



Analytical Resources, Incorporated
Analytical Chemists and Consultants

13 May 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)
21D0265

Associated SDG ID(s)
N/A

Shelly
Fishel

Digitally signed by
Shelly Fishel
Date: 2021.05.13
13:31:31 -07'00'

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, Inc.

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.



ARI Assigned Number: 2180160 KD	Turn-around Requested: Standard
ARI Client Company: SWI Shannon & Wilson, Inc.	Phone: (206) 696-6811
Client Contact: Shoshana Howard	
Client Project Name: LDW	
Client Project #: 21-1-12596	Samplers: MRH / DES

No. of Coolers: 3	Cooler Temps: 4.7, 5.4, 1.9
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21D0265

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: KD 2130174		Turn-around Requested: Standard		Page: 1 of 1		
ARI Client Company: Shannon & Wilson		Phone: 206-695-6911		Date: 2/11/21	Ice Present? Yes	
Client Contact: Shoshana Howard		No. of Coolers: 3		Cooler Temps: See CRE		
Client Project Name: LDW		Analysis Requested TPT-19 NITRATES TPT-19 NITRATES for Nitrate-N BTEX 8260C HVCs 8260C but low level VC HMBL 8260C PNTS 8260C Full list SVOCs 8260C Limited list SVOCs 8260C PUBS 8260C Metals (total and dissolved) 200.8 Inorganic C/P 200.8 Attenuation Indicators				
Client Project #: 21-1-12596						
Samplers: MRIHDES						
Sample ID	Date	Time	Matrix	No. Containers		
TB-2-20211102	2/11/21	0840	Water	1	X	X X
MW-45-20211102	2/11/21	0842		4		X
MW-25-20211102	2/11/21	0925		8		X X
EB-2-20211102	2/11/21	1030		10	X X	X X X
MW-70-20211102	2/11/21	1231		14	X X	X X X
MW-69-20211102	2/11/21	1313		15	X X	X X
MW-55-20211102	2/11/21	1500		11	X X	X X
MW-24-20211102	2/11/21	1612		10		X
Comments/Special Instructions Lab ID Filter for metals MW-25-20211102 = Arsenic only, Metals MW-24-20211102 = Metals only, Arsenic only					Relinquished by: (Signature) D. Abillit Printed Name: DANIEL SCHWICHT Company: SWI Date & Time: 11-FEB-21, 17:02	Received by: (Signature) Jacob Leitch Printed Name: Jacob Leitch Company: AJZ Date & Time: 02/11/2021 1702
					Relinquished by: (Signature) Printed Name: Company: Date & Time:	Received by: (Signature) Printed Name: Company: Date & Time:



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21D0265

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: KD 21D0265		Turn-around Requested: Standard		Page: 1 of 2	
ARI Client Company: Shannon & Wilson		Phone: 206-695-6811		Date: 2/12/21	Ice Present?
Client Contact: Shoshana Howard		No. of Coolers: 2		Cooler Temps: 3.7, 0.8	
Client Project Name: LON		Analysis Requested			
Client Project #: 21-1-12590		Samplers: MPH/DES			
Sample ID	Date	Time	Matrix	No. Containers	Notes/Comments
TB-3-20211202	2/12/21	0810	Water	1	
NW-49-20211202		1013		6	
NW-55-20211202		1102		10	
NW-50-20211202		1202		8	
NW-52-20211202		1316		12	
NW-23-20211202		1534		16	
Comments/Special Instructions Lab to filter for metals		Relinquished by: (Signature) m [Signature] Printed Name: Michael Harfield Company: SWI Date & Time: 2/12/21 1630		Received by: (Signature) [Signature] Printed Name: Samantha Colon Company: ARI Date & Time: 2/12/21 1630	



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21D0265

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: KD 2150192		Turn-around Requested: Standard		Page: 2 of 2									
ARI Client Company: Shannon & Wilson		Phone: 206-695-6911		Date: 2/12/21	Ice Present? 								
Client Contact: Sheshana Howard		No. of Coolers: 2		Cooler Temps: 3.7, 0.8									
Client Project Name: LDW		Analysis Requested											
Client Project #: 21-1-12640		Samplers: MRH/DES											
Sample ID	Date	Time	Matrix	No. Containers	1	2	Hexavalent Chromium (ppm)	Attenuation Indicators					Notes/Comments
MW-49-20210202	2/12/21	1013	Water	See page 1	X								1 = Metals total & dissolved: As, Mn, Ni, Cd, Cu, Pb, Hg, Se, Ag, Zn
MW-23-20210202	See page	page	1 →			X	X	X					2 = Metals total & diss.: only As, Cr, Mn
													Attenuation Indicators:
													• Nitrate, Nitrite, Sulfate
													• Chloride
													• Sulfide
													• Reduced Iron
													• Dissolved Mn
													• MEG
Comments/Special Instructions Lab to filter for metals		Relinquished by: (Signature) M. H. H.		Received by: (Signature) S. L. L.		Relinquished by: (Signature)		Received by: (Signature)					
		Printed Name: Mitchell H. H.		Printed Name: Samantha Colon		Printed Name:		Printed Name:					
		Company: SWI		Company: ARI		Company:		Company:					
		Date & Time: 2/12/21 1630		Date & Time: 2/12/21 1630		Date & Time:		Date & Time:					

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21B0227 KD		Turn-around Requested: Standard		Page: 1 of 2	
ARI Client Company: Shannon & Wilson		Phone: 206-695-6811		Date: 2/16/21	Ice Present? Yes
Client Contact: Shoshana Howard		No. of Coolers: 3		Cooler Temps: See CREF	
Client Project Name: LDW		Analysis Requested			
Client Project #: 21-1-125916		Samplers: CTC/MRH			
Sample ID	Date	Time	Matrix	No. Containers	Notes/Comments
TB-4-20211602	2/16/21	0800	NATR	1	TPH-4 ☒ TPH-D ₂ ☒ BTEX ☒ H ₂ O ₂ (100% V/V) ☒ MTBE ☒ PAHs ☒ Full HST SVOCs ☒ See page 2
MW-8-20211602	2/16/21	0853		10	TPH-4 ☒ TPH-D ₂ ☒ BTEX ☒ H ₂ O ₂ (100% V/V) ☒ MTBE ☒ PAHs ☒ Full HST SVOCs ☒ See page 2
MW-72-20211602		1000		12	TPH-4 ☒ TPH-D ₂ ☒ BTEX ☒ H ₂ O ₂ (100% V/V) ☒ MTBE ☒ PAHs ☒ Full HST SVOCs ☒ See page 2
MS/MSD-MW-72-20211602		1000		16	TPH-4 ☒ TPH-D ₂ ☒ BTEX ☒ H ₂ O ₂ (100% V/V) ☒ MTBE ☒ PAHs ☒ Full HST SVOCs ☒ See page 2
MW-64-20211602		1253		12	TPH-4 ☒ TPH-D ₂ ☒ BTEX ☒ H ₂ O ₂ (100% V/V) ☒ MTBE ☒ PAHs ☒ Full HST SVOCs ☒ See page 2
MW-68-20211602		1503		12	TPH-4 ☒ TPH-D ₂ ☒ BTEX ☒ H ₂ O ₂ (100% V/V) ☒ MTBE ☒ PAHs ☒ Full HST SVOCs ☒ See page 2
Comments/Special Instructions Lab to filter for metals Please refer to LDW project for methods		Relinquished by: (Signature) <i>M. H.</i> Printed Name: Mitchell Harfield Company: SWI Date & Time: 2/16/21 1605		Received by: (Signature) <i>[Signature]</i> Printed Name: Jacob Black Company: ANZ Date & Time: 02/16/2021 1605	
		Relinquished by: (Signature) Printed Name: Company: Date & Time:		Received by: (Signature) Printed Name: Company: Date & Time:	



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21D0265

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21D0265 KO		Turn-around Requested: Standard		Page: 2 of 2							
ARI Client Company: Shannon & Wilson		Phone: 206-695-6811		Date: 2/16/21	Ice Present? Yes						
Client Contact: Shoshana Howard		No. of Coolers: 3		Cooler Temps: See CRF							
Client Project Name: LDW				Analysis Requested							
Client Project #: 21-1-12590		Samplers: CTC/MKH		Notes/Comments							
Sample ID	Date	Time	Matrix	No. Containers	Full list Metals (total 45)	Metals - A (total 45)	Limited list 500s	PCBs	ATTH/THH/THH	Notes/Comments	
TB-4-20211602	See page	1	→							Full list Metals: As, Ba, Cr, Mn, Ni, Cd, Co, Cu, Fe, Pb, Hg, Se, Ag, V, Zn	
MW-8-20211602	See page	1	→			X				Metals - A = As, Ni, Hg, Se, Ag, Zn	
MW-72-20211602	See page	1	→		X					L.M.K.A. 500s = DDEP, dibutyl phthalate, BCLB	
MS/MSD-MW-72-20211602	See page	1	→		X		X	X		1,4-DCB, 2,4-dimethyl phenol, benzoic acid, BOP	
MW-64-20211602	See page	1	→		X			X		NOPIA, P-P	
MW-68-20211602	See page	1	→		X			X		ATTH/THH/THH - Please refer to LDW project analysis methods	
Comments/Special Instructions Lab to Alter for metals Please refer to LDW project for methods		Relinquished by: (Signature) <i>[Signature]</i> Printed Name: Mitchell Hatfield Company: SWI Date & Time: 2/16/21 1605		Received by: (Signature) <i>[Signature]</i> Printed Name: Jacob LaHe Company: ARI Date & Time: 02/16/2021 1605		Relinquished by: (Signature) Printed Name: Company: Date & Time:		Received by: (Signature) Printed Name: Company: Date & Time:			

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21D0265

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: <u>KD-210039</u>		Turn-around Requested: <u>Standard</u>		Page: <u>1</u> of <u>2</u>									
ARI Client Company: <u>Shannon & Wilson</u>		Phone: <u>206-695-6911</u>		Date: <u>2/17/21</u>	Ice Present? <u>Yes</u>								
Client Contact: <u>Shoshana Howard</u>		No. of Coolers: <u>3</u>		Cooler Temps: <u>See CREF</u>									
Client Project Name: <u>LDW</u>		Analysis Requested											
Client Project #: <u>21-1-12546</u>		Samplers: <u>OTC/MRH</u>											
Sample ID	Date	Time	Matrix	No. Containers	TPH-G	TPH-Dx	BTEX	HNOCs (low level VOC)	PAHs	Full list SVOCs	PCBs	See page 2	Notes/Comments
TB-5-20211702	2/17/21	0810	Water	1	X		X	X					
HW-63-20211702		0851		12		X	X	X		X	X	X	
HW-103-20211702		0906		12		X	X	X		X	X	X	
HW-60-20211702		1055		19	X	X	X	X	X		X	X	
HW-71-20211702		1154		14	X	X	X	X	X		X	X	
HW-43-20211702		1444		10		X	X	X			X	X	
Comments/Special Instructions: Lab to ARI for metals Please refer to project methods & analyze lists													
Relinquished by: (Signature) <u>M. Harfield</u>		Received by: (Signature) <u>James Harfield</u>		Relinquished by: (Signature)		Received by: (Signature)							
Printed Name: <u>Mitchell Harfield</u>		Printed Name: <u>James Harfield</u>		Printed Name:		Printed Name:							
Company: <u>SWE</u>		Company: <u>A02</u>		Company:		Company:							
Date & Time: <u>2/17/21 1530</u>		Date & Time: <u>02/17/2021 1530</u>		Date & Time:		Date & Time:							



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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: KO 2100239		Turn-around Requested: Standard		Page: 2 of 2		
ARI Client Company: Shannon & Wilson		Phone: 206-695-6811		Date: 2/17/21	Ice Present? Yes	
Client Contact: Shoshana Howard		No. of Coolers: 3		Cooler Temps: See CRF		
Client Project Name: L0W		Analysis Requested				
Client Project #: 21-1-12596						
Samplers: CTC/MRH		Notes/Comments				
Sample ID	Date	Time	Matrix	No. Containers	Full list Metals (Total & Dissolved)	Notes/Comments
MW-63-20211702	See	page 1	→	X		
MW-103-20211702	See	page 1	→	X		
MW-60-20211702	See	page 1	→	X	X	
MW-71-20211702	See	page 1	→	X		
MW-43-20211702	See	page 1	→		X	
Comments/Special Instructions • Lab to Analyze Metals • Please refer to project analysis list & methods	Relinquished by: (Signature) <i>M. H. H.</i>		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)	
	Printed Name: Mitchell H. H.		Printed Name: Shoshana H.		Printed Name:	
	Company: SWI		Company: ARZ		Company:	
	Date & Time: 2/17/21 1530		Date & Time: 02/17/2021 1530		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.

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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-May-2021 13:22

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-66-20211002	21D0265-01	Water	10-Feb-2021 09:30	26-Apr-2021 09:05
EB-2-20211102	21D0265-04	Water	11-Feb-2021 10:30	26-Apr-2021 09:05
MW-70-20211102	21D0265-05	Water	11-Feb-2021 12:31	26-Apr-2021 09:05
MW-69-20211102	21D0265-06	Water	11-Feb-2021 13:13	26-Apr-2021 09:05
MW-52-20211202	21D0265-09	Water	12-Feb-2021 13:16	26-Apr-2021 09:05
MW-23-20211202	21D0265-10	Water	12-Feb-2021 15:34	26-Apr-2021 09:05
MW-64-20211602	21D0265-12	Water	16-Feb-2021 12:53	26-Apr-2021 09:05
MW-68-20211602	21D0265-13	Water	16-Feb-2021 15:03	26-Apr-2021 09:05
MW-63-20211702	21D0265-14	Water	17-Feb-2021 08:51	26-Apr-2021 09:05
MW-103-20211702	21D0265-15	Water	17-Feb-2021 09:06	26-Apr-2021 09:05
MW-60-20211702	21D0265-16	Water	17-Feb-2021 10:55	26-Apr-2021 09:05
MW-71-20211702	21D0265-17	Water	17-Feb-2021 11:54	26-Apr-2021 09:05
MW-43-20211702	21D0265-18	Water	17-Feb-2021 14:44	26-Apr-2021 09:05

Analytical Resources, Inc.

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Seattle WA, 98103-8636

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

Reported:
13-May-2021 13:22

Work Order Case Narrative

Client: Shannon & Wilson, Inc

Project: Lower Duwamish

Work Order: 21D0265

Sample receipt

Samples as listed on the preceding page were received 26-Apr-2021 09:05 under ARI work order 21D0265. For details regarding sample receipt, please refer to the Cooler Receipt Form.

These samples were relogged for low level PCBs. A few samples were logged that were not requested on original COCs/work orders so samples 21D0265-02, 21D0265-03, 21D0265-07 and 21D0265-08 were not used.

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/blank spike duplicate (BS/BSD aka LCS/LCSD) percent recoveries were within control limits except Aroclor 1260 which was out of control high in the LCS. The LCS/LCSD relative percent difference (RPD) were within control limits except Aroclor 1260. Deviations have been flagged within the QC section of this report.

Lower Duwamish Relogs - Shannon & Wilson



Sue Dunninghoo

Sat 4/24/2021 10:43 AM

To: Sample Receiving



Please check the samples requesting PCBs in the following work orders (all waters) to see if we have a liter of sample (2 or more 500-mL ambers). I think there are 18 samples among the work orders but may only be about 10 that have 2 or more bottles.

Pull and log on a new work order for low-level PCBs, please change hold time 1 to 365, 2-week TAT. (If it's not a LDW workorder, I have a typo!)

21B0160 ✓

21B0174 ✓

~~21B0277~~ 21B0227 ✓

21B0239 ✓

21B0192 ✓

Thanks!

Sue

I will be working remotely through April, out of office on Friday, April 30.

Courier requests will not be guaranteed for same day pick-ups or deliveries.

Susan D. Dunninghoo
Director, Client Services
Analytical Resources, Inc.
sue@arilabs.com

W 206-695-6207 4611 S. 134th Place, Suite 100
Tukwila, WA 98168

<https://www.arilabs.com>

As many of our staff are working remotely we have changed sample receiving hours to 8 to 5 until further notice. Thank you for your understanding.

Version changes coming this summer to SW-846 8260 and 8270 analyses, see our recent [post](#) explaining the details.

"Don't wish it were easier. Wish you were better." - Jim Rohn

Before printing, think about ENVIRONMENTAL responsibility

Reply | Reply all | Forward



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: KD-Bulk-21D0265

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 1610

4.7 5.4 1.9

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

Temp Gun ID#: DOO520C

Cooler Accepted by: KD

Date: 2/10/21

Time: 1610

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 ☒ 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 2/18/21

Were the sample(s) split by ARI? ☒ YES ☐ NO Date/Time: _____ Equipment: _____ Split by: _____

Samples Logged by: SC Date: 2/11/21 Time: 0842 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:
Re-log 21D0265

By: _____ Date: _____



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon & Wilson

Project Name: LON

COC No(s): NA

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

Assigned ARI Job No: 21D0177 21D0265

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 1702

2.4 4.3 3.1

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

Temp Gun ID#: DOO 5206

Cooler Accepted by: TS

Date: 02/11/2021

Time: 1702

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 2/8/21

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

Samples Logged by: KD Date: 2/12/21 Time: 0920 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:
 Tot metals / Diss metals label were blank for EB-2-20211102.
 used process of elimination to determine where bottles belong.
Re-log 21D0265

By: KD Date: 2/12/21



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: NA

Assigned ARI Job No: 2100227 KD 2100265

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 1605

4.4 2.4 4.6

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

Temp Gun ID#: DOO 5206

Cooler Accepted by: TS

Date: 02/16/21

Time: 1605

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 2/18/21

Were the sample(s) split by ARI? ☒ YES ☐ NO

Date/Time: _____

Equipment: _____

Split by: _____

Samples Logged by: KD Date: 2/17/21 Time: 1255 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:

ms/msd logged as separate sample to fit client needs.

Re-log 2100265

By: KD Date: 2/17/21


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 Seattle WA, 98103-8636

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

Reported:
 13-May-2021 13:22

MW-66-20211002
21D0265-01 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/10/2021 09:30
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 03:52
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-01 A 01
	Preparation Batch: BJD0680		
	Prepared: 04/30/2021		
Sample Cleanup:	Sample Size: 1000 mL		Extract ID: 21D0265-01 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Silica Gel		
Sample Cleanup:	Cleanup Batch: CJE0011		Extract ID: 21D0265-01 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID:21D0265-01 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID:21D0265-01 A 01
	Cleaned: 04-May-2021		
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:21D0265-01 A 01
	Cleanup Batch: CJE0010		
	Cleaned: 04-May-2021		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID:21D0265-01 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfuric Acid		

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 %	88.8	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	73.4	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	87.4	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	70.2	%	


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

Reported:
 13-May-2021 13:22

EB-2-20211102
21D0265-04 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/11/2021 10:30
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 04:14
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-04 A 01
	Preparation Batch: BJD0680		
	Prepared: 04/30/2021		
Sample Cleanup:	Sample Size: 1000 mL		Extract ID: 21D0265-04 A 01
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 21D0265-04 A 01
	Cleanup Batch: CJE0011		
	Cleaned: 04-May-2021		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-04 A 01
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfuric Acid		Extract ID: 21D0265-04 A 01
	Cleanup Batch: CJE0009		
	Cleaned: 04-May-2021		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-04 A 01
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID: 21D0265-04 A 01
	Cleanup Batch: CJE0010		
	Cleaned: 04-May-2021		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-04 A 01
	Final Volume: 0.5 mL		

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 %	71.6	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	63.8	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	69.4	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	63.8	%	


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

Reported:
 13-May-2021 13:22

MW-70-20211102
21D0265-05 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/11/2021 12:31	
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 04:36	
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-05 A 01	
	Preparation Batch: BJD0680	Sample Size: 1000 mL		
	Prepared: 04/30/2021	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 21D0265-05 A 01	
	Cleanup Batch: CJE0011	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfuric Acid		Extract ID: 21D0265-05 A 01	
	Cleanup Batch: CJE0009	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID: 21D0265-05 A 01	
	Cleanup Batch: CJE0010	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021	Final Volume: 0.5 mL		

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 %	83.9	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	74.5	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	82.1	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	71.1	%	


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

Reported:
 13-May-2021 13:22

MW-69-20211102
21D0265-06 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/11/2021 13:13
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 04:57
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-06 A 01
	Preparation Batch: BJD0680		
	Prepared: 04/30/2021		
Sample Cleanup:	Sample Size: 1000 mL		Extract ID: 21D0265-06 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Silica Gel		
Sample Cleanup:	Cleanup Batch: CJE0011		Extract ID: 21D0265-06 A 01
	Cleaned: 04-May-2021		
	Initial Volume: 0.5 mL		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID:21D0265-06 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Cleaned: 04-May-2021		Extract ID:21D0265-06 A 01
	Initial Volume: 0.5 mL		
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:21D0265-06 A 01
	Cleanup Batch: CJE0010		
	Cleaned: 04-May-2021		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID:21D0265-06 A 01
	Final Volume: 0.5 mL		

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 %	81.0	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	73.4	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	80.8	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	70.8	%	


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

Reported:
 13-May-2021 13:22

MW-52-20211202
21D0265-09 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/12/2021 13:16
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 05:19
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-09 A 01
	Preparation Batch: BJD0680		
	Prepared: 04/30/2021		
	Sample Size: 1000 mL		
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 21D0265-09 A 01
	Cleanup Batch: CJE0011		
	Cleaned: 04-May-2021		
	Initial Volume: 0.5 mL		
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfuric Acid		Extract ID:21D0265-09 A 01
	Cleanup Batch: CJE0009		
	Cleaned: 04-May-2021		
	Initial Volume: 0.5 mL		
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:21D0265-09 A 01
	Cleanup Batch: CJE0010		
	Cleaned: 04-May-2021		
	Initial Volume: 0.5 mL		
	Final Volume: 0.5 mL		

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 %	84.7	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	68.9	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	83.1	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	66.3	%	


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

Reported:
 13-May-2021 13:22

MW-23-20211202
21D0265-10 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/12/2021 15:34
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 05:41
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-10 A 01
	Preparation Batch: BJD0680	Sample Size: 1000 mL	
	Prepared: 04/30/2021	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 21D0265-10 A 01
	Cleanup Batch: CJE0011	Initial Volume: 0.5 mL	
	Cleaned: 04-May-2021	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid		Extract ID:21D0265-10 A 01
	Cleanup Batch: CJE0009	Initial Volume: 0.5 mL	
	Cleaned: 04-May-2021	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:21D0265-10 A 01
	Cleanup Batch: CJE0010	Initial Volume: 0.5 mL	
	Cleaned: 04-May-2021	Final Volume: 0.5 mL	

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 %	85.2	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	68.0	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	83.5	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	65.3	%	


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

Reported:
 13-May-2021 13:22

MW-64-20211602
21D0265-12 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/16/2021 12:53
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 06:02
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-12 A 01
	Preparation Batch: BJD0680		
	Prepared: 04/30/2021		
Sample Cleanup:	Sample Size: 1000 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Silica Gel		
Sample Cleanup:	Cleanup Batch: CJE0011		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
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Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
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	Final Volume: 0.5 mL		
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	Initial Volume: 0.5 mL		
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	Initial Volume: 0.5 mL		
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Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
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	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
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Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
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	Cleanup Batch: CJE0009		
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Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
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	Cleanup Batch: CJE0009		
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	Final Volume: 0.5 mL		
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Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-12 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfur		
Sample Cleanup:	Cleanup Batch: CJE0010		Extract ID: 21D0265-12 A 01
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		
Sample Cleanup:			

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 %	85.9	%	
Surrogate: Tetrachlorometaxylene				32-120 %	70.7	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	87.7	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	67.7	%	


 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:
 13-May-2021 13:22

MW-68-20211602
21D0265-13 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/16/2021 15:03
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 06:24
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-13 A 01
	Preparation Batch: BJD0680		
	Prepared: 04/30/2021		
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 21D0265-13 A 01
	Cleanup Batch: CJE0011		
	Cleaned: 04-May-2021		
Sample Cleanup:	Cleanup Method: Sulfuric Acid		Extract ID:21D0265-13 A 01
	Cleanup Batch: CJE0009		
	Cleaned: 04-May-2021		
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:21D0265-13 A 01
	Cleanup Batch: CJE0010		
	Cleaned: 04-May-2021		

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 %	80.7	%	
Surrogate: Tetrachlorometaxylene				32-120 %	48.0	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	79.7	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	48.8	%	


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

Reported:
 13-May-2021 13:22

MW-63-20211702
21D0265-14 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/17/2021 08:51
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 07:29
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-14 A 01
	Preparation Batch: BJD0680		
	Sample Size: 1000 mL		
	Prepared: 04/30/2021		Final Volume: 0.5 mL
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 21D0265-14 A 01
	Cleanup Batch: CJE0011		
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		Final Volume: 0.5 mL
Sample Cleanup:	Cleanup Method: Sulfuric Acid		Extract ID:21D0265-14 A 01
	Cleanup Batch: CJE0009		
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		Final Volume: 0.5 mL
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:21D0265-14 A 01
	Cleanup Batch: CJE0010		
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021		Final Volume: 0.5 mL

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 %	81.9	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	60.6	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	80.2	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	56.5	%	


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

Reported:
 13-May-2021 13:22

MW-103-20211702
21D0265-15 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/17/2021 09:06
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 07:50
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-15 A 01
	Preparation Batch: BJD0680		
	Sample Size: 1000 mL		
	Prepared: 04/30/2021	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Silica Gel		Extract ID: 21D0265-15 A 01
	Cleanup Batch: CJE0011		
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Sulfuric Acid		Extract ID:21D0265-15 A 01
	Cleanup Batch: CJE0009		
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021	Final Volume: 0.5 mL	
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID:21D0265-15 A 01
	Cleanup Batch: CJE0010		
	Initial Volume: 0.5 mL		
	Cleaned: 04-May-2021	Final Volume: 0.5 mL	

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 %	84.8	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	67.5	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	84.3	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	62.9	%	


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 Seattle WA, 98103-8636

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

Reported:
 13-May-2021 13:22

MW-60-20211702
21D0265-16 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/17/2021 10:55
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 08:12
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-16 A 01
	Preparation Batch: BJD0680		
	Prepared: 04/30/2021		
Sample Cleanup:	Sample Size: 1000 mL		Extract ID: 21D0265-16 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Silica Gel		
Sample Cleanup:	Cleanup Batch: CJE0011		Extract ID: 21D0265-16 A 01
	Cleaned: 04-May-2021		
	Initial Volume: 0.5 mL		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-16 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Cleaned: 04-May-2021		Extract ID: 21D0265-16 A 01
	Initial Volume: 0.5 mL		
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID: 21D0265-16 A 01
	Cleanup Batch: CJE0010		
	Cleaned: 04-May-2021		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-16 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfuric Acid		

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 %	79.2	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	50.9	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	79.9	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	59.4	%	


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-71-20211702
21D0265-17 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/17/2021 11:54
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 08:34
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-17 A 01
	Preparation Batch: BJD0680		
	Prepared: 04/30/2021		
Sample Cleanup:	Sample Size: 1000 mL		Extract ID: 21D0265-17 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Silica Gel		
Sample Cleanup:	Cleanup Batch: CJE0011		Extract ID: 21D0265-17 A 01
	Cleaned: 04-May-2021		
	Initial Volume: 0.5 mL		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-17 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Cleaned: 04-May-2021		Extract ID: 21D0265-17 A 01
	Initial Volume: 0.5 mL		
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID: 21D0265-17 A 01
	Cleanup Batch: CJE0010		
	Cleaned: 04-May-2021		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-17 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfuric Acid		

