	5.00		84.2	30-160			
2-Nitrophenol	3.3	0.04	1.0	ug/L	5.00		66.1	30-160			
2,4-Dimethylphenol	7.7	0.3	1.0	ug/L	13.0		59.1	30-160			
Bis(2-Chloroethoxy)methane	3.5	0.03	0.2	ug/L	5.00		70.6	30-160			
2,4-Dichlorophenol	9.1	0.1	1.0	ug/L	13.0		70.2	30-160			
1,2,4-Trichlorobenzene	2.5	0.03	0.2	ug/L	5.00		50.5	30-160			
Naphthalene	3.4	0.03	0.2	ug/L	5.00		67.8	30-160			
Benzoic acid	8.3	0.1	2.0	ug/L	23.0		35.9	30-160			
4-Chloroaniline	1.5	0.04	1.0	ug/L	13.0		11.7	30-160			*
Hexachlorobutadiene	2.1	0.04	0.2	ug/L	5.00		42.4	30-160			
4-Chloro-3-Methylphenol	10.2	0.1	1.0	ug/L	13.0		78.3	30-160			
2-Methylnaphthalene	3.0	0.03	0.2	ug/L	5.00		60.3	30-160			
Hexachlorocyclopentadiene	4.1	0.1	1.0	ug/L	13.0		31.4	30-160			
2,4,6-Trichlorophenol	9.7	0.2	1.0	ug/L	13.0		74.9	30-160			
2,4,5-Trichlorophenol	9.6	0.1	1.0	ug/L	13.0		74.2	30-160			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:25

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJF0002 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0002-BS1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 17:57					
2-Chloronaphthalene	3.3	0.03	0.2	ug/L	5.00		65.1	30-160			
2-Nitroaniline	18.8	0.2	1.0	ug/L	13.0		144	30-160			Q
Acenaphthylene	3.4	0.02	0.2	ug/L	5.00		68.6	30-160			
Dimethylphthalate	3.9	0.04	0.2	ug/L	5.00		77.6	30-160			
2,6-Dinitrotoluene	12.9	0.2	1.0	ug/L	13.0		99.1	30-160			
Acenaphthene	3.6	0.03	0.2	ug/L	5.00		72.6	30-160			
3-Nitroaniline	11.8	0.2	1.0	ug/L	13.0		90.7	30-160			Q
2,4-Dinitrophenol	17.5	0.2	2.0	ug/L	23.0		76.1	30-160			
Dibenzofuran	3.6	0.02	0.2	ug/L	5.00		71.9	30-160			
4-Nitrophenol	5.4	0.06	1.0	ug/L	13.0		41.4	30-160			
2,4-Dinitrotoluene	13.1	0.1	1.0	ug/L	13.0		101	30-160			
Fluorene	3.7	0.02	0.2	ug/L	5.00		73.2	30-160			
4-Chlorophenylphenyl ether	2.8	0.02	0.2	ug/L	5.00		56.0	30-160			
Diethyl phthalate	4.1	0.06	0.2	ug/L	5.00		81.9	30-160			Q
4-Nitroaniline	11.4	0.2	1.0	ug/L	13.0		87.7	30-160			
4,6-Dinitro-2-methylphenol	19.0	0.4	2.0	ug/L	23.0		82.7	30-160			
N-Nitrosodiphenylamine	3.4	0.03	0.2	ug/L	5.00		67.3	30-160			
4-Bromophenyl phenyl ether	3.9	0.02	0.2	ug/L	5.00		78.6	30-160			
Hexachlorobenzene	4.7	0.04	0.2	ug/L	5.00		93.0	30-160			Q
Pentachlorophenol	10.8	0.1	1.0	ug/L	13.0		83.2	30-160			
Phenanthrene	3.9	0.02	0.2	ug/L	5.00		77.9	30-160			
Anthracene	3.4	0.03	0.2	ug/L	5.00		67.2	30-160			
Carbazole	3.7	0.04	0.2	ug/L	5.00		73.2	30-160			
Di-n-Butylphthalate	3.9	0.05	0.2	ug/L	5.00		78.0	30-160			
Fluoranthene	3.4	0.03	0.2	ug/L	5.00		68.2	30-160			
Pyrene	3.4	0.03	0.2	ug/L	5.00		67.7	30-160			
Butylbenzylphthalate	4.1	0.07	0.2	ug/L	5.00		81.9	30-160			
Benzo(a)anthracene	3.4	0.04	0.2	ug/L	5.00		68.2	30-160			
3,3'-Dichlorobenzidine	3.5	0.3	1.0	ug/L	8.00		43.6	30-160			
Chrysene	3.4	0.04	0.2	ug/L	5.00		67.5	30-160			
bis(2-Ethylhexyl)phthalate	4.2	0.2	0.2	ug/L	5.00		83.0	30-160			
Di-n-Octylphthalate	3.6	0.05	0.2	ug/L	5.00		72.2	30-160			
Benzo(a)fluoranthene, Total	7.5	0.08	0.4	ug/L	10.0		74.6	30-160			
Benzo(a)pyrene	3.2	0.05	0.2	ug/L	5.00		64.6	30-160			
Indeno(1,2,3-cd)pyrene	4.3	0.06	0.2	ug/L	5.00		85.1	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJF0002 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0002-BS1)											
Prepared: 01-Jun-2021						Analyzed: 04-Jun-2021 17:57					
Dibenzo(a,h)anthracene	4.4	0.07	0.2	ug/L	5.00		87.8	30-160			
Benzo(g,h,i)perylene	4.2	0.04	0.2	ug/L	5.00		83.3	30-160			
1-Methylnaphthalene	3.2	0.03	0.2	ug/L	5.00		63.6	30-160			
Surrogate: 2-Fluorophenol	3.81			ug/L	7.50		50.8	30-160			
Surrogate: Phenol-d5	2.78			ug/L	7.50		37.1	30-160			
Surrogate: 2-Chlorophenol-d4	5.87			ug/L	7.50		78.3	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	2.82			ug/L	5.00		56.5	30-160			
Surrogate: Nitrobenzene-d5	4.74			ug/L	5.00		94.8	30-160			
Surrogate: 2-Fluorobiphenyl	3.85			ug/L	5.00		77.1	30-160			
Surrogate: 2,4,6-Tribromophenol	10.5			ug/L	7.50		140	30-160			Q
Surrogate: p-Terphenyl-d14	4.27			ug/L	5.00		85.4	30-160			
LCS Dup (BJF0002-BSD1)											
Prepared: 01-Jun-2021						Analyzed: 04-Jun-2021 18:35					
Phenol	1.6	0.01	0.2	ug/L	5.00		32.4	30-160	0.82	30	
bis(2-chloroethyl) ether	3.8	0.03	0.2	ug/L	5.00		76.2	30-160	2.12	30	
2-Chlorophenol	3.3	0.03	0.2	ug/L	5.00		65.6	30-160	6.24	30	
1,3-Dichlorobenzene	2.6	0.03	0.2	ug/L	5.00		51.0	30-160	1.33	30	
1,4-Dichlorobenzene	2.4	0.03	0.2	ug/L	5.00		48.0	30-160	0.66	30	
1,2-Dichlorobenzene	2.7	0.03	0.2	ug/L	5.00		53.2	30-160	0.12	30	
Benzyl Alcohol	2.6	0.02	0.2	ug/L	5.00		51.8	30-160	3.28	30	
2,2'-Oxybis(1-chloropropane)	3.1	0.03	0.2	ug/L	5.00		61.1	30-160	1.91	30	
2-Methylphenol	2.9	0.03	0.2	ug/L	5.00		59.0	30-160	8.21	30	
Hexachloroethane	2.4	0.04	0.2	ug/L	5.00		47.3	30-160	3.38	30	
N-Nitroso-di-n-Propylamine	4.3	0.04	0.2	ug/L	5.00		86.6	30-160	13.30	30	Q
4-Methylphenol	2.9	0.03	0.2	ug/L	5.00		58.3	30-160	4.83	30	
Nitrobenzene	4.3	0.03	0.2	ug/L	5.00		86.7	30-160	2.42	30	
Isophorone	4.4	0.03	0.2	ug/L	5.00		87.3	30-160	3.59	30	
2-Nitrophenol	3.4	0.04	1.0	ug/L	5.00		68.1	30-160	2.88	30	
2,4-Dimethylphenol	9.5	0.3	1.0	ug/L	13.0		73.0	30-160	21.10	30	
Bis(2-Chloroethoxy)methane	3.7	0.03	0.2	ug/L	5.00		74.1	30-160	4.82	30	
2,4-Dichlorophenol	9.7	0.1	1.0	ug/L	13.0		74.4	30-160	5.74	30	
1,2,4-Trichlorobenzene	2.5	0.03	0.2	ug/L	5.00		50.2	30-160	0.54	30	
Naphthalene	3.4	0.03	0.2	ug/L	5.00		68.7	30-160	1.25	30	
Benzoic acid	9.5	0.1	2.0	ug/L	23.0		41.2	30-160	13.70	30	
4-Chloroaniline	1.6	0.04	1.0	ug/L	13.0		12.0	30-160	2.63	30	*



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJF0002 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJF0002-BSD1)					Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 18:35						
Hexachlorobutadiene	2.1	0.04	0.2	ug/L	5.00		42.7	30-160	0.87	30	
4-Chloro-3-Methylphenol	10.9	0.1	1.0	ug/L	13.0		84.2	30-160	7.31	30	
2-Methylnaphthalene	3.1	0.03	0.2	ug/L	5.00		62.6	30-160	3.72	30	
Hexachlorocyclopentadiene	6.4	0.1	1.0	ug/L	13.0		49.0	30-160	43.90	30	*
2,4,6-Trichlorophenol	10.3	0.2	1.0	ug/L	13.0		79.2	30-160	5.56	30	
2,4,5-Trichlorophenol	10.0	0.1	1.0	ug/L	13.0		77.0	30-160	3.69	30	
2-Chloronaphthalene	3.3	0.03	0.2	ug/L	5.00		66.6	30-160	2.40	30	
2-Nitroaniline	19.1	0.2	1.0	ug/L	13.0		147	30-160	1.72	30	Q
Acenaphthylene	3.4	0.02	0.2	ug/L	5.00		68.5	30-160	0.22	30	
Dimethylphthalate	3.9	0.04	0.2	ug/L	5.00		77.7	30-160	0.09	30	
2,6-Dinitrotoluene	13.7	0.2	1.0	ug/L	13.0		105	30-160	6.04	30	
Acenaphthene	3.7	0.03	0.2	ug/L	5.00		73.6	30-160	1.49	30	
3-Nitroaniline	11.8	0.2	1.0	ug/L	13.0		91.1	30-160	0.45	30	Q
2,4-Dinitrophenol	19.9	0.2	2.0	ug/L	23.0		86.5	30-160	12.80	30	
Dibenzofuran	3.7	0.02	0.2	ug/L	5.00		73.0	30-160	1.56	30	
4-Nitrophenol	5.6	0.06	1.0	ug/L	13.0		43.4	30-160	4.71	30	
2,4-Dinitrotoluene	13.4	0.1	1.0	ug/L	13.0		103	30-160	2.55	30	
Fluorene	3.1	0.02	0.2	ug/L	5.00		62.7	30-160	15.40	30	
4-Chlorophenylphenyl ether	2.8	0.02	0.2	ug/L	5.00		55.4	30-160	1.18	30	
Diethyl phthalate	4.1	0.06	0.2	ug/L	5.00		82.7	30-160	0.99	30	Q
4-Nitroaniline	12.6	0.2	1.0	ug/L	13.0		97.0	30-160	10.10	30	
4,6-Dinitro-2-methylphenol	20.2	0.4	2.0	ug/L	23.0		87.7	30-160	5.80	30	
N-Nitrosodiphenylamine	3.6	0.03	0.2	ug/L	5.00		72.6	30-160	7.67	30	
4-Bromophenyl phenyl ether	4.0	0.02	0.2	ug/L	5.00		79.1	30-160	0.63	30	
Hexachlorobenzene	4.7	0.04	0.2	ug/L	5.00		94.9	30-160	1.95	30	Q
Pentachlorophenol	11.1	0.1	1.0	ug/L	13.0		85.3	30-160	2.57	30	
Phenanthrene	3.9	0.02	0.2	ug/L	5.00		78.2	30-160	0.38	30	
Anthracene	3.6	0.03	0.2	ug/L	5.00		72.1	30-160	6.92	30	
Carbazole	3.7	0.04	0.2	ug/L	5.00		74.5	30-160	1.71	30	
Di-n-Butylphthalate	3.9	0.05	0.2	ug/L	5.00		78.3	30-160	0.34	30	
Fluoranthene	3.6	0.03	0.2	ug/L	5.00		71.2	30-160	4.32	30	
Pyrene	3.4	0.03	0.2	ug/L	5.00		68.6	30-160	1.35	30	
Butylbenzylphthalate	4.3	0.07	0.2	ug/L	5.00		86.1	30-160	5.01	30	
Benzo(a)anthracene	3.5	0.04	0.2	ug/L	5.00		70.8	30-160	3.67	30	
3,3'-Dichlorobenzidine	6.2	0.3	1.0	ug/L	8.00		77.4	30-160	55.90	30	*


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:25

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJF0002 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJF0002-BSD1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 18:35					
Chrysene	3.5	0.04	0.2	ug/L	5.00		70.3	30-160	4.09	30	
bis(2-Ethylhexyl)phthalate	4.2	0.2	0.2	ug/L	5.00		83.1	30-160	0.11	30	
Di-n-Octylphthalate	3.6	0.05	0.2	ug/L	5.00		71.4	30-160	1.11	30	
Benzo(a)fluoranthene, Total	7.5	0.08	0.4	ug/L	10.0		74.8	30-160	0.30	30	
Benzo(a)pyrene	3.6	0.05	0.2	ug/L	5.00		71.0	30-160	9.55	30	
Indeno(1,2,3-cd)pyrene	4.3	0.06	0.2	ug/L	5.00		86.2	30-160	1.30	30	
Dibenzo(a,h)anthracene	4.4	0.07	0.2	ug/L	5.00		88.9	30-160	1.19	30	
Benzo(g,h,i)perylene	4.3	0.04	0.2	ug/L	5.00		85.7	30-160	2.86	30	
1-Methylnaphthalene	3.2	0.03	0.2	ug/L	5.00		64.5	30-160	1.28	30	
Surrogate: 2-Fluorophenol	3.81			ug/L	7.50		50.8	30-160			
Surrogate: Phenol-d5	2.60			ug/L	7.50		34.6	30-160			
Surrogate: 2-Chlorophenol-d4	5.68			ug/L	7.50		75.7	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	2.77			ug/L	5.00		55.4	30-160			
Surrogate: Nitrobenzene-d5	4.58			ug/L	5.00		91.7	30-160			
Surrogate: 2-Fluorobiphenyl	3.67			ug/L	5.00		73.5	30-160			
Surrogate: 2,4,6-Tribromophenol	10.2			ug/L	7.50		136	30-160			Q
Surrogate: p-Terphenyl-d14	4.16			ug/L	5.00		83.3	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

Analysis by: Analytical Resources, LLC

Aroclor PCB - Quality Control

Batch BJE0731 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0731-BLK1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 22:47					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0180			ug/L	0.0200		90.2	29-120			
Surrogate: Tetrachlorometaxylene	0.0181			ug/L	0.0200		90.5	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0174			ug/L	0.0200		87.0	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0137			ug/L	0.0200		68.6	32-120			
LCS (BJE0731-BS1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 23:08					
Aroclor 1016	0.051	0.002	0.010	ug/L	0.0500		103	54-120			
Aroclor 1260	0.050	0.003	0.010	ug/L	0.0500		100	51-128			
Surrogate: Decachlorobiphenyl	0.0177			ug/L	0.0200		88.6	29-120			
Surrogate: Tetrachlorometaxylene	0.0194			ug/L	0.0200		96.8	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0171			ug/L	0.0200		85.4	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0137			ug/L	0.0200		68.4	32-120			
LCS Dup (BJE0731-BSD1)						Prepared: 01-Jun-2021 Analyzed: 04-Jun-2021 23:29					
Aroclor 1016	0.048	0.002	0.010	ug/L	0.0500		96.1	54-120	6.44	30	
Aroclor 1260	0.049	0.003	0.010	ug/L	0.0500		97.9	51-128	2.60	30	
Surrogate: Decachlorobiphenyl	0.0165			ug/L	0.0200		82.4	29-120			
Surrogate: Tetrachlorometaxylene	0.0182			ug/L	0.0200		90.8	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0158			ug/L	0.0200		79.0	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0136			ug/L	0.0200		68.1	32-120			



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:25

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJF0354 - TWM EPA 7470A

Instrument: HYDRA Analyst: CDE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0354-BLK1)						Prepared: 14-Jun-2021 Analyzed: 30-Jun-2021 20:06					
Mercury	0.000046	0.000013	0.000100	mg/L							J
Duplicate (BJF0354-DUP1)						Source: 21E0323-03 Prepared: 14-Jun-2021 Analyzed: 30-Jun-2021 20:13					
Mercury	0.000038	0.000013	0.000100	mg/L							H, J


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:25

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0554 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0554-BLK1)						Prepared: 21-Jun-2021 Analyzed: 23-Jun-2021 18:31						
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
LCS (BJF0554-BS1)						Prepared: 21-Jun-2021 Analyzed: 23-Jun-2021 18:36						
Chromium	52	24.9	0.260	0.500	ug/L	25.0		99.5	80-120			
Chromium	53	24.8	0.239	0.500	ug/L	25.0		99.1	80-120			
Duplicate (BJF0554-DUP1)						Source: 21E0323-01 Prepared: 21-Jun-2021 Analyzed: 23-Jun-2021 20:33						
Chromium	52	0.802	0.260	0.500	ug/L		0.833			3.79	20	
Matrix Spike (BJF0554-MS1)						Source: 21E0323-01 Prepared: 21-Jun-2021 Analyzed: 23-Jun-2021 20:38						
Chromium	52	22.6	0.260	0.500	ug/L	25.0	0.833	87.0	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0554-MSD1)						Source: 21E0323-01 Prepared: 21-Jun-2021 Analyzed: 23-Jun-2021 20:44						
Chromium	52	22.7	0.260	0.500	ug/L	25.0	0.833	87.5	75-125	0.49	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:25

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0388 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0388-BLK1)						Prepared: 18-Jun-2021 Analyzed: 18-Jun-2021 21:59						
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
LCS (BJF0388-BS1)						Prepared: 18-Jun-2021 Analyzed: 18-Jun-2021 22:04						
Chromium, Dissolved	52	24.8	0.260	0.500	ug/L	25.0		99.3	80-120			
Chromium, Dissolved	53	25.1	0.239	0.500	ug/L	25.0		100	80-120			
Duplicate (BJF0388-DUP1)						Source: 21E0323-02 Prepared: 18-Jun-2021 Analyzed: 19-Jun-2021 03:56						
Chromium, Dissolved	52	ND	0.260	0.500	ug/L		ND					U
Matrix Spike (BJF0388-MS1)						Source: 21E0323-02 Prepared: 18-Jun-2021 Analyzed: 19-Jun-2021 04:02						
Chromium, Dissolved	52	22.5	0.260	0.500	ug/L	25.0	ND	89.9	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.												
Matrix Spike Dup (BJF0388-MSD1)						Source: 21E0323-02 Prepared: 18-Jun-2021 Analyzed: 19-Jun-2021 04:11						
Chromium, Dissolved	52	21.9	0.260	0.500	ug/L	25.0	ND	87.6	75-125	2.59	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.												