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 %	77.5	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	54.8	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	76.0	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	54.5	%	


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

Reported:
 13-May-2021 13:22

MW-43-20211702
21D0265-18 (Water)
Aroclor PCB

Method: EPA 8082A			Sampled: 02/17/2021 14:44
Instrument: ECD7 Analyst: JGR			Analyzed: 05/11/2021 08:55
Sample Preparation:	Preparation Method: EPA 3510C SepF		Extract ID: 21D0265-18 A 01
	Preparation Batch: BJD0680		
	Prepared: 04/30/2021		
Sample Cleanup:	Sample Size: 1000 mL		Extract ID: 21D0265-18 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Silica Gel		
Sample Cleanup:	Cleanup Batch: CJE0011		Extract ID: 21D0265-18 A 01
	Cleaned: 04-May-2021		
	Initial Volume: 0.5 mL		
Sample Cleanup:	Final Volume: 0.5 mL		Extract ID: 21D0265-18 A 01
	Cleanup Method: Sulfuric Acid		
	Cleanup Batch: CJE0009		
Sample Cleanup:	Cleaned: 04-May-2021		Extract ID: 21D0265-18 A 01
	Initial Volume: 0.5 mL		
	Final Volume: 0.5 mL		
Sample Cleanup:	Cleanup Method: Sulfur		Extract ID: 21D0265-18 A 01
	Cleanup Batch: CJE0010		
	Cleaned: 04-May-2021		
Sample Cleanup:	Initial Volume: 0.5 mL		Extract ID: 21D0265-18 A 01
	Final Volume: 0.5 mL		
	Cleanup Method: Sulfuric Acid		

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 %	82.3	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	41.7	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	82.6	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	40.8	%	


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

Reported:
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Aroclor PCB - Quality Control
Batch BJD0680 - 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 (BJD0680-BLK1)						Prepared: 30-Apr-2021 Analyzed: 11-May-2021 02:47					
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	0.0152			ug/L	0.0200		76.2	29-120			
Surrogate: Tetrachlorometaxylene	0.0124			ug/L	0.0200		61.9	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0149			ug/L	0.0200		74.4	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0124			ug/L	0.0200		61.8	32-120			
LCS (BJD0680-BS1)						Prepared: 30-Apr-2021 Analyzed: 11-May-2021 03:09					
Aroclor 1016 [2C]	0.044	0.002	0.010	ug/L	0.0500		87.3	54-120			
Aroclor 1260	0.065	0.003	0.010	ug/L	0.0500		131	51-128			*
Surrogate: Decachlorobiphenyl	0.0154			ug/L	0.0200		77.1	29-120			
Surrogate: Tetrachlorometaxylene	0.0138			ug/L	0.0200		68.8	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0149			ug/L	0.0200		74.5	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0130			ug/L	0.0200		65.0	32-120			
LCS Dup (BJD0680-BSD1)						Prepared: 30-Apr-2021 Analyzed: 11-May-2021 03:31					
Aroclor 1016	0.044	0.002	0.010	ug/L	0.0500		87.6	54-120	2.49	30	
Aroclor 1260	0.048	0.003	0.010	ug/L	0.0500		95.2	51-128	31.40	30	*
Surrogate: Decachlorobiphenyl	0.0148			ug/L	0.0200		73.9	29-120			
Surrogate: Tetrachlorometaxylene	0.0146			ug/L	0.0200		72.8	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0148			ug/L	0.0200		74.0	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0138			ug/L	0.0200		69.2	32-120			



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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
EPA 8082A in Water	
Aroclor 1016	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1016	DoD-ELAP, NELAP, ADEC
Aroclor 1016 [2C]	DoD-ELAP, NELAP, ADEC
Aroclor 1016 [2C]	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1221	DoD-ELAP, NELAP, ADEC
Aroclor 1221	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1221 [2C]	DoD-ELAP, NELAP, ADEC
Aroclor 1221 [2C]	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1232	DoD-ELAP, NELAP, ADEC
Aroclor 1232	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1232 [2C]	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1232 [2C]	DoD-ELAP, NELAP, ADEC
Aroclor 1242	DoD-ELAP, NELAP, ADEC
Aroclor 1242	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1242 [2C]	DoD-ELAP, NELAP, ADEC
Aroclor 1242 [2C]	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1248	DoD-ELAP, NELAP, ADEC
Aroclor 1248	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1248 [2C]	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1248 [2C]	DoD-ELAP, NELAP, ADEC
Aroclor 1254	DoD-ELAP, NELAP, ADEC
Aroclor 1254	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1254 [2C]	DoD-ELAP, NELAP, ADEC
Aroclor 1254 [2C]	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1260	DoD-ELAP, NELAP, ADEC
Aroclor 1260	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1260 [2C]	DoD-ELAP, NELAP, ADEC
Aroclor 1260 [2C]	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1262	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1262	DoD-ELAP, NELAP, ADEC
Aroclor 1262 [2C]	DoD-ELAP, NELAP, ADEC
Aroclor 1262 [2C]	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1268	DoD-ELAP, NELAP, ADEC
Aroclor 1268	WADOE, DoD-ELAP, NELAP, ADEC
Aroclor 1268 [2C]	WADOE, DoD-ELAP, NELAP, ADEC



Analytical Resources, Incorporated
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-May-2021 13:22

Aroclor 1268 [2C]

DoD-ELAP,NELAP,ADEC

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



Analytical Resources, Incorporated
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-May-2021 13:22

Notes and Definitions

*	Flagged value is not within established control limits.
D	The reported value is from a dilution
J	Estimated concentration value detected below the reporting limit.
NRS	This surrogate not reported due to chromatographic interference
P1	The reported value is greater than 40% difference between the concentrations determined on two GC columns where applicable.
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.



Environment Testing America

ANALYTICAL REPORT

Eurofins TestAmerica, Sacramento
880 Riverside Parkway
West Sacramento, CA 95605
Tel: (916)373-5600

Laboratory Job ID: 320-70313-1
Client Project/Site: EMJ

For:

Shannon & Wilson, Inc
400 N. 34th Suite 100
PO BOX 300303
Seattle, Washington 98103

Attn: Meg Strong

Authorized for release by:
2/25/2021 12:57:32 PM

David Alltucker, Project Manager I
(916)374-4383
David.Alltucker@Eurofinset.com

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This report has been electronically signed and authorized by the signatory. Electronic signature is intended to be the legally binding equivalent of a traditionally handwritten signature.

Results relate only to the items tested and the sample(s) as received by the laboratory.

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Definitions/Glossary

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Qualifiers

LCMS

Qualifier	Qualifier Description
I	Value is EMPC (estimated maximum possible concentration).
J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
α	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CFU	Colony Forming Unit
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MCL	EPA recommended "Maximum Contaminant Level"
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
MPN	Most Probable Number
MQL	Method Quantitation Limit
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
NEG	Negative / Absent
POS	Positive / Present
PQL	Practical Quantitation Limit
PRES	Presumptive
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)
TNTC	Too Numerous To Count

Case Narrative

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Job ID: 320-70313-1

Laboratory: Eurofins TestAmerica, Sacramento

Narrative

Job Narrative 320-70313-1

Receipt

The samples were received on 2/19/2021 4:11 PM. Unless otherwise noted below, the samples arrived in good condition, and where required, properly preserved and on ice. The temperature of the cooler at receipt was 0.9° C.

LCMS

Method 537 (modified): The "I" qualifier means the transition mass ratio for the indicated analyte was outside of the established ratio limits. The qualitative identification of the analyte has some degree of uncertainty, and the reported value may have some high bias. However, analyst judgement was used to positively identify the analyte. MW-68-20211602 (320-70313-5)

Method 537 (modified): Results for samples MW-60-20211602 (320-70313-3), MW-43-20211602 (320-70313-4) and MW-64-20211602 (320-70313-6) were reported from the analysis of a diluted extract due to high concentration of the target analyte in the analysis of the undiluted extract. The dilution factor was applied to the labeled internal standard area counts and these area counts were within acceptance limits

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Organic Prep

Method 3535: Insufficient sample volume was available to perform a matrix spike/matrix spike duplicate (MS/MSD) associated with preparation batch 320-464133 and 320-464133.

Method 3535: The following samples were beige prior to extraction: MW-60-20211602 (320-70313-3), MW-43-20211602 (320-70313-4), MW-68-20211602 (320-70313-5), MW-64-20211602 (320-70313-6) and MW-71-20211602 (320-70313-8)

Method 3535: The following sample contained sediments which clogged the cartridge during extraction: MW-64-20211602 (320-70313-6)

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-72-20211602

Lab Sample ID: 320-70313-1

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	0.67	J	1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	3.0		1.8	0.50	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	0.45	J	1.8	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.0		1.8	0.75	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	3.6		1.8	0.48	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-63-20211602

Lab Sample ID: 320-70313-2

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	6.4		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	150		1.8	0.52	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	6.4		1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	18		1.8	0.77	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	190		1.8	0.49	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-60-20211602

Lab Sample ID: 320-70313-3

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	110		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	190		1.8	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	180		1.8	0.76	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2100		90	26	ng/L	50		537 (modified)	Total/NA
- DL									
Perfluorooctanesulfonic acid (PFOS) - DL	4100		90	24	ng/L	50		537 (modified)	Total/NA

Client Sample ID: MW-43-20211602

Lab Sample ID: 320-70313-4

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	190		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	31		1.8	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	50		1.8	0.75	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	730		18	5.0	ng/L	10		537 (modified)	Total/NA
- DL									
Perfluorooctanesulfonic acid (PFOS) - DL	79		18	4.7	ng/L	10		537 (modified)	Total/NA

Client Sample ID: MW-68-20211602

Lab Sample ID: 320-70313-5

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	3.7		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	34		1.8	0.52	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	4.2		1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	22		1.8	0.78	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	67	I	1.8	0.50	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	2.3		1.8	0.25	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-64-20211602

Lab Sample ID: 320-70313-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	14		1.7	0.17	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	150		1.7	0.49	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	11		1.7	0.22	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	14		1.7	0.73	ng/L	1		537 (modified)	Total/NA

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Detection Summary

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-64-20211602 (Continued)

Lab Sample ID: 320-70313-6

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorononanoic acid (PFNA)	0.48	J	1.7	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS) - DL	730		17	4.7	ng/L	10		537 (modified)	Total/NA

Client Sample ID: MW-8-20211602

Lab Sample ID: 320-70313-7

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	2.2		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	27		1.8	0.52	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.2	J	1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	3.2		1.8	0.77	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	46		1.8	0.49	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-71-20211602

Lab Sample ID: 320-70313-8

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	1.1	J	1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	2.4		1.8	0.52	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	1.3	J	1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	2.7		1.8	0.78	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	7.5		1.8	0.49	ng/L	1		537 (modified)	Total/NA
Perfluorononanoic acid (PFNA)	0.47	J	1.8	0.25	ng/L	1		537 (modified)	Total/NA

Client Sample ID: MW-103-20211602

Lab Sample ID: 320-70313-9

Analyte	Result	Qualifier	RL	MDL	Unit	Dil Fac	D	Method	Prep Type
Perfluorobutanesulfonic acid (PFBS)	6.4		1.8	0.18	ng/L	1		537 (modified)	Total/NA
Perfluorohexanesulfonic acid (PFHxS)	160		1.8	0.53	ng/L	1		537 (modified)	Total/NA
Perfluoroheptanoic acid (PFHpA)	5.9		1.8	0.23	ng/L	1		537 (modified)	Total/NA
Perfluorooctanoic acid (PFOA)	19		1.8	0.79	ng/L	1		537 (modified)	Total/NA
Perfluorooctanesulfonic acid (PFOS)	190		1.8	0.50	ng/L	1		537 (modified)	Total/NA

Client Sample ID: EB-1-20211602

Lab Sample ID: 320-70313-10

No Detections.

Client Sample ID: FB-1-20211602

Lab Sample ID: 320-70313-11

No Detections.

This Detection Summary does not include radiochemical test results.

Eurofins TestAmerica, Sacramento

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-72-20211602

Lab Sample ID: 320-70313-1

Date Collected: 02/16/21 10:06

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	0.67	J	1.8	0.18	ng/L		02/22/21 18:57	02/23/21 16:30	1
Perfluorohexanesulfonic acid (PFHxS)	3.0		1.8	0.50	ng/L		02/22/21 18:57	02/23/21 16:30	1
Perfluoroheptanoic acid (PFHpA)	0.45	J	1.8	0.22	ng/L		02/22/21 18:57	02/23/21 16:30	1
Perfluorooctanoic acid (PFOA)	2.0		1.8	0.75	ng/L		02/22/21 18:57	02/23/21 16:30	1
Perfluorooctanesulfonic acid (PFOS)	3.6		1.8	0.48	ng/L		02/22/21 18:57	02/23/21 16:30	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.24	ng/L		02/22/21 18:57	02/23/21 16:30	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	74		25 - 150				02/22/21 18:57	02/23/21 16:30	1
13C4 PFHpA	84		25 - 150				02/22/21 18:57	02/23/21 16:30	1
13C4 PFOA	95		25 - 150				02/22/21 18:57	02/23/21 16:30	1
13C3 PFBS	73		25 - 150				02/22/21 18:57	02/23/21 16:30	1
13C4 PFOS	79		25 - 150				02/22/21 18:57	02/23/21 16:30	1
13C5 PFNA	89		25 - 150				02/22/21 18:57	02/23/21 16:30	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-63-20211602

Lab Sample ID: 320-70313-2

Date Collected: 02/17/21 08:51

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	6.4		1.8	0.18	ng/L		02/22/21 18:57	02/23/21 16:39	1
Perfluorohexanesulfonic acid (PFHxS)	150		1.8	0.52	ng/L		02/22/21 18:57	02/23/21 16:39	1
Perfluoroheptanoic acid (PFHpA)	6.4		1.8	0.23	ng/L		02/22/21 18:57	02/23/21 16:39	1
Perfluorooctanoic acid (PFOA)	18		1.8	0.77	ng/L		02/22/21 18:57	02/23/21 16:39	1
Perfluorooctanesulfonic acid (PFOS)	190		1.8	0.49	ng/L		02/22/21 18:57	02/23/21 16:39	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.25	ng/L		02/22/21 18:57	02/23/21 16:39	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	78		25 - 150				02/22/21 18:57	02/23/21 16:39	1
13C4 PFHpA	86		25 - 150				02/22/21 18:57	02/23/21 16:39	1
13C4 PFOA	100		25 - 150				02/22/21 18:57	02/23/21 16:39	1
13C3 PFBS	77		25 - 150				02/22/21 18:57	02/23/21 16:39	1
13C4 PFOS	81		25 - 150				02/22/21 18:57	02/23/21 16:39	1
13C5 PFNA	97		25 - 150				02/22/21 18:57	02/23/21 16:39	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-60-20211602

Lab Sample ID: 320-70313-3

Date Collected: 02/17/21 10:55

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	110		1.8	0.18	ng/L		02/22/21 18:57	02/23/21 16:48	1
Perfluoroheptanoic acid (PFHpA)	190		1.8	0.22	ng/L		02/22/21 18:57	02/23/21 16:48	1
Perfluorooctanoic acid (PFOA)	180		1.8	0.76	ng/L		02/22/21 18:57	02/23/21 16:48	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.24	ng/L		02/22/21 18:57	02/23/21 16:48	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
13C4 PFHpA	67		25 - 150				02/22/21 18:57	02/23/21 16:48	1
13C4 PFOA	97		25 - 150				02/22/21 18:57	02/23/21 16:48	1
13C3 PFBS	87		25 - 150				02/22/21 18:57	02/23/21 16:48	1
13C5 PFNA	65		25 - 150				02/22/21 18:57	02/23/21 16:48	1

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	2100		90	26	ng/L		02/22/21 18:57	02/24/21 13:43	50
Perfluorooctanesulfonic acid (PFOS)	4100		90	24	ng/L		02/22/21 18:57	02/24/21 13:43	50
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	68		25 - 150				02/22/21 18:57	02/24/21 13:43	50
13C4 PFOS	71		25 - 150				02/22/21 18:57	02/24/21 13:43	50

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-43-20211602

Lab Sample ID: 320-70313-4

Date Collected: 02/17/21 14:44

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	190		1.8	0.18	ng/L		02/22/21 18:57	02/23/21 16:57	1
Perfluoroheptanoic acid (PFHpA)	31		1.8	0.22	ng/L		02/22/21 18:57	02/23/21 16:57	1
Perfluorooctanoic acid (PFOA)	50		1.8	0.75	ng/L		02/22/21 18:57	02/23/21 16:57	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.24	ng/L		02/22/21 18:57	02/23/21 16:57	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFHpA	94		25 - 150	02/22/21 18:57	02/23/21 16:57	1
13C4 PFOA	118		25 - 150	02/22/21 18:57	02/23/21 16:57	1
13C3 PFBS	83		25 - 150	02/22/21 18:57	02/23/21 16:57	1
13C5 PFNA	115		25 - 150	02/22/21 18:57	02/23/21 16:57	1

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorohexanesulfonic acid (PFHxS)	730		18	5.0	ng/L		02/22/21 18:57	02/24/21 13:25	10
Perfluorooctanesulfonic acid (PFOS)	79		18	4.7	ng/L		02/22/21 18:57	02/24/21 13:25	10

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	71		25 - 150	02/22/21 18:57	02/24/21 13:25	10
13C4 PFOS	76		25 - 150	02/22/21 18:57	02/24/21 13:25	10

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-68-20211602

Lab Sample ID: 320-70313-5

Date Collected: 02/16/21 15:03

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	3.7		1.8	0.18	ng/L		02/22/21 18:57	02/23/21 17:07	1
Perfluorohexanesulfonic acid (PFHxS)	34		1.8	0.52	ng/L		02/22/21 18:57	02/23/21 17:07	1
Perfluoroheptanoic acid (PFHpA)	4.2		1.8	0.23	ng/L		02/22/21 18:57	02/23/21 17:07	1
Perfluorooctanoic acid (PFOA)	22		1.8	0.78	ng/L		02/22/21 18:57	02/23/21 17:07	1
Perfluorooctanesulfonic acid (PFOS)	67	I	1.8	0.50	ng/L		02/22/21 18:57	02/23/21 17:07	1
Perfluorononanoic acid (PFNA)	2.3		1.8	0.25	ng/L		02/22/21 18:57	02/23/21 17:07	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	125		25 - 150				02/22/21 18:57	02/23/21 17:07	1
13C4 PFHpA	88		25 - 150				02/22/21 18:57	02/23/21 17:07	1
13C4 PFOA	108		25 - 150				02/22/21 18:57	02/23/21 17:07	1
13C3 PFBS	106		25 - 150				02/22/21 18:57	02/23/21 17:07	1
13C4 PFOS	124		25 - 150				02/22/21 18:57	02/23/21 17:07	1
13C5 PFNA	99		25 - 150				02/22/21 18:57	02/23/21 17:07	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-64-20211602

Lab Sample ID: 320-70313-6

Date Collected: 02/16/21 12:53

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	14		1.7	0.17	ng/L		02/22/21 18:57	02/23/21 17:16	1
Perfluorohexanesulfonic acid (PFHxS)	150		1.7	0.49	ng/L		02/22/21 18:57	02/23/21 17:16	1
Perfluoroheptanoic acid (PFHpA)	11		1.7	0.22	ng/L		02/22/21 18:57	02/23/21 17:16	1
Perfluorooctanoic acid (PFOA)	14		1.7	0.73	ng/L		02/22/21 18:57	02/23/21 17:16	1
Perfluorononanoic acid (PFNA)	0.48 J		1.7	0.23	ng/L		02/22/21 18:57	02/23/21 17:16	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	73		25 - 150	02/22/21 18:57	02/23/21 17:16	1
13C4 PFHpA	76		25 - 150	02/22/21 18:57	02/23/21 17:16	1
13C4 PFOA	80		25 - 150	02/22/21 18:57	02/23/21 17:16	1
13C3 PFBS	67		25 - 150	02/22/21 18:57	02/23/21 17:16	1
13C5 PFNA	78		25 - 150	02/22/21 18:57	02/23/21 17:16	1

Method: 537 (modified) - Fluorinated Alkyl Substances - DL

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorooctanesulfonic acid (PFOS)	730		17	4.7	ng/L		02/22/21 18:57	02/24/21 13:16	10

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
13C4 PFOS	63		25 - 150	02/22/21 18:57	02/24/21 13:16	10

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-8-20211602

Lab Sample ID: 320-70313-7

Date Collected: 02/16/21 08:53

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	2.2		1.8	0.18	ng/L		02/22/21 18:57	02/23/21 17:25	1
Perfluorohexanesulfonic acid (PFHxS)	27		1.8	0.52	ng/L		02/22/21 18:57	02/23/21 17:25	1
Perfluoroheptanoic acid (PFHpA)	1.2	J	1.8	0.23	ng/L		02/22/21 18:57	02/23/21 17:25	1
Perfluorooctanoic acid (PFOA)	3.2		1.8	0.77	ng/L		02/22/21 18:57	02/23/21 17:25	1
Perfluorooctanesulfonic acid (PFOS)	46		1.8	0.49	ng/L		02/22/21 18:57	02/23/21 17:25	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.24	ng/L		02/22/21 18:57	02/23/21 17:25	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	81		25 - 150				02/22/21 18:57	02/23/21 17:25	1
13C4 PFHpA	92		25 - 150				02/22/21 18:57	02/23/21 17:25	1
13C4 PFOA	106		25 - 150				02/22/21 18:57	02/23/21 17:25	1
13C3 PFBS	81		25 - 150				02/22/21 18:57	02/23/21 17:25	1
13C4 PFOS	83		25 - 150				02/22/21 18:57	02/23/21 17:25	1
13C5 PFNA	99		25 - 150				02/22/21 18:57	02/23/21 17:25	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-71-20211602

Lab Sample ID: 320-70313-8

Date Collected: 02/17/21 11:54

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	1.1	J	1.8	0.18	ng/L		02/22/21 18:57	02/23/21 17:52	1
Perfluorohexanesulfonic acid (PFHxS)	2.4		1.8	0.52	ng/L		02/22/21 18:57	02/23/21 17:52	1
Perfluoroheptanoic acid (PFHpA)	1.3	J	1.8	0.23	ng/L		02/22/21 18:57	02/23/21 17:52	1
Perfluorooctanoic acid (PFOA)	2.7		1.8	0.78	ng/L		02/22/21 18:57	02/23/21 17:52	1
Perfluorooctanesulfonic acid (PFOS)	7.5		1.8	0.49	ng/L		02/22/21 18:57	02/23/21 17:52	1
Perfluorononanoic acid (PFNA)	0.47	J	1.8	0.25	ng/L		02/22/21 18:57	02/23/21 17:52	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	76		25 - 150				02/22/21 18:57	02/23/21 17:52	1
13C4 PFHpA	92		25 - 150				02/22/21 18:57	02/23/21 17:52	1
13C4 PFOA	108		25 - 150				02/22/21 18:57	02/23/21 17:52	1
13C3 PFBS	77		25 - 150				02/22/21 18:57	02/23/21 17:52	1
13C4 PFOS	77		25 - 150				02/22/21 18:57	02/23/21 17:52	1
13C5 PFNA	89		25 - 150				02/22/21 18:57	02/23/21 17:52	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-103-20211602

Lab Sample ID: 320-70313-9

Date Collected: 02/17/21 09:06

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	6.4		1.8	0.18	ng/L		02/22/21 18:57	02/23/21 18:01	1
Perfluorohexanesulfonic acid (PFHxS)	160		1.8	0.53	ng/L		02/22/21 18:57	02/23/21 18:01	1
Perfluoroheptanoic acid (PFHpA)	5.9		1.8	0.23	ng/L		02/22/21 18:57	02/23/21 18:01	1
Perfluorooctanoic acid (PFOA)	19		1.8	0.79	ng/L		02/22/21 18:57	02/23/21 18:01	1
Perfluorooctanesulfonic acid (PFOS)	190		1.8	0.50	ng/L		02/22/21 18:57	02/23/21 18:01	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.25	ng/L		02/22/21 18:57	02/23/21 18:01	1
Isotope Dilution	%Recovery	Qualifier	Limits				Prepared	Analyzed	Dil Fac
18O2 PFHxS	75		25 - 150				02/22/21 18:57	02/23/21 18:01	1
13C4 PFHpA	87		25 - 150				02/22/21 18:57	02/23/21 18:01	1
13C4 PFOA	98		25 - 150				02/22/21 18:57	02/23/21 18:01	1
13C3 PFBS	77		25 - 150				02/22/21 18:57	02/23/21 18:01	1
13C4 PFOS	77		25 - 150				02/22/21 18:57	02/23/21 18:01	1
13C5 PFNA	89		25 - 150				02/22/21 18:57	02/23/21 18:01	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: EB-1-20211602

Lab Sample ID: 320-70313-10

Date Collected: 02/17/21 12:30

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		02/22/21 18:57	02/23/21 18:11	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.51	ng/L		02/22/21 18:57	02/23/21 18:11	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.22	ng/L		02/22/21 18:57	02/23/21 18:11	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.76	ng/L		02/22/21 18:57	02/23/21 18:11	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.48	ng/L		02/22/21 18:57	02/23/21 18:11	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.24	ng/L		02/22/21 18:57	02/23/21 18:11	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	73		25 - 150	02/22/21 18:57	02/23/21 18:11	1
13C4 PFHpA	84		25 - 150	02/22/21 18:57	02/23/21 18:11	1
13C4 PFOA	96		25 - 150	02/22/21 18:57	02/23/21 18:11	1
13C3 PFBS	79		25 - 150	02/22/21 18:57	02/23/21 18:11	1
13C4 PFOS	79		25 - 150	02/22/21 18:57	02/23/21 18:11	1
13C5 PFNA	95		25 - 150	02/22/21 18:57	02/23/21 18:11	1

Client Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: FB-1-20211602

Lab Sample ID: 320-70313-11

Date Collected: 02/17/21 11:30

Matrix: Water

Date Received: 02/19/21 16:11

Method: 537 (modified) - Fluorinated Alkyl Substances

Analyte	Result	Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		1.8	0.18	ng/L		02/22/21 18:57	02/23/21 18:20	1
Perfluorohexanesulfonic acid (PFHxS)	ND		1.8	0.51	ng/L		02/22/21 18:57	02/23/21 18:20	1
Perfluoroheptanoic acid (PFHpA)	ND		1.8	0.22	ng/L		02/22/21 18:57	02/23/21 18:20	1
Perfluorooctanoic acid (PFOA)	ND		1.8	0.76	ng/L		02/22/21 18:57	02/23/21 18:20	1
Perfluorooctanesulfonic acid (PFOS)	ND		1.8	0.48	ng/L		02/22/21 18:57	02/23/21 18:20	1
Perfluorononanoic acid (PFNA)	ND		1.8	0.24	ng/L		02/22/21 18:57	02/23/21 18:20	1

Isotope Dilution	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	82		25 - 150	02/22/21 18:57	02/23/21 18:20	1
13C4 PFHpA	93		25 - 150	02/22/21 18:57	02/23/21 18:20	1
13C4 PFOA	108		25 - 150	02/22/21 18:57	02/23/21 18:20	1
13C3 PFBS	88		25 - 150	02/22/21 18:57	02/23/21 18:20	1
13C4 PFOS	88		25 - 150	02/22/21 18:57	02/23/21 18:20	1
13C5 PFNA	97		25 - 150	02/22/21 18:57	02/23/21 18:20	1

Isotope Dilution Summary

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Matrix: Water

Prep Type: Total/NA

Lab Sample ID	Client Sample ID	Percent Isotope Dilution Recovery (Acceptance Limits)					
		PFHxS (25-150)	C4PFHA (25-150)	PFOA (25-150)	C3PFBS (25-150)	PFOS (25-150)	PFNA (25-150)
320-70313-1	MW-72-20211602	74	84	95	73	79	89
320-70313-2	MW-63-20211602	78	86	100	77	81	97
320-70313-3	MW-60-20211602		67	97	87		65
320-70313-3 - DL	MW-60-20211602	68				71	
320-70313-4	MW-43-20211602		94	118	83		115
320-70313-4 - DL	MW-43-20211602	71				76	
320-70313-5	MW-68-20211602	125	88	108	106	124	99
320-70313-6	MW-64-20211602	73	76	80	67		78
320-70313-6 - DL	MW-64-20211602					63	
320-70313-7	MW-8-20211602	81	92	106	81	83	99
320-70313-8	MW-71-20211602	76	92	108	77	77	89
320-70313-9	MW-103-20211602	75	87	98	77	77	89
320-70313-10	EB-1-20211602	73	84	96	79	79	95
320-70313-11	FB-1-20211602	82	93	108	88	88	97
LCS 320-464133/2-A	Lab Control Sample	78	94	98	81	82	98
LCSD 320-464133/3-A	Lab Control Sample Dup	76	88	99	77	82	90
MB 320-464133/1-A	Method Blank	70	80	96	72	74	88

Surrogate Legend

PFHxS = 18O2 PFHxS
C4PFHA = 13C4 PFHpA
PFOA = 13C4 PFOA
C3PFBS = 13C3 PFBS
PFOS = 13C4 PFOS
PFNA = 13C5 PFNA

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Method: 537 (modified) - Fluorinated Alkyl Substances

Lab Sample ID: MB 320-464133/1-A

Matrix: Water

Analysis Batch: 464419

Client Sample ID: Method Blank

Prep Type: Total/NA

Prep Batch: 464133

Analyte	MB Result	MB Qualifier	RL	MDL	Unit	D	Prepared	Analyzed	Dil Fac
Perfluorobutanesulfonic acid (PFBS)	ND		2.0	0.20	ng/L		02/22/21 18:57	02/23/21 16:03	1
Perfluorohexanesulfonic acid (PFHxS)	ND		2.0	0.57	ng/L		02/22/21 18:57	02/23/21 16:03	1
Perfluoroheptanoic acid (PFHpA)	ND		2.0	0.25	ng/L		02/22/21 18:57	02/23/21 16:03	1
Perfluorooctanoic acid (PFOA)	ND		2.0	0.85	ng/L		02/22/21 18:57	02/23/21 16:03	1
Perfluorooctanesulfonic acid (PFOS)	ND		2.0	0.54	ng/L		02/22/21 18:57	02/23/21 16:03	1
Perfluorononanoic acid (PFNA)	ND		2.0	0.27	ng/L		02/22/21 18:57	02/23/21 16:03	1

Isotope Dilution	MB %Recovery	MB Qualifier	Limits	Prepared	Analyzed	Dil Fac
18O2 PFHxS	70		25 - 150	02/22/21 18:57	02/23/21 16:03	1
13C4 PFHpA	80		25 - 150	02/22/21 18:57	02/23/21 16:03	1
13C4 PFOA	96		25 - 150	02/22/21 18:57	02/23/21 16:03	1
13C3 PFBS	72		25 - 150	02/22/21 18:57	02/23/21 16:03	1
13C4 PFOS	74		25 - 150	02/22/21 18:57	02/23/21 16:03	1
13C5 PFNA	88		25 - 150	02/22/21 18:57	02/23/21 16:03	1

Lab Sample ID: LCS 320-464133/2-A

Matrix: Water

Analysis Batch: 464419

Client Sample ID: Lab Control Sample

Prep Type: Total/NA

Prep Batch: 464133

Analyte	Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits
Perfluorobutanesulfonic acid (PFBS)	35.4	37.8		ng/L		107	67 - 127
Perfluorohexanesulfonic acid (PFHxS)	36.4	37.2		ng/L		102	59 - 119
Perfluoroheptanoic acid (PFHpA)	40.0	42.0		ng/L		105	72 - 132
Perfluorooctanoic acid (PFOA)	40.0	38.7		ng/L		97	70 - 130
Perfluorooctanesulfonic acid (PFOS)	37.1	38.7		ng/L		104	70 - 130
Perfluorononanoic acid (PFNA)	40.0	43.8		ng/L		110	75 - 135

Isotope Dilution	LCS %Recovery	LCS Qualifier	Limits
18O2 PFHxS	78		25 - 150
13C4 PFHpA	94		25 - 150
13C4 PFOA	98		25 - 150
13C3 PFBS	81		25 - 150
13C4 PFOS	82		25 - 150
13C5 PFNA	98		25 - 150

Lab Sample ID: LCSD 320-464133/3-A

Matrix: Water

Analysis Batch: 464419

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 464133

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorobutanesulfonic acid (PFBS)	35.4	37.9		ng/L		107	67 - 127	0	30
Perfluorohexanesulfonic acid (PFHxS)	36.4	36.1		ng/L		99	59 - 119	3	30
Perfluoroheptanoic acid (PFHpA)	40.0	42.3		ng/L		106	72 - 132	1	30
Perfluorooctanoic acid (PFOA)	40.0	41.1		ng/L		103	70 - 130	6	30

Eurofins TestAmerica, Sacramento

QC Sample Results

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Method: 537 (modified) - Fluorinated Alkyl Substances (Continued)

Lab Sample ID: LCSD 320-464133/3-A

Matrix: Water

Analysis Batch: 464419

Client Sample ID: Lab Control Sample Dup

Prep Type: Total/NA

Prep Batch: 464133

Analyte	Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Perfluorooctanesulfonic acid (PFOS)	37.1	39.3		ng/L		106	70 - 130	1	30
Perfluorononanoic acid (PFNA)	40.0	45.4		ng/L		113	75 - 135	3	30
Isotope Dilution	LCSD %Recovery	LCSD Qualifier	LCSD Limits						
18O2 PFHxS	76		25 - 150						
13C4 PFHpA	88		25 - 150						
13C4 PFOA	99		25 - 150						
13C3 PFBS	77		25 - 150						
13C4 PFOS	82		25 - 150						
13C5 PFNA	90		25 - 150						

QC Association Summary

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

LCMS

Prep Batch: 464133

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-70313-1	MW-72-20211602	Total/NA	Water	3535	
320-70313-2	MW-63-20211602	Total/NA	Water	3535	
320-70313-3	MW-60-20211602	Total/NA	Water	3535	
320-70313-3 - DL	MW-60-20211602	Total/NA	Water	3535	
320-70313-4 - DL	MW-43-20211602	Total/NA	Water	3535	
320-70313-4	MW-43-20211602	Total/NA	Water	3535	
320-70313-5	MW-68-20211602	Total/NA	Water	3535	
320-70313-6	MW-64-20211602	Total/NA	Water	3535	
320-70313-6 - DL	MW-64-20211602	Total/NA	Water	3535	
320-70313-7	MW-8-20211602	Total/NA	Water	3535	
320-70313-8	MW-71-20211602	Total/NA	Water	3535	
320-70313-9	MW-103-20211602	Total/NA	Water	3535	
320-70313-10	EB-1-20211602	Total/NA	Water	3535	
320-70313-11	FB-1-20211602	Total/NA	Water	3535	
MB 320-464133/1-A	Method Blank	Total/NA	Water	3535	
LCS 320-464133/2-A	Lab Control Sample	Total/NA	Water	3535	
LCSD 320-464133/3-A	Lab Control Sample Dup	Total/NA	Water	3535	

Analysis Batch: 464419

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-70313-1	MW-72-20211602	Total/NA	Water	537 (modified)	464133
320-70313-2	MW-63-20211602	Total/NA	Water	537 (modified)	464133
320-70313-3	MW-60-20211602	Total/NA	Water	537 (modified)	464133
320-70313-4	MW-43-20211602	Total/NA	Water	537 (modified)	464133
320-70313-5	MW-68-20211602	Total/NA	Water	537 (modified)	464133
320-70313-6	MW-64-20211602	Total/NA	Water	537 (modified)	464133
320-70313-7	MW-8-20211602	Total/NA	Water	537 (modified)	464133
320-70313-8	MW-71-20211602	Total/NA	Water	537 (modified)	464133
320-70313-9	MW-103-20211602	Total/NA	Water	537 (modified)	464133
320-70313-10	EB-1-20211602	Total/NA	Water	537 (modified)	464133
320-70313-11	FB-1-20211602	Total/NA	Water	537 (modified)	464133
MB 320-464133/1-A	Method Blank	Total/NA	Water	537 (modified)	464133
LCS 320-464133/2-A	Lab Control Sample	Total/NA	Water	537 (modified)	464133
LCSD 320-464133/3-A	Lab Control Sample Dup	Total/NA	Water	537 (modified)	464133

Analysis Batch: 464815

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
320-70313-3 - DL	MW-60-20211602	Total/NA	Water	537 (modified)	464133
320-70313-4 - DL	MW-43-20211602	Total/NA	Water	537 (modified)	464133
320-70313-6 - DL	MW-64-20211602	Total/NA	Water	537 (modified)	464133

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-72-20211602

Lab Sample ID: 320-70313-1

Date Collected: 02/16/21 10:06

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			282.5 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 16:30	K1S	TAL SAC

Client Sample ID: MW-63-20211602

Lab Sample ID: 320-70313-2

Date Collected: 02/17/21 08:51

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			274.2 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 16:39	K1S	TAL SAC

Client Sample ID: MW-60-20211602

Lab Sample ID: 320-70313-3

Date Collected: 02/17/21 10:55

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			278.7 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 16:48	K1S	TAL SAC
Total/NA	Prep	3535	DL		278.7 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)	DL	50			464815	02/24/21 13:43	S1M	TAL SAC

Client Sample ID: MW-43-20211602

Lab Sample ID: 320-70313-4

Date Collected: 02/17/21 14:44

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			284.7 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 16:57	K1S	TAL SAC
Total/NA	Prep	3535	DL		284.7 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)	DL	10			464815	02/24/21 13:25	S1M	TAL SAC

Client Sample ID: MW-68-20211602

Lab Sample ID: 320-70313-5

Date Collected: 02/16/21 15:03

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			271.5 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 17:07	K1S	TAL SAC

Client Sample ID: MW-64-20211602

Lab Sample ID: 320-70313-6

Date Collected: 02/16/21 12:53

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			289.6 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 17:16	K1S	TAL SAC

Eurofins TestAmerica, Sacramento

Lab Chronicle

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Client Sample ID: MW-64-20211602

Lab Sample ID: 320-70313-6

Date Collected: 02/16/21 12:53

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535	DL		289.6 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)	DL	10			464815	02/24/21 13:16	S1M	TAL SAC

Client Sample ID: MW-8-20211602

Lab Sample ID: 320-70313-7

Date Collected: 02/16/21 08:53

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			275.9 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 17:25	K1S	TAL SAC

Client Sample ID: MW-71-20211602

Lab Sample ID: 320-70313-8

Date Collected: 02/17/21 11:54

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			274.1 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 17:52	K1S	TAL SAC

Client Sample ID: MW-103-20211602

Lab Sample ID: 320-70313-9

Date Collected: 02/17/21 09:06

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			270.7 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 18:01	K1S	TAL SAC

Client Sample ID: EB-1-20211602

Lab Sample ID: 320-70313-10

Date Collected: 02/17/21 12:30

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			279.5 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 18:11	K1S	TAL SAC

Client Sample ID: FB-1-20211602

Lab Sample ID: 320-70313-11

Date Collected: 02/17/21 11:30

Matrix: Water

Date Received: 02/19/21 16:11

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	3535			279.4 mL	10.00 mL	464133	02/22/21 18:57	VP	TAL SAC
Total/NA	Analysis	537 (modified)		1			464419	02/23/21 18:20	K1S	TAL SAC

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Eurofins TestAmerica, Sacramento

Accreditation/Certification Summary

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Laboratory: Eurofins TestAmerica, Sacramento

All accreditations/certifications held by this laboratory are listed. Not all accreditations/certifications are applicable to this report.

Authority	Program	Identification Number	Expiration Date
Alaska (UST)	State	17-020	02-20-24
ANAB	Dept. of Defense ELAP	L2468	01-20-24
ANAB	Dept. of Energy	L2468.01	01-20-21 *
ANAB	ISO/IEC 17025	L2468	01-20-21 *
Arizona	State	AZ0708	08-11-21
Arkansas DEQ	State	88-0691	06-17-21
California	State	2897	02-01-23
Colorado	State	CA0004	08-31-21
Connecticut	State	PH-0691	06-30-21
Florida	NELAP	E87570	06-30-21
Georgia	State	4040	01-29-22
Hawaii	State	<cert No.>	01-29-22
Illinois	NELAP	200060	03-17-21
Kansas	NELAP	E-10375	02-01-21 *
Louisiana	NELAP	01944	06-30-21
Maine	State	CA00004	04-14-22
Michigan	State	9947	01-29-21 *
Nevada	State	CA000442021-2	07-31-21
New Hampshire	NELAP	2997	04-18-21
New Jersey	NELAP	CA005	06-30-21
New York	NELAP	11666	04-01-21
Ohio	State	41252	01-29-22
Oregon	NELAP	4040	01-29-22
Pennsylvania	NELAP	68-01272	03-31-21
Texas	NELAP	T104704399-19-13	06-01-21
US Fish & Wildlife	US Federal Programs	58448	07-31-21
USDA	US Federal Programs	P330-18-00239	07-31-21
Utah	NELAP	CA000442019-01	02-28-21
Vermont	State	VT-4040	04-16-21
Virginia	NELAP	460278	03-14-21
Washington	State	C581	05-05-21
West Virginia (DW)	State	9930C	12-31-21
Wisconsin	State	998204680	08-31-21
Wyoming	State Program	8TMS-L	01-28-19 *

* Accreditation/Certification renewal pending - accreditation/certification considered valid.

Eurofins TestAmerica, Sacramento

Method Summary

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Method	Method Description	Protocol	Laboratory
537 (modified)	Fluorinated Alkyl Substances	EPA	TAL SAC
3535	Solid-Phase Extraction (SPE)	SW846	TAL SAC

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

Laboratory References:

TAL SAC = Eurofins TestAmerica, Sacramento, 880 Riverside Parkway, West Sacramento, CA 95605, TEL (916)373-5600

Sample Summary

Client: Shannon & Wilson, Inc
Project/Site: EMJ

Job ID: 320-70313-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received	Asset ID
320-70313-1	MW-72-20211602	Water	02/16/21 10:06	02/19/21 16:11	
320-70313-2	MW-63-20211602	Water	02/17/21 08:51	02/19/21 16:11	
320-70313-3	MW-60-20211602	Water	02/17/21 10:55	02/19/21 16:11	
320-70313-4	MW-43-20211602	Water	02/17/21 14:44	02/19/21 16:11	
320-70313-5	MW-68-20211602	Water	02/16/21 15:03	02/19/21 16:11	
320-70313-6	MW-64-20211602	Water	02/16/21 12:53	02/19/21 16:11	
320-70313-7	MW-8-20211602	Water	02/16/21 08:53	02/19/21 16:11	
320-70313-8	MW-71-20211602	Water	02/17/21 11:54	02/19/21 16:11	
320-70313-9	MW-103-20211602	Water	02/17/21 09:06	02/19/21 16:11	
320-70313-10	EB-1-20211602	Water	02/17/21 12:30	02/19/21 16:11	
320-70313-11	FB-1-20211602	Water	02/17/21 11:30	02/19/21 16:11	

Address:

Regulatory Program: ☐ DW ☐ NPDES ☐ RCRA ☐ Other:						TAL-8210	
Client Contact		Project Manager: Meg Strong Tel/Email: mstrong@shannon-wilson.com				Date: 2/17/2021	COC No:
Company Name: Shannon & Wilson, Inc. Address: 400 N. 34 th St., Suite 100 City/State/Zip: Seattle, WA 98103 Phone: 206-632-8020 Fax: 206-695-6777 Project Name: EMJ Site: EMJ PO # 21-1-12596		Analysis Turnaround Time ☐ CALENDAR DAYS ☐ WORKING DAYS TAT if different from Below: ☐ 2 weeks ☒ Standard ☐ 1 week ☐ 2 days ☐ 1 day				Lab Contact: David Altker Carrier: FedEx	Sampler: For Lab Use Only: Walk-in Client: Lab Sampling: Job / SDG No.: Sample Specific Notes:
Sample Identification		Sample Date	Sample Type (C=Comp, G=Grab)	Matrix	# of Cont.	Filtered Sample (Y/N)	Perform MS / MSD (Y/N)
MW-72-20211602	2/16	G	GW	2	N	X	PAS (UCMR 6)
MW-63-20211702	2/17	G	GW	2	N	X	
MW-60-20211702	2/17	G	GW	2	N	X	
MW-43-20211702	2/17	G	GW	2	N	X	
MW-68-20211602	2/16	G	GW	2	N	X	
MW-64-20211602	2/16	G	GW	2	N	X	
MW-8-20211602	2/16	G	GW	2	N	X	
MW-71-20211702	2/17	G	GW	2	N	X	
MW-103-20211702	2/17	G	GW	2	N	X	
EB-1-20211702	2/17	G	GW	2	N	X	
FB-1-20211702	2/17	G	GW	2	N	X	
						320-70313 Chain of Custody	
						Sample Disposal (A fee may be assessed if samples are retained longer than 1 month) ☐ Return to Client ☒ Disposal by Lab ☐ Archive for _____ Months	
						Special Instructions/QC Requirements & Comments:	
Custody Seal No. 1468960		Date/Time: 19 Feb 21				Therm ID No.: 102	
Relinquished by: Shannon & Wilson, Inc. 2/17/21		Received by: [Signature]				Company: C1AW S&W	
Relinquished by:		Received in Laboratory by:				Date/Time: 19 Feb 21	
Relinquished by:		Received in Laboratory by:				Date/Time:	

- 1
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Login Sample Receipt Checklist

Client: Shannon & Wilson, Inc

Job Number: 320-70313-1

Login Number: 70313**List Source: Eurofins TestAmerica, Sacramento****List Number: 1****Creator: Her, David A**

Question	Answer	Comment
Radioactivity wasn't checked or is $\leq$ background as measured by a survey meter.	True	
The cooler's custody seal, if present, is intact.	N/A	
Sample custody seals, if present, are intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	N/A	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is $<6\text{mm}$ (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	



Analytical Resources, Incorporated
Analytical Chemists and Consultants

30 July 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)
21G0121

Associated SDG ID(s)
N/A

Shelly
Fishel

Digitally signed by
Shelly Fishel
Date: 2021.07.30
14:42:55 -07'00'

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, Inc.

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



21G0121

WO	Sample	Analysis	Issue	Note	
21A0352	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix
	SB-2021-034:15	VOC	Extra analyte(s)	Only requested BTEX but included HVOCs	Can fix
	SB-2021-034:21	VOC	Extra analyte(s)	Only requested BTEX but included HVOCs	Can fix
21A0376	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix
	SB-2021-003:2	VOC	Extra analyte(s)	Only requested BTEX and HVOCs but full list VOC reported.	Can fix
	SB-2021-018	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	SB-2021-019	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	SB-2021-020	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	SB-2021-021	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	SB-2021-022	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	SB-2021-023	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	SB-2021-024	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	SB-2021-025	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	SB-2021-026	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	SB-2021-103	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	Area9Comp	All	EDD Sample Type	Listed as "TB" instead of "PS"	Can fix
	MW-76:1.5	SVOC	Wrong analysis	Requested full list SVOC but reported PAH	Frozen archive can be run -76A J7-2
	MW-76:5.0	SVOC	Wrong analysis	Requested full list SVOC but reported PAH	Frozen archive can be run -77A J7-2
	MW-100:5.0	SVOC	Wrong analysis	Requested full list SVOC but reported PAH	Frozen archive can be run -80A J7-2
	MW-67:0.5	SVOC	Wrong analysis	Requested full list SVOC but reported PAH	Frozen archive can be run -81A H7-4
	MW-67:5.5	SVOC	Wrong analysis	Requested full list SVOC but reported PAH	Frozen archive can be run -82B H6-3
	MW-67:9.0	SVOC	Wrong analysis	Requested full list SVOC but reported PAH	Frozen archive can be run -83B H7-4
	MW-67:16.0	SVOC	Wrong analysis	Requested full list SVOC but reported PAH	Frozen archive can be run -84A J12-3
	MW-67:20.5	SVOC	Wrong analysis	Requested full list SVOC but reported PAH	Frozen archive can be run -85A J12-3
	MW-67:0.5	VOC	Extra analyte(s)	Only requested HVOC but included BTEX	Can fix
	MW-67:5.5	VOC	Extra analyte(s)	Only requested HVOC but included BTEX	Can fix
	MW-67:9.0	VOC	Extra analyte(s)	Only requested HVOC but included BTEX	Can fix
	MW-67:16.0	VOC	Extra analyte(s)	Only requested HVOC but included BTEX	Can fix
	MW-67:20.5	VOC	Extra analyte(s)	Only requested HVOC but included BTEX	Can fix
21B0005	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix
	AugerWater	Metals	Missing analyte(s)	Missing dissolved barium, dissolved vanadium, and total iron	Missed by ARI
	ProbeWater	Metals	Missing analyte(s)	Missing dissolved barium, dissolved vanadium, and total iron	Missed by ARI
21B0081	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix
	MW-70:4.3	TOC	Extra analyte(s)	TOC not requested but reported	Can fix
	MW-70:15	TOC	Extra analyte(s)	TOC not requested but reported	Can fix
21B0087	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix
	MW-53:9.5	VOC	Missing analyte(s)	Requested BTEX and HVOC but no VOC analyses reported	Missed by ARI
	MW-53:11	VOC	Missing analyte(s)	Requested BTEX and HVOC but no VOC analyses reported	Missed by ARI
21B0101	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix
	MW-71:1.5	Metals	Missing analyte(s)	Missing barium and vanadium	Please confirm. I cancelled these after the fact. (EMJ list?)
	MW-71:5.0	Metals	Missing analyte(s)	Missing barium and vanadium	Happy to uncancel!
	MW-71:8.5	Metals	Missing analyte(s)	Missing barium and vanadium	Can add analytes but not to lower level. Have frozen archive that can be reanalyze
	MW-71:1.5	PAH	Wrong analysis	Reported PAHs by SW8270 and not SW8270-SIM; several analytes missing	-01A J13-3
	MW-71:5.0	PAH	Wrong analysis	Reported PAHs by SW8270 and not SW8270-SIM; several analytes missing	-02A J13-3
21B0126	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix
	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix

21G0121

WO	Sample	Analysis	Issue	Note	
21B0160	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can be added
21B0174 (WATERS)	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses and LL VC (SIM)	Can add 1,2-DCE. LL-SIM missed
	All	SVOC	Extra EDD analyte(s)	Report has limited VOC analytes but EDD has all analytes listed	Can fix
	MW-48	VOC	Extra analyte(s)	Only requested BTEX but included HVOCs	Can fix
	MW-25	VOC	Extra analyte(s)	Only requested HVOC but includes BTEX	Can fix
	MW-69	Hardness	Missing analyte(s)	Missing hardness analysis	May have archive to run 21B0174-11 B R02 N-07
	MW-24	VOC	Extra analyte(s)	Only requested BTEX but included HVOCs	Can fix
	MW-24	PCB	Missing analyte(s)	Missing PCB analysis	May have archive to analyze 21B0174-13 C R-01 11
21B0192	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses and LL VC (SIM)	Can add 1,2-DCE. LL-SIM missed
	TB-3	All	Missing sample	Sample not in cooler	
	MW-23	VOC	Extra analyte(s)	Only requested HVOC but includes BTEX	
21B0227	MW-72	VOC	Extra EDD analyte(s)	Report has BTEX and HVOC analytes but EDD has all VOC analytes listed	Can fix
	MW-72	VOC	Extra analyte(s)	Report includes MTBE but not requested	Can fix
	MW-8	VOC	Extra analyte(s)	LL VC (SIM) reported but not requested	Can fix
21B0239	MW-60	Attenuation Para.	Missing analyte(s)	Missing RSK-175 analysis	Can remove
	TB-5	VOC	Missing analyte(s)	Missing LL VC (SIM)	Missed by ARI
	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Missed by ARI
	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can be added
21B0255	TB-6	VOC	Missing analyte(s)	Missing LL VC (SIM)	Can be added
	MW-58	Attenuation Para.	Missing analyte(s)	Missing Dissolved Mn and RSK-175 analysis	Missed by ARI
	MW-30	Attenuation Para.	Missing analyte(s)	Missing RSK-175 analysis	Missed by ARI
	MW-30	VOC	Extra analyte(s)	Only requested HVOC but includes BTEX	Missed by ARI
	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix
	TB-7	VOC	Missing analyte(s)	Missing LL VC (SIM)	Can fix
21B0272	MW-4	VOC	Extra analyte(s)	Only requested BTEX but included MTBE	Missed by ARI
	MW-14	VOC	Missing analyte(s)	Missing MTBE analyte	Can fix
	MW-14	Attenuation Para.	Missing analyte(s)	Missing RSK-175 analysis	Can fix
	MW-15	Attenuation Para.	Missing analyte(s)	Missing Dissolved Mn and RSK-175 analysis	Missed by ARI
	MW-15	VOC	Extra analyte(s)	Only requested HVOC but includes all VOC analytes	Missed by ARI
	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix
21B2096	TB-8	VOC	Missing analyte(s)	Missing LL VC (SIM)	Can fix
	MW-53	SVOC	Extra EDD analyte(s)	Report has limited SVOCs but but EDD has all SVOC analytes listed	Missed by ARI
	MW-101	SVOC	Extra EDD analyte(s)	Report has limited SVOCs but but EDD has all SVOC analytes listed	Can fix
	MW-36	Attenuation Para.	Missing analyte(s)	Missing RSK-175 analysis	Can fix
	MW-32	SVOC	Extra EDD analyte(s)	Report has limited SVOCs but but EDD has all SVOC analytes listed	Missed by ARI
21B0309	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Can fix
	TB-9	VOC	Missing analyte(s)	Missing LL VC (SIM)	Can fix
	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	Missed by ARI
	TB-10	VOC	Missing analyte(s)	Missing LL VC (SIM)	Can fix
21B0322	MW-46	SVOC	Extra analyte(s)	Only requested limited SVOC but full list SVOC reported	Missed by ARI
	MW-46	PAH	Extra EDD analyte(s)	Only requested PAH but full list SVOC by SIM reported in EDD	Can fix
	MW-31	SVOC	Extra analyte(s)	Only requested limited SVOC but full list SVOC reported	COC requests PAH and limited SVOC list - can fix
	MW-31	PAH	Extra EDD analyte(s)	Only requested PAH but full list SVOC by SIM reported in EDD	Can fix
	All	HVOC	Missing analyte(s)	Missing trans-1,2-DCE for HVOC analyses	COC requests PAH and limited SVOC list - can fix
21B0344	TB-10	VOC	Missing analyte(s)	Missing LL VC (SIM)	Can fix
	MW-65	SVOC	Extra EDD analyte(s)	Only requested limited SVOC but full list SVOC reported in EDD	Missed by ARI
	MW-40	SVOC	Extra EDD analyte(s)	Only requested limited SVOC but full list SVOC reported in EDD	Can fix
	MW-41	SVOC	Extra EDD analyte(s)	Only requested limited SVOC but full list SVOC reported in EDD	Can fix