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJE0706 - No Prep Wet Chem

Instrument: UV1800-2 Analyst: CDE

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0706-BLK1)					Prepared: 27-May-2021 Analyzed: 27-May-2021 18:28						
Hexavalent Chromium	ND	0.013	0.013	mg/L							U
LCS (BJE0706-BS1)					Prepared: 27-May-2021 Analyzed: 27-May-2021 18:28						
Hexavalent Chromium	0.635	0.013	0.013	mg/L	0.625		102	85-115			D
Duplicate (BJE0706-DUP1)					Source: 21E0323-01 Prepared: 27-May-2021 Analyzed: 27-May-2021 18:29						
Hexavalent Chromium	ND	0.013	0.013	mg/L		ND					U
Matrix Spike (BJE0706-MS1)					Source: 21E0323-01 Prepared: 27-May-2021 Analyzed: 27-May-2021 18:30						
Hexavalent Chromium	0.063	0.013	0.013	mg/L	0.0625	ND	100	85-115			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.


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Certified Analyses included in this Report

Analyte	Certifications
EPA 6020B in Water	
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
EPA 8082A in Water	
Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
EPA 8260D in Water	
Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE
Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE


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Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE


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1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP
2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP
2-Methylphenol	NELAP,DoD-ELAP
Hexachloroethane	NELAP,DoD-ELAP
N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP


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Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP
2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP
2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP
2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP
Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP
Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP


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Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzofluoranthenes, Total	NELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

SM 3500-Cr B-09 in Water

Hexavalent Chromium	WADOE,NELAP
---------------------	-------------

Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
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Notes and Definitions

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
H	Hold time violation - Hold time was exceeded.
J	Estimated concentration value detected below the reporting limit.
P1	The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
Y1	Raised reporting limit due to interference
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.



Analytical Resources, LLC
Analytical Chemists and Consultants

14 December 2021

Meg Strong
Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle, WA 98103-8636

RE: Lower Duwamish

Please find enclosed sample receipt documentation and analytical results for samples from the project referenced above.

Sample analyses were performed according to ARI's Quality Assurance Plan and any provided project specific Quality Assurance Plan. Each analytical section of this report has been approved and reviewed by an analytical peer, the appropriate Laboratory Supervisor or qualified substitute, and a technical reviewer.

Should you have any questions or problems, please feel free to contact us at your convenience.

Associated Work Order(s)
21E0352

Associated SDG ID(s)
N/A

Susan
Dunniho

Digitally signed by
Susan Dunniho
Date: 2021.12.15
14:56:16 -08'00'

I certify that this data package is in compliance with the terms and conditions of the contract, both technically and for completeness, for other than the conditions detailed in the enclose Narrative. ARI, an accredited laboratory, certifies that the report results for which ARI is accredited meets all the requirements of the accrediting body. A list of certified analyses, accreditations, and expiration dates is included in this report.

Release of the data contained in this hardcopy data package has been authorized by the Laboratory Manager or his/her designee, as verified by the following signature.

Analytical Resources, LLC

Susan Dunniho For Shelly Fishel, Project Manager

The results in this report apply to the samples analyzed in accordance with the chain of custody document. This analytical report must be reproduced in its entirety.



Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21E0352		Turn-around Requested: Standard		Page: 1 of 1											
ARI Client Company: Shannon & Wilson		Phone:		Date: 5/26/21	Ice Present?										
Client Contact: Shoshana Howard		No. of Coolers: 3		Cooler Temps: see CRF											
Client Project Name: LDW		Analysis Requested:													
Client Project #: 21-1-12586-012		Notes/Comments:													
Samplers: RBP + JXS		① arsenic, nickel, mercury, selenium, silver, zinc ② arsenic, barium,													
Sample ID	Date	Time	Matrix	No. Containers	TPH-G	TPH-Dx	BTEX	HVOCs	MTBE	PAHs	Full list SVOCs	Limited SVOC	PCB Analysis	Metals (Total + individual)	Hardness
MW-8-20212605	5/26/21	1010	W	9	X	X	X		X					①	
TB-10-20212605		0900	W	5	X		X	X	X						
Decon-20212605		0930	W	6								X	X	②	
MW-4-20212605		1105	W	9	X	X	X		X					③	
MW-52-20212605		1209	W	11	X		X	X		X			X	④	
MW-70-20212605		1321	W	13	X	X	X	X		X			X	②	
MW-69-20212605		1435	W	13	X	X	X	X				X	X	②	X
Comments/Special Instructions: * Lab to filter for dissolved metals * Refer to project methods and analytes lists		Relinquished by: (Signature) <i>[Signature]</i> Printed Name: Joseph Scudery Company: SWI Date & Time: 5/26/21 1556		Received by: (Signature) <i>[Signature]</i> Printed Name: Samantha Colon Company: ARI Date & Time: 5/26/21 1555		Relinquished by: (Signature) Printed Name: Company: Date & Time:		Received by: (Signature) Printed Name: Company: Date & Time:							

Limits of Liability: ARI will perform all requested services in accordance with appropriate methodology following ARI Standard Operating Procedures and the ARI Quality Assurance Program. This program meets standards for the industry. The total liability of ARI, its officers, agents, employees, or successors, arising out of or in connection with the requested services, shall not exceed the Invoiced amount for said services. The acceptance by the client of a proposal for services by ARI release ARI from any liability in excess thereof, notwithstanding any provision to the contrary in any contract, purchase order or co-signed agreement between ARI and the Client.

Sample Retention Policy: All samples submitted to ARI will be appropriately discarded no sooner than 90 days after receipt or 60 days after submission of hardcopy data, whichever is longer, unless alternate retention schedules have been established by work-order or contract.


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-8-20212605	21E0352-01	Water	26-May-2021 10:10	26-May-2021 15:55
MW-8-20212605	21E0352-02	Water	26-May-2021 10:10	26-May-2021 15:55
TB-10-20212605	21E0352-03	Water	26-May-2021 09:30	26-May-2021 15:55
Decon-20212605	21E0352-04	Water	26-May-2021 09:30	26-May-2021 15:55
Decon-20212605	21E0352-05	Water	26-May-2021 09:30	26-May-2021 15:55
MW-4-20212605	21E0352-06	Water	26-May-2021 11:05	26-May-2021 15:55
MW-4-20212605	21E0352-07	Water	26-May-2021 11:05	26-May-2021 15:55
MW-52-20212605	21E0352-08	Water	26-May-2021 12:09	26-May-2021 15:55
MW-52-20212605	21E0352-09	Water	26-May-2021 12:09	26-May-2021 15:55
MW-70-20212605	21E0352-10	Water	26-May-2021 13:21	26-May-2021 15:55
MW-70-20212605	21E0352-11	Water	26-May-2021 13:21	26-May-2021 15:55
MW-69-20212605	21E0352-12	Water	26-May-2021 14:35	26-May-2021 15:55
MW-69-20212605	21E0352-13	Water	26-May-2021 14:35	26-May-2021 15:55



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish
Work Order: 21E0352

Sample receipt

Samples as listed on the preceding page were received 26-May-2021 15:55 under ARI work order 21E0352. For details regarding sample receipt, please refer to the Cooler Receipt Form.

PCB Aroclors - EPA Method SW8082A

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Gasoline by NWTPH-q (GC/MS)

The sample(s) were analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Volatiles - EPA Method SW8260D

The sample(s) were analyzed within the recommended holding times.



Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike and blank spike duplicate (BS/LCS and BSD/LCSD) spike recoveries and relative percent difference (RPD) were within control limits.

Semivolatiles - EPA Method SW8270E

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements except surrogate 2,4,6- Tribromophenol which was out of control high. All samples which contain analyte have been flagged with a "Q" qualifier.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits except Phenol-d5 which was out of control low in samples 21E0352-04, 21E0352-12 and the method blank as well as 2,4,6- Tribromophenol which was out of control high in the initial calibration verification (ICV). Deviations have been flagged.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Polynuclear Aromatic Hydrocarbons (PAH) - EPA Method SW8270E-SIM

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

Internal standard areas were within limits.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Total Metals - EPA Method 6020B


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0352-01 in batch BJF0328. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and the RPD were within advisory control limits except Calcium and Magnesium percent recoveries which were out of control low in the matrix spike duplicate and have been flagged.

Dissolved Metals - EPA Method 6020B

The sample(s) were digested and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The method blank(s) were clean at the reporting limits.

The blank spike (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0352-13 in batch BJF0379. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and RPD were within advisory control limits except Dissolved Lead which was out of control low in the matrix spike and matrix spike duplicate and have been flagged.

Total and Dissolved Mercury - EPA Method 7470/7471

Due to ARI instrument issues the samples were subcontracted to Fremont Analytical for Total and Dissolved Mercury. Due to Fremont's workload the samples were analyzed out of hold and have been flagged.

Diesel/Heavy Oil Range Organics - WA-Ecology Method NW-TPHDx

The sample(s) were extracted and analyzed within the recommended holding times.

Initial and continuing calibrations were within method requirements.

The surrogate percent recoveries were within control limits.

The method blank(s) were clean at the reporting limits.



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

The blank spike (BS/LCS) percent recoveries were within control limits.

REVISED to correct VOC and metals lists.



WORK ORDER

21E0352

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0352-01 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0352-01 B	Glass NM, Amber, 500 mL		
21E0352-01 C	Glass NM, Amber, 500 mL		
21E0352-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0352-01 E	VOA Vial, Clear, 40 mL, HCL		
21E0352-01 F	VOA Vial, Clear, 40 mL, HCL		
21E0352-01 G	VOA Vial, Clear, 40 mL, HCL		
21E0352-01 H	VOA Vial, Clear, 40 mL, HCL		
21E0352-02 A	Large OJ, 1000 mL	7.2	Fail
21E0352-03 A	VOA Vial, Clear, 40 mL, HCL		
21E0352-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0352-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0352-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0352-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0352-04 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0352-04 B	Glass NM, Amber, 1000 mL		
21E0352-04 C	Glass NM, Amber, 1000 mL		
21E0352-04 D	Glass NM, Amber, 500 mL		
21E0352-04 E	Glass NM, Amber, 500 mL		
21E0352-05 A	Large OJ, 1000 mL	7.2	Fail
21E0352-06 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0352-06 B	Glass NM, Amber, 500 mL		
21E0352-06 C	Glass NM, Amber, 500 mL		
21E0352-06 D	VOA Vial, Clear, 40 mL, HCL		
21E0352-06 E	VOA Vial, Clear, 40 mL, HCL		
21E0352-06 F	VOA Vial, Clear, 40 mL, HCL		
21E0352-06 G	VOA Vial, Clear, 40 mL, HCL		
21E0352-06 H	VOA Vial, Clear, 40 mL, HCL		
21E0352-07 A	Large OJ, 1000 mL	7.2	Fail
21E0352-08 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0352-08 B	Glass NM, Amber, 1000 mL		
21E0352-08 C	Glass NM, Amber, 1000 mL		
21E0352-08 D	Glass NM, Amber, 500 mL		
21E0352-08 E	Glass NM, Amber, 500 mL		
21E0352-08 F	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21E0352

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0352-08 G	VOA Vial, Clear, 40 mL, HCL		
21E0352-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0352-08 I	VOA Vial, Clear, 40 mL, HCL		
21E0352-08 J	VOA Vial, Clear, 40 mL, HCL		
21E0352-09 A	Large OJ, 1000 mL	72	Fail
21E0352-10 A	HDPE NM, 1000 mL, 1:1 HNO3	<2	Pass
21E0352-10 B	Glass NM, Amber, 1000 mL		
21E0352-10 C	Glass NM, Amber, 1000 mL		
21E0352-10 D	Glass NM, Amber, 500 mL		
21E0352-10 E	Glass NM, Amber, 500 mL		
21E0352-10 F	Glass NM, Amber, 500 mL		
21E0352-10 G	Glass NM, Amber, 500 mL		
21E0352-10 H	VOA Vial, Clear, 40 mL, HCL		
21E0352-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0352-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0352-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0352-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0352-11 A	Large OJ, 1000 mL	72	Fail
21E0352-12 A	HDPE NM, 1000 mL, 1:1 HNO3	<2	Pass
21E0352-12 B	Glass NM, Amber, 1000 mL		
21E0352-12 C	Glass NM, Amber, 1000 mL		
21E0352-12 D	Glass NM, Amber, 500 mL		
21E0352-12 E	Glass NM, Amber, 500 mL		
21E0352-12 F	Glass NM, Amber, 500 mL		
21E0352-12 G	Glass NM, Amber, 500 mL		
21E0352-12 H	VOA Vial, Clear, 40 mL, HCL		
21E0352-12 I	VOA Vial, Clear, 40 mL, HCL		
21E0352-12 J	VOA Vial, Clear, 40 mL, HCL		
21E0352-12 K	VOA Vial, Clear, 40 mL, HCL		
21E0352-12 L	VOA Vial, Clear, 40 mL, HCL		
21E0352-13 A	Large OJ, 1000 mL	72	Fail

Preservation Confirmed By

Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: 5+W

Project Name: LOW

COC No(s): _____ NA

Delivered by: Fed-Ex UPS Courier Hand Delivered Other: _____

Assigned ARI Job No: 2160352

Tracking No: _____ NA

Preliminary Examination Phase:

Were intact, properly signed and dated custody seals attached to the outside of the cooler? YES NO

Were custody papers included with the cooler? YES NO

Were custody papers properly filled out (ink, signed, etc.) YES NO

Temperature of Cooler(s) (°C) (recommended 2.0-6.0 °C for chemistry)

Time 1555 1.7 0.3 4.5

If cooler temperature is out of compliance fill out form 00070F

Temp Gun ID#: DOO 5206

Cooler Accepted by: Sc Date: 5/26/21 Time: 1555

Complete custody forms and attach all shipping documents

Log-In Phase:

Was a temperature blank included in the cooler? YES NO

What kind of packing material was used? ... Bubble Wrap Wet Ice Gel Packs Baggies Foam Block Paper Other: _____

Was sufficient ice used (if appropriate)? NA YES NO

How were bottles sealed in plastic bags? Individually Grouped Not

Did all bottles arrive in good condition (unbroken)? YES NO

Were all bottle labels complete and legible? YES NO

Did the number of containers listed on COC match with the number of containers received? YES NO

Did all bottle labels and tags agree with custody papers? YES NO

Were all bottles used correct for the requested analyses? YES NO

Do any of the analyses (bottles) require preservation? (attach preservation sheet, excluding VOCs) ... NA YES NO

Were all VOC vials free of air bubbles? NA YES NO

Was sufficient amount of sample sent in each bottle? YES NO

Date VOC Trip Blank was made at ARI: NA 05/24/2021

Were the sample(s) split by ARI? NA YES Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: JSS Date: 05/28/2021 Time: 1051 Labels checked by: Jo

**** Notify Project Manager of discrepancies or concerns ****

Sample ID on Bottle	Sample ID on COC	Sample ID on Bottle	Sample ID on COC

Additional Notes, Discrepancies, & Resolutions:

By: _____ Date: _____



WORK ORDER

21E0352

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0352-01 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0352-01 B	Glass NM, Amber, 500 mL		
21E0352-01 C	Glass NM, Amber, 500 mL		
21E0352-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0352-01 E	VOA Vial, Clear, 40 mL, HCL		
21E0352-01 F	VOA Vial, Clear, 40 mL, HCL		
21E0352-01 G	VOA Vial, Clear, 40 mL, HCL		
21E0352-01 H	VOA Vial, Clear, 40 mL, HCL		
21E0352-02 A	Large OJ, 1000 mL	7.2	Fail ①
21E0352-03 A	VOA Vial, Clear, 40 mL, HCL		
21E0352-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0352-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0352-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0352-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0352-04 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0352-04 B	Glass NM, Amber, 1000 mL		
21E0352-04 C	Glass NM, Amber, 1000 mL		
21E0352-04 D	Glass NM, Amber, 500 mL		
21E0352-04 E	Glass NM, Amber, 500 mL		
21E0352-05 A	Large OJ, 1000 mL	7.2	Fail ①
21E0352-06 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0352-06 B	Glass NM, Amber, 500 mL		
21E0352-06 C	Glass NM, Amber, 500 mL		
21E0352-06 D	VOA Vial, Clear, 40 mL, HCL		
21E0352-06 E	VOA Vial, Clear, 40 mL, HCL		
21E0352-06 F	VOA Vial, Clear, 40 mL, HCL		
21E0352-06 G	VOA Vial, Clear, 40 mL, HCL		
21E0352-06 H	VOA Vial, Clear, 40 mL, HCL		
21E0352-07 A	Large OJ, 1000 mL	7.2	Fail ①
21E0352-08 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0352-08 B	Glass NM, Amber, 1000 mL		
21E0352-08 C	Glass NM, Amber, 1000 mL		
21E0352-08 D	Glass NM, Amber, 500 mL		
21E0352-08 E	Glass NM, Amber, 500 mL		
21E0352-08 F	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21E0352

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0352-08 G	VOA Vial, Clear, 40 mL, HCL		
21E0352-08 H	VOA Vial, Clear, 40 mL, HCL		
21E0352-08 I	VOA Vial, Clear, 40 mL, HCL		
21E0352-08 J	VOA Vial, Clear, 40 mL, HCL		
21E0352-09 A	Large OJ, 1000 mL	72	Fail ①
21E0352-10 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	Pass
21E0352-10 B	Glass NM, Amber, 1000 mL		
21E0352-10 C	Glass NM, Amber, 1000 mL		
21E0352-10 D	Glass NM, Amber, 500 mL		
21E0352-10 E	Glass NM, Amber, 500 mL		
21E0352-10 F	Glass NM, Amber, 500 mL		
21E0352-10 G	Glass NM, Amber, 500 mL		
21E0352-10 H	VOA Vial, Clear, 40 mL, HCL		
21E0352-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0352-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0352-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0352-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0352-11 A	Large OJ, 1000 mL	72	Fail ①
21E0352-12 A	HDPE NM, 1000 mL, 1:1 HNO ₃	< 2	Pass
21E0352-12 B	Glass NM, Amber, 1000 mL		
21E0352-12 C	Glass NM, Amber, 1000 mL		
21E0352-12 D	Glass NM, Amber, 500 mL		
21E0352-12 E	Glass NM, Amber, 500 mL		
21E0352-12 F	Glass NM, Amber, 500 mL		
21E0352-12 G	Glass NM, Amber, 500 mL		
21E0352-12 H	VOA Vial, Clear, 40 mL, HCL		
21E0352-12 I	VOA Vial, Clear, 40 mL, HCL		
21E0352-12 J	VOA Vial, Clear, 40 mL, HCL		
21E0352-12 K	VOA Vial, Clear, 40 mL, HCL		
21E0352-12 L	VOA Vial, Clear, 40 mL, HCL		
21E0352-13 A	Large OJ, 1000 mL	72	Fail ①

JSW

Preservation Confirmed By

Date

05/28/2021

① Filtered at 0.45 um
and preserved to pH < 2.0 with
0.75 ml conc. HNO₃ (2314).
on 05/28/21

**Fremont**
Analytical

3600 Fremont Ave. N.

Seattle, WA 98103

T: (206) 352-3790

F: (206) 352-7178

info@fremontanalytical.com

Analytical Resources Inc.

Shelly Fishel

4611 South 134th Place, Ste 100

Tukwila, WA 98168

RE: 21E0352**Work Order Number: 2106414**

June 29, 2021

Attention Shelly Fishel:

Fremont Analytical, Inc. received 10 sample(s) on 6/22/2021 for the analyses presented in the following report.

Dissolved Mercury by EPA Method 7470***Mercury by EPA Method 7470***

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

CC:
Sub Data

*DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910*

Original

www.fremontanalytical.com



Date: 06/29/2021

CLIENT: Analytical Resources Inc.
Project: 21E0352
Work Order: 2106414

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2106414-001	21E0352-01	05/26/2021 10:10 AM	06/22/2021 2:45 PM
2106414-002	21E0352-02	05/26/2021 10:10 AM	06/22/2021 2:45 PM
2106414-003	21E0352-04	05/26/2021 9:30 AM	06/22/2021 2:45 PM
2106414-004	21E0352-05	05/26/2021 9:30 AM	06/22/2021 2:45 PM
2106414-005	21E0352-06	05/26/2021 11:05 AM	06/22/2021 2:45 PM
2106414-006	21E0352-07	05/26/2021 11:05 AM	06/22/2021 2:45 PM
2106414-007	21E0352-10	05/26/2021 1:21 PM	06/22/2021 2:45 PM
2106414-008	21E0352-11	05/26/2021 1:21 PM	06/22/2021 2:45 PM
2106414-009	21E0352-12	05/26/2021 2:35 PM	06/22/2021 2:45 PM
2106414-010	21E0352-13	05/26/2021 2:35 PM	06/22/2021 2:45 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original



Case Narrative

WO#: 2106414

Date: 6/29/2021

CLIENT: Analytical Resources Inc.**Project:** 21E0352

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.



Qualifiers & Acronyms

WO#: 2106414

Date Reported: 6/29/2021

Qualifiers:

- * - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit
- R - High relative percent difference observed

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate

Original

www.fremontanalytical.com



Analytical Report

Work Order: 2106414

Date Reported: 6/29/2021

CLIENT: Analytical Resources Inc.

Project: 21E0352

Lab ID: 2106414-001

Client Sample ID: 21E0352-01

Collection Date: 5/26/2021 10:10:00 AM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Mercury by EPA Method 7470

Batch ID: 32769

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/24/2021 4:29:01 PM
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Lab ID: 2106414-002

Client Sample ID: 21E0352-02

Collection Date: 5/26/2021 10:10:00 AM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:43:46 PM
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Lab ID: 2106414-003

Client Sample ID: 21E0352-04

Collection Date: 5/26/2021 9:30:00 AM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Mercury by EPA Method 7470

Batch ID: 32769

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/24/2021 4:30:43 PM
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Lab ID: 2106414-004

Client Sample ID: 21E0352-05

Collection Date: 5/26/2021 9:30:00 AM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:45:29 PM
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Original



Analytical Report

Work Order: 2106414

Date Reported: 6/29/2021

CLIENT: Analytical Resources Inc.

Project: 21E0352

Lab ID: 2106414-005

Client Sample ID: 21E0352-06

Collection Date: 5/26/2021 11:05:00 AM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Mercury by EPA Method 7470

Batch ID: 32769

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/24/2021 4:32:25 PM
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Lab ID: 2106414-006

Client Sample ID: 21E0352-07

Collection Date: 5/26/2021 11:05:00 AM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
----------	--------	----	------	-------	----	---------------

Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:50:35 PM
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Lab ID: 2106414-007

Client Sample ID: 21E0352-10

Collection Date: 5/26/2021 1:21:00 PM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Mercury by EPA Method 7470

Batch ID: 32769

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/24/2021 4:34:06 PM
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Lab ID: 2106414-008

Client Sample ID: 21E0352-11

Collection Date: 5/26/2021 1:21:00 PM

Matrix: Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
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Dissolved Mercury by EPA Method 7470

Batch ID: 32808

Analyst: LB

Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:52:17 PM
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Original



Analytical Report

Work Order: **2106414**
Date Reported: **6/29/2021**

CLIENT: Analytical Resources Inc.
Project: 21E0352

Lab ID: 2106414-009 **Collection Date:** 5/26/2021 2:35:00 PM
Client Sample ID: 21E0352-12 **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Mercury by EPA Method 7470</u>				Batch ID: 32769		Analyst: LB
Mercury	ND	0.100	H	µg/L	1	6/24/2021 4:35:47 PM

Lab ID: 2106414-010 **Collection Date:** 5/26/2021 2:35:00 PM
Client Sample ID: 21E0352-13 **Matrix:** Water

Analyses	Result	RL	Qual	Units	DF	Date Analyzed
<u>Dissolved Mercury by EPA Method 7470</u>				Batch ID: 32808		Analyst: LB
Mercury	ND	0.100	H	µg/L	1	6/29/2021 3:54:00 PM



Date: 6/29/2021

Work Order: 2106414
 CLIENT: Analytical Resources Inc.
 Project: 21E0352

QC SUMMARY REPORT

Mercury by EPA Method 7470

Sample ID: MB-32769		SampType: MBLK			Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202		
Client ID: MBLKW		Batch ID: 32769			Analysis Date: 6/24/2021					SeqNo: 1376867		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.100

Sample ID: LCS-32769		SampType: LCS			Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202		
Client ID: LCSW		Batch ID: 32769			Analysis Date: 6/24/2021			SeqNo: 1376868				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.31 0.100 2.500 0 92.4 20 120

Sample ID: 2106373-001ADUP		SampType: DUP			Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202		
Client ID: BATCH		Batch ID: 32769			Analysis Date: 6/24/2021			SeqNo: 1376870				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 1.00 0 20

Sample ID: 2106373-001AMS		SampType: MS			Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202		
Client ID: BATCH		Batch ID: 32769			Analysis Date: 6/24/2021					SeqNo: 1376871		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 1.00 25.00 0 0 70 130 S

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.

Sample ID: 2106373-001AMSD		SampType: MSD			Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202		
Client ID: BATCH		Batch ID: 32769			Analysis Date: 6/24/2021					SeqNo: 1376872		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 1.00 25.00 0 0 70 130 0 20 S

NOTES:

S - Outlying spike recovery(ies) observed. A duplicate analysis was performed with similar results indicating a possible matrix effect.



Date: 6/29/2021

Work Order: 2106414
CLIENT: Analytical Resources Inc.
Project: 21E0352

QC SUMMARY REPORT

Mercury by EPA Method 7470

Sample ID: MB-32759FB		SampType: MBLK		Units: µg/L		Prep Date: 6/24/2021			RunNo: 68202		
Client ID: MBLKW		Batch ID: 32769		Analysis Date: 6/24/2021						SeqNo: 1376873	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury	ND	0.100									
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NOTES:
 Filter Blank



Date: 6/29/2021

Work Order: 2106414
 CLIENT: Analytical Resources Inc.
 Project: 21E0352

QC SUMMARY REPORT

Dissolved Mercury by EPA Method 7470

Sample ID: MB-32808		SampType: MBLK			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: MBLKW		Batch ID: 32808			Analysis Date: 6/29/2021					SeqNo: 1378985		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.100

Sample ID: LCS-32808		SampType: LCS			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: LCSW		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378986				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.84 0.100 2.500 0 114 80 120

Sample ID: 2106413-004ADUP		SampType: DUP			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378988				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury ND 0.100 0 0

Sample ID: 2106413-004AMS		SampType: MS			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021				SeqNo: 1378989			
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.53 0.100 2.500 0 101 70 130

Sample ID: 2106413-004AMSD		SampType: MSD			Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: BATCH		Batch ID: 32808			Analysis Date: 6/29/2021			SeqNo: 1378990				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual	

Mercury 2.67 0.100 2.500 0 107 70 130 2.530 5.38 20



Date: 6/29/2021

Work Order: 2106414
CLIENT: Analytical Resources Inc.
Project: 21E0352

QC SUMMARY REPORT

Dissolved Mercury by EPA Method 7470

Sample ID: MB-32829FB		SampType: MBLK		Units: µg/L		Prep Date: 6/28/2021			RunNo: 68281		
Client ID: MBLKW		Batch ID: 32808		Analysis Date: 6/29/2021						SeqNo: 1379012	
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury	ND	0.100									
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NOTES:
 Filter Blank



Sample Log-In Check List

Client Name: **ARI**
 Logged by: **Gabrielle Coeulle**

Work Order Number: **2106414**
 Date Received: **6/22/2021 2:45:55 PM**

Chain of Custody

1. Is Chain of Custody complete? Yes ☒ No ☐ Not Present ☐
 2. How was the sample delivered? Courier

Log In

3. Coolers are present? Yes ☒ No ☐ NA ☐
 4. Shipping container/cooler in good condition? Yes ☒ No ☐
 5. Custody Seals present on shipping container/cooler?
 (Refer to comments for Custody Seals not intact) Yes ☒ No ☐ Not Present ☐
 6. Was an attempt made to cool the samples? Yes ☒ No ☐ NA ☐
 7. Were all items received at a temperature of $>2^{\circ}\text{C}$ to 6°C * Yes ☒ No ☐ NA ☐
 8. Sample(s) in proper container(s)? Yes ☒ No ☐
 9. Sufficient sample volume for indicated test(s)? Yes ☒ No ☐
 10. Are samples properly preserved? Yes ☒ No ☐
 11. Was preservative added to bottles? Yes ☐ No ☒ NA ☐
 12. Is there headspace in the VOA vials? Yes ☐ No ☐ NA ☒
 13. Did all samples containers arrive in good condition(unbroken)? Yes ☒ No ☐
 14. Does paperwork match bottle labels? Yes ☒ No ☐
 15. Are matrices correctly identified on Chain of Custody? Yes ☒ No ☐
 16. Is it clear what analyses were requested? Yes ☒ No ☐
 17. Were all holding times able to be met? Yes ☐ No ☒

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes ☒ No ☐ NA ☐

Person Notified:	Shelly Fishel	Date:	6/22/2021
By Whom:	Gabrielle Coeulle	Via:	☒ eMail ☐ Phone ☐ Fax ☐ In Person
Regarding:	Ok to proceed out of hold if necessary?		
Client Instructions:	Proceed.		

19. Additional remarks:

Item Information

Item #	Temp $^{\circ}\text{C}$
Sample 1	4.3

* Note: DoD/ELAP and TNI require items to be received at $4^{\circ}\text{C} \pm 2^{\circ}\text{C}$

Original



Analytical Resources, Incorporated
Analytical Chemists and Consultants

SUBCONTRACT ORDER
To: Fremont Analytical
ARI Work Order: 21E0352

2106414

SENDING LABORATORY:

Analytical Resources, Inc.
4611 S. 134th Place, Suite 100
Tukwila, WA 98168
Phone: (206) 695-6200
Fax: (206) 695-6201
Project Manager: Shelly Fishel
E-Mail: shelly.fishel@arilabs.com

RECEIVING LABORATORY:

Fremont Analytical
3600 Fremont Avenue N.
Seattle, WA 98103
Phone: (206) 352-3790
Fax: (206) 352-7178

PLEASE SEND DATA TO subdata@arilabs.com

Analysis	Due	Expires	Sub Laboratory ID	Comments
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Sample ID: 21E0352-01

Sampled: 05/26/21 10:10 Matrix: Water

Met 7470A Hg	06/11/21	06/23/21 10:10		
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Containers Supplied:

21E0352-01 I
HDPE NM, 500 mL, 1:1 HNO₃

Sample ID: 21E0352-02

Sampled: 05/26/21 10:10 Matrix: Water

Met Diss 7470A Hg	06/11/21	06/23/21 10:10		
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Containers Supplied:

21E0352-02 B
HDPE NM, 500 mL

Sample ID: 21E0352-04

Sampled: 05/26/21 09:30 Matrix: Water

Met 7470A Hg	06/11/21	06/23/21 09:30		
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Containers Supplied:

21E0352-04 F
HDPE NM, 500 mL, 1:1 HNO₃

Sample ID: 21E0352-05

Sampled: 05/26/21 09:30 Matrix: Water

Met Diss 7470A Hg	06/11/21	06/23/21 09:30		
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Containers Supplied:

21E0352-05 B
HDPE NM, 500 mL

* Diss Hg needs to be filtered
POT: EDD
SOLV: TAT SUR 6/1/2021

Released By	Date	Received By	Date
Jacob Walter	06/22/21 1406	[Signature]	06/22/21 1445

Released By	Date	Received By	Date
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Printed: 6/21/2021 4:08:59PM



Analytical Resources, Incorporated
Analytical Chemists and Consultants

SUBCONTRACT ORDER
To: Fremont Analytical
ARI Work Order: 21E0352

2106414

Analysis	Due	Expires	Sub Laboratory ID	Comments
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Sample ID: 21E0352-06

Sampled: 05/26/21 11:05 Matrix: Water

Met 7470A Hg 06/11/21 06/23/21 11:05

Containers Supplied:

21E0352-06 I
HDPE NM, 500 mL, 1:1 HNO3

Sample ID: 21E0352-07

Sampled: 05/26/21 11:05 Matrix: Water

Met Diss 7470A Hg 06/11/21 06/23/21 11:05

Containers Supplied:

21E0352-07 B
HDPE NM, 500 mL

Sample ID: 21E0352-10

Sampled: 05/26/21 13:21 Matrix: Water

Met 7470A Hg 06/11/21 06/23/21 13:21

Containers Supplied:

21E0352-10 M
HDPE NM, 500 mL, 1:1 HNO3

Sample ID: 21E0352-11

Sampled: 05/26/21 13:21 Matrix: Water

Met Diss 7470A Hg 06/11/21 06/23/21 13:21

Containers Supplied:

21E0352-11 B
HDPE NM, 500 mL

Sample ID: 21E0352-12

Sampled: 05/26/21 14:35 Matrix: Water

Met 7470A Hg 06/11/21 06/23/21 14:35

Containers Supplied:

21E0352-12 M
HDPE NM, 500 mL, 1:1 HNO3

Sample ID: 21E0352-13

Sampled: 05/26/21 14:35 Matrix: Water

Met Diss 7470A Hg 06/11/21 06/23/21 14:35

Containers Supplied:

21E0352-13 B
HDPE NM, 500 mL

* need to be filtered for Diss Hg

Released By

Date

Received By

Date

Released By

Date

Received By

Date

Printed: 6/21/2021 4:08:59PM

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Page 2 of 2

21E0352 ARISample FINAL 14 Dec 2021 1244 - Page 26 of 102


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-8-20212605
21E0352-01 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/26/2021 10:10

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 12:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-01 H

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.12	ug/L	J
Ethylbenzene	100-41-4	1	0.05	0.20	0.18	ug/L	J
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	110	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	98.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	96.8	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-8-20212605
21E0352-01 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/26/2021 10:10

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 12:34

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-01 H

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	98.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	96.8	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-8-20212605
21E0352-01 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/26/2021 10:10

Instrument: FID4 Analyst: CTO

Analyzed: 06/09/2021 02:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0352-01 B 01

Preparation Batch: BJF0015

Sample Size: 500 mL

Prepared: 06/02/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>67.6</i>	<i>%</i>	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-8-20212605
21E0352-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/26/2021 10:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 01:15

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-01 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Silver	7440-22-4	1	0.0220	0.200	0.0240	ug/L	J


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-8-20212605
21E0352-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/26/2021 10:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/15/2021 03:44

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-01 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	13.4	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	1.31	ug/L	
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-8-20212605
21E0352-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/26/2021 10:10

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/24/2021 00:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-02 A 02

Preparation Batch: BJF0379

Sample Size: 25 mL

Filtration Batch: BJE0747

Prepared: 06/15/2021

Final Volume: 25 mL

Filtration Date: 05/28/2021 15:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Silver, Dissolved	7440-22-4	2	0.0440	0.400	0.0600	ug/L	J, D


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-8-20212605
21E0352-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/26/2021 10:10

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 19:55

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-02 A 02

Preparation Batch: BJF0379

Sample Size: 25 mL

Filtration Batch: BJE0747

Prepared: 06/15/2021

Final Volume: 25 mL

Filtration Date: 05/28/2021 15:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	2	0.0746	0.400	12.0	ug/L	D
Nickel, Dissolved	7440-02-0	2	0.158	1.00	1.15	ug/L	D
Selenium, Dissolved	7782-49-2	2	0.358	1.00	0.646	ug/L	J, D
Zinc, Dissolved	7440-66-6	2	5.84	12.0	ND	ug/L	U


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

TB-10-20212605
21E0352-03 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/26/2021 09:30

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 10:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-03 E

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	107	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	97.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	96.7	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

TB-10-20212605
21E0352-03 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/26/2021 09:30

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 10:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-03 E

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	97.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	96.7	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Decon-20212605
21E0352-04 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/26/2021 09:30

Instrument: NT10 Analyst: VTS

Analyzed: 06/08/2021 19:54

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: EPA 3510C SepF
 Preparation Batch: BJF0020
 Prepared: 06/02/2021

 Sample Size: 1000 mL
 Final Volume: 1 mL

Extract ID: 21E0352-04 C 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	ND	ug/L	U
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	ND	ug/L	U
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 % 43.9 %

Surrogate: Phenol-d5

30-160 % 26.5 %

*

Surrogate: 2-Chlorophenol-d4

30-160 % 77.8 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 % 65.7 %

Surrogate: Nitrobenzene-d5

30-160 % 90.1 %

Surrogate: 2-Fluorobiphenyl

30-160 % 73.4 %

Surrogate: 2,4,6-Tribromophenol

30-160 % 136 %

Q

Surrogate: p-Terphenyl-d14

30-160 % 81.1 %



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

Decon-20212605 21E0352-04 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/26/2021 09:30

Instrument: ECD7 Analyst: JGR

Analyzed: 06/08/2021 23:30

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJF0018 Prepared: 06/02/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0352-04 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0058 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-04 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0056 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-04 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0057 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-04 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	89.1	%	
Surrogate: Tetrachlorometaxylene				32-120 %	83.0	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	85.8	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	62.6	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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Decon-20212605
21E0352-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/26/2021 09:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 08:30

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-04 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	1	0.114	0.500	ND	ug/L	U
Chromium	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt	7440-48-4	1	0.0173	0.200	ND	ug/L	U
Iron	7439-89-6	1	18.2	36.0	ND	ug/L	U
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese	7439-96-5	1	0.142	0.500	0.162	ug/L	J
Vanadium	7440-62-2	1	0.0556	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/23/2021 22:32

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-04 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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Decon-20212605
21E0352-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/26/2021 09:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 08:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-04 A 01

Preparation Batch: BJF0328

Sample Size: 25 mL

Prepared: 06/14/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	ND	ug/L	U
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel	7440-02-0	1	0.0792	0.500	ND	ug/L	U
Selenium	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Decon-20212605
21E0352-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/26/2021 09:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 08:17

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0352-05 A 02
	Preparation Batch: BJF0379	Filtration Batch: BJE0747
	Prepared: 06/15/2021	Filtration Date: 05/28/2021 15:25
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	1	0.114	0.500	ND	ug/L	U
Chromium, Dissolved	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	ND	ug/L	U
Iron, Dissolved	7439-89-6	1	18.2	36.0	ND	ug/L	U
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	1	0.142	0.500	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/23/2021 22:37

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0352-05 A 02
	Preparation Batch: BJF0379	Filtration Batch: BJE0747
	Prepared: 06/15/2021	Filtration Date: 05/28/2021 15:25
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver, Dissolved	7440-22-4	1	0.0220	0.200	0.0260	ug/L	J


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Decon-20212605
21E0352-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/26/2021 09:30

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 08:17

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-05 A 02

Preparation Batch: BJF0379

Sample Size: 25 mL

Filtration Batch: BJE0747

Prepared: 06/15/2021

Final Volume: 25 mL

Filtration Date: 05/28/2021 15:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	ND	ug/L	U
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	ND	ug/L	U
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-4-20212605
21E0352-06 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/26/2021 11:05

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 12:56

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-06 H

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.12	ug/L	J
Ethylbenzene	100-41-4	1	0.05	0.20	0.07	ug/L	J
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
Methyl tert-butyl Ether	1634-04-4	1	0.14	0.50	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	99.1	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	109	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	99.1	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	104	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-4-20212605
21E0352-06 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/26/2021 11:05

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 12:56

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-06 H

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	847	ug/L	
HC ID: GRO						
Surrogate: Toluene-d8			80-120 %	109	%	
Surrogate: 4-Bromofluorobenzene			80-120 %	99.1	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-4-20212605
21E0352-06 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/26/2021 11:05

Instrument: FID4 Analyst: CTO

Analyzed: 06/09/2021 02:52

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0352-06 B 01

Preparation Batch: BJF0015

Sample Size: 500 mL

Prepared: 06/02/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.107	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	69.7	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-4-20212605
21E0352-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/26/2021 11:05

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 08:36

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-06 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	0.343	ug/L	
Manganese	7439-96-5	5	0.710	2.50	561	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/23/2021 23:28

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-06 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-4-20212605
21E0352-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/26/2021 11:05

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 08:36

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	5.82	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	0.0560	ug/L	J
Copper	7440-50-8	1	0.173	0.500	2.55	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	2.20	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.225	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	4.69	ug/L	J


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-4-20212605
21E0352-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/26/2021 11:05

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 08:23

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0352-07 A 02
	Preparation Batch: BJF0379	Filtration Batch: BJE0747
	Prepared: 06/15/2021	Filtration Date: 05/28/2021 15:25
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese, Dissolved	7439-96-5	5	0.710	2.50	571	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/23/2021 23:32

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0352-07 A 02
	Preparation Batch: BJF0379	Filtration Batch: BJE0747
	Prepared: 06/15/2021	Filtration Date: 05/28/2021 15:25
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-4-20212605
21E0352-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/26/2021 11:05

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 08:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-07 A 02

Preparation Batch: BJF0379

Sample Size: 25 mL

Filtration Batch: BJE0747

Prepared: 06/15/2021

Final Volume: 25 mL

Filtration Date: 05/28/2021 15:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	3.09	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	0.0310	ug/L	J
Copper, Dissolved	7440-50-8	1	0.173	0.500	1.03	ug/L	
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.87	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	3.40	ug/L	J


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-52-20212605
21E0352-08 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/26/2021 12:09

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 13:17

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-08 J

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	0.41	ug/L	
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	0.11	ug/L	J
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	2.43	ug/L	
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>					<i>80-129 %</i>	<i>115 %</i>	
<i>Surrogate: Toluene-d8</i>					<i>80-120 %</i>	<i>97.5 %</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>					<i>80-120 %</i>	<i>91.7 %</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					<i>80-120 %</i>	<i>104 %</i>	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-52-20212605
21E0352-08 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/26/2021 12:09

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 13:17

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-08 J

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	97.5	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	91.7	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

MW-52-20212605

21E0352-08 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/26/2021 12:09

Instrument: NT11 Analyst: VTS

Analyzed: 06/09/2021 16:40

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJF0019 Prepared: 06/02/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0352-08 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0059 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-08 D 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.002	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.001	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.001	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.079	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	ND	ug/L	U
Phenanthrene	85-01-8	1	0.001	0.010	ND	ug/L	U
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	56.7	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	56.4	%	
Surrogate: Fluoranthene-d10				57-120 %	65.6	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-52-20212605
21E0352-08 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/26/2021 12:09

Instrument: ECD7 Analyst: JGR

Analyzed: 06/08/2021 23:51

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJF0018 Prepared: 06/02/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0352-08 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0058 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-08 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0056 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-08 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0057 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-08 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	90.0	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	73.3	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	86.3	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	52.6	%	


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-52-20212605
21E0352-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/26/2021 12:09

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/23/2021 19:27

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-08 A 01

Preparation Batch: BJF0328

Sample Size: 25 mL

Prepared: 06/14/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	5	0.710	2.50	814	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-52-20212605
21E0352-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/26/2021 12:09

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 18:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-09 A 02

Preparation Batch: BJF0379

Sample Size: 25 mL

Filtration Batch: BJE0747

Prepared: 06/15/2021

Final Volume: 25 mL

Filtration Date: 05/28/2021 15:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	10	1.42	5.00	841	ug/L	D



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

MW-70-20212605

21E0352-10 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/26/2021 13:21

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 13:39

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-10 L

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	ND	ug/L	U
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	0.48	ug/L	
Benzene	71-43-2	1	0.05	0.20	ND	ug/L	U
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	ND	ug/L	U
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	ND	ug/L	U
m,p-Xylene	179601-23-1	1	0.14	0.40	ND	ug/L	U
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	ND	ug/L	U
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	118	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	97.1	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	93.2	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	104	%	


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Reported:
 14-Dec-2021 12:44

MW-70-20212605
21E0352-10 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/26/2021 13:21

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 13:39

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-10 L

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	ND	ug/L	U
<i>Surrogate: Toluene-d8</i>			80-120 %	97.1	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	93.2	%	



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

MW-70-20212605

21E0352-10 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/26/2021 13:21

Instrument: NT11 Analyst: VTS

Analyzed: 06/09/2021 17:12

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJF0019 Prepared: 06/02/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0352-10 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0059 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-10 F 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.007	ug/L	J
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.004	ug/L	J
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.003	ug/L	J
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	ND	ug/L	U
Dibenzofuran	132-64-9	1	0.002	0.010	0.002	ug/L	J
Fluorene	86-73-7	1	0.002	0.010	0.002	ug/L	J
Phenanthrene	85-01-8	1	0.001	0.010	0.003	ug/L	J
Anthracene	120-12-7	1	0.001	0.010	ND	ug/L	U
Carbazole	86-74-8	1	0.001	0.010	0.001	ug/L	J
Fluoranthene	206-44-0	1	0.002	0.010	ND	ug/L	U
Pyrene	129-00-0	1	0.001	0.010	ND	ug/L	U
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	ND	ug/L	U
Chrysene	218-01-9	1	0.0009	0.010	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	1	0.0005	0.010	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	1	0.003	0.010	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	1	0.002	0.010	ND	ug/L	U
Benzofluoranthenes, Total		1	0.004	0.010	ND	ug/L	U
Benzo(a)pyrene	50-32-8	1	0.002	0.010	ND	ug/L	U
Perylene	1985-5-0	1	0.006	0.010	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.001	0.010	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	1	0.001	0.010	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	1	0.001	0.010	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %	65.3	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	60.1	%	
Surrogate: Fluoranthene-d10				57-120 %	73.1	%	


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-70-20212605
21E0352-10 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/26/2021 13:21

Instrument: FID4 Analyst: CTO

Analyzed: 06/09/2021 03:13

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0352-10 D 01

Preparation Batch: BJF0015

Sample Size: 500 mL

Prepared: 06/02/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	ND	mg/L	U
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
<i>Surrogate: o-Terphenyl</i>			<i>50-150 %</i>	<i>69.4</i>	<i>%</i>	


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 Project Manager: Meg Strong

Reported:
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MW-70-20212605
21E0352-10 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/26/2021 13:21

Instrument: ECD7 Analyst: JGR

Analyzed: 06/09/2021 00:12

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJF0018 Prepared: 06/02/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0352-10 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0058 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-10 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0056 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-10 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0057 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-10 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
<i>Surrogate: Decachlorobiphenyl</i>				29-120 %	68.1	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	63.5	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	66.1	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	42.9	%	


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-70-20212605
21E0352-10 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/26/2021 13:21

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 09:07

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-10 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	10	1.14	5.00	272	ug/L	D
Chromium	7440-47-3	10	2.60	5.00	7.59	ug/L	D
Cobalt	7440-48-4	10	0.173	2.00	0.450	ug/L	J, D
Iron	7439-89-6	10	182	360	53200	ug/L	D
Lead	7439-92-1	10	0.513	1.00	ND	ug/L	U
Manganese	7439-96-5	10	1.42	5.00	2170	ug/L	D
Vanadium	7440-62-2	10	0.556	2.00	3.42	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/24/2021 00:27

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-10 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	10	0.220	2.00	0.400	ug/L	J, D


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-70-20212605
21E0352-10 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/26/2021 13:21

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 09:07

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-10 A 01

Preparation Batch: BJF0328

Sample Size: 25 mL

Prepared: 06/14/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	10	0.373	2.00	0.940	ug/L	J, D
Cadmium	7440-43-9	10	0.300	1.00	ND	ug/L	U
Copper	7440-50-8	10	1.73	5.00	ND	ug/L	U
Nickel	7440-02-0	10	0.792	5.00	2.20	ug/L	J, D
Selenium	7782-49-2	10	1.79	5.00	3.91	ug/L	J, D
Zinc	7440-66-6	10	29.2	60.0	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-70-20212605
21E0352-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/26/2021 13:21

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 07:21

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0352-11 A 02
	Preparation Batch: BJF0379	Filtration Batch: BJE0747
	Prepared: 06/15/2021	Filtration Date: 05/28/2021 15:25
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium, Dissolved	7440-39-3	10	1.14	5.00	177	ug/L	D
Chromium, Dissolved	7440-47-3	10	2.60	5.00	6.14	ug/L	D
Cobalt, Dissolved	7440-48-4	10	0.173	2.00	0.290	ug/L	J, D
Iron, Dissolved	7439-89-6	10	182	360	25700	ug/L	D
Lead, Dissolved	7439-92-1	10	0.513	1.00	ND	ug/L	U
Manganese, Dissolved	7439-96-5	10	1.42	5.00	2160	ug/L	D
Vanadium, Dissolved	7440-62-2	10	0.556	2.00	2.77	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/24/2021 01:05

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0352-11 A 02
	Preparation Batch: BJF0379	Filtration Batch: BJE0747
	Prepared: 06/15/2021	Filtration Date: 05/28/2021 15:25
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver, Dissolved	7440-22-4	10	0.220	2.00	ND	ug/L	U


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-70-20212605
21E0352-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/26/2021 13:21

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 07:21

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-11 A 02

Preparation Batch: BJF0379

Sample Size: 25 mL

Filtration Batch: BJE0747

Prepared: 06/15/2021

Final Volume: 25 mL

Filtration Date: 05/28/2021 15:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	10	0.373	2.00	0.660	ug/L	J, D
Cadmium, Dissolved	7440-43-9	10	0.300	1.00	ND	ug/L	U
Copper, Dissolved	7440-50-8	10	1.73	5.00	ND	ug/L	U
Nickel, Dissolved	7440-02-0	10	0.792	5.00	ND	ug/L	U
Selenium, Dissolved	7782-49-2	10	1.79	5.00	2.75	ug/L	J, D
Zinc, Dissolved	7440-66-6	10	29.2	60.0	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-69-20212605
21E0352-12 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/26/2021 14:35

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 14:01

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-12 L

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Vinyl Chloride	75-01-4	1	0.08	0.20	0.21	ug/L	
1,1-Dichloroethene	75-35-4	1	0.08	0.20	ND	ug/L	U
trans-1,2-Dichloroethene	156-60-5	1	0.07	0.20	ND	ug/L	U
cis-1,2-Dichloroethene	156-59-2	1	0.08	0.20	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	2.02	ug/L	
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.19	ug/L	J
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	0.06	ug/L	J
m,p-Xylene	179601-23-1	1	0.14	0.40	0.22	ug/L	J
o-Xylene	95-47-6	1	0.08	0.20	ND	ug/L	U
Xylenes, total	1330-20-7	1	0.22	0.60	0.27	ug/L	J
<i>Surrogate: 1,2-Dichloroethane-d4</i>					<i>80-129 %</i>	<i>108</i>	<i>%</i>
<i>Surrogate: Toluene-d8</i>					<i>80-120 %</i>	<i>99.7</i>	<i>%</i>
<i>Surrogate: 4-Bromofluorobenzene</i>					<i>80-120 %</i>	<i>96.2</i>	<i>%</i>
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					<i>80-120 %</i>	<i>102</i>	<i>%</i>