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21A0376		Turn-around Requested: Standard		Page: 1 of 11		 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		Phone:		Date: 1/26/21				Ice Present? Yes																																																																																																					
Client Contact: Shoshana Howard				No. of Coolers: 6				Cooler Temps: See CREF																																																																																																					
Client Project Name: LDW				Analysis Requested																																																																																																									
Client Project #: 21-1-12546		Samplers: MLH, RBP		<table border="1"> <thead> <tr> <th>TTH-G</th> <th>TTH-DX</th> <th>BTEX</th> <th>HVOCs</th> <th>PAHs</th> <th>Full List SVOCs</th> <th>PCB Analysis</th> <th>Metals</th> <th>Notes/Comments</th> </tr> </thead> <tbody> <tr> <td>X</td> <td></td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>X</td> <td>X</td> <td>X</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>X</td> <td></td> <td></td> </tr> <tr> <td></td> <td>X</td> <td></td> <td></td> <td>X</td> <td></td> <td>X</td> <td>X</td> <td></td> </tr> <tr> <td></td> <td>X</td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td>X</td> <td></td> </tr> <tr> <td></td> <td>X</td> <td></td> <td></td> <td>X</td> <td></td> <td></td> <td>X</td> <td></td> </tr> </tbody> </table>							TTH-G	TTH-DX	BTEX	HVOCs	PAHs	Full List SVOCs	PCB Analysis	Metals	Notes/Comments	X		X	X						X	X	X							X	X	X							X	X	X	X						X	X	X							X	X	X													X				X			X		X	X			X			X			X			X			X			X	
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SB-2021-033:18-01262021		0940		6																																																																																																									
Asphalt-004-01262021		1020		1																																																																																																									
SB-2021-046:2-01262021		1030		3																																																																																																									
SB-2021-046:5.6-01262021		1033		3																																																																																																									
SB-2021-046:107-01262021	✓	1035	✓	2																																																																																																									
Comments/Special Instructions X = run analysis H = hold analysis				Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Received by: (Signature)																																																																																																			
				Printed Name: <i>RYAN PERKIN</i>		Printed Name: <i>Jacob LaHe</i>		Printed Name:		Printed Name:																																																																																																			
				Company: <i>S&W</i>		Company: <i>ARI</i>		Company:		Company:																																																																																																			
				Date & Time: <i>1/27/21 051705</i>		Date & Time: <i>01/27/2021 1705</i>		Date & Time:		Date & Time:																																																																																																			

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21A0376		Turn-around Requested: Standard		Page: 2 of 11	
ARI Client Company: Stannan & Wilson		Phone:		Date: 1/26/21	Ice Present? Yes
Client Contact: Shoshana Howard				No. of Coolers: 6	Cooler Temps: See CRF
Client Project Name: LDW					
Client Project #: 21-1-12596		Samplers: RBP, MCH			

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested								Notes/Comments	
					TPH-C	TPH-Dx	GPX	HVOCs	PAHs	PAH L&S SVOCs	PCB Analysis	Metals		
SB-2021-046:13.4-01262021	1/26/21	1040	Sol I	3		H				H			H	
SB-2021-003:12-01262021		1140		5		X	X	X	X				X	
SB-2021-003:10.3-01262021		1145		5		X	X	X	X				X	
SB-2021-003:11.5-01262021		1150		5		X	X	X	X				X	
SB-2021-003:13.1-01262021		1155		5		H	H	H	H				H	
SB-2021-038:2-01262021		1230		2		X			X		X	X		
SB-2021-038:6.9-01262021		1235		2		X			X		X	X		
SB-2021-038:7.6-01262021		1240		2		X			X		X	X		
SB-2021-038:12.9-01262021		1245		2		X			X		X	X		
SB-2021-018:1.5-01272021	1/27/21	1020		1		X					X			

Comments/Special Instructions X = run analysis H = hold analysis	Relinquished by: (Signature) <i>[Signature]</i>	Received by: (Signature) <i>[Signature]</i>	Relinquished by: (Signature)	Received by: (Signature)
	Printed Name: <i>RYAN PETERSON</i>	Printed Name: <i>Jacob Lutz</i>	Printed Name:	Printed Name:
	Company: <i>S&W</i>	Company: <i>ARI</i>	Company:	Company:
	Date & Time: 1/27/21 1705	Date & Time: 01/27/2021 1705	Date & Time:	Date & Time:

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 2110376		Turn-around Requested: Standard		Page: 3 of 11	
ARI Client Company: Shannon & Wilson		Phone:		Date: 1/27/21	Ice Present? Yes
Client Contact: Shoshana Howard				No. of Coolers: 6	Cooler Temps: See CRF
Client Project Name: LDW		Analysis Requested			
Client Project #: 21-1-12546		Samplers: RBP, JXS		Notes/Comments	
Sample ID	Date	Time	Matrix	No. Containers	
SB-2021-018:25-01272021	1/27/21	1025	Soil	1	
SB-2021-018:5.5-01272021		1030		1	
SB-2021-018:7.2-01272021		1035		1	
SB-2021-018:8.2-01272021		1040		1	
SB-2021-018:11-01272021		1045		1	
SB-2021-019:0.8-01272021		1100		1	
SB-2021-019:2.5-01272021		1105		1	
SB-2021-019:5-01272021		1110		1	
SB-2021-019:7-01272021		1115		1	
SB-2021-019:8.5-01272021		1120		1	
Comments/Special Instructions: X = run analysis H = hold analysis		Relinquished by: (Signature) <i>[Signature]</i> Printed Name: <i>RYAN PETERSON</i> Company: <i>S&W</i> Date & Time: <i>1/27/21 1705</i>		Received by: (Signature) <i>[Signature]</i> Printed Name: <i>Scott Laite</i> Company: <i>ARI</i> Date & Time: <i>01/27/2021 1705</i>	
		Relinquished by: (Signature) Printed Name: Company: Date & Time:		Received by: (Signature) Printed Name: Company: Date & Time:	



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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21A0376		Turn-around Requested: Standard		Page: 4 of 11	
ARI Client Company: Shannon & Wilson		Phone:		Date: 1/27/21	Ice Present? Yes
Client Contact: Shoshana Howard				No. of Coolers: 6	Cooler Temps: See CRF
Client Project Name: LDW		Analysis Requested			
Client Project #: 21-1-12546		Samplers: RBP, JXS		Notes/Comments	
Sample ID	Date	Time	Matrix	No. Containers	
SB-2021-019:12-01272021	1/27/21	1125	Soil	1	H
SB-2021-020:1.5-01272021		1140		1	X
SB-2021-020:2.2-01272021		1145		1	X
SB-2021-020:6-01272021		1150		1	X
SB-2021-020:7-01272021		1155		1	X
SB-2021-020:8.2-01272021		1200		1	H
SB-2021-020:11-01272021		1205		1	H
SB-2021-021:1.5-01272021		1230		1	X
SB-2021-021:2.5-01272021		1235		1	X
SB-2021-021:5.2-01272021		1240		1	X
Comments/Special Instructions X = run analysis H = hold analysis		Relinquished by: (Signature) [Signature] Printed Name: R VAN PETERSON Company: S & W Date & Time: 1/27/21 1705		Received by: (Signature) [Signature] Printed Name: Jacob Lalk Company: ARI Date & Time: 01/27/2021 1705	



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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21A0376		Turn-around Requested: Standard		Page: 5 of 11	
ARI Client Company: Shannon & Wilson		Phone:		Date:	Ice Present? Yes
Client Contact: Shoshana Howard		No. of Coolers: 6		Cooler Temps: See CRF	
Client Project Name: LDW		Analysis Requested			
Client Project #: 21-1-12596		Samplers: RSP, 5xs		Notes/Comments	
Sample ID	Date	Time	Matrix	No. Containers	
SB-2021-021:7-01272021	1/27/21	1245	Soil	1	X
SB-2021-021:10-01272021		1250		1	H
SB-2021-021:11-01272021		1255		1	H
SB-2021-021:15-01272021		1300		1	X
SB-2021-022:15-01272021		1305		1	X
SB-2021-022:25-01272021		1310		1	X
SB-2021-022:55-01272021		1315		1	X
SB-2021-022:7-01272021		1320		1	X
SB-2021-022:10-01272021		1325		1	H
SB-2021-022:11-01272021		1330		1	H
Comments/Special Instructions X = Run analysis H = Hold analysis		Relinquished by: (Signature) [Signature] Printed Name: RYAN PETERSON Company: S&W Date & Time: 1/27/21 1705		Received by: (Signature) [Signature] Printed Name: Jacob [Signature] Company: ARZ Date & Time: 01/27/2021 1705	
		Relinquished by: (Signature) Printed Name: Company: Date & Time:		Received by: (Signature) Printed Name: Company: Date & Time:	



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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 2140376		Turn-around Requested: Standard		Page: 6 of 11	
ARI Client Company: Shannon & Wilson		Phone:		Date: 1/27/21	Ice Present? Yes
Client Contact: Shoshana Howard				No. of Coolers: 6	Cooler Temps: See CRF
Client Project Name: LDW		Analysis Requested			
Client Project #: 21-1-12596		Samplers: RBF, JXS		Notes/Comments	
Sample ID	Date	Time	Matrix	No. Containers	
SB-2021-023:1.5-01272021	1/27/21	1340	Soil	1	X
SB-2021-023:2.7-01272021		1345		1	X
SB-2021-023:5.5-01272021		1350		1	X
SB-2021-023:7-01272021		1355		1	X
SB-2021-023:10-01272021		1400		1	H
SB-2021-023:11-01272021		1405		1	H
SB-2021-024:0.5-01272021		1410		1	X
SB-2021-024:2.4-01272021		1415		1	X
SB-2021-024:5.6-01272021		1420		1	X
SB-2021-024:7-01272021		1425		1	X
Comments/Special Instructions		Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>	
		Printed Name: RYAN PETERSON		Printed Name: Jacob L. Lath	
Company: S&W		Company: ARI		Company:	
Date & Time: 1/27/21 1705		Date & Time: 01/27/2021 1705		Date & Time:	



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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21A0376		Turn-around Requested: Standard		Page: 7 of 11																			
ARI Client Company: Shannon & Wilson		Phone:		Date: 1/27/21	Ice Present? Yes																		
Client Contact: Shoshana Howard				No. of Coolers: 6	Cooler Temps: See CPE																		
Client Project Name: LDW		<table border="1"> <thead> <tr> <th colspan="8">Analysis Requested</th> <th>Notes/Comments</th> </tr> </thead> <tbody> <tr> <td></td><td></td><td></td><td></td><td></td><td></td><td></td><td>RB Analog</td> <td></td> </tr> </tbody> </table>				Analysis Requested								Notes/Comments								RB Analog	
Analysis Requested								Notes/Comments															
							RB Analog																
Client Project #: 21-1-12546		Samplers: RBP, JXS																					
Sample ID	Date	Time	Matrix	No. Containers																			
SB-2021-024:8.4-01272021	1/27/21	1430	Soil	1			H		H														
SB-2021-024:11-01272021		1435		1			H		H														
SB-2021-026:1.5-01272021		1450		1			X		X														
SB-2021-026:3-01272021		1455		1			X		X														
SB-2021-026:5.5-01272021		1500		1			X		X														
SB-2021-026:7-01272021		1505		1			X		X														
SB-2021-026:10-01272021		1510		1			H		H														
SB-2021-026:11-01272021		1515		1			H		H														
SB-2021-025:1.5-01272021		1550		1			X		X														
SB-2021-025:2.5-01272021	✓	1555	✓	1			X		X														
Comments/Special Instructions X = run analysis H = hold analysis		Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Received by: (Signature)															
		Printed Name: RYAN PETERSON		Printed Name: Jacob Laid		Printed Name:		Printed Name:															
		Company: S & W		Company: ARI		Company:		Company:															
		Date & Time: 1/27/21 1705		Date & Time: 01/27/2021 1705		Date & Time:		Date & Time:															

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21A0370		Turn-around Requested: Standard		Page: 8 of 11	
ARI Client Company: Shannon & Wilson		Phone:		Date: 1/27/21	Ice Present? Yes
Client Contact: Shoshana Howard				No. of Coolers: 6	Cooler Temps: See CRF
Client Project Name: LAW		Analysis Requested			
Client Project #: 21-1-12546		Samplers: RBP, 5XS		Notes/Comments	
Sample ID	Date	Time	Matrix	No. Containers	
SB-2021-025:5.5-01272021	1/27/21	1600	Soil	1	X
SB-2021-025:6.5-01272021	↓	1605	↓	1	X
SB-2021-025:10-01272021	↓	1610	↓	1	H
SB-2021-025:11-01272021	↓	1615	↓	1	H
Aren 9 Comp-01272021	↓	1630	↓	1	X
Comments/Special Instructions					
Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)	
Printed Name: RYAN PETERSON		Printed Name: Jacob Shultz		Printed Name:	
Company: S&W		Company: A02		Company:	
Date & Time: 1/27/21 1705		Date & Time: 01/27/2021 1705		Date & Time:	



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21G0121

Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21G0376		Turn-around Requested: Standard		Page: 9 of 11												
ARI Client Company: Shannon & Wilson, Inc.		Phone: 206-632-9020		Date:	Ice Present? Yes											
Client Contact: Shoshana Howard		No. of Coolers: 6		Cooler Temps: See CRF												
Client Project Name: EMJ		Analysis Requested														
Client Project #: 21G12596																
Samplers: CTC		Notes/Comments														
Sample ID	Date	Time	Matrix	No. Containers	TPH-G	TPH-D	BTEX	HVOCs	PAHs	Full list SVOCs	PCB areators	metals	T.O.C.	Grain Size	NOTES	Hex.Chrome
MW-76:1.5-01262021	1/26	0850	S	2		X				X		X				
MW-76:5.0-01262021	1/26	0855	S	2		X				X		X				
MW-76:15.5-01262021	1/26	0905	S	2		⊗				⊗		⊗			⊗ Hold	
MW-76:20.5-01262021	1/26	0915	S	2		⊗				⊗		⊗			⊗ Hold	
MW-100:5.0-01262021	1/26	0858	S	2		X				X		X				
MW-67:0.5-01262021	1/26	1320	S	5		X		X		X		X				X
MW-67:5.5-01262021	1/26	1325	S	6		X		X		X		X	X	X		X
MW-67:9.0-01262021	1/26	1335	S	6		X		X		X		X	X	X		X
MW-67:16.0-01262021	1/26	1350	S	5		⊗		X		⊗		⊗			⊗ Hold	⊗
MW-67:20.5-01262021	1/26	1400	S	5		⊗		X		⊗		⊗			⊗ Hold	⊗
Comments/Special Instructions Please refer to EMJ analyte list.		Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Received by: (Signature)								
		Printed Name: RYAN PETERSON		Printed Name: Jacob Laith		Printed Name:		Printed Name:								
		Company: S&W		Company: A12		Company:		Company:								
		Date & Time: 1/27/21 1705		Date & Time: 01/27/2021 1705		Date & Time:		Date & Time:								

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 21A0376		Turn-around Requested: Standard		Page: 10 of 11	
ARI Client Company: Shannon & Wilson		Phone: 206-632-8020		Date: 1/27/2021	Ice Present? Yes
Client Contact: Shoshana Howard				No. of Coolers: 6	Cooler Temps: See CRF
Client Project Name: LDW		Analysis Requested			
Client Project #: 21-1-12510		Samplers: MRE		Notes/Comments	
Sample ID	Date	Time	Matrix	No. Containers	
MW-59: 1.5-01272021	1/27/2021	1005	Soil	5	
MW-59: 5.5-01272021		1015		6	
MW-59: 8.4-01272021		1025		5	
MW-59: 15-01272021		1035		6	
MW-59: 20-01272021		1045		5	
MW-57: 5-01272021		1330		2	
MW-57: 6-01272021		1340		2	
MW-57: 10-01272021		1345		2	
MW-57: 15.3-01272021		1355		2	
MW-57: 20-01272021		1405		2	
Comments/Special Instructions H = hold		Relinquished by: (Signature) [Signature]		Received by: (Signature) [Signature]	
		Printed Name: Ryan Peterson		Printed Name: Jacob [Signature]	
		Company: S&W		Company: ARI	
		Date & Time: 1/27/21 1705		Date & Time: 01/27/2021 1705	



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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.

ARI Assigned Number: 2100101	Turn-around Requested: Standard
ARI Client Company: Shannon & Wilson, Inc.	Phone: 206-632-8020
Client Contact: Shoshana Howard	
Client Project Name: EMJ	
Client Project #: 21-1-12596	Samplers: CTC

Page: 1	of 2
Date: 2/4/21	Ice Present? Yes
No. of Coolers: 2	Cooler Temps: 5.5 3.6



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Analytical Chemists and Consultants
4611 South 134th Place, Suite 100
Tukwila, WA 98168
206-695-6200 206-695-6201 (fax)
www.arilabs.com

Client Project Name: EMJ					Analysis Requested										Notes/Comments									
Client Project #:		Samplers:			TPH-G	TPH-D _x	BTEX	HVOCs	PAH _s	SVOCs	PCB analytes	Metals	Hex. Chrome	T.O.C.	Grain Size	Porosity	⊗ = Hold							
21-1-12596		CTC																						
Sample ID	Date	Time	Matrix	No. Containers																				
MW-65:20.5 -02042021	2/4		soil	5		⊗	X	X	⊗		⊗	⊗	⊗											
MW-71:1.5 -02042021	2/4	1030	Soil	5		X	X	X	X		X													
MW-71:5.0 -02042021	2/4	1035	Soil	5		X	X	X	X		X													
MW-71:8.5 -02042021	2/4	1045	Soil	5		X	X	X	X		X													
MW-71:15.5 -02042021	2/4	1055	Soil	5		⊗	X	X	⊗		⊗													
MW-71:20.5 -02042021	2/4	1105	Soil	5		⊗	X	X	⊗		⊗													
MW-10R: -02042021	2/4		Soil	5		X	X	X	X		X													
MW-10B: -02042021	2/4		Soil	5		X	X	X	X		X													
MW-10R: -02042021	2/4		Soil	5		X	X	X	X		X													
MW-10R: -02042021	2/4		Soil	5		⊗	⊗	⊗	⊗		⊗													
Comments/Special Instructions • Refer to EMJ analyte list.					Relinquished by: (Signature) <i>[Signature]</i> Printed Name: Christian Canfield Company: SWI Date & Time: 2/4/2021 1240					Received by: (Signature) <i>[Signature]</i> Printed Name: Jack Harte Company: ARI2 Date & Time: 02/04/2021 1240					Relinquished by: (Signature) Printed Name: Company: Date & Time:					Received by: (Signature) Printed Name: Company: Date & Time:				

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: <u>21B0101</u>		Turn-around Requested: <u>Standard</u>		Page: <u>2</u> of <u>2</u>														
ARI Client Company: <u>Shannon & Wilson, Inc.</u>		Phone: <u>206-632-8020</u>		Date: <u>2/4/21</u>	Ice Present? <u>Yes</u>													
Client Contact: <u>Shoshana Howard</u>				No. of Coolers: <u>2</u>	Cooler Temps: <u>5.5 36</u>													
Client Project Name: <u>EMJ</u>				Analysis Requested														
Client Project #: <u>21-1-12596</u>		Samplers: <u>etc</u>		Notes/Comments														
Sample ID	Date	Time	Matrix	No. Containers	TPH-G	TPH-DX	BTEX	HVOCs	PAHs	SVOCs	PCB analytes	Metals	Hex. Chlors	T.O.C.	Grain Size	Porosity		
MW-10R	02042021	2/4	Soil	5		⊗	⊗	⊗	⊗			⊗						⊗ = Hold
MW-10H	02042021	2/4	Soil	5		X	X	X	X			X						
MW-54:14.S-02042021	2/4	0840	soil	5		⊗	⊗	⊗	⊗	⊗	⊗	⊗						
MW-54:20.S-02042021	2/4	0900	soil	5		⊗	⊗	⊗	⊗	⊗	⊗	⊗						
Trip Blank	2/4		Water	3			X	X										
Comments/Special Instructions <u>Refer to EMJ analyte list.</u>	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>Scott L. [Signature]</u>		Printed Name:		Printed Name:											
	Company: <u>SWI</u>		Company: <u>ARI</u>		Company:		Company:											
	Date & Time: <u>2/4/2021 1240</u>		Date & Time: <u>02/04/2021 1240</u>		Date & Time:		Date & Time:											

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Chain of Custody Record & Laboratory Analysis Request

ARI Assigned Number: 2130174		Turn-around Requested: Standard		Page: 1 of 1	
ARI Client Company: Shannon & Wilson		Phone: 206-695-6911		Date: 2/11/21	Ice Present? Yes
Client Contact: Shoshana Howard				No. of Coolers: 3	Cooler Temps: See CRT
Client Project Name: LON		Analysis Requested			
Client Project #: 21-1-12590		Samplers: MRH/DES			
Sample ID	Date	Time	Matrix	No. Containers	Notes/Comments
TB-2-2021102	2/11/21	0940	Water	1	X
MW-49-2021102	2/11/21	0942		4	X
MW-25-2021102	2/11/21	0925		8	X
EB-2-2021102	2/11/21	1030		10	X
MW-70-2021102	2/11/21	1231		14	X
MW-69-2021102	2/11/21	1313		15	X
MW-55-2021102	2/11/21	1500		11	X
MW-24-2021102	2/11/21	1612		10	X
Comments/Special Instructions: Lab id filter for metals MW-25-2021102 = Arsenic only Metals MW-24-2021102 = Metals only Arsenic only					
Relinquished by: (Signature) [Signature]		Received by: (Signature) [Signature]		Relinquished by: (Signature) [Signature]	
Printed Name: DANIEL SCHWICHT		Printed Name: Jacob Leif		Printed Name: [Signature]	
Company: SWI		Company: ADZ		Company: [Signature]	
Date & Time: 11-FEB-21, 17:02		Date & Time: 02/11/2021 1702		Date & Time: [Signature]	



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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-76:1.5-01262021	21G0121-01	Solid	26-Jan-2021 08:50	12-Jul-2021 13:47
MW-76:5.0-01262021	21G0121-02	Solid	26-Jan-2021 08:55	12-Jul-2021 13:47
MW-100:5.0-01262021	21G0121-03	Solid	26-Jan-2021 08:58	12-Jul-2021 13:47
MW-67:0.5-01262021	21G0121-04	Solid	26-Jan-2021 13:20	12-Jul-2021 13:47
MW-67:5.5-01262021	21G0121-05	Solid	26-Jan-2021 13:25	12-Jul-2021 13:47
MW-67:9.0-01262021	21G0121-06	Solid	26-Jan-2021 13:35	12-Jul-2021 13:47
MW-67:16.0-01262021	21G0121-07	Solid	26-Jan-2021 13:50	12-Jul-2021 13:47
MW-67:20.5-01262021	21G0121-08	Solid	26-Jan-2021 14:00	12-Jul-2021 13:47
MW-71:1.5-02042021	21G0121-09	Solid	04-Feb-2021 10:30	12-Jul-2021 13:47
MW-71:5.0-02042021	21G0121-10	Solid	04-Feb-2021 10:35	12-Jul-2021 13:47
MW-71:8.5-02042021	21G0121-11	Solid	04-Feb-2021 10:45	12-Jul-2021 13:47
MW-69-20211102	21G0121-12	Water	11-Feb-2021 13:13	12-Jul-2021 13:47
MW-24-20211102	21G0121-13	Water	11-Feb-2021 16:12	12-Jul-2021 13:47

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Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish
Work Order: 21G0121

Sample receipt

Samples as listed on the preceding page were received previously. Requested additional analyses was received on 12-Jul-2021 were logged under ARI work order 21G0121. The samples were pulled from frozen archives and hold times were extended based upon storage conditions.

PCB Aroclors - EPA Method SW8082A

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

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.

Semivolatiles - EPA Method SW8270E

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

Initial and continuing calibrations were within method requirements except for Isophorone which was out of control high and Benzoic Acid and Pentachlorophenol which were out of control low in initial calibration verification SJG 0329-ICV. Also out of control are Pentachlorophenol which was out of control low and 2,4-Dichlorophenol which was out of control high in initial calibration verification SJG0343. All samples associated with the out of control ICVs which contain analyte have been flagged with a "Q" qualifier. Additionally, 2,4-Dichlorophenol and Hexachlorocyclopentadiene which were out of control low in the continuing calibration verification SJG0329-CCV.

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 except n-Nitrosodiphenylamine which was out of



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Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

control low and has been flagged within the QC section of this report.

Sample specific QC was performed in association with sample 21F0121-07 in batch BJG0492. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits.

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

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

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.

Sample specific QC was performed in association with sample 21G0121-10. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries were within advisory control limits except for Naphthalene which was out of control low in the MS and MSD and have been flagged. The MS/MSD relative percent difference (RPD) were within advisory control limits.

Total Metals - EPA Method 6010D

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 21G0121-12 in batch BJG0531. 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.


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 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-76:1.5-01262021
21G0121-01 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 01/26/2021 08:50	
Instrument: NT10 Analyst: VTS			Analyzed: 07/27/2021 20:59	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 21G0121-01 A 01	
	Preparation Batch: BJG0492	Sample Size: 11.64 g (wet)		Dry Weight: 10.00 g
	Prepared: 07/22/2021	Final Volume: 1 mL		% Solids: 85.93
Sample Cleanup:	Cleanup Method: GPC		Extract ID: 21G0121-01 A 01	
	Cleanup Batch: CJG0267	Initial Volume: 1 uL		
	Cleaned: 27-Jul-2021	Final Volume: 1 uL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	4.4	20.0	ND	ug/kg	U
bis(2-chloroethyl) ether	111-44-4	1	19.3	50.0	ND	ug/kg	U
2-Chlorophenol	95-57-8	1	13.8	20.0	ND	ug/kg	U
1,3-Dichlorobenzene	541-73-1	1	3.1	20.0	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	3.1	20.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	2.4	20.0	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	16.3	20.0	ND	ug/kg	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	3.4	20.0	ND	ug/kg	U
2-Methylphenol	95-48-7	1	6.7	20.0	ND	ug/kg	U
Hexachloroethane	67-72-1	1	3.4	20.0	ND	ug/kg	U
N-Nitroso-di-n-Propylamine	621-64-7	1	7.4	20.0	ND	ug/kg	U
4-Methylphenol	106-44-5	1	7.4	20.0	ND	ug/kg	U
Nitrobenzene	98-95-3	1	7.2	20.0	ND	ug/kg	U
Isophorone	78-59-1	1	3.9	20.0	ND	ug/kg	U
2-Nitrophenol	88-75-5	1	4.9	20.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	3.8	100	ND	ug/kg	U
Bis(2-Chloroethoxy)methane	111-91-1	1	4.3	20.0	ND	ug/kg	U
2,4-Dichlorophenol	120-83-2	1	15.3	100	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	3.6	20.0	ND	ug/kg	U
Naphthalene	91-20-3	1	4.2	20.0	ND	ug/kg	U
Benzoic acid	65-85-0	1	39.0	200	ND	ug/kg	U
4-Chloroaniline	106-47-8	1	8.4	100	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	4.8	20.0	ND	ug/kg	U
4-Chloro-3-Methylphenol	59-50-7	1	12.4	100	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	4.5	20.0	ND	ug/kg	U
Hexachlorocyclopentadiene	77-47-4	1	24.5	100	ND	ug/kg	U
2,4,6-Trichlorophenol	88-06-2	1	9.0	100	ND	ug/kg	U
2,4,5-Trichlorophenol	95-95-4	1	25.7	100	ND	ug/kg	U
2-Chloronaphthalene	91-58-7	1	8.0	20.0	ND	ug/kg	U
2-Nitroaniline	88-74-4	1	16.4	100	ND	ug/kg	U
Acenaphthylene	208-96-8	1	6.2	20.0	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	4.4	20.0	ND	ug/kg	U



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-76:1.5-01262021 21G0121-01 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 08:50

Instrument: NT10 Analyst: VTS

Analyzed: 07/27/2021 20:59

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
2,6-Dinitrotoluene	606-20-2	1	20.5	100	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.2	20.0	ND	ug/kg	U
3-Nitroaniline	99-09-2	1	22.3	100	ND	ug/kg	U
2,4-Dinitrophenol	51-28-5	1	33.8	200	ND	ug/kg	U
Dibenzofuran	132-64-9	1	14.1	20.0	ND	ug/kg	U
4-Nitrophenol	100-02-7	1	32.6	100	ND	ug/kg	U
2,4-Dinitrotoluene	121-14-2	1	16.2	100	ND	ug/kg	U
Fluorene	86-73-7	1	14.6	20.0	ND	ug/kg	U
4-Chlorophenylphenyl ether	7005-72-3	1	19.1	50.0	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	19.7	50.0	25.0	ug/kg	J
4-Nitroaniline	100-01-6	1	29.4	100	ND	ug/kg	U
4,6-Dinitro-2-methylphenol	534-52-1	1	38.0	200	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	5.3	20.0	ND	ug/kg	U
4-Bromophenyl phenyl ether	101-55-3	1	17.0	20.0	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	13.5	20.0	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	100	ND	ug/kg	U
Phenanthrene	85-01-8	1	8.7	20.0	ND	ug/kg	U
Anthracene	120-12-7	1	7.2	20.0	ND	ug/kg	U
Carbazole	86-74-8	1	4.3	20.0	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.6	20.0	ND	ug/kg	U
Fluoranthene	206-44-0	1	6.1	20.0	ND	ug/kg	U
Pyrene	129-00-0	1	5.7	20.0	ND	ug/kg	U
Butylbenzylphthalate	85-68-7	1	9.4	20.0	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	6.0	20.0	ND	ug/kg	U
3,3'-Dichlorobenzidine	91-94-1	1	7.1	100	ND	ug/kg	U
Chrysene	218-01-9	1	6.1	20.0	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	5.5	50.0	5.7	ug/kg	J
Di-n-Octylphthalate	117-84-0	1	4.4	20.0	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.0	40.0	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	4.2	20.0	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	14.6	20.0	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	17.2	20.0	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	13.6	20.0	ND	ug/kg	U
1-Methylnaphthalene	90-12-0	1	5.3	20.0	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	63.4	%	
Surrogate: Phenol-d5				29-120 %	58.9	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	80.6	%	
Surrogate: 1,2-Dichlorobenzene-d4				32-120 %	65.3	%	

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-76:1.5-01262021
21G0121-01 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 08:50

Instrument: NT10 Analyst: VTS

Analyzed: 07/27/2021 20:59

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: Nitrobenzene-d5		30-120 %	74.6	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	71.5	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	74.6	%	
Surrogate: p-Terphenyl-d14		37-120 %	79.1	%	

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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-76:5.0-01262021
21G0121-02 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 01/26/2021 08:55
Instrument: NT10 Analyst: VTS			Analyzed: 07/27/2021 21:36
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 21G0121-02 A 01
	Preparation Batch: BJG0492	Sample Size: 14.17 g (wet)	
	Prepared: 07/22/2021	Final Volume: 1 mL	
Sample Cleanup:	Cleanup Method: GPC		Extract ID:21G0121-02 A 01
	Cleanup Batch: CJG0267	Initial Volume: 1 uL	
	Cleaned: 27-Jul-2021	Final Volume: 1 uL	
			Dry Weight:10.00 g
			% Solids: 70.59

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	4.4	20.0	6.6	ug/kg	J
bis(2-chloroethyl) ether	111-44-4	1	19.3	50.0	ND	ug/kg	U
2-Chlorophenol	95-57-8	1	13.8	20.0	ND	ug/kg	U
1,3-Dichlorobenzene	541-73-1	1	3.1	20.0	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	3.1	20.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	2.4	20.0	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	16.3	20.0	ND	ug/kg	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	3.4	20.0	ND	ug/kg	U
2-Methylphenol	95-48-7	1	6.7	20.0	11.3	ug/kg	J
Hexachloroethane	67-72-1	1	3.4	20.0	ND	ug/kg	U
N-Nitroso-di-n-Propylamine	621-64-7	1	7.4	20.0	ND	ug/kg	U
4-Methylphenol	106-44-5	1	7.4	20.0	10.1	ug/kg	J
Nitrobenzene	98-95-3	1	7.2	20.0	ND	ug/kg	U
Isophorone	78-59-1	1	3.9	20.0	ND	ug/kg	U
2-Nitrophenol	88-75-5	1	4.9	20.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	3.8	100	ND	ug/kg	U
Bis(2-Chloroethoxy)methane	111-91-1	1	4.3	20.0	ND	ug/kg	U
2,4-Dichlorophenol	120-83-2	1	15.3	100	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	3.6	20.0	ND	ug/kg	U
Naphthalene	91-20-3	1	4.2	20.0	17.4	ug/kg	J
Benzoic acid	65-85-0	1	39.0	200	48.8	ug/kg	J
4-Chloroaniline	106-47-8	1	8.4	100	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	4.8	20.0	ND	ug/kg	U
4-Chloro-3-Methylphenol	59-50-7	1	12.4	100	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	4.5	20.0	13.6	ug/kg	J
Hexachlorocyclopentadiene	77-47-4	1	24.5	100	ND	ug/kg	U
2,4,6-Trichlorophenol	88-06-2	1	9.0	100	ND	ug/kg	U
2,4,5-Trichlorophenol	95-95-4	1	25.7	100	ND	ug/kg	U
2-Chloronaphthalene	91-58-7	1	8.0	20.0	ND	ug/kg	U
2-Nitroaniline	88-74-4	1	16.4	100	ND	ug/kg	U
Acenaphthylene	208-96-8	1	6.2	20.0	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	4.4	20.0	ND	ug/kg	U



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-76:5.0-01262021 21G0121-02 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 08:55

Instrument: NT10 Analyst: VTS

Analyzed: 07/27/2021 21:36

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
2,6-Dinitrotoluene	606-20-2	1	20.5	100	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.2	20.0	32.8	ug/kg	
3-Nitroaniline	99-09-2	1	22.3	100	ND	ug/kg	U
2,4-Dinitrophenol	51-28-5	1	33.8	200	ND	ug/kg	U
Dibenzofuran	132-64-9	1	14.1	20.0	15.5	ug/kg	J
4-Nitrophenol	100-02-7	1	32.6	100	ND	ug/kg	U
2,4-Dinitrotoluene	121-14-2	1	16.2	100	ND	ug/kg	U
Fluorene	86-73-7	1	14.6	20.0	24.6	ug/kg	
4-Chlorophenylphenyl ether	7005-72-3	1	19.1	50.0	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	19.7	50.0	37.5	ug/kg	J
4-Nitroaniline	100-01-6	1	29.4	100	ND	ug/kg	U
4,6-Dinitro-2-methylphenol	534-52-1	1	38.0	200	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	5.3	20.0	ND	ug/kg	U
4-Bromophenyl phenyl ether	101-55-3	1	17.0	20.0	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	13.5	20.0	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	100	ND	ug/kg	U
Phenanthrene	85-01-8	1	8.7	20.0	56.2	ug/kg	
Anthracene	120-12-7	1	7.2	20.0	11.0	ug/kg	J
Carbazole	86-74-8	1	4.3	20.0	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.6	20.0	ND	ug/kg	U
Fluoranthene	206-44-0	1	6.1	20.0	41.6	ug/kg	
Pyrene	129-00-0	1	5.7	20.0	38.6	ug/kg	
Butylbenzylphthalate	85-68-7	1	9.4	20.0	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	6.0	20.0	11.5	ug/kg	J
3,3'-Dichlorobenzidine	91-94-1	1	7.1	100	ND	ug/kg	U
Chrysene	218-01-9	1	6.1	20.0	15.8	ug/kg	J
bis(2-Ethylhexyl)phthalate	117-81-7	1	5.5	50.0	8.6	ug/kg	J
Di-n-Octylphthalate	117-84-0	1	4.4	20.0	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.0	40.0	16.2	ug/kg	J
Benzo(a)pyrene	50-32-8	1	4.2	20.0	5.6	ug/kg	J
Indeno(1,2,3-cd)pyrene	193-39-5	1	14.6	20.0	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	17.2	20.0	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	13.6	20.0	ND	ug/kg	U
1-Methylnaphthalene	90-12-0	1	5.3	20.0	13.1	ug/kg	J
Surrogate: 2-Fluorophenol				27-120 %	59.5	%	
Surrogate: Phenol-d5				29-120 %	57.9	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	70.6	%	
Surrogate: 1,2-Dichlorobenzene-d4				32-120 %	61.7	%	

Analytical Resources, Inc.

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.

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-76:5.0-01262021
21G0121-02 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 08:55

Instrument: NT10 Analyst: VTS

Analyzed: 07/27/2021 21:36

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: Nitrobenzene-d5		30-120 %	71.5	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	74.7	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	80.1	%	
Surrogate: p-Terphenyl-d14		37-120 %	74.2	%	

Analytical Resources, Inc.

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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-100:5.0-01262021
21G0121-03 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 01/26/2021 08:58	
Instrument: NT10 Analyst: VTS			Analyzed: 07/27/2021 22:14	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Sample Size: 14.8 g (wet)	Extract ID: 21G0121-03 A 01	
	Preparation Batch: BJG0492		Dry Weight: 10.04 g	
	Prepared: 07/22/2021		% Solids: 67.84	
Sample Cleanup:	Cleanup Method: GPC	Initial Volume: 1 uL	Extract ID: 21G0121-03 A 01	
	Cleanup Batch: CJG0267			
	Cleaned: 27-Jul-2021			

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	4.4	19.9	10.3	ug/kg	J
bis(2-chloroethyl) ether	111-44-4	1	19.2	49.8	ND	ug/kg	U
2-Chlorophenol	95-57-8	1	13.8	19.9	ND	ug/kg	U
1,3-Dichlorobenzene	541-73-1	1	3.1	19.9	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	3.1	19.9	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	2.4	19.9	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	16.2	19.9	ND	ug/kg	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	3.4	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	6.6	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	3.4	19.9	ND	ug/kg	U
N-Nitroso-di-n-Propylamine	621-64-7	1	7.4	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	7.4	19.9	14.1	ug/kg	J
Nitrobenzene	98-95-3	1	7.2	19.9	ND	ug/kg	U
Isophorone	78-59-1	1	3.9	19.9	ND	ug/kg	U
2-Nitrophenol	88-75-5	1	4.8	19.9	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	3.8	99.6	ND	ug/kg	U
Bis(2-Chloroethoxy)methane	111-91-1	1	4.3	19.9	ND	ug/kg	U
2,4-Dichlorophenol	120-83-2	1	15.3	99.6	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	3.6	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	4.2	19.9	35.1	ug/kg	
Benzoic acid	65-85-0	1	38.9	199	79.1	ug/kg	J
4-Chloroaniline	106-47-8	1	8.3	99.6	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	4.8	19.9	ND	ug/kg	U
4-Chloro-3-Methylphenol	59-50-7	1	12.4	99.6	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	4.5	19.9	22.1	ug/kg	
Hexachlorocyclopentadiene	77-47-4	1	24.4	99.6	ND	ug/kg	U
2,4,6-Trichlorophenol	88-06-2	1	8.9	99.6	ND	ug/kg	U
2,4,5-Trichlorophenol	95-95-4	1	25.6	99.6	ND	ug/kg	U
2-Chloronaphthalene	91-58-7	1	7.9	19.9	ND	ug/kg	U
2-Nitroaniline	88-74-4	1	16.4	99.6	ND	ug/kg	U
Acenaphthylene	208-96-8	1	6.2	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	4.4	19.9	ND	ug/kg	U


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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-100:5.0-01262021
21G0121-03 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 08:58

Instrument: NT10 Analyst: VTS

Analyzed: 07/27/2021 22:14

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
2,6-Dinitrotoluene	606-20-2	1	20.4	99.6	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.2	19.9	50.5	ug/kg	
3-Nitroaniline	99-09-2	1	22.2	99.6	ND	ug/kg	U
2,4-Dinitrophenol	51-28-5	1	33.7	199	ND	ug/kg	U
Dibenzofuran	132-64-9	1	14.1	19.9	29.6	ug/kg	
4-Nitrophenol	100-02-7	1	32.5	99.6	ND	ug/kg	U
2,4-Dinitrotoluene	121-14-2	1	16.1	99.6	ND	ug/kg	U
Fluorene	86-73-7	1	14.5	19.9	59.2	ug/kg	
4-Chlorophenylphenyl ether	7005-72-3	1	19.1	49.8	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	19.6	49.8	21.6	ug/kg	J
4-Nitroaniline	100-01-6	1	29.3	99.6	ND	ug/kg	U
4,6-Dinitro-2-methylphenol	534-52-1	1	37.8	199	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	5.3	19.9	ND	ug/kg	U
4-Bromophenyl phenyl ether	101-55-3	1	16.9	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	13.4	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.1	99.6	ND	ug/kg	U
Phenanthrene	85-01-8	1	8.7	19.9	145	ug/kg	
Anthracene	120-12-7	1	7.2	19.9	23.0	ug/kg	
Carbazole	86-74-8	1	4.3	19.9	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.6	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	6.1	19.9	75.2	ug/kg	
Pyrene	129-00-0	1	5.7	19.9	63.8	ug/kg	
Butylbenzylphthalate	85-68-7	1	9.4	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.9	19.9	16.6	ug/kg	J
3,3'-Dichlorobenzidine	91-94-1	1	7.1	99.6	ND	ug/kg	U
Chrysene	218-01-9	1	6.0	19.9	21.8	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	5.4	49.8	ND	ug/kg	U
Di-n-Octylphthalate	117-84-0	1	4.4	19.9	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.0	39.8	21.1	ug/kg	J
Benzo(a)pyrene	50-32-8	1	4.2	19.9	7.4	ug/kg	J
Indeno(1,2,3-cd)pyrene	193-39-5	1	14.6	19.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	17.2	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	13.5	19.9	ND	ug/kg	U
1-Methylnaphthalene	90-12-0	1	5.2	19.9	19.5	ug/kg	J
<i>Surrogate: 2-Fluorophenol</i>				27-120 %	60.4	%	
<i>Surrogate: Phenol-d5</i>				29-120 %	58.2	%	
<i>Surrogate: 2-Chlorophenol-d4</i>				31-120 %	70.2	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				32-120 %	62.0	%	



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-100:5.0-01262021
21G0121-03 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 08:58

Instrument: NT10 Analyst: VTS

Analyzed: 07/27/2021 22:14

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: Nitrobenzene-d5		30-120 %	71.7	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	75.8	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	78.4	%	
Surrogate: p-Terphenyl-d14		37-120 %	72.0	%	

Analytical Resources, Inc.

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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-67:0.5-01262021
21G0121-04 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E		Sampled: 01/26/2021 13:20	
Instrument: NT10 Analyst: VTS		Analyzed: 07/27/2021 22:51	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)	Extract ID: 21G0121-04 A 01	
	Preparation Batch: BJG0492	Dry Weight: 10.04 g	
	Prepared: 07/22/2021	% Solids: 90.61	
Sample Cleanup:	Cleanup Method: GPC	Extract ID: 21G0121-04 A 01	
	Cleanup Batch: CJG0267	Initial Volume: 1 uL	
	Cleaned: 27-Jul-2021	Final Volume: 1 uL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	4.4	19.9	4.5	ug/kg	J
bis(2-chloroethyl) ether	111-44-4	1	19.2	49.8	ND	ug/kg	U
2-Chlorophenol	95-57-8	1	13.8	19.9	ND	ug/kg	U
1,3-Dichlorobenzene	541-73-1	1	3.1	19.9	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	3.1	19.9	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	2.4	19.9	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	16.2	19.9	ND	ug/kg	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	3.4	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	6.6	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	3.4	19.9	ND	ug/kg	U
N-Nitroso-di-n-Propylamine	621-64-7	1	7.4	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	7.4	19.9	ND	ug/kg	U
Nitrobenzene	98-95-3	1	7.2	19.9	ND	ug/kg	U
Isophorone	78-59-1	1	3.9	19.9	ND	ug/kg	U
2-Nitrophenol	88-75-5	1	4.8	19.9	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	3.8	99.6	ND	ug/kg	U
Bis(2-Chloroethoxy)methane	111-91-1	1	4.3	19.9	ND	ug/kg	U
2,4-Dichlorophenol	120-83-2	1	15.3	99.6	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	3.6	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	4.2	19.9	5.0	ug/kg	J
Benzoic acid	65-85-0	1	38.9	199	ND	ug/kg	U
4-Chloroaniline	106-47-8	1	8.3	99.6	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	4.8	19.9	ND	ug/kg	U
4-Chloro-3-Methylphenol	59-50-7	1	12.4	99.6	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	4.5	19.9	4.6	ug/kg	J
Hexachlorocyclopentadiene	77-47-4	1	24.4	99.6	ND	ug/kg	U
2,4,6-Trichlorophenol	88-06-2	1	8.9	99.6	ND	ug/kg	U
2,4,5-Trichlorophenol	95-95-4	1	25.6	99.6	ND	ug/kg	U
2-Chloronaphthalene	91-58-7	1	7.9	19.9	ND	ug/kg	U
2-Nitroaniline	88-74-4	1	16.4	99.6	ND	ug/kg	U
Acenaphthylene	208-96-8	1	6.2	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	4.4	19.9	5.3	ug/kg	J


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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-67:0.5-01262021
21G0121-04 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 13:20

Instrument: NT10 Analyst: VTS

Analyzed: 07/27/2021 22:51

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
2,6-Dinitrotoluene	606-20-2	1	20.4	99.6	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.2	19.9	ND	ug/kg	U
3-Nitroaniline	99-09-2	1	22.2	99.6	ND	ug/kg	U
2,4-Dinitrophenol	51-28-5	1	33.7	199	ND	ug/kg	U
Dibenzofuran	132-64-9	1	14.1	19.9	ND	ug/kg	U
4-Nitrophenol	100-02-7	1	32.5	99.6	ND	ug/kg	U
2,4-Dinitrotoluene	121-14-2	1	16.1	99.6	ND	ug/kg	U
Fluorene	86-73-7	1	14.5	19.9	ND	ug/kg	U
4-Chlorophenylphenyl ether	7005-72-3	1	19.1	49.8	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	19.6	49.8	ND	ug/kg	U
4-Nitroaniline	100-01-6	1	29.3	99.6	ND	ug/kg	U
4,6-Dinitro-2-methylphenol	534-52-1	1	37.8	199	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	5.3	19.9	ND	ug/kg	U
4-Bromophenyl phenyl ether	101-55-3	1	16.9	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	13.4	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.1	99.6	ND	ug/kg	U
Phenanthrene	85-01-8	1	8.7	19.9	19.3	ug/kg	J
Anthracene	120-12-7	1	7.2	19.9	ND	ug/kg	U
Carbazole	86-74-8	1	4.3	19.9	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.6	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	6.1	19.9	21.8	ug/kg	
Pyrene	129-00-0	1	5.7	19.9	22.2	ug/kg	
Butylbenzylphthalate	85-68-7	1	9.4	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.9	19.9	13.7	ug/kg	J
3,3'-Dichlorobenzidine	91-94-1	1	7.1	99.6	ND	ug/kg	U
Chrysene	218-01-9	1	6.0	19.9	23.9	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	5.4	49.8	ND	ug/kg	U
Di-n-Octylphthalate	117-84-0	1	4.4	19.9	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.0	39.8	50.0	ug/kg	
Benzo(a)pyrene	50-32-8	1	4.2	19.9	21.8	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	14.6	19.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	17.2	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	13.5	19.9	16.0	ug/kg	J
1-Methylnaphthalene	90-12-0	1	5.2	19.9	ND	ug/kg	U
<i>Surrogate: 2-Fluorophenol</i>				27-120 %	63.0	%	
<i>Surrogate: Phenol-d5</i>				29-120 %	58.0	%	
<i>Surrogate: 2-Chlorophenol-d4</i>				31-120 %	71.6	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				32-120 %	63.4	%	



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-67:0.5-01262021
21G0121-04 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 13:20

Instrument: NT10 Analyst: VTS

Analyzed: 07/27/2021 22:51

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: Nitrobenzene-d5		30-120 %	75.1	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	74.3	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	79.4	%	
Surrogate: p-Terphenyl-d14		37-120 %	68.0	%	

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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-67:5.5-01262021
21G0121-05 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 01/26/2021 13:25	
Instrument: NT10 Analyst: VTS			Analyzed: 07/28/2021 14:12	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 21G0121-05 A 01	
	Preparation Batch: BJG0492		Dry Weight: 10.04 g	
	Prepared: 07/22/2021		% Solids: 89.63	
Sample Cleanup:	Sample Size: 11.2 g (wet)		Extract ID: 21G0121-05 A 01	
	Final Volume: 1 mL			
Sample Cleanup:	Cleanup Method: GPC		Initial Volume: 1 uL	
	Cleanup Batch: CJG0267		Final Volume: 1 uL	
	Cleaned: 27-Jul-2021			

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	4.4	19.9	ND	ug/kg	U
bis(2-chloroethyl) ether	111-44-4	1	19.2	49.8	ND	ug/kg	U
2-Chlorophenol	95-57-8	1	13.8	19.9	ND	ug/kg	U
1,3-Dichlorobenzene	541-73-1	1	3.1	19.9	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	3.1	19.9	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	2.4	19.9	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	16.2	19.9	ND	ug/kg	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	3.4	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	6.6	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	3.4	19.9	ND	ug/kg	U
N-Nitroso-di-n-Propylamine	621-64-7	1	7.4	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	7.4	19.9	ND	ug/kg	U
Nitrobenzene	98-95-3	1	7.2	19.9	ND	ug/kg	U
Isophorone	78-59-1	1	3.9	19.9	ND	ug/kg	U
2-Nitrophenol	88-75-5	1	4.8	19.9	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	3.8	99.6	ND	ug/kg	U
Bis(2-Chloroethoxy)methane	111-91-1	1	4.3	19.9	ND	ug/kg	U
2,4-Dichlorophenol	120-83-2	1	15.3	99.6	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	3.6	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	4.2	19.9	5.6	ug/kg	J
Benzoic acid	65-85-0	1	38.9	199	ND	ug/kg	U
4-Chloroaniline	106-47-8	1	8.3	99.6	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	4.8	19.9	ND	ug/kg	U
4-Chloro-3-Methylphenol	59-50-7	1	12.4	99.6	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	4.5	19.9	8.7	ug/kg	J
Hexachlorocyclopentadiene	77-47-4	1	24.4	99.6	ND	ug/kg	U
2,4,6-Trichlorophenol	88-06-2	1	8.9	99.6	ND	ug/kg	U
2,4,5-Trichlorophenol	95-95-4	1	25.7	99.6	ND	ug/kg	U
2-Chloronaphthalene	91-58-7	1	7.9	19.9	ND	ug/kg	U
2-Nitroaniline	88-74-4	1	16.4	99.6	ND	ug/kg	U
Acenaphthylene	208-96-8	1	6.2	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	4.4	19.9	ND	ug/kg	U



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-67:5.5-01262021 21G0121-05 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 13:25

Instrument: NT10 Analyst: VTS

Analyzed: 07/28/2021 14:12

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
2,6-Dinitrotoluene	606-20-2	1	20.4	99.6	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.2	19.9	ND	ug/kg	U
3-Nitroaniline	99-09-2	1	22.2	99.6	ND	ug/kg	U
2,4-Dinitrophenol	51-28-5	1	33.7	199	ND	ug/kg	U
Dibenzofuran	132-64-9	1	14.1	19.9	ND	ug/kg	U
4-Nitrophenol	100-02-7	1	32.5	99.6	ND	ug/kg	U
2,4-Dinitrotoluene	121-14-2	1	16.1	99.6	ND	ug/kg	U
Fluorene	86-73-7	1	14.5	19.9	ND	ug/kg	U
4-Chlorophenylphenyl ether	7005-72-3	1	19.1	49.8	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	19.6	49.8	34.5	ug/kg	J
4-Nitroaniline	100-01-6	1	29.3	99.6	ND	ug/kg	U
4,6-Dinitro-2-methylphenol	534-52-1	1	37.8	199	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	5.3	19.9	ND	ug/kg	U
4-Bromophenyl phenyl ether	101-55-3	1	16.9	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	13.4	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.1	99.6	ND	ug/kg	U
Phenanthrene	85-01-8	1	8.7	19.9	28.9	ug/kg	
Anthracene	120-12-7	1	7.2	19.9	ND	ug/kg	U
Carbazole	86-74-8	1	4.3	19.9	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.6	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	6.1	19.9	42.3	ug/kg	
Pyrene	129-00-0	1	5.7	19.9	37.7	ug/kg	
Butylbenzylphthalate	85-68-7	1	9.4	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.9	19.9	21.5	ug/kg	
3,3'-Dichlorobenzidine	91-94-1	1	7.1	99.6	ND	ug/kg	U
Chrysene	218-01-9	1	6.0	19.9	29.8	ug/kg	
bis(2-Ethylhexyl)phthalate	117-81-7	1	5.4	49.8	17.1	ug/kg	J
Di-n-Octylphthalate	117-84-0	1	4.4	19.9	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.0	39.8	40.6	ug/kg	
Benzo(a)pyrene	50-32-8	1	4.2	19.9	17.4	ug/kg	J
Indeno(1,2,3-cd)pyrene	193-39-5	1	14.6	19.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	17.2	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	13.5	19.9	15.5	ug/kg	J
1-Methylnaphthalene	90-12-0	1	5.2	19.9	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	62.4	%	
Surrogate: Phenol-d5				29-120 %	60.5	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	75.7	%	
Surrogate: 1,2-Dichlorobenzene-d4				32-120 %	66.4	%	

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-67:5.5-01262021
21G0121-05 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 13:25

Instrument: NT10 Analyst: VTS

Analyzed: 07/28/2021 14:12

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: Nitrobenzene-d5		30-120 %	73.4	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	77.7	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	80.7	%	
Surrogate: p-Terphenyl-d14		37-120 %	83.4	%	

Analytical Resources, Inc.