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 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-69-20212605
21E0352-12 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/26/2021 14:35

Instrument: NT2 Analyst: LH

Analyzed: 06/02/2021 14:01

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0352-12 L

Preparation Batch: BJF0045

Sample Size: 10 mL

Prepared: 06/02/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Gasoline Range Organics (Tol-Nap)	GRO	1	100	371	ug/L	
HC ID: GRO						
Surrogate: Toluene-d8			80-120 %	99.7	%	
Surrogate: 4-Bromofluorobenzene			80-120 %	96.2	%	



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

MW-69-20212605

21E0352-12 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/26/2021 14:35

Instrument: NT10 Analyst: VTS

Analyzed: 06/08/2021 20:32

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0352-12 C 01

Preparation Batch: BJF0020

Sample Size: 1000 mL

Prepared: 06/02/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
1,4-Dichlorobenzene	106-46-7	1	0.03	0.2	5.0	ug/L	
1,2-Dichlorobenzene	95-50-1	1	0.03	0.2	1.3	ug/L	
2,4-Dimethylphenol	105-67-9	1	0.3	1.0	ND	ug/L	U
Benzoic acid	65-85-0	1	0.1	2.0	ND	ug/L	U
N-Nitrosodiphenylamine	86-30-6	1	0.03	0.2	ND	ug/L	U
Pentachlorophenol	87-86-5	1	0.1	1.0	ND	ug/L	U
Di-n-Butylphthalate	84-74-2	1	0.05	0.2	ND	ug/L	U
Butylbenzylphthalate	85-68-7	1	0.07	0.2	ND	ug/L	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	0.2	0.2	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

30.8

%

Surrogate: Phenol-d5

30-160 %

19.8

%

*

Surrogate: 2-Chlorophenol-d4

30-160 %

54.4

%

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

44.4

%

Surrogate: Nitrobenzene-d5

30-160 %

64.3

%

Surrogate: 2-Fluorobiphenyl

30-160 %

55.7

%

Surrogate: 2,4,6-Tribromophenol

30-160 %

99.3

%

Q

Surrogate: p-Terphenyl-d14

30-160 %

52.8

%



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

MW-69-20212605

21E0352-12 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/26/2021 14:35

Instrument: FID4 Analyst: CTO

Analyzed: 06/09/2021 03:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0352-12 D 01

Preparation Batch: BJF0015

Sample Size: 500 mL

Prepared: 06/02/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	1.23	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	0.297	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	73.4	%	



Analytical Report

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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

MW-69-20212605

21E0352-12 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/26/2021 14:35

Instrument: ECD7 Analyst: JGR

Analyzed: 06/09/2021 00:32

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJF0018 Prepared: 06/02/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0352-12 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJF0058 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-12 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJF0056 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-12 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJF0057 Cleaned: 07-Jun-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0352-12 B 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.002	0.010	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.002	0.010	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.002	0.010	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.002	0.010	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.002	0.010	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1262	37324-23-5	1	0.003	0.010	ND	ug/L	U
Aroclor 1268	11100-14-4	1	0.003	0.010	ND	ug/L	U
Surrogate: Decachlorobiphenyl				29-120 %	89.1	%	
Surrogate: Tetrachlorometaxylene				32-120 %	73.0	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	85.3	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	70.0	%	



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

MW-69-20212605

21E0352-12 (Water)

Metals and Metallic Compounds

Method: [CALC]

Sampled: 05/26/2021 14:35

Instrument: [CALC] Analyst: MCB

Analyzed: 06/17/2021 18:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: [CALC]

Extract ID: 21E0352-12

Preparation Batch: [CALC]

Prepared: 06/14/2021

Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness		10	1.33	191	mg/L CaCO ₃	


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-69-20212605
21E0352-12 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/26/2021 14:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 18:01

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-12 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	1	0.114	0.500	15.9	ug/L	
Chromium	7440-47-3	1	0.260	0.500	1.48	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	0.368	ug/L	
Iron	7439-89-6	1	18.2	36.0	23400	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0720	ug/L	J
Magnesium	7439-95-4	1	2.22	20.0	14800	ug/L	
Manganese	7439-96-5	1	0.142	0.500	1350	ug/L	
Vanadium	7440-62-2	1	0.0556	0.200	7.53	ug/L	

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/23/2021 23:37

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJF0328 Sample Size: 25 mL
 Prepared: 06/14/2021 Final Volume: 25 mL

Extract ID: 21E0352-12 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-69-20212605
21E0352-12 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/26/2021 14:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 18:01

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-12 A 01

Preparation Batch: BJF0328

Sample Size: 25 mL

Prepared: 06/14/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	1.12	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	0.448	ug/L	J
Nickel	7440-02-0	1	0.0792	0.500	0.867	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.221	ug/L	J
Zinc	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project Manager: Meg Strong

Reported:
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MW-69-20212605
21E0352-12RE1 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/26/2021 14:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 18:38

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0352-12RE1 A 01
	Preparation Batch: BJF0328	Sample Size: 25 mL
	Prepared: 06/14/2021	Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese	7439-96-5	10	1.42	5.00	1670	ug/L	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-69-20212605
21E0352-13 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/26/2021 14:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 08:59

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-13 A 02

Preparation Batch: BJF0379

Sample Size: 25 mL

Filtration Batch: BJE0747

Prepared: 06/15/2021

Final Volume: 25 mL

Filtration Date: 05/28/2021 15:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	3.65	ug/L	
Chromium, Dissolved	7440-47-3	2	0.520	1.00	ND	ug/L	U
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.281	ug/L	
Iron, Dissolved	7439-89-6	2	36.4	72.0	3860	ug/L	D
Lead, Dissolved	7439-92-1	2	0.103	0.200	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	2	0.111	0.400	0.404	ug/L	D


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-69-20212605
21E0352-13 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/26/2021 14:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/17/2021 08:59

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Extract ID: 21E0352-13 A 02

Preparation Batch: BJF0379

Sample Size: 25 mL

Filtration Batch: BJE0747

Prepared: 06/15/2021

Final Volume: 25 mL

Filtration Date: 05/28/2021 15:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.583	ug/L	
Cadmium, Dissolved	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper, Dissolved	7440-50-8	1	0.173	0.500	ND	ug/L	U
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.591	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	ND	ug/L	U
Zinc, Dissolved	7440-66-6	1	2.92	6.00	ND	ug/L	U


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

MW-69-20212605
21E0352-13RE1 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/26/2021 14:35

Instrument: ICPMS1 Analyst: MCB

Analyzed: 06/18/2021 07:00

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0352-13RE1 A 02
	Preparation Batch: BJF0379	Filtration Batch: BJE0747
	Prepared: 06/15/2021	Filtration Date: 05/28/2021 15:25
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Manganese, Dissolved	7439-96-5	10	1.42	5.00	1580	ug/L	D



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJF0045 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0045-BLK1)		Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 09:45								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.85		ug/L	5.00		96.9	80-120			
Surrogate: 4-Bromofluorobenzene	4.89		ug/L	5.00		97.9	80-120			

Blank (BJF0045-BLK2)		Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 09:45								
Vinyl Chloride	ND	0.08	0.20	ug/L						U
1,1-Dichloroethene	ND	0.08	0.20	ug/L						U
trans-1,2-Dichloroethene	ND	0.07	0.20	ug/L						U
cis-1,2-Dichloroethene	ND	0.08	0.20	ug/L						U
Benzene	ND	0.05	0.20	ug/L						U
Trichloroethene	ND	0.07	0.20	ug/L						U
Toluene	ND	0.05	0.20	ug/L						U
Tetrachloroethene	ND	0.09	0.20	ug/L						U
Ethylbenzene	ND	0.05	0.20	ug/L						U
m,p-Xylene	ND	0.14	0.40	ug/L						U
o-Xylene	ND	0.08	0.20	ug/L						U
Xylenes, total	ND	0.22	0.60	ug/L						U
Methyl tert-butyl Ether	ND	0.14	0.50	ug/L						U
Surrogate: 1,2-Dichloroethane-d4	5.37		ug/L	5.00		107	80-129			
Surrogate: Toluene-d8	4.85		ug/L	5.00		96.9	80-120			
Surrogate: 4-Bromofluorobenzene	4.89		ug/L	5.00		97.9	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.07		ug/L	5.00		101	80-120			

LCS (BJF0045-BS1)		Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 07:20								
Gasoline Range Organics (Tol-Nap)	911	100	ug/L	1000		91.1	72-128			
Surrogate: Toluene-d8	5.01		ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.14		ug/L	5.00		103	80-120			

LCS (BJF0045-BS2)		Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 07:41								
Vinyl Chloride	8.79	0.08	0.20	ug/L	10.0	87.9	66-133			
1,1-Dichloroethene	9.17	0.08	0.20	ug/L	10.0	91.7	69-135			
trans-1,2-Dichloroethene	9.43	0.07	0.20	ug/L	10.0	94.3	78-128			
cis-1,2-Dichloroethene	10.3	0.08	0.20	ug/L	10.0	103	80-121			
Benzene	10.3	0.05	0.20	ug/L	10.0	103	80-120			


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJF0045 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0045-BS2)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 07:41					
Trichloroethene	9.85	0.07	0.20	ug/L	10.0		98.5	80-120			
Toluene	10.0	0.05	0.20	ug/L	10.0		100	80-120			
Tetrachloroethene	9.51	0.09	0.20	ug/L	10.0		95.1	80-120			
Ethylbenzene	10.2	0.05	0.20	ug/L	10.0		102	80-120			
m,p-Xylene	21.2	0.14	0.40	ug/L	20.0		106	80-121			
o-Xylene	9.58	0.08	0.20	ug/L	10.0		95.8	80-121			
Xylenes, total	30.8	0.22	0.60	ug/L	30.0		103	76-127			
Methyl tert-butyl Ether	10.3	0.14	0.50	ug/L	10.0		103	71-132			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.97			ug/L	5.00		99.5	80-129			
<i>Surrogate: Toluene-d8</i>	5.06			ug/L	5.00		101	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.23			ug/L	5.00		105	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	5.04			ug/L	5.00		101	80-120			
LCS Dup (BJF0045-BSD1)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 08:02					
Gasoline Range Organics (Tol-Nap)	956		100	ug/L	1000		95.6	72-128	4.80	30	
<i>Surrogate: Toluene-d8</i>	5.05			ug/L	5.00		101	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.13			ug/L	5.00		103	80-120			
LCS Dup (BJF0045-BSD2)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 08:22					
Vinyl Chloride	8.85	0.08	0.20	ug/L	10.0		88.5	66-133	0.66	30	
1,1-Dichloroethene	9.11	0.08	0.20	ug/L	10.0		91.1	69-135	0.61	30	
trans-1,2-Dichloroethene	9.35	0.07	0.20	ug/L	10.0		93.5	78-128	0.89	30	
cis-1,2-Dichloroethene	10.2	0.08	0.20	ug/L	10.0		102	80-121	0.60	30	
Benzene	10.1	0.05	0.20	ug/L	10.0		101	80-120	1.42	30	
Trichloroethene	9.56	0.07	0.20	ug/L	10.0		95.6	80-120	2.96	30	
Toluene	9.82	0.05	0.20	ug/L	10.0		98.2	80-120	2.12	30	
Tetrachloroethene	9.00	0.09	0.20	ug/L	10.0		90.0	80-120	5.50	30	
Ethylbenzene	9.83	0.05	0.20	ug/L	10.0		98.3	80-120	3.98	30	
m,p-Xylene	20.6	0.14	0.40	ug/L	20.0		103	80-121	2.95	30	
o-Xylene	9.42	0.08	0.20	ug/L	10.0		94.2	80-121	1.68	30	
Xylenes, total	30.0	0.22	0.60	ug/L	30.0		100	76-127	2.55	30	
Methyl tert-butyl Ether	10.5	0.14	0.50	ug/L	10.0		105	71-132	2.34	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	5.00			ug/L	5.00		100	80-129			
<i>Surrogate: Toluene-d8</i>	5.10			ug/L	5.00		102	80-120			



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJF0045 - EPA 5030C (Purge and Trap)

Instrument: NT2 Analyst: LH

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJF0045-BSD2)					Prepared: 02-Jun-2021		Analyzed: 02-Jun-2021 08:22				
Surrogate: 4-Bromofluorobenzene	5.22			ug/L	5.00		104	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.00			ug/L	5.00		100	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJF0020 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0020-BLK1)						Prepared: 02-May-2021 Analyzed: 08-Jun-2021 14:53					
1,4-Dichlorobenzene	ND	0.03	0.2	ug/L							U
1,2-Dichlorobenzene	ND	0.03	0.2	ug/L							U
2,4-Dimethylphenol	ND	0.3	1.0	ug/L							U
Benzoic acid	ND	0.1	2.0	ug/L							U
N-Nitrosodiphenylamine	ND	0.03	0.2	ug/L							U
Pentachlorophenol	ND	0.1	1.0	ug/L							U
Di-n-Butylphthalate	ND	0.05	0.2	ug/L							U
Butylbenzylphthalate	ND	0.07	0.2	ug/L							U
bis(2-Ethylhexyl)phthalate	ND	0.2	0.2	ug/L							U
<i>Surrogate: 2-Fluorophenol</i>	3.47			ug/L	7.50		46.3	30-160			
<i>Surrogate: Phenol-d5</i>	2.14			ug/L	7.50		28.5	30-160			*
<i>Surrogate: 2-Chlorophenol-d4</i>	5.55			ug/L	7.50		74.0	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	3.09			ug/L	5.00		61.8	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	4.32			ug/L	5.00		86.3	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	3.47			ug/L	5.00		69.4	30-160			
<i>Surrogate: 2,4,6-Tribromophenol</i>	9.51			ug/L	7.50		127	30-160			Q
<i>Surrogate: p-Terphenyl-d14</i>	3.85			ug/L	5.00		77.0	30-160			
LCS (BJF0020-BS1)						Prepared: 02-May-2021 Analyzed: 08-Jun-2021 15:31					
1,4-Dichlorobenzene	2.9	0.03	0.2	ug/L	5.00		58.7	30-160			
1,2-Dichlorobenzene	3.2	0.03	0.2	ug/L	5.00		64.2	30-160			
2,4-Dimethylphenol	10.2	0.3	1.0	ug/L	13.0		78.8	30-160			
Benzoic acid	8.8	0.1	2.0	ug/L	23.0		38.2	30-160			
N-Nitrosodiphenylamine	3.6	0.03	0.2	ug/L	5.00		72.1	30-160			
Pentachlorophenol	10.5	0.1	1.0	ug/L	13.0		81.1	30-160			
Di-n-Butylphthalate	3.8	0.05	0.2	ug/L	5.00		76.7	30-160			
Butylbenzylphthalate	4.4	0.07	0.2	ug/L	5.00		87.0	30-160			
bis(2-Ethylhexyl)phthalate	4.1	0.2	0.2	ug/L	5.00		82.1	30-160			
<i>Surrogate: 2-Fluorophenol</i>	3.81			ug/L	7.50		50.8	30-160			
<i>Surrogate: Phenol-d5</i>	2.66			ug/L	7.50		35.5	30-160			
<i>Surrogate: 2-Chlorophenol-d4</i>	6.00			ug/L	7.50		80.0	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	3.18			ug/L	5.00		63.6	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	4.76			ug/L	5.00		95.1	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	3.83			ug/L	5.00		76.7	30-160			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJF0020 - EPA 3510C SepF

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0020-BS1)						Prepared: 02-May-2021 Analyzed: 08-Jun-2021 15:31					
Surrogate: 2,4,6-Tribromophenol	9.82			ug/L	7.50		131	30-160			Q
Surrogate: p-Terphenyl-d14	4.09			ug/L	5.00		81.7	30-160			
LCS Dup (BJF0020-BSD1)						Prepared: 02-May-2021 Analyzed: 08-Jun-2021 16:09					
1,4-Dichlorobenzene	3.4	0.03	0.2	ug/L	5.00		67.4	30-160	13.70	30	
1,2-Dichlorobenzene	3.8	0.03	0.2	ug/L	5.00		75.6	30-160	16.40	30	
2,4-Dimethylphenol	10.6	0.3	1.0	ug/L	13.0		81.6	30-160	3.40	30	
Benzoic acid	9.3	0.1	2.0	ug/L	23.0		40.2	30-160	5.32	30	
N-Nitrosodiphenylamine	4.1	0.03	0.2	ug/L	5.00		82.3	30-160	13.10	30	
Pentachlorophenol	11.7	0.1	1.0	ug/L	13.0		90.3	30-160	10.80	30	
Di-n-Butylphthalate	4.4	0.05	0.2	ug/L	5.00		88.5	30-160	14.30	30	
Butylbenzylphthalate	4.9	0.07	0.2	ug/L	5.00		97.7	30-160	11.50	30	
bis(2-Ethylhexyl)phthalate	4.8	0.2	0.2	ug/L	5.00		95.1	30-160	14.80	30	
Surrogate: 2-Fluorophenol	3.97			ug/L	7.50		52.9	30-160			
Surrogate: Phenol-d5	2.82			ug/L	7.50		37.6	30-160			
Surrogate: 2-Chlorophenol-d4	6.24			ug/L	7.50		83.2	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.27			ug/L	5.00		65.4	30-160			
Surrogate: Nitrobenzene-d5	4.78			ug/L	5.00		95.6	30-160			
Surrogate: 2-Fluorobiphenyl	3.91			ug/L	5.00		78.3	30-160			
Surrogate: 2,4,6-Tribromophenol	10.4			ug/L	7.50		138	30-160			Q
Surrogate: p-Terphenyl-d14	4.31			ug/L	5.00		86.1	30-160			