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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-67:9.0-01262021
21G0121-06 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 01/26/2021 13:35	
Instrument: NT10 Analyst: VTS			Analyzed: 07/28/2021 14:50	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 21G0121-06 A 01	
	Preparation Batch: BJG0492	Sample Size: 13.57 g (wet)		Dry Weight: 10.01 g
	Prepared: 07/22/2021	Final Volume: 1 mL		% Solids: 73.77
Sample Cleanup:	Cleanup Method: GPC		Extract ID: 21G0121-06 A 01	
	Cleanup Batch: CJG0267	Initial Volume: 1 uL		
	Cleaned: 27-Jul-2021	Final Volume: 1 uL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	4.4	20.0	ND	ug/kg	U
bis(2-chloroethyl) ether	111-44-4	1	19.3	49.9	ND	ug/kg	U
2-Chlorophenol	95-57-8	1	13.8	20.0	ND	ug/kg	U
1,3-Dichlorobenzene	541-73-1	1	3.1	20.0	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	3.1	20.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	2.4	20.0	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	16.2	20.0	ND	ug/kg	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	3.4	20.0	ND	ug/kg	U
2-Methylphenol	95-48-7	1	6.7	20.0	ND	ug/kg	U
Hexachloroethane	67-72-1	1	3.4	20.0	ND	ug/kg	U
N-Nitroso-di-n-Propylamine	621-64-7	1	7.4	20.0	ND	ug/kg	U
4-Methylphenol	106-44-5	1	7.4	20.0	ND	ug/kg	U
Nitrobenzene	98-95-3	1	7.2	20.0	ND	ug/kg	U
Isophorone	78-59-1	1	3.9	20.0	ND	ug/kg	U
2-Nitrophenol	88-75-5	1	4.9	20.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	3.8	99.9	ND	ug/kg	U
Bis(2-Chloroethoxy)methane	111-91-1	1	4.3	20.0	ND	ug/kg	U
2,4-Dichlorophenol	120-83-2	1	15.3	99.9	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	3.6	20.0	ND	ug/kg	U
Naphthalene	91-20-3	1	4.2	20.0	35.2	ug/kg	
Benzoic acid	65-85-0	1	39.0	200	ND	ug/kg	U
4-Chloroaniline	106-47-8	1	8.4	99.9	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	4.8	20.0	ND	ug/kg	U
4-Chloro-3-Methylphenol	59-50-7	1	12.4	99.9	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	4.5	20.0	4.6	ug/kg	J
Hexachlorocyclopentadiene	77-47-4	1	24.4	99.9	ND	ug/kg	U
2,4,6-Trichlorophenol	88-06-2	1	9.0	99.9	ND	ug/kg	U
2,4,5-Trichlorophenol	95-95-4	1	25.7	99.9	ND	ug/kg	U
2-Chloronaphthalene	91-58-7	1	8.0	20.0	ND	ug/kg	U
2-Nitroaniline	88-74-4	1	16.4	99.9	ND	ug/kg	U
Acenaphthylene	208-96-8	1	6.2	20.0	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	4.4	20.0	ND	ug/kg	U


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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-67:9.0-01262021
21G0121-06 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 13:35

Instrument: NT10 Analyst: VTS

Analyzed: 07/28/2021 14:50

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
2,6-Dinitrotoluene	606-20-2	1	20.5	99.9	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.2	20.0	ND	ug/kg	U
3-Nitroaniline	99-09-2	1	22.2	99.9	ND	ug/kg	U
2,4-Dinitrophenol	51-28-5	1	33.8	200	ND	ug/kg	U
Dibenzofuran	132-64-9	1	14.1	20.0	ND	ug/kg	U
4-Nitrophenol	100-02-7	1	32.6	99.9	ND	ug/kg	U
2,4-Dinitrotoluene	121-14-2	1	16.2	99.9	ND	ug/kg	U
Fluorene	86-73-7	1	14.6	20.0	ND	ug/kg	U
4-Chlorophenylphenyl ether	7005-72-3	1	19.1	49.9	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	19.7	49.9	ND	ug/kg	U
4-Nitroaniline	100-01-6	1	29.4	99.9	ND	ug/kg	U
4,6-Dinitro-2-methylphenol	534-52-1	1	37.9	200	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	5.3	20.0	ND	ug/kg	U
4-Bromophenyl phenyl ether	101-55-3	1	17.0	20.0	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	13.5	20.0	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	99.9	ND	ug/kg	U
Phenanthrene	85-01-8	1	8.7	20.0	11.7	ug/kg	J
Anthracene	120-12-7	1	7.2	20.0	ND	ug/kg	U
Carbazole	86-74-8	1	4.3	20.0	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.6	20.0	ND	ug/kg	U
Fluoranthene	206-44-0	1	6.1	20.0	6.3	ug/kg	J
Pyrene	129-00-0	1	5.7	20.0	6.3	ug/kg	J
Butylbenzylphthalate	85-68-7	1	9.4	20.0	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	6.0	20.0	ND	ug/kg	U
3,3'-Dichlorobenzidine	91-94-1	1	7.1	99.9	ND	ug/kg	U
Chrysene	218-01-9	1	6.1	20.0	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	5.5	49.9	58.6	ug/kg	
Di-n-Octylphthalate	117-84-0	1	4.4	20.0	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.0	40.0	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	4.2	20.0	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	14.6	20.0	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	17.2	20.0	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	13.6	20.0	ND	ug/kg	U
1-Methylnaphthalene	90-12-0	1	5.3	20.0	ND	ug/kg	U
<i>Surrogate: 2-Fluorophenol</i>				27-120 %	61.2	%	
<i>Surrogate: Phenol-d5</i>				29-120 %	60.3	%	
<i>Surrogate: 2-Chlorophenol-d4</i>				31-120 %	73.9	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				32-120 %	63.6	%	



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-67:9.0-01262021
21G0121-06 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 13:35

Instrument: NT10 Analyst: VTS

Analyzed: 07/28/2021 14:50

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: Nitrobenzene-d5		30-120 %	73.0	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	74.2	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	80.8	%	
Surrogate: p-Terphenyl-d14		37-120 %	78.2	%	

Analytical Resources, Inc.

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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-67:16.0-01262021
21G0121-07 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 01/26/2021 13:50	
Instrument: NT10 Analyst: VTS			Analyzed: 07/28/2021 15:29	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 21G0121-07 A 01	
	Preparation Batch: BJG0492	Sample Size: 12.83 g (wet)		Dry Weight: 10.03 g
	Prepared: 07/22/2021	Final Volume: 1 mL		% Solids: 78.17
Sample Cleanup:	Cleanup Method: GPC		Extract ID: 21G0121-07 A 01	
	Cleanup Batch: CJG0267	Initial Volume: 1 uL		
	Cleaned: 27-Jul-2021	Final Volume: 1 uL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	4.4	19.9	ND	ug/kg	U
bis(2-chloroethyl) ether	111-44-4	1	19.2	49.9	ND	ug/kg	U
2-Chlorophenol	95-57-8	1	13.8	19.9	ND	ug/kg	U
1,3-Dichlorobenzene	541-73-1	1	3.1	19.9	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	3.1	19.9	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	2.4	19.9	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	16.2	19.9	ND	ug/kg	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	3.4	19.9	ND	ug/kg	U
2-Methylphenol	95-48-7	1	6.6	19.9	ND	ug/kg	U
Hexachloroethane	67-72-1	1	3.4	19.9	ND	ug/kg	U
N-Nitroso-di-n-Propylamine	621-64-7	1	7.4	19.9	ND	ug/kg	U
4-Methylphenol	106-44-5	1	7.4	19.9	ND	ug/kg	U
Nitrobenzene	98-95-3	1	7.2	19.9	ND	ug/kg	U
Isophorone	78-59-1	1	3.9	19.9	ND	ug/kg	U
2-Nitrophenol	88-75-5	1	4.8	19.9	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	3.8	99.7	ND	ug/kg	U
Bis(2-Chloroethoxy)methane	111-91-1	1	4.3	19.9	ND	ug/kg	U
2,4-Dichlorophenol	120-83-2	1	15.3	99.7	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	3.6	19.9	ND	ug/kg	U
Naphthalene	91-20-3	1	4.2	19.9	ND	ug/kg	U
Benzoic acid	65-85-0	1	38.9	199	ND	ug/kg	U
4-Chloroaniline	106-47-8	1	8.4	99.7	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	4.8	19.9	ND	ug/kg	U
4-Chloro-3-Methylphenol	59-50-7	1	12.4	99.7	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	4.5	19.9	ND	ug/kg	U
Hexachlorocyclopentadiene	77-47-4	1	24.4	99.7	ND	ug/kg	U
2,4,6-Trichlorophenol	88-06-2	1	9.0	99.7	ND	ug/kg	U
2,4,5-Trichlorophenol	95-95-4	1	25.7	99.7	ND	ug/kg	U
2-Chloronaphthalene	91-58-7	1	7.9	19.9	ND	ug/kg	U
2-Nitroaniline	88-74-4	1	16.4	99.7	ND	ug/kg	U
Acenaphthylene	208-96-8	1	6.2	19.9	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	4.4	19.9	ND	ug/kg	U



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-67:16.0-01262021
21G0121-07 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 13:50

Instrument: NT10 Analyst: VTS

Analyzed: 07/28/2021 15:29

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
2,6-Dinitrotoluene	606-20-2	1	20.4	99.7	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.2	19.9	ND	ug/kg	U
3-Nitroaniline	99-09-2	1	22.2	99.7	ND	ug/kg	U
2,4-Dinitrophenol	51-28-5	1	33.7	199	ND	ug/kg	U
Dibenzofuran	132-64-9	1	14.1	19.9	ND	ug/kg	U
4-Nitrophenol	100-02-7	1	32.5	99.7	ND	ug/kg	U
2,4-Dinitrotoluene	121-14-2	1	16.2	99.7	ND	ug/kg	U
Fluorene	86-73-7	1	14.5	19.9	ND	ug/kg	U
4-Chlorophenylphenyl ether	7005-72-3	1	19.1	49.9	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	19.7	49.9	ND	ug/kg	U
4-Nitroaniline	100-01-6	1	29.3	99.7	ND	ug/kg	U
4,6-Dinitro-2-methylphenol	534-52-1	1	37.9	199	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	5.3	19.9	ND	ug/kg	U
4-Bromophenyl phenyl ether	101-55-3	1	17.0	19.9	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	13.4	19.9	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	99.7	ND	ug/kg	U
Phenanthrene	85-01-8	1	8.7	19.9	11.4	ug/kg	J
Anthracene	120-12-7	1	7.2	19.9	ND	ug/kg	U
Carbazole	86-74-8	1	4.3	19.9	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.6	19.9	ND	ug/kg	U
Fluoranthene	206-44-0	1	6.1	19.9	ND	ug/kg	U
Pyrene	129-00-0	1	5.7	19.9	ND	ug/kg	U
Butylbenzylphthalate	85-68-7	1	9.4	19.9	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.9	19.9	ND	ug/kg	U
3,3'-Dichlorobenzidine	91-94-1	1	7.1	99.7	ND	ug/kg	U
Chrysene	218-01-9	1	6.0	19.9	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	5.4	49.9	6.4	ug/kg	J
Di-n-Octylphthalate	117-84-0	1	4.4	19.9	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.0	39.9	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	4.2	19.9	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	14.6	19.9	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	17.2	19.9	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	13.6	19.9	ND	ug/kg	U
1-Methylnaphthalene	90-12-0	1	5.2	19.9	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	64.5	%	
Surrogate: Phenol-d5				29-120 %	59.5	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	73.3	%	
Surrogate: 1,2-Dichlorobenzene-d4				32-120 %	63.9	%	

Analytical Resources, Inc.

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-67:16.0-01262021
21G0121-07 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 13:50

Instrument: NT10 Analyst: VTS

Analyzed: 07/28/2021 15:29

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: Nitrobenzene-d5		30-120 %	72.1	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	73.9	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	82.2	%	
Surrogate: p-Terphenyl-d14		37-120 %	79.3	%	

Analytical Resources, Inc.

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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-67:20.5-01262021
21G0121-08 (Solid)
Semivolatile Organic Compounds

Method: EPA 8270E			Sampled: 01/26/2021 14:00	
Instrument: NT10 Analyst: VTS			Analyzed: 07/28/2021 17:24	
Sample Preparation:	Preparation Method: EPA 3546 (Microwave)		Extract ID: 21G0121-08 A 01	
	Preparation Batch: BJG0492	Sample Size: 12.88 g (wet)		Dry Weight: 10.02 g
	Prepared: 07/22/2021	Final Volume: 1 mL		% Solids: 77.83
Sample Cleanup:	Cleanup Method: GPC		Extract ID: 21G0121-08 A 01	
	Cleanup Batch: CJG0267	Initial Volume: 1 uL		
	Cleaned: 27-Jul-2021	Final Volume: 1 uL		

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Phenol	108-95-2	1	4.4	20.0	ND	ug/kg	U
bis(2-chloroethyl) ether	111-44-4	1	19.2	49.9	ND	ug/kg	U
2-Chlorophenol	95-57-8	1	13.8	20.0	ND	ug/kg	U
1,3-Dichlorobenzene	541-73-1	1	3.1	20.0	ND	ug/kg	U
1,4-Dichlorobenzene	106-46-7	1	3.1	20.0	ND	ug/kg	U
1,2-Dichlorobenzene	95-50-1	1	2.4	20.0	ND	ug/kg	U
Benzyl Alcohol	100-51-6	1	16.2	20.0	ND	ug/kg	U
2,2'-Oxybis(1-chloropropane)	108-60-1	1	3.4	20.0	ND	ug/kg	U
2-Methylphenol	95-48-7	1	6.6	20.0	ND	ug/kg	U
Hexachloroethane	67-72-1	1	3.4	20.0	ND	ug/kg	U
N-Nitroso-di-n-Propylamine	621-64-7	1	7.4	20.0	ND	ug/kg	U
4-Methylphenol	106-44-5	1	7.4	20.0	ND	ug/kg	U
Nitrobenzene	98-95-3	1	7.2	20.0	ND	ug/kg	U
Isophorone	78-59-1	1	3.9	20.0	ND	ug/kg	U
2-Nitrophenol	88-75-5	1	4.8	20.0	ND	ug/kg	U
2,4-Dimethylphenol	105-67-9	1	3.8	99.8	ND	ug/kg	U
Bis(2-Chloroethoxy)methane	111-91-1	1	4.3	20.0	ND	ug/kg	U
2,4-Dichlorophenol	120-83-2	1	15.3	99.8	ND	ug/kg	U
1,2,4-Trichlorobenzene	120-82-1	1	3.6	20.0	ND	ug/kg	U
Naphthalene	91-20-3	1	4.2	20.0	ND	ug/kg	U
Benzoic acid	65-85-0	1	38.9	200	ND	ug/kg	U
4-Chloroaniline	106-47-8	1	8.4	99.8	ND	ug/kg	U
Hexachlorobutadiene	87-68-3	1	4.8	20.0	ND	ug/kg	U
4-Chloro-3-Methylphenol	59-50-7	1	12.4	99.8	ND	ug/kg	U
2-Methylnaphthalene	91-57-6	1	4.5	20.0	ND	ug/kg	U
Hexachlorocyclopentadiene	77-47-4	1	24.4	99.8	ND	ug/kg	U
2,4,6-Trichlorophenol	88-06-2	1	9.0	99.8	ND	ug/kg	U
2,4,5-Trichlorophenol	95-95-4	1	25.7	99.8	ND	ug/kg	U
2-Chloronaphthalene	91-58-7	1	7.9	20.0	ND	ug/kg	U
2-Nitroaniline	88-74-4	1	16.4	99.8	ND	ug/kg	U
Acenaphthylene	208-96-8	1	6.2	20.0	ND	ug/kg	U
Dimethylphthalate	131-11-3	1	4.4	20.0	ND	ug/kg	U



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-67:20.5-01262021
21G0121-08 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 14:00

Instrument: NT10 Analyst: VTS

Analyzed: 07/28/2021 17:24

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
2,6-Dinitrotoluene	606-20-2	1	20.4	99.8	ND	ug/kg	U
Acenaphthene	83-32-9	1	5.2	20.0	ND	ug/kg	U
3-Nitroaniline	99-09-2	1	22.2	99.8	ND	ug/kg	U
2,4-Dinitrophenol	51-28-5	1	33.7	200	ND	ug/kg	U
Dibenzofuran	132-64-9	1	14.1	20.0	ND	ug/kg	U
4-Nitrophenol	100-02-7	1	32.6	99.8	ND	ug/kg	U
2,4-Dinitrotoluene	121-14-2	1	16.2	99.8	ND	ug/kg	U
Fluorene	86-73-7	1	14.5	20.0	ND	ug/kg	U
4-Chlorophenylphenyl ether	7005-72-3	1	19.1	49.9	ND	ug/kg	U
Diethyl phthalate	84-66-2	1	19.7	49.9	ND	ug/kg	U
4-Nitroaniline	100-01-6	1	29.3	99.8	ND	ug/kg	U
4,6-Dinitro-2-methylphenol	534-52-1	1	37.9	200	ND	ug/kg	U
N-Nitrosodiphenylamine	86-30-6	1	5.3	20.0	ND	ug/kg	U
4-Bromophenyl phenyl ether	101-55-3	1	17.0	20.0	ND	ug/kg	U
Hexachlorobenzene	118-74-1	1	13.4	20.0	ND	ug/kg	U
Pentachlorophenol	87-86-5	1	31.2	99.8	ND	ug/kg	U
Phenanthrene	85-01-8	1	8.7	20.0	ND	ug/kg	U
Anthracene	120-12-7	1	7.2	20.0	ND	ug/kg	U
Carbazole	86-74-8	1	4.3	20.0	ND	ug/kg	U
Di-n-Butylphthalate	84-74-2	1	5.6	20.0	ND	ug/kg	U
Fluoranthene	206-44-0	1	6.1	20.0	ND	ug/kg	U
Pyrene	129-00-0	1	5.7	20.0	ND	ug/kg	U
Butylbenzylphthalate	85-68-7	1	9.4	20.0	ND	ug/kg	U
Benzo(a)anthracene	56-55-3	1	5.9	20.0	ND	ug/kg	U
3,3'-Dichlorobenzidine	91-94-1	1	7.1	99.8	ND	ug/kg	U
Chrysene	218-01-9	1	6.0	20.0	ND	ug/kg	U
bis(2-Ethylhexyl)phthalate	117-81-7	1	5.4	49.9	5.7	ug/kg	J
Di-n-Octylphthalate	117-84-0	1	4.4	20.0	ND	ug/kg	U
Benzo(a)fluoranthene, Total		1	10.0	39.9	ND	ug/kg	U
Benzo(a)pyrene	50-32-8	1	4.2	20.0	ND	ug/kg	U
Indeno(1,2,3-cd)pyrene	193-39-5	1	14.6	20.0	ND	ug/kg	U
Dibenzo(a,h)anthracene	53-70-3	1	17.2	20.0	ND	ug/kg	U
Benzo(g,h,i)perylene	191-24-2	1	13.6	20.0	ND	ug/kg	U
1-Methylnaphthalene	90-12-0	1	5.2	20.0	ND	ug/kg	U
Surrogate: 2-Fluorophenol				27-120 %	65.6	%	
Surrogate: Phenol-d5				29-120 %	60.0	%	
Surrogate: 2-Chlorophenol-d4				31-120 %	74.7	%	
Surrogate: 1,2-Dichlorobenzene-d4				32-120 %	64.6	%	

Analytical Resources, Inc.

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Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-67:20.5-01262021
21G0121-08 (Solid)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 01/26/2021 14:00

Instrument: NT10 Analyst: VTS

Analyzed: 07/28/2021 17:24

Analyte	CAS Number	Recovery Limits	Recovery	Units	Notes
Surrogate: Nitrobenzene-d5		30-120 %	73.6	%	
Surrogate: 2-Fluorobiphenyl		35-120 %	74.4	%	
Surrogate: 2,4,6-Tribromophenol		24-134 %	79.7	%	
Surrogate: p-Terphenyl-d14		37-120 %	78.0	%	

Analytical Resources, Inc.

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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-71:1.5-02042021
21G0121-09 (Solid)
Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 02/04/2021 10:30
Instrument: NT11 Analyst: VTS		Analyzed: 07/28/2021 14:59
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level	Extract ID: 21G0121-09 A 01
	Preparation Batch: BJG0493	Dry Weight: 10.01 g
	Prepared: 07/22/2021	% Solids: 87.16
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 21G0121-09 A 01
	Cleanup Batch: CJG0277	Initial Volume: 0.5 mL
	Cleaned: 27-Jul-2021	Final Volume: 0.5 mL
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 21G0121-09 A 01
	Cleanup Batch: CJG0276	Initial Volume: 0.5 mL
	Cleaned: 27-Jul-2021	Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.44	0.60	3.65	ug/kg	
1-Methylnaphthalene	90-12-0	1	0.11	0.50	4.48	ug/kg	
2-Methylnaphthalene	91-57-6	1	0.13	0.50	4.76	ug/kg	
Acenaphthylene	208-96-8	1	0.06	0.50	0.84	ug/kg	
Acenaphthene	83-32-9	1	0.09	0.50	0.85	ug/kg	
Dibenzofuran	132-64-9	1	0.13	0.50	2.50	ug/kg	
Fluorene	86-73-7	1	0.07	0.50	0.69	ug/kg	
Phenanthrene	85-01-8	1	0.11	0.50	13.1	ug/kg	
Anthracene	120-12-7	1	0.07	0.50	2.03	ug/kg	
Fluoranthene	206-44-0	1	0.08	0.50	15.6	ug/kg	
Pyrene	129-00-0	1	0.09	0.50	17.5	ug/kg	
Benzo(a)anthracene	56-55-3	1	0.07	0.50	8.08	ug/kg	
Chrysene	218-01-9	1	0.07	0.50	13.2	ug/kg	
Benzo(b)fluoranthene	205-99-2	1	0.07	0.50	12.7	ug/kg	
Benzo(k)fluoranthene	207-08-9	1	0.10	0.50	5.79	ug/kg	
Benzo(j)fluoranthene	205-82-3	1	0.10	0.50	5.47	ug/kg	
Benzo(a)pyrene	50-32-8	1	0.09	0.50	11.5	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.09	0.50	10.6	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	0.10	0.50	3.37	ug/kg	
Benzo(g,h,i)perylene	191-24-2	1	0.08	0.50	17.0	ug/kg	
Surrogate: 2-Methylnaphthalene-d10					30-160 %	61.2	%
Surrogate: Dibenzo[a,h]anthracene-d14					30-160 %	98.6	%
Surrogate: Fluoranthene-d10					30-160 %	91.1	%


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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-71:5.0-02042021
21G0121-10 (Solid)
Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 02/04/2021 10:35
Instrument: NT11 Analyst: VTS		Analyzed: 07/28/2021 15:29
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level	Extract ID: 21G0121-10 A 01
	Preparation Batch: BJG0493	Dry Weight: 10.02 g
	Prepared: 07/22/2021	% Solids: 79.36
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 21G0121-10 A 01
	Cleanup Batch: CJG0277	Initial Volume: 0.5 mL
	Cleaned: 27-Jul-2021	Final Volume: 0.5 mL
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 21G0121-10 A 01
	Cleanup Batch: CJG0276	Initial Volume: 0.5 mL
	Cleaned: 27-Jul-2021	Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.44	0.60	10.6	ug/kg	
1-Methylnaphthalene	90-12-0	1	0.11	0.50	5.98	ug/kg	
2-Methylnaphthalene	91-57-6	1	0.13	0.50	5.82	ug/kg	
Acenaphthylene	208-96-8	1	0.06	0.50	0.43	ug/kg	J
Acenaphthene	83-32-9	1	0.09	0.50	2.16	ug/kg	
Dibenzofuran	132-64-9	1	0.13	0.50	3.65	ug/kg	
Fluorene	86-73-7	1	0.07	0.50	2.70	ug/kg	
Phenanthrene	85-01-8	1	0.11	0.50	12.2	ug/kg	
Anthracene	120-12-7	1	0.07	0.50	2.63	ug/kg	
Fluoranthene	206-44-0	1	0.08	0.50	8.11	ug/kg	
Pyrene	129-00-0	1	0.09	0.50	7.41	ug/kg	
Benzo(a)anthracene	56-55-3	1	0.07	0.50	2.52	ug/kg	
Chrysene	218-01-9	1	0.07	0.50	3.85	ug/kg	
Benzo(b)fluoranthene	205-99-2	1	0.07	0.50	1.95	ug/kg	
Benzo(k)fluoranthene	207-08-9	1	0.10	0.50	0.76	ug/kg	
Benzo(j)fluoranthene	205-82-3	1	0.10	0.50	0.71	ug/kg	
Benzo(a)pyrene	50-32-8	1	0.09	0.50	1.37	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.09	0.50	0.97	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	0.10	0.50	0.35	ug/kg	J
Benzo(g,h,i)perylene	191-24-2	1	0.08	0.50	1.51	ug/kg	
Surrogate: 2-Methylnaphthalene-d10					30-160 %	61.8 %	
Surrogate: Dibenzo[a,h]anthracene-d14					30-160 %	102 %	
Surrogate: Fluoranthene-d10					30-160 %	90.3 %	


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-71:8.5-02042021
21G0121-11 (Solid)
Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 02/04/2021 10:45
Instrument: NT11 Analyst: VTS		Analyzed: 07/28/2021 17:00
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level	Extract ID: 21G0121-11 A 01
	Preparation Batch: BJG0493	Dry Weight: 10.02 g
	Prepared: 07/22/2021	% Solids: 71.68
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 21G0121-11 A 01
	Cleanup Batch: CJG0277	Initial Volume: 0.5 mL
	Cleaned: 27-Jul-2021	Final Volume: 0.5 mL
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 21G0121-11 A 01
	Cleanup Batch: CJG0276	Initial Volume: 0.5 mL
	Cleaned: 27-Jul-2021	Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.44	0.60	58.3	ug/kg	E
1-Methylnaphthalene	90-12-0	1	0.11	0.50	7.36	ug/kg	
2-Methylnaphthalene	91-57-6	1	0.13	0.50	11.3	ug/kg	
Acenaphthylene	208-96-8	1	0.06	0.50	9.41	ug/kg	
Acenaphthene	83-32-9	1	0.09	0.50	4.48	ug/kg	
Dibenzofuran	132-64-9	1	0.13	0.50	8.68	ug/kg	
Fluorene	86-73-7	1	0.07	0.50	3.59	ug/kg	
Phenanthrene	85-01-8	1	0.11	0.50	35.0	ug/kg	
Anthracene	120-12-7	1	0.07	0.50	6.04	ug/kg	
Fluoranthene	206-44-0	1	0.08	0.50	29.3	ug/kg	
Pyrene	129-00-0	1	0.09	0.50	27.5	ug/kg	
Benzo(a)anthracene	56-55-3	1	0.07	0.50	2.62	ug/kg	
Chrysene	218-01-9	1	0.07	0.50	10.1	ug/kg	
Benzo(b)fluoranthene	205-99-2	1	0.07	0.50	7.57	ug/kg	
Benzo(k)fluoranthene	207-08-9	1	0.10	0.50	3.32	ug/kg	
Benzo(j)fluoranthene	205-82-3	1	0.10	0.50	3.29	ug/kg	
Benzo(a)pyrene	50-32-8	1	0.09	0.50	4.28	ug/kg	
Indeno(1,2,3-cd)pyrene	193-39-5	1	0.09	0.50	6.46	ug/kg	
Dibenzo(a,h)anthracene	53-70-3	1	0.10	0.50	0.88	ug/kg	
Benzo(g,h,i)perylene	191-24-2	1	0.08	0.50	11.9	ug/kg	
Surrogate: 2-Methylnaphthalene-d10					30-160 %	60.5	%
Surrogate: Dibenzo[a,h]anthracene-d14					30-160 %	91.8	%
Surrogate: Fluoranthene-d10					30-160 %	88.6	%