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 400 N 34th St., Suite 100
 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJF0019 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0019-BLK1)						Prepared: 02-Jun-2021 Analyzed: 09-Jun-2021 12:20					
Naphthalene	0.002	0.001	0.010	ug/L							J
2-Methylnaphthalene	0.001	0.001	0.010	ug/L							J
1-Methylnaphthalene	0.001	0.0009	0.010	ug/L							J
Acenaphthylene	ND	0.002	0.010	ug/L							U
Acenaphthene	ND	0.003	0.010	ug/L							U
Dibenzofuran	ND	0.002	0.010	ug/L							U
Fluorene	ND	0.002	0.010	ug/L							U
Phenanthrene	ND	0.001	0.010	ug/L							U
Anthracene	ND	0.001	0.010	ug/L							U
Carbazole	ND	0.001	0.010	ug/L							U
Fluoranthene	ND	0.002	0.010	ug/L							U
Pyrene	ND	0.001	0.010	ug/L							U
Benzo(a)anthracene	ND	0.0008	0.010	ug/L							U
Chrysene	ND	0.0009	0.010	ug/L							U
Benzo(b)fluoranthene	ND	0.0005	0.010	ug/L							U
Benzo(k)fluoranthene	ND	0.003	0.010	ug/L							U
Benzo(j)fluoranthene	ND	0.002	0.010	ug/L							U
Benzofluoranthenes, Total	ND	0.004	0.010	ug/L							U
Benzo(a)pyrene	ND	0.002	0.010	ug/L							U
Perylene	ND	0.006	0.010	ug/L							U
Indeno(1,2,3-cd)pyrene	ND	0.001	0.010	ug/L							U
Dibenzo(a,h)anthracene	ND	0.001	0.010	ug/L							U
Benzo(g,h,i)perylene	ND	0.001	0.010	ug/L							U
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.176			ug/L	0.300		58.7	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.174			ug/L	0.300		57.9	29-120			
<i>Surrogate: Fluoranthene-d10</i>	0.219			ug/L	0.300		72.9	57-120			
LCS (BJF0019-BS1)						Prepared: 02-Jun-2021 Analyzed: 09-Jun-2021 12:53					
Naphthalene	0.197	0.001	0.010	ug/L	0.300		65.8	37-120			
2-Methylnaphthalene	0.194	0.001	0.010	ug/L	0.300		64.8	37-120			
1-Methylnaphthalene	0.196	0.0009	0.010	ug/L	0.300		65.5	29-120			
Acenaphthylene	0.188	0.002	0.010	ug/L	0.300		62.6	41-120			
Acenaphthene	0.202	0.003	0.010	ug/L	0.300		67.3	41-120			
Dibenzofuran	0.194	0.002	0.010	ug/L	0.300		64.8	38-120			
Fluorene	0.200	0.002	0.010	ug/L	0.300		66.7	43-120			


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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJF0019 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0019-BS1)						Prepared: 02-Jun-2021 Analyzed: 09-Jun-2021 12:53					
Phenanthrene	0.201	0.001	0.010	ug/L	0.300		67.1	41-120			
Anthracene	0.187	0.001	0.010	ug/L	0.300		62.4	40-120			
Carbazole	0.210	0.001	0.010	ug/L	0.300		69.9	30-160			
Fluoranthene	0.213	0.002	0.010	ug/L	0.300		70.9	45-120			
Pyrene	0.209	0.001	0.010	ug/L	0.300		69.6	41-120			
Benzo(a)anthracene	0.210	0.0008	0.010	ug/L	0.300		69.9	42-120			
Chrysene	0.198	0.0009	0.010	ug/L	0.300		66.1	44-120			
Benzo(b)fluoranthene	0.219	0.0005	0.010	ug/L	0.300		73.0	44-120			
Benzo(k)fluoranthene	0.208	0.003	0.010	ug/L	0.300		69.4	50-120			
Benzo(j)fluoranthene	0.195	0.002	0.010	ug/L	0.300		64.9	39-160			
Benzofluoranthenes, Total	0.622	0.004	0.010	ug/L	0.900		69.1	46-120			
Benzo(a)pyrene	0.186	0.002	0.010	ug/L	0.300		61.9	35-120			
Perylene	0.155	0.006	0.010	ug/L	0.300		51.5	30-160			
Indeno(1,2,3-cd)pyrene	0.187	0.001	0.010	ug/L	0.300		62.5	37-120			
Dibenzo(a,h)anthracene	0.182	0.001	0.010	ug/L	0.300		60.7	34-120			
Benzo(g,h,i)perylene	0.219	0.001	0.010	ug/L	0.300		73.1	38-120			
Surrogate: 2-Methylnaphthalene-d10	0.198			ug/L	0.300		66.1	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.189			ug/L	0.300		63.0	29-120			
Surrogate: Fluoranthene-d10	0.219			ug/L	0.300		72.8	57-120			
LCS Dup (BJF0019-BSD1)						Prepared: 02-Jun-2021 Analyzed: 09-Jun-2021 13:25					
Naphthalene	0.203	0.001	0.010	ug/L	0.300		67.8	37-120	3.06	30	
2-Methylnaphthalene	0.201	0.001	0.010	ug/L	0.300		67.0	37-120	3.38	30	
1-Methylnaphthalene	0.204	0.0009	0.010	ug/L	0.300		67.9	29-120	3.66	30	
Acenaphthylene	0.198	0.002	0.010	ug/L	0.300		66.0	41-120	5.14	30	
Acenaphthene	0.210	0.003	0.010	ug/L	0.300		70.2	41-120	4.19	30	
Dibenzofuran	0.204	0.002	0.010	ug/L	0.300		68.1	38-120	5.01	30	
Fluorene	0.211	0.002	0.010	ug/L	0.300		70.4	43-120	5.39	30	
Phenanthrene	0.212	0.001	0.010	ug/L	0.300		70.7	41-120	5.13	30	
Anthracene	0.202	0.001	0.010	ug/L	0.300		67.4	40-120	7.70	30	
Carbazole	0.222	0.001	0.010	ug/L	0.300		74.0	30-160	5.73	30	
Fluoranthene	0.227	0.002	0.010	ug/L	0.300		75.5	45-120	6.40	30	
Pyrene	0.219	0.001	0.010	ug/L	0.300		72.9	41-120	4.68	30	
Benzo(a)anthracene	0.222	0.0008	0.010	ug/L	0.300		73.9	42-120	5.50	30	
Chrysene	0.207	0.0009	0.010	ug/L	0.300		69.1	44-120	4.42	30	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJF0019 - EPA 3510C SepF

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJF0019-BS01)						Prepared: 02-Jun-2021 Analyzed: 09-Jun-2021 13:25					
Benzo(b)fluoranthene	0.233	0.0005	0.010	ug/L	0.300		77.7	44-120	6.20	30	
Benzo(k)fluoranthene	0.218	0.003	0.010	ug/L	0.300		72.7	50-120	4.56	30	
Benzo(j)fluoranthene	0.202	0.002	0.010	ug/L	0.300		67.4	39-160	3.88	30	
Benzofluoranthenes, Total	0.654	0.004	0.010	ug/L	0.900		72.6	46-120	4.93	30	
Benzo(a)pyrene	0.202	0.002	0.010	ug/L	0.300		67.3	35-120	8.31	30	
Perylene	0.193	0.006	0.010	ug/L	0.300		64.3	30-160	22.10	30	
Indeno(1,2,3-cd)pyrene	0.195	0.001	0.010	ug/L	0.300		65.1	37-120	4.07	30	
Dibenzo(a,h)anthracene	0.189	0.001	0.010	ug/L	0.300		63.1	34-120	3.85	30	
Benzo(g,h,i)perylene	0.228	0.001	0.010	ug/L	0.300		76.1	38-120	4.12	30	
Surrogate: 2-Methylnaphthalene-d10	0.197			ug/L	0.300		65.8	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.190			ug/L	0.300		63.5	29-120			
Surrogate: Fluoranthene-d10	0.225			ug/L	0.300		75.0	57-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJF0015 - EPA 3510C SepF

Instrument: FID4 Analyst: CTO

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0015-BLK1)										
					Prepared: 02-Jun-2021 Analyzed: 09-Jun-2021 01:27					
Diesel Range Organics (C12-C24)	ND	0.100	mg/L							U
Motor Oil Range Organics (C24-C38)	ND	0.200	mg/L							U
<i>Surrogate: o-Terphenyl</i>	0.168		mg/L	0.225		74.8	50-150			
LCS (BJF0015-BS1)										
					Prepared: 02-Jun-2021 Analyzed: 09-Jun-2021 01:48					
Diesel Range Organics (C12-C24)	2.41	0.100	mg/L	3.00		80.5	56-120			
<i>Surrogate: o-Terphenyl</i>	0.193		mg/L	0.225		85.8	50-150			
LCS Dup (BJF0015-BSD1)										
					Prepared: 02-Jun-2021 Analyzed: 09-Jun-2021 02:09					
Diesel Range Organics (C12-C24)	2.14	0.100	mg/L	3.00		71.4	56-120	11.90	30	
<i>Surrogate: o-Terphenyl</i>	0.170		mg/L	0.225		75.7	50-150			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC

Aroclor PCB - Quality Control

Batch BJF0018 - EPA 3510C SepF

Instrument: ECD7 Analyst: JGR

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0018-BLK1)						Prepared: 02-Jun-2021 Analyzed: 08-Jun-2021 20:03					
Aroclor 1016	ND	0.002	0.010	ug/L							U
Aroclor 1221	ND	0.002	0.010	ug/L							U
Aroclor 1232	ND	0.002	0.010	ug/L							U
Aroclor 1242	ND	0.002	0.010	ug/L							U
Aroclor 1248	ND	0.002	0.010	ug/L							U
Aroclor 1254	ND	0.002	0.010	ug/L							U
Aroclor 1260	ND	0.003	0.010	ug/L							U
Aroclor 1262	ND	0.003	0.010	ug/L							U
Aroclor 1268	ND	0.003	0.010	ug/L							U
Surrogate: Decachlorobiphenyl	0.0188			ug/L	0.0200		94.2	29-120			
Surrogate: Tetrachlorometaxylene	0.0173			ug/L	0.0200		86.7	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0165			ug/L	0.0200		82.4	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0123			ug/L	0.0200		61.4	32-120			
LCS (BJF0018-BS1)						Prepared: 02-Jun-2021 Analyzed: 08-Jun-2021 20:24					
Aroclor 1016	0.052	0.002	0.010	ug/L	0.0500		105	54-120			
Aroclor 1260	0.058	0.003	0.010	ug/L	0.0500		116	51-128			
Surrogate: Decachlorobiphenyl	0.0191			ug/L	0.0200		95.7	29-120			
Surrogate: Tetrachlorometaxylene	0.0178			ug/L	0.0200		89.1	32-120			PI
Surrogate: Decachlorobiphenyl [2C]	0.0181			ug/L	0.0200		90.4	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0119			ug/L	0.0200		59.5	32-120			PI
LCS Dup (BJF0018-BSD1)						Prepared: 02-Jun-2021 Analyzed: 08-Jun-2021 20:45					
Aroclor 1016	0.046	0.002	0.010	ug/L	0.0500		92.6	54-120	12.30	30	
Aroclor 1260	0.051	0.003	0.010	ug/L	0.0500		101	51-128	13.60	30	
Surrogate: Decachlorobiphenyl	0.0170			ug/L	0.0200		85.2	29-120			
Surrogate: Tetrachlorometaxylene	0.0160			ug/L	0.0200		79.9	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0158			ug/L	0.0200		79.2	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0109			ug/L	0.0200		54.6	32-120			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0328 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0328-BLK1)						Prepared: 14-Jun-2021 Analyzed: 14-Jun-2021 21:12						
Barium	135	ND	0.114	0.500	ug/L							U
Barium	137	0.0840	0.0765	0.500	ug/L							J
Chromium	52	ND	0.260	0.500	ug/L							U
Chromium	53	ND	0.239	0.500	ug/L							U
Lead	208	ND	0.0513	0.100	ug/L							U
Manganese	55	ND	0.142	0.500	ug/L							U
Silver	107	ND	0.0220	0.200	ug/L							U
Arsenic	75a	ND	0.0373	0.200	ug/L							U
Cadmium	111	ND	0.0300	0.100	ug/L							U
Cadmium	114	ND	0.0400	0.100	ug/L							U
Copper	63	ND	0.173	0.500	ug/L							U
Copper	65	ND	0.350	0.500	ug/L							U
Nickel	60	ND	0.0792	0.500	ug/L							U
Nickel	62	ND	0.220	0.500	ug/L							U
Zinc	66	ND	2.92	6.00	ug/L							U
Zinc	67	ND	0.940	6.00	ug/L							U
Blank (BJF0328-BLK2)						Prepared: 14-Jun-2021 Analyzed: 16-Jun-2021 20:46						
Cobalt	59	ND	0.0173	0.200	ug/L							U
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U
Vanadium	51a	ND	0.0556	0.200	ug/L							U
Vanadium	51b	ND	0.0521	0.200	ug/L							U
Selenium	78	ND	0.179	0.500	ug/L							U
LCS (BJF0328-BS1)						Prepared: 14-Jun-2021 Analyzed: 14-Jun-2021 21:16						
Barium	135	23.4	0.114	0.500	ug/L	25.0		93.8	80-120			
Barium	137	23.2	0.0765	0.500	ug/L	25.0		92.8	80-120			
Chromium	52	25.0	0.260	0.500	ug/L	25.0		100	80-120			
Chromium	53	24.6	0.239	0.500	ug/L	25.0		98.3	80-120			
Lead	208	24.9	0.0513	0.100	ug/L	25.0		99.8	80-120			
Manganese	55	25.4	0.142	0.500	ug/L	25.0		102	80-120			
Silver	107	24.0	0.0220	0.200	ug/L	25.0		95.8	80-120			
Arsenic	75a	23.9	0.0373	0.200	ug/L	25.0		95.4	80-120			
Cadmium	111	24.8	0.0300	0.100	ug/L	25.0		99.2	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0328 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0328-BS1)						Prepared: 14-Jun-2021 Analyzed: 14-Jun-2021 21:16						
Cadmium	114	25.0	0.0400	0.100	ug/L	25.0		100	80-120			
Copper	63	24.9	0.173	0.500	ug/L	25.0		99.4	80-120			
Copper	65	24.7	0.350	0.500	ug/L	25.0		98.8	80-120			
Nickel	60	24.5	0.0792	0.500	ug/L	25.0		97.9	80-120			
Nickel	62	24.7	0.220	0.500	ug/L	25.0		98.8	80-120			
Zinc	66	77.0	2.92	6.00	ug/L	80.0		96.2	80-120			
Zinc	67	75.3	0.940	6.00	ug/L	80.0		94.1	80-120			
LCS (BJF0328-BS2)						Prepared: 14-Jun-2021 Analyzed: 16-Jun-2021 20:51						
Cobalt	59	24.2	0.0173	0.200	ug/L	25.0		96.6	80-120			
Iron	54	5320	18.2	36.0	ug/L	5000		106	80-120			
Iron	57	5300	6.63	36.0	ug/L	5000		106	80-120			
Vanadium	51a	24.0	0.0556	0.200	ug/L	25.0		96.1	80-120			
Vanadium	51b	24.1	0.0521	0.200	ug/L	25.0		96.4	80-120			
Selenium	78	75.6	0.179	0.500	ug/L	80.0		94.6	80-120			
Duplicate (BJF0328-DUP1)						Source: 21E0352-01 Prepared: 14-Jun-2021 Analyzed: 15-Jun-2021 03:48						
Chromium	52	0.833	0.260	0.500	ug/L		0.859			3.07	20	
Lead	208	ND	0.0513	0.100	ug/L		ND					U
Arsenic	75a	12.7	0.0373	0.200	ug/L		13.4			4.96	20	
Cadmium	111	0.0370	0.0300	0.100	ug/L		0.0400			7.79	20	J
Copper	63	2.79	0.173	0.500	ug/L		3.00			7.32	20	
Nickel	60	1.19	0.0792	0.500	ug/L		1.31			9.79	20	
Zinc	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJF0328-DUP2)						Source: 21E0352-01 Prepared: 14-Jun-2021 Analyzed: 16-Jun-2021 03:38						
Iron	57	9730	66.3	360	ug/L		10200			4.28	20	D
Manganese	55	848	1.42	5.00	ug/L		882			3.92	20	D
Duplicate (BJF0328-DUP3)						Source: 21E0352-01 Prepared: 14-Jun-2021 Analyzed: 17-Jun-2021 01:20						
Barium	135	3.56	0.114	0.500	ug/L		3.89			8.97	20	
Cobalt	59	0.835	0.0173	0.200	ug/L		0.871			4.22	20	
Silver	107	ND	0.0220	0.200	ug/L		0.0240					U
Selenium	78	0.229	0.179	0.500	ug/L		ND					J
Duplicate (BJF0328-DUP4)						Source: 21E0352-01 Prepared: 14-Jun-2021 Analyzed: 17-Jun-2021 18:19						