Analytical Resources, Incorporated
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Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-71:8.5-02042021 21G0121-11RE1 (Solid)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM		Sampled: 02/04/2021 10:45
Instrument: NT11 Analyst: VTS		Analyzed: 07/29/2021 10:45
Sample Preparation:	Preparation Method: EPA 3546 (Microwave) Low Level	Extract ID: 21G0121-11RE1 A 01
	Preparation Batch: BJG0493	Dry Weight: 10.02 g
	Prepared: 07/22/2021	% Solids: 71.68
Sample Cleanup:	Cleanup Method: Silica Gel	Extract ID: 21G0121-11RE1 A 01
	Cleanup Batch: CJG0277	Initial Volume: 0.5 mL
	Cleaned: 27-Jul-2021	Final Volume: 0.5 mL
Sample Cleanup:	Cleanup Method: Sulfur	Extract ID: 21G0121-11RE1 A 01
	Cleanup Batch: CJG0276	Initial Volume: 0.5 mL
	Cleaned: 27-Jul-2021	Final Volume: 0.5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	2	0.88	1.20	65.7	ug/kg	D
1-Methylnaphthalene	90-12-0	2	0.21	1.00	7.04	ug/kg	D
2-Methylnaphthalene	91-57-6	2	0.26	1.00	10.7	ug/kg	D
Acenaphthylene	208-96-8	2	0.13	1.00	8.74	ug/kg	D
Acenaphthene	83-32-9	2	0.18	1.00	4.34	ug/kg	D
Dibenzofuran	132-64-9	2	0.25	1.00	8.55	ug/kg	D
Fluorene	86-73-7	2	0.14	1.00	3.40	ug/kg	D
Phenanthrene	85-01-8	2	0.23	1.00	38.5	ug/kg	D
Anthracene	120-12-7	2	0.15	1.00	6.72	ug/kg	D
Fluoranthene	206-44-0	2	0.16	1.00	30.5	ug/kg	D
Pyrene	129-00-0	2	0.18	1.00	28.9	ug/kg	D
Benzo(a)anthracene	56-55-3	2	0.14	1.00	3.19	ug/kg	D
Chrysene	218-01-9	2	0.14	1.00	9.55	ug/kg	D
Benzo(b)fluoranthene	205-99-2	2	0.13	1.00	6.91	ug/kg	D
Benzo(k)fluoranthene	207-08-9	2	0.20	1.00	3.06	ug/kg	D
Benzo(j)fluoranthene	205-82-3	2	0.19	1.00	3.19	ug/kg	D
Benzo(a)pyrene	50-32-8	2	0.17	1.00	3.94	ug/kg	D
Indeno(1,2,3-cd)pyrene	193-39-5	2	0.18	1.00	5.75	ug/kg	D
Dibenzo(a,h)anthracene	53-70-3	2	0.21	1.00	0.76	ug/kg	J, D
Benzo(g,h,i)perylene	191-24-2	2	0.17	1.00	10.5	ug/kg	D
Surrogate: 2-Methylnaphthalene-d10					30-160 %	58.1 %	
Surrogate: Dibenzo[a,h]anthracene-d14					30-160 %	79.9 %	
Surrogate: Fluoranthene-d10					30-160 %	86.4 %	

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Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-69-20211102

21G0121-12 (Water)

Metals and Metallic Compounds

Method: EPA 6010D

Sampled: 02/11/2021 13:13

Instrument: ICP2 Analyst: MVP

Analyzed: 07/22/2021 15:51

Sample Preparation:

Preparation Method: TWC EPA 3010A

Extract ID: 21G0121-12 A 02

Preparation Batch: BJG0531

Sample Size: 25 mL

Prepared: 07/22/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Calcium	7440-70-2	1	0.0220	0.0500	52.7	mg/L	
Magnesium	7439-95-4	1	0.0209	0.0500	20.3	mg/L	

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Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

MW-69-20211102

21G0121-12 (Water)

Metals and Metallic Compounds

Method: SM 2340 B-97

Sampled: 02/11/2021 13:13

Instrument: [CALC] Analyst: MVP

Analyzed: 07/22/2021 15:51

Sample Preparation:

Preparation Method: [CALC]

Extract ID: 21G0121-12

Preparation Batch: [CALC]

Prepared: 07/22/2021

Final Volume: 1

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Hardness		1		215	mg/L CaCO ₃	

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 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

MW-24-20211102
21G0121-13 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 02/11/2021 16:12

Instrument: ECD7 Analyst: JGR

Analyzed: 07/17/2021 21:30

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJG0348 Prepared: 07/16/2021	Sample Size: 500 mL Final Volume: 1 mL	Extract ID: 21G0121-13 A 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJG0171 Cleaned: 16-Jul-2021	Initial Volume: 1 mL Final Volume: 1 mL	Extract ID: 21G0121-13 A 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJG0169 Cleaned: 16-Jul-2021	Initial Volume: 1 mL Final Volume: 1 mL	Extract ID: 21G0121-13 A 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJG0170 Cleaned: 16-Jul-2021	Initial Volume: 1 mL Final Volume: 1 mL	Extract ID: 21G0121-13 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Aroclor 1016	12674-11-2	1	0.018	0.100	ND	ug/L	U
Aroclor 1221	11104-28-2	1	0.018	0.100	ND	ug/L	U
Aroclor 1232	11141-16-5	1	0.018	0.100	ND	ug/L	U
Aroclor 1242	53469-21-9	1	0.018	0.100	ND	ug/L	U
Aroclor 1248	12672-29-6	1	0.018	0.100	ND	ug/L	U
Aroclor 1254	11097-69-1	1	0.018	0.100	ND	ug/L	U
Aroclor 1260	11096-82-5	1	0.017	0.100	ND	ug/L	U
Surrogate: Decachlorobiphenyl				26-120 %	86.2	%	
Surrogate: Tetrachlorometaxylene				39-120 %	62.8	%	
Surrogate: Decachlorobiphenyl [2C]				26-120 %	89.8	%	
Surrogate: Tetrachlorometaxylene [2C]				39-120 %	60.7	%	


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - Quality Control
Batch BJG0492 - EPA 3546 (Microwave)

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 (BJG0492-BLK1)						Prepared: 22-Jul-2021 Analyzed: 27-Jul-2021 19:43					
Phenol	ND	4.4	20.0	ug/kg							U
bis(2-chloroethyl) ether	ND	19.3	50.0	ug/kg							U
2-Chlorophenol	ND	13.9	20.0	ug/kg							U
1,3-Dichlorobenzene	ND	3.1	20.0	ug/kg							U
1,4-Dichlorobenzene	ND	3.1	20.0	ug/kg							U
1,2-Dichlorobenzene	ND	2.4	20.0	ug/kg							U
Benzyl Alcohol	ND	16.3	20.0	ug/kg							U
2,2'-Oxybis(1-chloropropane)	ND	3.4	20.0	ug/kg							U
2-Methylphenol	ND	6.7	20.0	ug/kg							U
Hexachloroethane	ND	3.5	20.0	ug/kg							U
N-Nitroso-di-n-Propylamine	ND	7.5	20.0	ug/kg							U
4-Methylphenol	ND	7.4	20.0	ug/kg							U
Nitrobenzene	ND	7.2	20.0	ug/kg							U
Isophorone	ND	3.9	20.0	ug/kg							U
2-Nitrophenol	ND	4.9	20.0	ug/kg							U
2,4-Dimethylphenol	ND	3.8	100	ug/kg							U
Bis(2-Chloroethoxy)methane	ND	4.3	20.0	ug/kg							U
2,4-Dichlorophenol	ND	15.3	100	ug/kg							U
1,2,4-Trichlorobenzene	ND	3.6	20.0	ug/kg							U
Naphthalene	ND	4.2	20.0	ug/kg							U
Benzoic acid	ND	39.0	200	ug/kg							U
4-Chloroaniline	ND	8.4	100	ug/kg							U
Hexachlorobutadiene	ND	4.8	20.0	ug/kg							U
4-Chloro-3-Methylphenol	ND	12.4	100	ug/kg							U
2-Methylnaphthalene	ND	4.5	20.0	ug/kg							U
Hexachlorocyclopentadiene	ND	24.5	100	ug/kg							U
2,4,6-Trichlorophenol	ND	9.0	100	ug/kg							U
2,4,5-Trichlorophenol	ND	25.8	100	ug/kg							U
2-Chloronaphthalene	ND	8.0	20.0	ug/kg							U
2-Nitroaniline	ND	16.4	100	ug/kg							U
Acenaphthylene	ND	6.2	20.0	ug/kg							U
Dimethylphthalate	ND	4.4	20.0	ug/kg							U
2,6-Dinitrotoluene	ND	20.5	100	ug/kg							U
Acenaphthene	ND	5.2	20.0	ug/kg							U
3-Nitroaniline	ND	22.3	100	ug/kg							U


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Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - Quality Control
Batch BJG0492 - EPA 3546 (Microwave)

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 (BJG0492-BLK1)						Prepared: 22-Jul-2021 Analyzed: 27-Jul-2021 19:43					
2,4-Dinitrophenol	ND	33.8	200	ug/kg							U
Dibenzofuran	ND	14.1	20.0	ug/kg							U
4-Nitrophenol	ND	32.6	100	ug/kg							U
2,4-Dinitrotoluene	ND	16.2	100	ug/kg							U
Fluorene	ND	14.6	20.0	ug/kg							U
4-Chlorophenylphenyl ether	ND	19.2	50.0	ug/kg							U
Diethyl phthalate	ND	19.7	50.0	ug/kg							U
4-Nitroaniline	ND	29.4	100	ug/kg							U
4,6-Dinitro-2-methylphenol	ND	38.0	200	ug/kg							U
N-Nitrosodiphenylamine	ND	5.3	20.0	ug/kg							U
4-Bromophenyl phenyl ether	ND	17.0	20.0	ug/kg							U
Hexachlorobenzene	ND	13.5	20.0	ug/kg							U
Pentachlorophenol	ND	31.3	100	ug/kg							U
Phenanthrene	ND	8.7	20.0	ug/kg							U
Anthracene	ND	7.2	20.0	ug/kg							U
Carbazole	ND	4.3	20.0	ug/kg							U
Di-n-Butylphthalate	ND	5.6	20.0	ug/kg							U
Fluoranthene	ND	6.1	20.0	ug/kg							U
Pyrene	ND	5.7	20.0	ug/kg							U
Butylbenzylphthalate	ND	9.4	20.0	ug/kg							U
Benzo(a)anthracene	ND	6.0	20.0	ug/kg							U
3,3'-Dichlorobenzidine	ND	7.1	100	ug/kg							U
Chrysene	ND	6.1	20.0	ug/kg							U
bis(2-Ethylhexyl)phthalate	ND	5.5	50.0	ug/kg							U
Di-n-Octylphthalate	ND	4.4	20.0	ug/kg							U
Benzo(a)fluoranthene, Total	ND	10.0	40.0	ug/kg							U
Benzo(a)pyrene	ND	4.2	20.0	ug/kg							U
Indeno(1,2,3-cd)pyrene	ND	14.7	20.0	ug/kg							U
Dibenzo(a,h)anthracene	ND	17.2	20.0	ug/kg							U
Benzo(g,h,i)perylene	ND	13.6	20.0	ug/kg							U
1-Methylnaphthalene	ND	5.3	20.0	ug/kg							U
Surrogate: 2-Fluorophenol	481			ug/kg	750		64.1	27-120			
Surrogate: Phenol-d5	447			ug/kg	750		59.6	29-120			
Surrogate: 2-Chlorophenol-d4	610			ug/kg	750		81.3	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	325			ug/kg	500		64.9	32-120			


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Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - Quality Control
Batch BJG0492 - EPA 3546 (Microwave)

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 (BJG0492-BLK1)						Prepared: 22-Jul-2021 Analyzed: 27-Jul-2021 19:43					
Surrogate: Nitrobenzene-d5	380			ug/kg	500		76.0	30-120			
Surrogate: 2-Fluorobiphenyl	358			ug/kg	500		71.5	35-120			
Surrogate: 2,4,6-Tribromophenol	554			ug/kg	750		73.9	24-134			
Surrogate: p-Terphenyl-d14	411			ug/kg	500		82.1	37-120			
LCS (BJG0492-BS1)						Prepared: 22-Jul-2021 Analyzed: 27-Jul-2021 20:21					
Phenol	314	4.4	20.0	ug/kg	500		62.9	34-120			
bis(2-chloroethyl) ether	308	19.3	50.0	ug/kg	500		61.7	36-120			
2-Chlorophenol	353	13.9	20.0	ug/kg	500		70.6	39-120			
1,3-Dichlorobenzene	308	3.1	20.0	ug/kg	500		61.6	40-120			
1,4-Dichlorobenzene	320	3.1	20.0	ug/kg	500		63.9	39-120			
1,2-Dichlorobenzene	312	2.4	20.0	ug/kg	500		62.4	40-120			
Benzyl Alcohol	276	16.3	20.0	ug/kg	500		55.1	19-120			
2,2'-Oxybis(1-chloropropane)	271	3.4	20.0	ug/kg	500		54.2	32-120			
2-Methylphenol	305	6.7	20.0	ug/kg	500		61.0	28-120			
Hexachloroethane	318	3.5	20.0	ug/kg	500		63.5	38-120			
N-Nitroso-di-n-Propylamine	330	7.5	20.0	ug/kg	500		66.1	34-120			
4-Methylphenol	326	7.4	20.0	ug/kg	500		65.2	29-120			
Nitrobenzene	308	7.2	20.0	ug/kg	500		61.6	36-120			
Isophorone	370	3.9	20.0	ug/kg	500		74.0	37-120			Q
2-Nitrophenol	305	4.9	20.0	ug/kg	500		61.1	30-120			
2,4-Dimethylphenol	872	3.8	100	ug/kg	1300		67.1	10-120			
Bis(2-Chloroethoxy)methane	292	4.3	20.0	ug/kg	500		58.5	39-120			
2,4-Dichlorophenol	749	15.3	100	ug/kg	1300		57.6	28-120			
1,2,4-Trichlorobenzene	293	3.6	20.0	ug/kg	500		58.6	35-120			
Naphthalene	299	4.2	20.0	ug/kg	500		59.8	43-120			
Benzoic acid	1270	39.0	200	ug/kg	2300		55.2	10-120			Q
4-Chloroaniline	756	8.4	100	ug/kg	1300		58.2	11-120			
Hexachlorobutadiene	318	4.8	20.0	ug/kg	500		63.6	37-120			
4-Chloro-3-Methylphenol	1160	12.4	100	ug/kg	1300		88.9	32-120			
2-Methylnaphthalene	296	4.5	20.0	ug/kg	500		59.1	43-120			
Hexachlorocyclopentadiene	656	24.5	100	ug/kg	1300		50.5	10-120			
2,4,6-Trichlorophenol	1250	9.0	100	ug/kg	1300		96.2	44.6-132			
2,4,5-Trichlorophenol	1280	25.8	100	ug/kg	1300		98.6	51.5-129			
2-Chloronaphthalene	343	8.0	20.0	ug/kg	500		68.7	40-120			


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 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - Quality Control
Batch BJG0492 - EPA 3546 (Microwave)

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 (BJG0492-BS1)						Prepared: 22-Jul-2021 Analyzed: 27-Jul-2021 20:21					
2-Nitroaniline	1300	16.4	100	ug/kg	1300		99.9	40-152			
Acenaphthylene	325	6.2	20.0	ug/kg	500		65.0	42-120			
Dimethylphthalate	364	4.4	20.0	ug/kg	500		72.8	43-120			
2,6-Dinitrotoluene	1280	20.5	100	ug/kg	1300		98.4	31-156			
Acenaphthene	334	5.2	20.0	ug/kg	500		66.8	45-120			
3-Nitroaniline	981	22.3	100	ug/kg	1300		75.5	22-120			
2,4-Dinitrophenol	1940	33.8	200	ug/kg	2300		84.4	10-120			
Dibenzofuran	344	14.1	20.0	ug/kg	500		68.7	43-120			
4-Nitrophenol	1070	32.6	100	ug/kg	1300		82.4	15-138			
2,4-Dinitrotoluene	1300	16.2	100	ug/kg	1300		100	44-150			
Fluorene	344	14.6	20.0	ug/kg	500		68.8	45-120			
4-Chlorophenylphenyl ether	289	19.2	50.0	ug/kg	500		57.8	36-141			
Diethyl phthalate	438	19.7	50.0	ug/kg	500		87.6	50-120			
4-Nitroaniline	957	29.4	100	ug/kg	1300		73.6	24-168			
4,6-Dinitro-2-methylphenol	2300	38.0	200	ug/kg	2300		99.9	33-144			
N-Nitrosodiphenylamine	333	5.3	20.0	ug/kg	500		66.6	70-154			*
4-Bromophenyl phenyl ether	370	17.0	20.0	ug/kg	500		74.1	39-120			
Hexachlorobenzene	361	13.5	20.0	ug/kg	500		72.2	33-120			
Pentachlorophenol	815	31.3	100	ug/kg	1300		62.7	16-120			Q
Phenanthrene	364	8.7	20.0	ug/kg	500		72.8	49-120			
Anthracene	353	7.2	20.0	ug/kg	500		70.6	45-120			
Carbazole	348	4.3	20.0	ug/kg	500		69.7	43-135			
Di-n-Butylphthalate	341	5.6	20.0	ug/kg	500		68.3	48-126			
Fluoranthene	388	6.1	20.0	ug/kg	500		77.5	53-145			
Pyrene	401	5.7	20.0	ug/kg	500		80.1	52-134			
Butylbenzylphthalate	400	9.4	20.0	ug/kg	500		80.1	45-132			
Benzo(a)anthracene	361	6.0	20.0	ug/kg	500		72.3	49-120			
3,3'-Dichlorobenzidine	531	7.1	100	ug/kg	800		66.4	10-120			
Chrysene	375	6.1	20.0	ug/kg	500		75.0	47-120			
bis(2-Ethylhexyl)phthalate	423	5.5	50.0	ug/kg	500		84.7	34-130			
Di-n-Octylphthalate	343	4.4	20.0	ug/kg	500		68.6	28-124			
Benzo(a)fluoranthene, Total	709	10.0	40.0	ug/kg	1000		70.9	30-160			
Benzo(a)pyrene	349	4.2	20.0	ug/kg	500		69.9	42-120			
Indeno(1,2,3-cd)pyrene	325	14.7	20.0	ug/kg	500		65.0	42-163			
Dibenzo(a,h)anthracene	335	17.2	20.0	ug/kg	500		67.0	30-133			


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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - Quality Control
Batch BJG0492 - EPA 3546 (Microwave)

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 (BJG0492-BS1)											
						Prepared: 22-Jul-2021 Analyzed: 27-Jul-2021 20:21					
Benzo(g,h,i)perylene	302	13.6	20.0	ug/kg	500		60.3	46-148			
1-Methylnaphthalene	309	5.3	20.0	ug/kg	500		61.8	42-120			
Surrogate: 2-Fluorophenol	578			ug/kg	750		77.1	27-120			
Surrogate: Phenol-d5	568			ug/kg	750		75.8	29-120			
Surrogate: 2-Chlorophenol-d4	567			ug/kg	750		75.6	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	339			ug/kg	500		67.9	32-120			
Surrogate: Nitrobenzene-d5	371			ug/kg	500		74.3	30-120			
Surrogate: 2-Fluorobiphenyl	398			ug/kg	500		79.5	35-120			
Surrogate: 2,4,6-Tribromophenol	581			ug/kg	750		77.5	24-134			
Surrogate: p-Terphenyl-d14	415			ug/kg	500		82.9	37-120			
Matrix Spike (BJG0492-MS1)											
				Source: 21G0121-07		Prepared: 22-Jul-2021 Analyzed: 28-Jul-2021 16:07					
Phenol	361	4.4	20.0	ug/kg	500	ND	72.2	34-120			
bis(2-chloroethyl) ether	358	19.3	50.0	ug/kg	500	ND	71.6	36-120			
2-Chlorophenol	360	13.9	20.0	ug/kg	500	ND	71.9	39-120			
1,3-Dichlorobenzene	353	3.1	20.0	ug/kg	500	ND	70.6	40-120			
1,4-Dichlorobenzene	365	3.1	20.0	ug/kg	500	ND	73.1	39-120			
1,2-Dichlorobenzene	351	2.4	20.0	ug/kg	500	ND	70.2	40-120			
Benzyl Alcohol	361	16.3	20.0	ug/kg	500	ND	72.2	19-120			
2,2'-Oxybis(1-chloropropane)	307	3.4	20.0	ug/kg	500	ND	61.4	32-120			
2-Methylphenol	362	6.7	20.0	ug/kg	500	ND	72.3	28-120			
Hexachloroethane	366	3.5	20.0	ug/kg	500	ND	73.3	38-120			
N-Nitroso-di-n-Propylamine	373	7.5	20.0	ug/kg	500	ND	74.5	34-120			
4-Methylphenol	376	7.4	20.0	ug/kg	500	ND	75.1	29-120			
Nitrobenzene	349	7.2	20.0	ug/kg	500	ND	69.8	36-120			
Isophorone	355	3.9	20.0	ug/kg	500	ND	71.0	37-120			
2-Nitrophenol	346	4.9	20.0	ug/kg	500	ND	69.1	30-120			
2,4-Dimethylphenol	921	3.8	100	ug/kg	1300	ND	70.8	10-120			
Bis(2-Chloroethoxy)methane	328	4.3	20.0	ug/kg	500	ND	65.7	39-120			
2,4-Dichlorophenol	1220	15.3	100	ug/kg	1300	ND	94.1	28-120			Q
1,2,4-Trichlorobenzene	333	3.6	20.0	ug/kg	500	ND	66.5	35-120			
Naphthalene	335	4.2	20.0	ug/kg	500	ND	67.0	43-120			
Benzoic acid	1090	39.0	200	ug/kg	2300	ND	47.4	10-120			
4-Chloroaniline	621	8.4	100	ug/kg	1300	ND	47.7	11-120			
Hexachlorobutadiene	354	4.8	20.0	ug/kg	500	ND	70.9	37-120			


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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - Quality Control
Batch BJG0492 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJG0492-MS1)		Source: 21G0121-07		Prepared: 22-Jul-2021 Analyzed: 28-Jul-2021 16:07							
4-Chloro-3-Methylphenol	1100	12.4	100	ug/kg	1300	ND	84.4	32-120			
2-Methylnaphthalene	333	4.5	20.0	ug/kg	500	ND	66.5	43-120			
Hexachlorocyclopentadiene	890	24.5	100	ug/kg	1300	ND	68.5	10-120			
2,4,6-Trichlorophenol	1250	9.0	100	ug/kg	1300	ND	96.4	44.6-132			
2,4,5-Trichlorophenol	1240	25.8	100	ug/kg	1300	ND	95.5	51.5-129			
2-Chloronaphthalene	385	8.0	20.0	ug/kg	500	ND	77.0	40-120			
2-Nitroaniline	1270	16.4	100	ug/kg	1300	ND	97.9	40-152			
Acenaphthylene	364	6.2	20.0	ug/kg	500	ND	72.8	42-120			
Dimethylphthalate	402	4.4	20.0	ug/kg	500	ND	80.3	43-120			
2,6-Dinitrotoluene	1260	20.5	100	ug/kg	1300	ND	97.2	31-156			
Acenaphthene	389	5.2	20.0	ug/kg	500	ND	77.7	45-120			
3-Nitroaniline	768	22.3	100	ug/kg	1300	ND	59.1	22-120			
2,4-Dinitrophenol	1710	33.8	200	ug/kg	2300	ND	74.2	10-120			
Dibenzofuran	384	14.1	20.0	ug/kg	500	ND	76.7	43-120			
4-Nitrophenol	1170	32.6	100	ug/kg	1300	ND	90.2	15-138			
2,4-Dinitrotoluene	1290	16.2	100	ug/kg	1300	ND	99.5	44-150			
Fluorene	372	14.6	20.0	ug/kg	500	ND	74.5	45-120			
4-Chlorophenylphenyl ether	317	19.2	50.0	ug/kg	500	ND	63.3	36-141			
Diethyl phthalate	414	19.7	50.0	ug/kg	500	ND	82.7	50-120			
4-Nitroaniline	822	29.4	100	ug/kg	1300	ND	63.2	24-168			
4,6-Dinitro-2-methylphenol	1980	38.0	200	ug/kg	2300	ND	86.1	33-144			
N-Nitrosodiphenylamine	365	5.3	20.0	ug/kg	500	ND	73.0	70-154			
4-Bromophenyl phenyl ether	403	17.0	20.0	ug/kg	500	ND	80.5	39-120			
Hexachlorobenzene	400	13.5	20.0	ug/kg	500	ND	80.0	33-120			
Pentachlorophenol	851	31.3	100	ug/kg	1300	ND	65.4	16-120			Q
Phenanthrene	408	8.7	20.0	ug/kg	500	11.4	79.3	49-120			
Anthracene	405	7.2	20.0	ug/kg	500	ND	80.9	45-120			
Carbazole	395	4.3	20.0	ug/kg	500	ND	79.1	43-135			
Di-n-Butylphthalate	369	5.6	20.0	ug/kg	500	ND	73.9	48-126			
Fluoranthene	411	6.1	20.0	ug/kg	500	ND	82.2	53-145			
Pyrene	398	5.7	20.0	ug/kg	500	ND	79.5	52-134			
Butylbenzylphthalate	430	9.4	20.0	ug/kg	500	ND	86.0	45-132			
Benzo(a)anthracene	400	6.0	20.0	ug/kg	500	ND	79.9	49-120			
3,3'-Dichlorobenzidine	168	7.1	100	ug/kg	800	ND	20.9	10-120			
Chrysene	411	6.1	20.0	ug/kg	500	ND	82.3	47-120			


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 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - Quality Control
Batch BJG0492 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJG0492-MS1)		Source: 21G0121-07		Prepared: 22-Jul-2021		Analyzed: 28-Jul-2021 16:07					
bis(2-Ethylhexyl)phthalate	454	5.5	50.0	ug/kg	500	6.4	89.4	34-130			
Di-n-Octylphthalate	370	4.4	20.0	ug/kg	500	ND	73.9	28-124			
Benzo(a)fluoranthene, Total	787	10.0	40.0	ug/kg	1000	ND	78.7	30-160			
Benzo(a)pyrene	383	4.2	20.0	ug/kg	500	ND	76.5	42-120			
Indeno(1,2,3-cd)pyrene	382	14.7	20.0	ug/kg	500	ND	76.4	42-163			
Dibenzo(a,h)anthracene	381	17.2	20.0	ug/kg	500	ND	76.1	30-133			
Benzo(g,h,i)perylene	380	13.6	20.0	ug/kg	500	ND	75.9	46-148			
1-Methylnaphthalene	343	5.3	20.0	ug/kg	500	ND	68.5	42-120			
Surrogate: 2-Fluorophenol	539			ug/kg	750	483	71.8	27-120			
Surrogate: Phenol-d5	537			ug/kg	750	445	71.6	29-120			
Surrogate: 2-Chlorophenol-d4	544			ug/kg	750	548	72.5	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	317			ug/kg	500	318	63.3	32-120			
Surrogate: Nitrobenzene-d5	344			ug/kg	500	360	68.8	30-120			
Surrogate: 2-Fluorobiphenyl	377			ug/kg	500	369	75.3	35-120			
Surrogate: 2,4,6-Tribromophenol	569			ug/kg	750	615	75.9	24-134			
Surrogate: p-Terphenyl-d14	387			ug/kg	500	395	77.4	37-120			

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

Matrix Spike Dup (BJG0492-MSD1)		Source: 21G0121-07		Prepared: 22-Jul-2021		Analyzed: 28-Jul-2021 16:46					
Phenol	390	4.4	20.0	ug/kg	500	ND	78.1	34-120	7.75	30	
bis(2-chloroethyl) ether	390	19.3	50.0	ug/kg	500	ND	78.0	36-120	8.49	30	
2-Chlorophenol	390	13.9	20.0	ug/kg	500	ND	77.9	39-120	7.98	30	
1,3-Dichlorobenzene	382	3.1	20.0	ug/kg	500	ND	76.3	40-120	7.84	30	
1,4-Dichlorobenzene	404	3.1	20.0	ug/kg	500	ND	80.8	39-120	10.10	30	
1,2-Dichlorobenzene	387	2.4	20.0	ug/kg	500	ND	77.5	40-120	9.87	30	
Benzyl Alcohol	381	16.3	20.0	ug/kg	500	ND	76.1	19-120	5.21	30	
2,2'-Oxybis(1-chloropropane)	332	3.4	20.0	ug/kg	500	ND	66.4	32-120	7.80	30	
2-Methylphenol	390	6.7	20.0	ug/kg	500	ND	78.0	28-120	7.57	30	
Hexachloroethane	394	3.5	20.0	ug/kg	500	ND	78.8	38-120	7.30	30	
N-Nitroso-di-n-Propylamine	411	7.5	20.0	ug/kg	500	ND	82.1	34-120	9.70	30	
4-Methylphenol	409	7.4	20.0	ug/kg	500	ND	81.8	29-120	8.47	30	
Nitrobenzene	373	7.2	20.0	ug/kg	500	ND	74.6	36-120	6.76	30	
Isophorone	433	3.9	20.0	ug/kg	500	ND	86.6	37-120	19.70	30	
2-Nitrophenol	378	4.9	20.0	ug/kg	500	ND	75.7	30-120	9.09	30	
2,4-Dimethylphenol	993	3.8	100	ug/kg	1300	ND	76.3	10-120	7.49	30	

Analytical Resources, Inc.