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJF0328 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Duplicate (BJF0328-DUP4)		Source: 21E0352-01		Prepared: 14-Jun-2021		Analyzed: 17-Jun-2021 18:19						
Magnesium	24	14700	4.44	40.0	ug/L		15400			4.54	20	D
Vanadium	51a	7.72	0.111	0.400	ug/L		8.18			5.86	20	D
Matrix Spike (BJF0328-MS1)		Source: 21E0352-01		Prepared: 14-Jun-2021		Analyzed: 15-Jun-2021 03:52						
Chromium	52	20.3	0.260	0.500	ug/L	25.0	0.859	77.9	75-125			
Lead	208	24.3	0.0513	0.100	ug/L	25.0	ND	97.3	75-125			
Arsenic	75a	37.2	0.0373	0.200	ug/L	25.0	13.4	95.3	75-125			
Cadmium	111	23.6	0.0300	0.100	ug/L	25.0	0.0400	94.4	75-125			
Copper	63	27.7	0.173	0.500	ug/L	25.0	3.00	98.9	75-125			
Nickel	60	26.4	0.0792	0.500	ug/L	25.0	1.31	100	75-125			
Zinc	66	75.5	2.92	6.00	ug/L	80.0	ND	94.4	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0328-MS2)		Source: 21E0352-01		Prepared: 14-Jun-2021		Analyzed: 16-Jun-2021 03:42						
Iron	57	15300	66.3	360	ug/L	5000	10200	102	75-125			D
Manganese	55	929	1.42	5.00	ug/L	25.0	882	191	75-125			HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0328-MS3)		Source: 21E0352-01		Prepared: 14-Jun-2021		Analyzed: 17-Jun-2021 01:25						
Barium	135	26.9	0.114	0.500	ug/L	25.0	3.89	91.9	75-125			
Cobalt	59	25.4	0.0173	0.200	ug/L	25.0	0.871	97.9	75-125			
Silver	107	23.8	0.0220	0.200	ug/L	25.0	0.0240	95.0	75-125			
Selenium	78	70.2	0.179	0.500	ug/L	80.0	ND	87.8	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0328-MS4)		Source: 21E0352-01		Prepared: 14-Jun-2021		Analyzed: 17-Jun-2021 18:24						
Magnesium	24	19800	4.44	40.0	ug/L	5000	15400	88.5	75-125			D
Vanadium	51a	29.2	0.111	0.400	ug/L	25.0	8.18	84.2	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0328-MSD1)		Source: 21E0352-01		Prepared: 14-Jun-2021		Analyzed: 15-Jun-2021 03:58						
Chromium	52	21.0	0.260	0.500	ug/L	25.0	0.859	80.7	75-125	3.37	20	
Lead	208	24.9	0.0513	0.100	ug/L	25.0	ND	99.6	75-125	2.32	20	
Arsenic	75a	36.9	0.0373	0.200	ug/L	25.0	13.4	94.2	75-125	0.75	20	
Cadmium	111	24.3	0.0300	0.100	ug/L	25.0	0.0400	97.1	75-125	2.78	20	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJF0328 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJF0328-MSD1)		Source: 21E0352-01		Prepared: 14-Jun-2021		Analyzed: 15-Jun-2021 03:58						
Copper	63	28.0	0.173	0.500	ug/L	25.0	3.00	99.8	75-125	0.78	20	
Nickel	60	26.7	0.0792	0.500	ug/L	25.0	1.31	101	75-125	0.95	20	
Zinc	66	75.9	2.92	6.00	ug/L	80.0	ND	94.9	75-125	0.56	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0328-MSD2)		Source: 21E0352-01		Prepared: 14-Jun-2021		Analyzed: 16-Jun-2021 03:47						
Iron	57	14800	66.3	360	ug/L	5000	10200	93.4	75-125	2.87	20	D
Manganese	55	886	1.42	5.00	ug/L	25.0	882	16.4	75-125	4.81	20	HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0328-MSD3)		Source: 21E0352-01		Prepared: 14-Jun-2021		Analyzed: 17-Jun-2021 01:31						
Barium	135	27.4	0.114	0.500	ug/L	25.0	3.89	94.2	75-125	2.14	20	
Cobalt	59	25.7	0.0173	0.200	ug/L	25.0	0.871	99.5	75-125	1.51	20	
Silver	107	24.2	0.0220	0.200	ug/L	25.0	0.0240	96.7	75-125	1.72	20	
Selenium	78	70.5	0.179	0.500	ug/L	80.0	ND	88.1	75-125	0.35	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0328-MSD4)		Source: 21E0352-01		Prepared: 14-Jun-2021		Analyzed: 17-Jun-2021 18:30						
Magnesium	24	19000	4.44	40.0	ug/L	5000	15400	72.0	75-125	4.25	20	*, D
Vanadium	51a	29.7	0.111	0.400	ug/L	25.0	8.18	85.9	75-125	1.47	20	D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJF0379 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJF0379-BLK1)						Prepared: 15-Jun-2021 Analyzed: 16-Jun-2021 23:40						
Barium, Dissolved	135	ND	0.114	0.500	ug/L							U
Barium, Dissolved	137	ND	0.0765	0.500	ug/L							U
Chromium, Dissolved	52	ND	0.260	0.500	ug/L							U
Cobalt, Dissolved	59	ND	0.0173	0.200	ug/L							U
Chromium, Dissolved	53	ND	0.239	0.500	ug/L							U
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	ND	6.63	20.0	ug/L							U
Manganese, Dissolved	55	ND	0.142	0.500	ug/L							U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L							U
Vanadium, Dissolved	51a	ND	0.0556	0.200	ug/L							U
Vanadium, Dissolved	51b	ND	0.0521	0.200	ug/L							U
Arsenic, Dissolved	75a	ND	0.0373	0.200	ug/L							U
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L							U
Cadmium, Dissolved	114	ND	0.0400	0.100	ug/L							U
Copper, Dissolved	63	ND	0.173	0.500	ug/L							U
Copper, Dissolved	65	ND	0.350	0.500	ug/L							U
Nickel, Dissolved	60	ND	0.0792	0.500	ug/L							U
Nickel, Dissolved	62	ND	0.220	0.500	ug/L							U
Selenium, Dissolved	78	ND	0.179	0.500	ug/L							U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L							U
Zinc, Dissolved	67	ND	0.940	6.00	ug/L							U

Blank (BJF0379-BLK2)						Prepared: 15-Jun-2021 Analyzed: 17-Jun-2021 19:36						
Lead, Dissolved	208	ND	0.0513	0.100	ug/L							U

LCS (BJF0379-BS1)						Prepared: 15-Jun-2021 Analyzed: 16-Jun-2021 23:45						
Barium, Dissolved	135	25.4	0.114	0.500	ug/L	25.0		102	80-120			
Barium, Dissolved	137	25.3	0.0765	0.500	ug/L	25.0		101	80-120			
Chromium, Dissolved	52	24.5	0.260	0.500	ug/L	25.0		98.0	80-120			
Chromium, Dissolved	53	24.0	0.239	0.500	ug/L	25.0		95.8	80-120			
Cobalt, Dissolved	59	24.4	0.0173	0.200	ug/L	25.0		97.7	80-120			
Iron, Dissolved	54	5110	18.2	36.0	ug/L	5000		102	80-120			
Iron, Dissolved	57	5050	6.63	20.0	ug/L	5000		101	80-120			
Manganese, Dissolved	55	24.5	0.142	0.500	ug/L	25.0		97.9	80-120			
Silver, Dissolved	107	25.6	0.0220	0.200	ug/L	25.0		102	80-120			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 14-Dec-2021 12:44

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0379 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS (BJF0379-BS1)						Prepared: 15-Jun-2021 Analyzed: 16-Jun-2021 23:45						
Vanadium, Dissolved	51a	24.2	0.0556	0.200	ug/L	25.0		97.0	80-120			
Vanadium, Dissolved	51b	24.1	0.0521	0.200	ug/L	25.0		96.3	80-120			
Arsenic, Dissolved	75a	23.7	0.0373	0.200	ug/L	25.0		94.8	80-120			
Cadmium, Dissolved	111	24.2	0.0300	0.100	ug/L	25.0		96.8	80-120			
Cadmium, Dissolved	114	23.7	0.0400	0.100	ug/L	25.0		95.0	80-120			
Copper, Dissolved	63	24.2	0.173	0.500	ug/L	25.0		96.8	80-120			
Copper, Dissolved	65	24.1	0.350	0.500	ug/L	25.0		96.2	80-120			
Nickel, Dissolved	60	24.5	0.0792	0.500	ug/L	25.0		97.9	80-120			
Nickel, Dissolved	62	24.7	0.220	0.500	ug/L	25.0		98.7	80-120			
Selenium, Dissolved	78	75.4	0.179	0.500	ug/L	80.0		94.3	80-120			
Zinc, Dissolved	66	76.0	2.92	6.00	ug/L	80.0		95.0	80-120			
Zinc, Dissolved	67	72.4	0.940	6.00	ug/L	80.0		90.5	80-120			
LCS (BJF0379-BS2)						Prepared: 15-Jun-2021 Analyzed: 17-Jun-2021 19:41						
Lead, Dissolved	208	20.7	0.0513	0.100	ug/L	25.0		82.9	80-120			
Duplicate (BJF0379-DUP1)						Source: 21E0352-13 Prepared: 15-Jun-2021 Analyzed: 17-Jun-2021 09:03						
Barium, Dissolved	135	3.57	0.114	0.500	ug/L		3.65			2.33	20	
Cobalt, Dissolved	59	0.288	0.0173	0.200	ug/L		0.281			2.46	20	
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND					U
Arsenic, Dissolved	75a	0.558	0.0373	0.200	ug/L		0.583			4.38	20	
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L		ND					U
Copper, Dissolved	63	ND	0.173	0.500	ug/L		ND					U
Nickel, Dissolved	60	0.600	0.0792	0.500	ug/L		0.591			1.51	20	
Selenium, Dissolved	78	ND	0.179	0.500	ug/L		ND					U
Zinc, Dissolved	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJF0379-DUP2)						Source: 21E0352-13 Prepared: 15-Jun-2021 Analyzed: 18-Jun-2021 07:52						
Chromium, Dissolved	52	ND	0.520	1.00	ug/L		ND					U
Iron, Dissolved	54	3800	36.4	72.0	ug/L		3860			1.36	20	D
Lead, Dissolved	208	ND	0.103	0.200	ug/L		ND					U
Vanadium, Dissolved	51a	0.404	0.111	0.400	ug/L		0.404			0.00		D
Duplicate (BJF0379-DUP3)						Source: 21E0352-13RE1 Prepared: 15-Jun-2021 Analyzed: 18-Jun-2021 07:05						
Manganese, Dissolved	55	1590	1.42	5.00	ug/L		1580			0.61	20	D


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0379 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJF0379-MS1)		Source: 21E0352-13			Prepared: 15-Jun-2021 Analyzed: 17-Jun-2021 09:07							
Barium, Dissolved	135	26.0	0.114	0.500	ug/L	25.0	3.65	89.3	75-125			
Cobalt, Dissolved	59	25.3	0.0173	0.200	ug/L	25.0	0.281	100	75-125			
Silver, Dissolved	107	23.9	0.0220	0.200	ug/L	25.0	ND	95.5	75-125			
Arsenic, Dissolved	75a	23.6	0.0373	0.200	ug/L	25.0	0.583	92.0	75-125			
Cadmium, Dissolved	111	22.5	0.0300	0.100	ug/L	25.0	ND	90.2	75-125			
Copper, Dissolved	63	23.0	0.173	0.500	ug/L	25.0	ND	92.2	75-125			
Nickel, Dissolved	60	24.1	0.0792	0.500	ug/L	25.0	0.591	94.2	75-125			
Selenium, Dissolved	78	67.1	0.179	0.500	ug/L	80.0	ND	83.8	75-125			
Zinc, Dissolved	67	65.2	0.940	6.00	ug/L	80.0	ND	81.5	75-125			

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0379-MS2)		Source: 21E0352-13			Prepared: 15-Jun-2021 Analyzed: 18-Jun-2021 07:58							
Chromium, Dissolved	52	19.9	0.520	1.00	ug/L	25.0	ND	79.5	75-125			D
Iron, Dissolved	54	8180	36.4	72.0	ug/L	5000	3860	86.4	75-125			D
Lead, Dissolved	208	17.6	0.103	0.200	ug/L	25.0	ND	70.3	75-125			*, D
Vanadium, Dissolved	51a	20.1	0.111	0.400	ug/L	25.0	0.404	78.9	75-125			D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike (BJF0379-MS3)		Source: 21E0352-13RE1			Prepared: 15-Jun-2021 Analyzed: 18-Jun-2021 07:09							
Manganese, Dissolved	55	1600	1.42	5.00	ug/L	25.0	1580	83.6	75-125			HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0379-MSD1)		Source: 21E0352-13			Prepared: 15-Jun-2021 Analyzed: 17-Jun-2021 09:12							
Barium, Dissolved	135	26.4	0.114	0.500	ug/L	25.0	3.65	91.0	75-125	1.62	20	
Cobalt, Dissolved	59	25.4	0.0173	0.200	ug/L	25.0	0.281	100	75-125	0.19	20	
Arsenic, Dissolved	75a	23.7	0.0373	0.200	ug/L	25.0	0.583	92.4	75-125	0.46	20	
Cadmium, Dissolved	111	22.8	0.0300	0.100	ug/L	25.0	ND	91.1	75-125	1.08	20	
Copper, Dissolved	63	23.1	0.173	0.500	ug/L	25.0	ND	92.6	75-125	0.46	20	
Nickel, Dissolved	60	24.4	0.0792	0.500	ug/L	25.0	0.591	95.3	75-125	1.15	20	
Selenium, Dissolved	78	68.0	0.179	0.500	ug/L	80.0	ND	85.0	75-125	1.34	20	
Zinc, Dissolved	66	68.6	2.92	6.00	ug/L	80.0	ND	85.7	75-125	2.52	20	

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0379-MSD2)		Source: 21E0352-13			Prepared: 15-Jun-2021 Analyzed: 18-Jun-2021 08:04							
Chromium, Dissolved	52	20.5	0.520	1.00	ug/L	25.0	ND	82.0	75-125	3.15	20	D


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Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJF0379 - REN EPA 600/4-79-020 4.1.4 HNO3 matrix

Instrument: ICPMS1 Analyst: MCB

QC Sample/Analyte	Isotope	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJF0379-MSD2)		Source: 21E0352-13		Prepared: 15-Jun-2021		Analyzed: 18-Jun-2021 08:04						
Iron, Dissolved	54	8360	36.4	72.0	ug/L	5000	3860	90.0	75-125	2.17	20	D
Lead, Dissolved	208	18.7	0.103	0.200	ug/L	25.0	ND	74.7	75-125	6.13	20	*, D
Vanadium, Dissolved	51a	20.8	0.111	0.400	ug/L	25.0	0.404	81.6	75-125	3.27	20	D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJF0379-MSD3)		Source: 21E0352-13RE1		Prepared: 15-Jun-2021		Analyzed: 18-Jun-2021 07:14						
Manganese, Dissolved	55	1590	1.42	5.00	ug/L	25.0	1580	15.2	75-125	1.07	20	HC, D

Recovery limits for target analytes in MS/MSD QC samples are advisory only.



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
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Certified Analyses included in this Report

Analyte	Certifications
<i>EPA 6020B in Water</i>	
Silver-107	WADOE,WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	DoD-ELAP,NELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Magnesium-24	NELAP,DoD-ELAP,WADOE
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
Silver-107	WA-DW,DoD-ELAP,NELAP
Barium-135	NELAP,WADOE,DoD-ELAP,ADEC
Barium-137	NELAP,WADOE,DoD-ELAP,ADEC
Cobalt-59	NELAP,DoD-ELAP,WADOE
Chromium-52	NELAP,WADOE,DoD-ELAP,ADEC
Chromium-53	NELAP,WADOE,DoD-ELAP,ADEC
Iron-54	NELAP,WADOE,DoD-ELAP
Iron-57	NELAP,WADOE,DoD-ELAP
Manganese-55	NELAP,WADOE,DoD-ELAP
Lead-208	NELAP,WADOE,DoD-ELAP,ADEC
Vanadium-51a	NELAP,DoD-ELAP,WADOE,ADEC
Vanadium-51b	NELAP,DoD-ELAP,WADOE,ADEC
<i>EPA 6020B UCT-KED in Water</i>	
Arsenic-75a	WADOE,WA-DW,DoD-ELAP,ADEC,NELAP
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	WADOE,WA-DW,DoD-ELAP


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Zinc-67	WADOE,WA-DW,DoD-ELAP
Arsenic-75a	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-111	NELAP,WADOE,DoD-ELAP,ADEC
Cadmium-114	NELAP,WADOE,DoD-ELAP,ADEC
Copper-63	NELAP,WADOE,DoD-ELAP
Copper-65	NELAP,WADOE,DoD-ELAP
Nickel-60	NELAP,WADOE,DoD-ELAP,ADEC
Nickel-62	NELAP,WADOE,DoD-ELAP,ADEC
Selenium-78	NELAP,WADOE,DoD-ELAP
Zinc-66	NELAP,WADOE,DoD-ELAP
Zinc-67	NELAP,WADOE,DoD-ELAP

EPA 8082A in Water

Aroclor 1016	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1016 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1221 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1232 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1242 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1248 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1254 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1260 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1262 [2C]	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268	WADOE,DoD-ELAP,NELAP,ADEC
Aroclor 1268 [2C]	WADOE,DoD-ELAP,NELAP,ADEC

EPA 8260D in Water

Chloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Bromomethane	DoD-ELAP,ADEC,NELAP,WADOE
Chloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Trichlorofluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Acrolein	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloro-1,2,2-Trifluoroethane	DoD-ELAP,ADEC,NELAP,WADOE



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Acetone	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Iodomethane	DoD-ELAP,NELAP,WADOE
Methylene Chloride	DoD-ELAP,ADEC,NELAP,WADOE
Acrylonitrile	DoD-ELAP,NELAP,WADOE
Carbon Disulfide	DoD-ELAP,NELAP,WADOE
trans-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Vinyl Acetate	DoD-ELAP,NELAP,WADOE
1,1-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Butanone	DoD-ELAP,NELAP,WADOE
2,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
cis-1,2-Dichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Chloroform	DoD-ELAP,ADEC,NELAP,WADOE
Bromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,1-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Carbon tetrachloride	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
Benzene	DoD-ELAP,ADEC,NELAP,WADOE
Trichloroethene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Bromodichloromethane	DoD-ELAP,ADEC,NELAP,WADOE
Dibromomethane	DoD-ELAP,ADEC,NELAP,WADOE
2-Chloroethyl vinyl ether	DoD-ELAP,ADEC,NELAP,WADOE
4-Methyl-2-Pentanone	DoD-ELAP,NELAP,WADOE
cis-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
Toluene	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,3-Dichloropropene	DoD-ELAP,ADEC,NELAP,WADOE
2-Hexanone	DoD-ELAP,NELAP,WADOE
1,1,2-Trichloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,3-Dichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
Tetrachloroethene	DoD-ELAP,ADEC,NELAP,WADOE
Dibromochloromethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromoethane	DoD-ELAP,NELAP,WADOE
Chlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Ethylbenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,1,1,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
m,p-Xylene	DoD-ELAP,ADEC,NELAP,WADOE
o-Xylene	DoD-ELAP,ADEC,NELAP,WADOE


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Styrene	DoD-ELAP,NELAP,WADOE
Bromoform	DoD-ELAP,NELAP,WADOE
1,1,2,2-Tetrachloroethane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichloropropane	DoD-ELAP,ADEC,NELAP,WADOE
trans-1,4-Dichloro 2-Butene	DoD-ELAP,ADEC,NELAP,WADOE
n-Propylbenzene	DoD-ELAP,NELAP,WADOE
Bromobenzene	DoD-ELAP,NELAP,WADOE
Isopropyl Benzene	DoD-ELAP,NELAP,WADOE
2-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
4-Chlorotoluene	DoD-ELAP,ADEC,NELAP,WADOE
t-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,3,5-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
1,2,4-Trimethylbenzene	DoD-ELAP,NELAP,WADOE
s-Butylbenzene	DoD-ELAP,NELAP,WADOE
4-Isopropyl Toluene	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
n-Butylbenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
1,2-Dibromo-3-chloropropane	DoD-ELAP,ADEC,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Hexachloro-1,3-Butadiene	DoD-ELAP,ADEC,NELAP,WADOE
Naphthalene	DoD-ELAP,ADEC,NELAP,WADOE
1,2,3-Trichlorobenzene	DoD-ELAP,ADEC,NELAP,WADOE
Dichlorodifluoromethane	DoD-ELAP,ADEC,NELAP,WADOE
Methyl tert-butyl Ether	DoD-ELAP,ADEC,NELAP,WADOE
n-Hexane	WADOE
2-Pentanone	WADOE

EPA 8270E in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP
2-Chlorophenol	NELAP,DoD-ELAP
1,3-Dichlorobenzene	NELAP,DoD-ELAP
1,4-Dichlorobenzene	NELAP,DoD-ELAP
1,2-Dichlorobenzene	NELAP,DoD-ELAP
Benzyl Alcohol	NELAP,DoD-ELAP
2,2'-Oxybis(1-chloropropane)	NELAP,DoD-ELAP
2-Methylphenol	NELAP,DoD-ELAP
Hexachloroethane	NELAP,DoD-ELAP


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N-Nitroso-di-n-Propylamine	NELAP,DoD-ELAP
4-Methylphenol	NELAP,DoD-ELAP
Nitrobenzene	NELAP,DoD-ELAP
Isophorone	NELAP,DoD-ELAP
2-Nitrophenol	NELAP,DoD-ELAP
2,4-Dimethylphenol	NELAP,DoD-ELAP
Bis(2-Chloroethoxy)methane	NELAP,DoD-ELAP
2,4-Dichlorophenol	NELAP,DoD-ELAP
1,2,4-Trichlorobenzene	NELAP,DoD-ELAP
Naphthalene	NELAP,DoD-ELAP
Benzoic acid	NELAP,DoD-ELAP
4-Chloroaniline	NELAP,DoD-ELAP
Hexachlorobutadiene	NELAP,DoD-ELAP
4-Chloro-3-Methylphenol	NELAP,DoD-ELAP
2-Methylnaphthalene	NELAP,DoD-ELAP
Hexachlorocyclopentadiene	NELAP,DoD-ELAP
2,4,6-Trichlorophenol	NELAP,DoD-ELAP
2,4,5-Trichlorophenol	NELAP,DoD-ELAP
2-Chloronaphthalene	NELAP,DoD-ELAP
2-Nitroaniline	NELAP,DoD-ELAP
Acenaphthylene	NELAP,DoD-ELAP
Dimethylphthalate	NELAP,DoD-ELAP
2,6-Dinitrotoluene	NELAP,DoD-ELAP
Acenaphthene	NELAP,DoD-ELAP
3-Nitroaniline	NELAP,DoD-ELAP
2,4-Dinitrophenol	NELAP,DoD-ELAP
Dibenzofuran	NELAP,DoD-ELAP
4-Nitrophenol	NELAP,DoD-ELAP
2,4-Dinitrotoluene	NELAP,DoD-ELAP
Fluorene	NELAP,DoD-ELAP
4-Chlorophenylphenyl ether	NELAP,DoD-ELAP
Diethyl phthalate	NELAP,DoD-ELAP
4-Nitroaniline	NELAP,DoD-ELAP
4,6-Dinitro-2-methylphenol	NELAP,DoD-ELAP
N-Nitrosodiphenylamine	NELAP,DoD-ELAP
4-Bromophenyl phenyl ether	NELAP,DoD-ELAP
Hexachlorobenzene	NELAP,DoD-ELAP
Pentachlorophenol	NELAP,DoD-ELAP
Phenanthrene	NELAP,DoD-ELAP


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Anthracene	NELAP,DoD-ELAP
Carbazole	NELAP,DoD-ELAP
Di-n-Butylphthalate	NELAP,DoD-ELAP
Fluoranthene	NELAP,DoD-ELAP
Pyrene	NELAP,DoD-ELAP
Butylbenzylphthalate	NELAP,DoD-ELAP
Benzo(a)anthracene	NELAP,DoD-ELAP
3,3'-Dichlorobenzidine	NELAP,DoD-ELAP
Chrysene	NELAP,DoD-ELAP
bis(2-Ethylhexyl)phthalate	NELAP,DoD-ELAP
Di-n-Octylphthalate	NELAP,DoD-ELAP
Benzo(b)fluoranthene	NELAP,DoD-ELAP
Benzo(k)fluoranthene	NELAP,DoD-ELAP
Benzo(a)pyrene	NELAP,DoD-ELAP
Indeno(1,2,3-cd)pyrene	NELAP,DoD-ELAP
Dibenzo(a,h)anthracene	NELAP,DoD-ELAP
Benzo(g,h,i)perylene	NELAP,DoD-ELAP
N-Nitrosodimethylamine	NELAP,DoD-ELAP
1-Methylnaphthalene	NELAP,DoD-ELAP

EPA 8270E-SIM in Water

Naphthalene	ADEC,DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	ADEC,DoD-ELAP,NELAP
1-Methylnaphthalene	ADEC,DoD-ELAP,NELAP,WADOE
Biphenyl	NELAP
Acenaphthylene	ADEC,DoD-ELAP,NELAP,WADOE
Acenaphthene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzofuran	ADEC,DoD-ELAP,NELAP
Fluorene	ADEC,DoD-ELAP,NELAP,WADOE
Phenanthrene	ADEC,DoD-ELAP,NELAP,WADOE
Anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Carbazole	NELAP
Fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Chrysene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(k)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(j)fluoranthene	ADEC,DoD-ELAP,NELAP,WADOE


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Benzo(e)pyrene	NELAP
Benzo(a)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Perylene	ADEC,NELAP
Indeno(1,2,3-cd)pyrene	ADEC,DoD-ELAP,NELAP,WADOE
Dibenzo(a,h)anthracene	ADEC,DoD-ELAP,NELAP,WADOE
Benzo(g,h,i)perylene	ADEC,DoD-ELAP,NELAP,WADOE

NWTPH-Dx in Water

Diesel Range Organics (C12-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C25)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C24)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C10-C28)	DoD-ELAP,NELAP,WADOE
Diesel Range Organics (C12-C22)	DoD-ELAP
Diesel Range Organics (C12-C25)	DoD-ELAP
Motor Oil Range Organics (C24-C38)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C25-C36)	DoD-ELAP,NELAP,WADOE
Motor Oil Range Organics (C24-C40)	DoD-ELAP,NELAP,WADOE
Residual Range Organics (C23-C32)	DoD-ELAP
Mineral Spirits Range Organics (Tol-C12)	DoD-ELAP,NELAP,WADOE
Mineral Oil Range Organics (C16-C28)	DoD-ELAP,NELAP,WADOE
Kerosene Range Organics (Tol-C18)	DoD-ELAP,NELAP,WADOE
JP8 Range Organics (C8-C18)	DoD-ELAP,NELAP,WADOE
JP5 Range Organics (C10-C16)	DoD-ELAP,NELAP,WADOE
JP4 Range Organics (Tol-C14)	DoD-ELAP,NELAP,WADOE
Jet-A Range Organics (C10-C18)	DoD-ELAP,NELAP,WADOE
Creosote Range Organics (C12-C22)	DoD-ELAP,NELAP,WADOE
Bunker C Range Organics (C10-C38)	DoD-ELAP,NELAP,WADOE
Stoddard Range Organics (C8-C12)	DoD-ELAP,NELAP,WADOE
Transformer Oil Range Organics (C12-C28)	DoD-ELAP,NELAP,WADOE

NWTPHg in Water

Gasoline Range Organics (Tol-Nap)	WADOE,DoD-ELAP
Gasoline Range Organics (2MP-TMB)	WADOE,DoD-ELAP
Gasoline Range Organics (Tol-C12)	WADOE,DoD-ELAP
Gasoline Range Organics (C6-C10)	WADOE,ADEC,DoD-ELAP
Gasoline Range Organics (C5-C12)	WADOE,DoD-ELAP



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Code	Description	Number	Expires
ADEC	Alaska Dept of Environmental Conservation	17-015	03/28/2023
DoD-ELAP	DoD-Environmental Laboratory Accreditation Program	66169	02/28/2022
NELAP	ORELAP - Oregon Laboratory Accreditation Program	WA100006-012	05/12/2022
WADOE	WA Dept of Ecology	C558	06/30/2022
WA-DW	Ecology - Drinking Water	C558	06/30/2022



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Notes and Definitions

*	Flagged value is not within established control limits.
B	This analyte was detected in the method blank.
D	The reported value is from a dilution
E	The analyte concentration exceeds the upper limit of the calibration range of the instrument established by the initial calibration (ICAL)
HC	The natural concentration of the spiked analyte is so much greater than the concentration spiked that an accurate determination of spike recovery is not possible
J	Estimated concentration value detected below the reporting limit.
P1	The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
Q	Indicates a detected analyte with an initial or continuing calibration that does not meet established acceptance criteria (<20% RSD, <20% drift or minimum RRF)
U	This analyte is not detected above the reporting limit (RL) or if noted, not detected above the limit of detection (LOD).
DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
RPD	Relative Percent Difference
[2C]	Indicates this result was quantified on the second column on a dual column analysis.

Important Information

About Your Geotechnical/Environmental Report

CONSULTING SERVICES ARE PERFORMED FOR SPECIFIC PURPOSES AND FOR SPECIFIC CLIENTS.

Consultants prepare reports to meet the specific needs of specific individuals. A report prepared for a civil engineer may not be adequate for a construction contractor or even another civil engineer. Unless indicated otherwise, your consultant prepared your report expressly for you and expressly for the purposes you indicated. No one other than you should apply this report for its intended purpose without first conferring with the consultant. No party should apply this report for any purpose other than that originally contemplated without first conferring with the consultant.

THE CONSULTANT'S REPORT IS BASED ON PROJECT-SPECIFIC FACTORS.

A geotechnical/environmental report is based on a subsurface exploration plan designed to consider a unique set of project-specific factors. Depending on the project, these may include the general nature of the structure and property involved; its size and configuration; its historical use and practice; the location of the structure on the site and its orientation; other improvements such as access roads, parking lots, and underground utilities; and the additional risk created by scope-of-service limitations imposed by the client. To help avoid costly problems, ask the consultant to evaluate how any factors that change subsequent to the date of the report may affect the recommendations. Unless your consultant indicates otherwise, your report should not be used (1) when the nature of the proposed project is changed (for example, if an office building will be erected instead of a parking garage, or if a refrigerated warehouse will be built instead of an unrefrigerated one, or chemicals are discovered on or near the site); (2) when the size, elevation, or configuration of the proposed project is altered; (3) when the location or orientation of the proposed project is modified; (4) when there is a change of ownership; or (5) for application to an adjacent site. Consultants cannot accept responsibility for problems that may occur if they are not consulted after factors that were considered in the development of the report have changed.

SUBSURFACE CONDITIONS CAN CHANGE.

Subsurface conditions may be affected as a result of natural processes or human activity. Because a geotechnical/environmental report is based on conditions that existed at the time of subsurface exploration, construction decisions should not be based on a report whose adequacy may have been affected by time. Ask the consultant to advise if additional tests are desirable before construction starts; for example, groundwater conditions commonly vary seasonally.

Construction operations at or adjacent to the site and natural events such as floods, earthquakes, or groundwater fluctuations may also affect subsurface conditions and, thus, the continuing adequacy of a geotechnical/environmental report. The consultant should be kept apprised of any such events and should be consulted to determine if additional tests are necessary.

MOST RECOMMENDATIONS ARE PROFESSIONAL JUDGMENTS.

Site exploration and testing identifies actual surface and subsurface conditions only at those points where samples are taken. The data were extrapolated by your consultant, who then applied judgment to render an opinion about overall subsurface conditions. The actual interface between materials may be far more gradual or abrupt than your report indicates. Actual conditions in areas not sampled may differ from those predicted in your report. While nothing can be done to prevent such situations, you and your consultant can work together to help reduce their impacts. Retaining

your consultant to observe subsurface construction operations can be particularly beneficial in this respect.

A REPORT'S CONCLUSIONS ARE PRELIMINARY.

The conclusions contained in your consultant's report are preliminary, because they must be based on the assumption that conditions revealed through selective exploratory sampling are indicative of actual conditions throughout a site. Actual subsurface conditions can be discerned only during earthwork; therefore, you should retain your consultant to observe actual conditions and to provide conclusions. Only the consultant who prepared the report is fully familiar with the background information needed to determine whether or not the report's recommendations based on those conclusions are valid and whether or not the contractor is abiding by applicable recommendations. The consultant who developed your report cannot assume responsibility or liability for the adequacy of the report's recommendations if another party is retained to observe construction.

THE CONSULTANT'S REPORT IS SUBJECT TO MISINTERPRETATION.

Costly problems can occur when other design professionals develop their plans based on misinterpretation of a geotechnical/environmental report. To help avoid these problems, the consultant should be retained to work with other project design professionals to explain relevant geotechnical, geological, hydrogeological, and environmental findings, and to review the adequacy of their plans and specifications relative to these issues.

BORING LOGS AND/OR MONITORING WELL DATA SHOULD NOT BE SEPARATED FROM THE REPORT.

Final boring logs developed by the consultant are based upon interpretation of field logs (assembled by site personnel), field test results, and laboratory and/or office evaluation of field samples and data. Only final boring logs and data are customarily included in geotechnical/environmental reports. These final logs should not, under any circumstances, be redrawn for inclusion in architectural or other design drawings, because drafters may commit errors or omissions in the transfer process.

To reduce the likelihood of boring log or monitoring well misinterpretation, contractors should be given ready access to the complete geotechnical engineering/environmental report prepared or authorized for their use. If access is provided only to the report prepared for you, you should advise contractors of the report's limitations, assuming that a contractor was not one of the specific persons for whom the report was prepared, and that developing construction cost estimates was not one of the specific purposes for which it was prepared. While a contractor may gain important knowledge from a report prepared for another party, the contractor should discuss the report with your consultant and perform the additional or alternative work believed necessary to obtain the data specifically appropriate for construction cost estimating purposes. Some clients hold the mistaken impression that simply disclaiming responsibility for the accuracy of subsurface information always insulates them from attendant liability. Providing the best available information to contractors helps prevent costly construction problems and the adversarial attitudes that aggravate them to a disproportionate scale.

READ RESPONSIBILITY CLAUSES CLOSELY.

Because geotechnical/environmental engineering is based extensively on judgment and opinion, it is far less exact than other design disciplines. This situation has resulted in wholly unwarranted claims

being lodged against consultants. To help prevent this problem, consultants have developed a number of clauses for use in their contracts, reports, and other documents. These responsibility clauses are not exculpatory clauses designed to transfer the consultant's liabilities to other parties; rather, they are definitive clauses that identify where the consultant's responsibilities begin and end. Their use helps all parties involved recognize their individual responsibilities and take appropriate action. Some of these definitive clauses are likely to appear in your report, and you are encouraged to read them closely. Your consultant will be pleased to give full and frank answers to your questions.

**The preceding paragraphs are based on information
provided by the GBA, Silver Spring, Maryland**