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.


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

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - Quality Control
Batch BJG0492 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJG0492-MSD1)											
Source: 21G0121-07				Prepared: 22-Jul-2021 Analyzed: 28-Jul-2021 16:46							
Bis(2-Chloroethoxy)methane	353	4.3	20.0	ug/kg	500	ND	70.6	39-120	7.23	30	
2,4-Dichlorophenol	1300	15.3	100	ug/kg	1300	ND	100	28-120	6.07	30	Q
1,2,4-Trichlorobenzene	361	3.6	20.0	ug/kg	500	ND	72.1	35-120	8.12	30	
Naphthalene	369	4.2	20.0	ug/kg	500	ND	73.8	43-120	9.61	30	
Benzoic acid	1120	39.0	200	ug/kg	2300	ND	48.7	10-120	2.78	30	
4-Chloroaniline	641	8.4	100	ug/kg	1300	ND	49.3	11-120	3.20	30	
Hexachlorobutadiene	395	4.8	20.0	ug/kg	500	ND	79.0	37-120	10.90	30	
4-Chloro-3-Methylphenol	1160	12.4	100	ug/kg	1300	ND	88.8	32-120	5.09	30	
2-Methylnaphthalene	369	4.5	20.0	ug/kg	500	ND	73.8	43-120	10.40	30	
Hexachlorocyclopentadiene	933	24.5	100	ug/kg	1300	ND	71.8	10-120	4.71	30	
2,4,6-Trichlorophenol	1350	9.0	100	ug/kg	1300	ND	104	44.6-132	7.09	30	
2,4,5-Trichlorophenol	1330	25.8	100	ug/kg	1300	ND	102	51.5-129	6.71	30	
2-Chloronaphthalene	423	8.0	20.0	ug/kg	500	ND	84.6	40-120	9.43	30	
2-Nitroaniline	1360	16.4	100	ug/kg	1300	ND	105	40-152	6.63	30	
Acenaphthylene	398	6.2	20.0	ug/kg	500	ND	79.6	42-120	8.96	30	
Dimethylphthalate	435	4.4	20.0	ug/kg	500	ND	86.9	43-120	7.90	30	
2,6-Dinitrotoluene	1340	20.5	100	ug/kg	1300	ND	103	31-156	5.50	30	
Acenaphthene	432	5.2	20.0	ug/kg	500	ND	86.5	45-120	10.70	30	
3-Nitroaniline	837	22.3	100	ug/kg	1300	ND	64.3	22-120	8.56	30	
2,4-Dinitrophenol	1770	33.8	200	ug/kg	2300	ND	77.1	10-120	3.86	30	
Dibenzofuran	421	14.1	20.0	ug/kg	500	ND	84.2	43-120	9.27	30	
4-Nitrophenol	1230	32.6	100	ug/kg	1300	ND	94.4	15-138	4.56	30	
2,4-Dinitrotoluene	1390	16.2	100	ug/kg	1300	ND	107	44-150	6.94	30	
Fluorene	409	14.6	20.0	ug/kg	500	ND	81.7	45-120	9.26	30	
4-Chlorophenylphenyl ether	348	19.2	50.0	ug/kg	500	ND	69.6	36-141	9.43	30	
Diethyl phthalate	448	19.7	50.0	ug/kg	500	ND	89.7	50-120	8.10	30	
4-Nitroaniline	925	29.4	100	ug/kg	1300	ND	71.2	24-168	11.90	30	
4,6-Dinitro-2-methylphenol	2150	38.0	200	ug/kg	2300	ND	93.3	33-144	8.06	30	
N-Nitrosodiphenylamine	407	5.3	20.0	ug/kg	500	ND	81.4	70-154	10.90	30	
4-Bromophenyl phenyl ether	443	17.0	20.0	ug/kg	500	ND	88.6	39-120	9.55	30	
Hexachlorobenzene	442	13.5	20.0	ug/kg	500	ND	88.3	33-120	9.84	30	
Pentachlorophenol	905	31.3	100	ug/kg	1300	ND	69.6	16-120	6.21	30	Q
Phenanthrene	447	8.7	20.0	ug/kg	500	11.4	87.2	49-120	9.24	30	
Anthracene	438	7.2	20.0	ug/kg	500	ND	87.6	45-120	7.95	30	
Carbazole	422	4.3	20.0	ug/kg	500	ND	84.3	43-135	6.42	30	


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - Quality Control
Batch BJG0492 - EPA 3546 (Microwave)

Instrument: NT10 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike Dup (BJG0492-MSD1)											
Source: 21G0121-07				Prepared: 22-Jul-2021 Analyzed: 28-Jul-2021 16:46							
Di-n-Butylphthalate	400	5.6	20.0	ug/kg	500	ND	80.0	48-126	7.97	30	
Fluoranthene	443	6.1	20.0	ug/kg	500	ND	88.6	53-145	7.57	30	
Pyrene	425	5.7	20.0	ug/kg	500	ND	85.0	52-134	6.76	30	
Butylbenzylphthalate	462	9.4	20.0	ug/kg	500	ND	92.4	45-132	7.17	30	
Benzo(a)anthracene	429	6.0	20.0	ug/kg	500	ND	85.8	49-120	7.12	30	
3,3'-Dichlorobenzidine	190	7.1	100	ug/kg	800	ND	23.8	10-120	12.70	30	
Chrysene	453	6.1	20.0	ug/kg	500	ND	90.6	47-120	9.60	30	
bis(2-Ethylhexyl)phthalate	503	5.5	50.0	ug/kg	500	6.4	99.4	34-130	10.40	30	
Di-n-Octylphthalate	409	4.4	20.0	ug/kg	500	ND	81.8	28-124	10.10	30	
Benzo(a)fluoranthene, Total	849	10.0	40.0	ug/kg	1000	ND	84.9	30-160	7.55	30	
Benzo(a)pyrene	415	4.2	20.0	ug/kg	500	ND	83.0	42-120	8.17	30	
Indeno(1,2,3-cd)pyrene	419	14.7	20.0	ug/kg	500	ND	83.7	42-163	9.08	30	
Dibenzo(a,h)anthracene	413	17.2	20.0	ug/kg	500	ND	82.6	30-133	8.23	30	
Benzo(g,h,i)perylene	411	13.6	20.0	ug/kg	500	ND	82.2	46-148	7.89	30	
1-Methylnaphthalene	372	5.3	20.0	ug/kg	500	ND	74.4	42-120	8.25	30	
Surrogate: 2-Fluorophenol	556			ug/kg	750	483	74.1	27-120			
Surrogate: Phenol-d5	551			ug/kg	750	445	73.4	29-120			
Surrogate: 2-Chlorophenol-d4	549			ug/kg	750	548	73.3	31-120			
Surrogate: 1,2-Dichlorobenzene-d4	324			ug/kg	500	318	64.8	32-120			
Surrogate: Nitrobenzene-d5	351			ug/kg	500	360	70.1	30-120			
Surrogate: 2-Fluorobiphenyl	380			ug/kg	500	369	76.1	35-120			
Surrogate: 2,4,6-Tribromophenol	567			ug/kg	750	615	75.6	24-134			
Surrogate: p-Terphenyl-d14	392			ug/kg	500	395	78.4	37-120			

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



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Analytical Report

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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

Semivolatile Organic Compounds - SIM - Quality Control

Batch BJG0493 - EPA 3546 (Microwave) Low Level

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 (BJG0493-BLK1)											
						Prepared: 22-Jul-2021 Analyzed: 28-Jul-2021 13:59					
Naphthalene	ND	0.44	0.60	ug/kg							U
1-Methylnaphthalene	ND	0.11	0.50	ug/kg							U
2-Methylnaphthalene	ND	0.13	0.50	ug/kg							U
Acenaphthylene	ND	0.06	0.50	ug/kg							U
Acenaphthene	ND	0.09	0.50	ug/kg							U
Dibenzofuran	ND	0.13	0.50	ug/kg							U
Fluorene	ND	0.07	0.50	ug/kg							U
Phenanthrene	0.13	0.11	0.50	ug/kg							J
Anthracene	ND	0.07	0.50	ug/kg							U
Fluoranthene	ND	0.08	0.50	ug/kg							U
Pyrene	ND	0.09	0.50	ug/kg							U
Benzo(a)anthracene	ND	0.07	0.50	ug/kg							U
Chrysene	ND	0.07	0.50	ug/kg							U
Benzo(b)fluoranthene	ND	0.07	0.50	ug/kg							U
Benzo(k)fluoranthene	ND	0.10	0.50	ug/kg							U
Benzo(j)fluoranthene	ND	0.10	0.50	ug/kg							U
Benzo(a)pyrene	ND	0.09	0.50	ug/kg							U
Indeno(1,2,3-cd)pyrene	ND	0.09	0.50	ug/kg							U
Dibenzo(a,h)anthracene	ND	0.11	0.50	ug/kg							U
Benzo(g,h,i)perylene	ND	0.09	0.50	ug/kg							U
Surrogate: 2-Methylnaphthalene-d10	8.66			ug/kg	15.0		57.7	30-160			
Surrogate: Dibenzo[a,h]anthracene-d14	12.0			ug/kg	15.0		80.1	30-160			
Surrogate: Fluoranthene-d10	12.4			ug/kg	15.0		82.8	30-160			

LCS (BJG0493-BS1)											
						Prepared: 22-Jul-2021 Analyzed: 28-Jul-2021 14:29					
Naphthalene	8.90	0.44	0.60	ug/kg	15.0		59.3	30-160			
1-Methylnaphthalene	9.23	0.11	0.50	ug/kg	15.0		61.5	30-160			
2-Methylnaphthalene	9.21	0.13	0.50	ug/kg	15.0		61.4	30-160			
Acenaphthylene	8.00	0.06	0.50	ug/kg	15.0		53.3	30-160			
Acenaphthene	9.15	0.09	0.50	ug/kg	15.0		61.0	30-160			
Dibenzofuran	9.55	0.13	0.50	ug/kg	15.0		63.7	30-160			
Fluorene	10.0	0.07	0.50	ug/kg	15.0		67.0	30-160			
Phenanthrene	10.5	0.11	0.50	ug/kg	15.0		70.3	30-160			
Anthracene	8.81	0.07	0.50	ug/kg	15.0		58.7	30-160			
Fluoranthene	11.8	0.08	0.50	ug/kg	15.0		78.5	30-160			

Analytical Resources, Inc.

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.


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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - SIM - Quality Control
Batch BJG0493 - EPA 3546 (Microwave) Low Level

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 (BJG0493-BS1)											
						Prepared: 22-Jul-2021 Analyzed: 28-Jul-2021 14:29					
Pyrene	11.4	0.09	0.50	ug/kg	15.0		75.9	30-160			
Benzo(a)anthracene	11.8	0.07	0.50	ug/kg	15.0		78.9	30-160			
Chrysene	12.5	0.07	0.50	ug/kg	15.0		83.3	30-160			
Benzo(b)fluoranthene	12.7	0.07	0.50	ug/kg	15.0		84.9	30-160			
Benzo(k)fluoranthene	12.8	0.10	0.50	ug/kg	15.0		85.3	30-160			
Benzo(j)fluoranthene	13.5	0.10	0.50	ug/kg	15.0		89.9	30-160			
Benzo(a)pyrene	10.5	0.09	0.50	ug/kg	15.0		70.0	30-160			
Indeno(1,2,3-cd)pyrene	12.0	0.09	0.50	ug/kg	15.0		79.9	30-160			
Dibenzo(a,h)anthracene	12.4	0.11	0.50	ug/kg	15.0		82.7	30-160			
Benzo(g,h,i)perylene	11.9	0.09	0.50	ug/kg	15.0		79.6	30-160			
Surrogate: 2-Methylnaphthalene-d10	9.50			ug/kg	15.0		63.3	30-160			
Surrogate: Dibenzo[a,h]anthracene-d14	13.0			ug/kg	15.0		86.8	30-160			
Surrogate: Fluoranthene-d10	12.1			ug/kg	15.0		80.5	30-160			
Matrix Spike (BJG0493-MS1)											
				Source: 21G0121-10		Prepared: 22-Jul-2021 Analyzed: 28-Jul-2021 15:59					
Naphthalene	13.9	0.44	0.60	ug/kg	15.0	10.6	22.1	30-160			*
1-Methylnaphthalene	14.2	0.11	0.50	ug/kg	15.0	5.98	55.0	30-160			
2-Methylnaphthalene	15.4	0.13	0.50	ug/kg	15.0	5.82	64.1	30-160			
Acenaphthylene	10.7	0.06	0.50	ug/kg	15.0	0.43	68.6	30-160			
Acenaphthene	11.5	0.09	0.50	ug/kg	15.0	2.16	62.6	30-160			
Dibenzofuran	11.5	0.13	0.50	ug/kg	15.0	3.65	52.2	30-160			
Fluorene	12.7	0.07	0.50	ug/kg	15.0	2.70	66.7	30-160			
Phenanthrene	19.6	0.11	0.50	ug/kg	15.0	12.2	48.8	30-160			
Anthracene	13.7	0.07	0.50	ug/kg	15.0	2.63	74.1	30-160			
Fluoranthene	19.0	0.08	0.50	ug/kg	15.0	8.11	72.4	30-160			
Pyrene	19.1	0.09	0.50	ug/kg	15.0	7.41	77.8	30-160			
Benzo(a)anthracene	15.8	0.07	0.50	ug/kg	15.0	2.52	88.5	30-160			
Chrysene	16.1	0.07	0.50	ug/kg	15.0	3.85	81.5	30-160			
Benzo(b)fluoranthene	15.7	0.07	0.50	ug/kg	15.0	1.95	91.4	30-160			
Benzo(k)fluoranthene	13.9	0.10	0.50	ug/kg	15.0	0.76	87.7	30-160			
Benzo(j)fluoranthene	12.5	0.10	0.50	ug/kg	15.0	0.71	78.8	30-160			
Benzo(a)pyrene	14.2	0.09	0.50	ug/kg	15.0	1.37	85.8	30-160			
Indeno(1,2,3-cd)pyrene	16.2	0.09	0.50	ug/kg	15.0	0.97	102	30-160			
Dibenzo(a,h)anthracene	15.6	0.11	0.50	ug/kg	15.0	0.35	102	30-160			
Benzo(g,h,i)perylene	15.3	0.09	0.50	ug/kg	15.0	1.51	91.8	30-160			


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 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Semivolatile Organic Compounds - SIM - Quality Control
Batch BJG0493 - EPA 3546 (Microwave) Low Level

Instrument: NT11 Analyst: VTS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Matrix Spike (BJG0493-MS1)		Source: 21G0121-10		Prepared: 22-Jul-2021		Analyzed: 28-Jul-2021 15:59					
Surrogate: 2-Methylnaphthalene-d10	9.23			ug/kg	15.0	9.25	61.5	30-160			
Surrogate: Dibenzo[a,h]anthracene-d14	15.8			ug/kg	15.0	15.3	105	30-160			
Surrogate: Fluoranthene-d10	13.9			ug/kg	15.0	13.5	92.7	30-160			

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

Matrix Spike Dup (BJG0493-MSD1)		Source: 21G0121-10		Prepared: 22-Jul-2021		Analyzed: 28-Jul-2021 16:30					
Naphthalene	11.7	0.44	0.60	ug/kg	15.0	10.6	7.33	30-160	17.30	30	*
1-Methylnaphthalene	12.5	0.11	0.50	ug/kg	15.0	5.98	43.7	30-160	12.60	30	
2-Methylnaphthalene	11.9	0.13	0.50	ug/kg	15.0	5.82	40.8	30-160	25.60	30	
Acenaphthylene	10.7	0.06	0.50	ug/kg	15.0	0.43	68.3	30-160	0.39	30	
Acenaphthene	12.0	0.09	0.50	ug/kg	15.0	2.16	65.7	30-160	3.95	30	
Dibenzofuran	12.0	0.13	0.50	ug/kg	15.0	3.65	55.7	30-160	4.41	30	
Fluorene	14.0	0.07	0.50	ug/kg	15.0	2.70	75.3	30-160	9.65	30	
Phenanthrene	22.5	0.11	0.50	ug/kg	15.0	12.2	68.6	30-160	14.10	30	
Anthracene	15.2	0.07	0.50	ug/kg	15.0	2.63	83.9	30-160	10.10	30	
Fluoranthene	18.5	0.08	0.50	ug/kg	15.0	8.11	69.1	30-160	2.67	30	
Pyrene	20.0	0.09	0.50	ug/kg	15.0	7.41	84.2	30-160	4.97	30	
Benzo(a)anthracene	15.1	0.07	0.50	ug/kg	15.0	2.52	83.6	30-160	4.79	30	
Chrysene	15.3	0.07	0.50	ug/kg	15.0	3.85	76.4	30-160	4.88	30	
Benzo(b)fluoranthene	15.1	0.07	0.50	ug/kg	15.0	1.95	87.5	30-160	3.81	30	
Benzo(k)fluoranthene	13.9	0.10	0.50	ug/kg	15.0	0.76	87.9	30-160	0.20	30	
Benzo(j)fluoranthene	12.4	0.10	0.50	ug/kg	15.0	0.71	78.0	30-160	0.91	30	
Benzo(a)pyrene	14.1	0.09	0.50	ug/kg	15.0	1.37	85.1	30-160	0.73	30	
Indeno(1,2,3-cd)pyrene	14.8	0.09	0.50	ug/kg	15.0	0.97	92.0	30-160	9.27	30	
Dibenzo(a,h)anthracene	15.4	0.11	0.50	ug/kg	15.0	0.35	100	30-160	1.22	30	
Benzo(g,h,i)perylene	15.1	0.09	0.50	ug/kg	15.0	1.51	90.5	30-160	1.30	30	
Surrogate: 2-Methylnaphthalene-d10	9.04			ug/kg	15.0	9.25	60.3	30-160			
Surrogate: Dibenzo[a,h]anthracene-d14	15.6			ug/kg	15.0	15.3	104	30-160			
Surrogate: Fluoranthene-d10	13.8			ug/kg	15.0	13.5	92.0	30-160			

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: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Aroclor PCB - Quality Control
Batch BJG0348 - 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 (BJG0348-BLK1)											
						Prepared: 16-Jul-2021 Analyzed: 17-Jul-2021 20:28					
Aroclor 1016	ND	0.018	0.100	ug/L							U
Aroclor 1221	ND	0.018	0.100	ug/L							U
Aroclor 1232	ND	0.018	0.100	ug/L							U
Aroclor 1242	ND	0.018	0.100	ug/L							U
Aroclor 1248	ND	0.018	0.100	ug/L							U
Aroclor 1254	ND	0.018	0.100	ug/L							U
Aroclor 1260	ND	0.017	0.100	ug/L							U
Surrogate: Decachlorobiphenyl	0.0552			ug/L	0.0800	69.0		26-120			
Surrogate: Tetrachlorometaxylene	0.0573			ug/L	0.0800	71.6		39-120			
Surrogate: Decachlorobiphenyl [2C]	0.0566			ug/L	0.0800	70.8		26-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0547			ug/L	0.0800	68.4		39-120			
LCS (BJG0348-BS1)											
						Prepared: 16-Jul-2021 Analyzed: 17-Jul-2021 20:49					
Aroclor 1016	0.825	0.018	0.100	ug/L	1.00	82.5		51-120			
Aroclor 1260	0.913	0.017	0.100	ug/L	1.00	91.3		56-120			
Surrogate: Decachlorobiphenyl	0.0553			ug/L	0.0800	69.1		26-120			
Surrogate: Tetrachlorometaxylene	0.0602			ug/L	0.0800	75.2		39-120			
Surrogate: Decachlorobiphenyl [2C]	0.0567			ug/L	0.0800	70.9		26-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0564			ug/L	0.0800	70.5		39-120			
LCS Dup (BJG0348-BSD1)											
						Prepared: 16-Jul-2021 Analyzed: 17-Jul-2021 21:09					
Aroclor 1016	0.821	0.018	0.100	ug/L	1.00	82.1		51-120	0.47	30	
Aroclor 1260	0.914	0.017	0.100	ug/L	1.00	91.4		56-120	0.06	30	
Surrogate: Decachlorobiphenyl	0.0585			ug/L	0.0800	73.1		26-120			
Surrogate: Tetrachlorometaxylene	0.0551			ug/L	0.0800	68.8		39-120			
Surrogate: Decachlorobiphenyl [2C]	0.0603			ug/L	0.0800	75.4		26-120			
Surrogate: Tetrachlorometaxylene [2C]	0.0514			ug/L	0.0800	64.2		39-120			


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: 21-12596
 Project Manager: Meg Strong

Reported:
 30-Jul-2021 14:10

Metals and Metallic Compounds - Quality Control
Batch BJG0531 - TWC EPA 3010A

Instrument: ICP2 Analyst: MVP

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJG0531-BLK1)						Prepared: 22-Jul-2021 Analyzed: 22-Jul-2021 15:38					
Calcium	ND	0.0220	0.0500	mg/L							U
Magnesium	ND	0.0209	0.0500	mg/L							U
LCS (BJG0531-BS1)						Prepared: 22-Jul-2021 Analyzed: 22-Jul-2021 15:44					
Calcium	10.5	0.0220	0.0500	mg/L	10.0		105	80-120			
Magnesium	10.1	0.0209	0.0500	mg/L	10.0		101	80-120			
Duplicate (BJG0531-DUP1)						Source: 21G0121-12 Prepared: 22-Jul-2021 Analyzed: 22-Jul-2021 15:48					
Calcium	51.5	0.0220	0.0500	mg/L		52.7			2.24	20	
Magnesium	19.9	0.0209	0.0500	mg/L		20.3			2.30	20	
Matrix Spike (BJG0531-MS1)						Source: 21G0121-12 Prepared: 22-Jul-2021 Analyzed: 22-Jul-2021 15:54					
Calcium	64.2	0.0220	0.0500	mg/L	10.0	52.7	116	75-125			
Magnesium	31.4	0.0209	0.0500	mg/L	10.0	20.3	110	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJG0531-MSD1)						Source: 21G0121-12 Prepared: 22-Jul-2021 Analyzed: 22-Jul-2021 15:59					
Calcium	63.3	0.0220	0.0500	mg/L	10.0	52.7	106	75-125	1.51	20	
Magnesium	30.8	0.0209	0.0500	mg/L	10.0	20.3	104	75-125	1.89	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
EPA 6010D in Water	
Calcium	WADOE,NELAP,DoD-ELAP
Magnesium	WADOE,NELAP,DoD-ELAP
EPA 8082A in Water	
Aroclor 1016	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1016 (1)	ADEC
Aroclor-1016 (2)	ADEC
Aroclor-1016 (3)	ADEC
Aroclor-1016 (4)	ADEC
Aroclor 1016 [2C]	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1016 (1) [2C]	ADEC
Aroclor-1016 (2) [2C]	ADEC
Aroclor-1016 (3) [2C]	ADEC
Aroclor-1016 (4) [2C]	ADEC
Aroclor 1221	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1221 (1)	ADEC
Aroclor-1221 (2)	ADEC
Aroclor-1221 (3)	ADEC
Aroclor 1221 [2C]	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1221 (1) [2C]	ADEC
Aroclor-1221 (2) [2C]	ADEC
Aroclor-1221 (3) [2C]	ADEC
Aroclor-1221 (4) [2C]	ADEC
Aroclor 1232	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1232 (1)	ADEC
Aroclor-1232 (2)	ADEC
Aroclor-1232 (3)	ADEC
Aroclor-1232 (4)	ADEC
Aroclor 1232 [2C]	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1232 (1) [2C]	ADEC
Aroclor-1232 (2) [2C]	ADEC
Aroclor-1232 (3) [2C]	ADEC
Aroclor-1232 (4) [2C]	ADEC
Aroclor 1242	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1242 (1)	ADEC
Aroclor-1242 (2)	ADEC



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Aroclor-1242 (3)	ADEC
Aroclor-1242 (4)	ADEC
Aroclor 1242 [2C]	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1242 (1) [2C]	ADEC
Aroclor-1242 (2) [2C]	ADEC
Aroclor-1242 (3) [2C]	ADEC
Aroclor-1242 (4) [2C]	ADEC
Aroclor 1248	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1248 (1)	ADEC
Aroclor-1248 (2)	ADEC
Aroclor-1248 (3)	ADEC
Aroclor-1248 (4)	ADEC
Aroclor 1248 [2C]	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1248 (1) [2C]	ADEC
Aroclor-1248 (2) [2C]	ADEC
Aroclor-1248 (3) [2C]	ADEC
Aroclor-1248 (4) [2C]	ADEC
Aroclor 1254	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1254 (1)	ADEC
Aroclor-1254 (2)	ADEC
Aroclor-1254 (3)	ADEC
Aroclor-1254 (4)	ADEC
Aroclor-1254 (5)	ADEC
Aroclor 1254 [2C]	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1254 (1) [2C]	ADEC
Aroclor-1254 (2) [2C]	ADEC
Aroclor-1254 (3) [2C]	ADEC
Aroclor-1254 (4) [2C]	ADEC
Aroclor-1254 (5) [2C]	ADEC
Aroclor 1260	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1260 (1)	ADEC
Aroclor-1260 (2)	ADEC
Aroclor-1260 (3)	ADEC
Aroclor-1260 (4)	ADEC
Aroclor-1260 (5)	ADEC
Aroclor 1260 [2C]	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1260 (1) [2C]	ADEC
Aroclor-1260 (2) [2C]	ADEC
Aroclor-1260 (3) [2C]	ADEC



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30-Jul-2021 14:10

Aroclor-1260 (4) [2C]	ADEC
Aroclor 1262	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1262 (1)	ADEC
Aroclor-1262 (2)	ADEC
Aroclor-1262 (3)	ADEC
Aroclor-1262 (4)	ADEC
Aroclor-1262 (5)	ADEC
Aroclor 1262 [2C]	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1262 (1) [2C]	ADEC
Aroclor-1262 (2) [2C]	ADEC
Aroclor-1262 (3) [2C]	ADEC
Aroclor-1262 (4) [2C]	ADEC
Aroclor-1262 (5) [2C]	ADEC
Aroclor 1268	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1268 (1)	ADEC
Aroclor-1268 (2)	ADEC
Aroclor-1268 (3)	ADEC
Aroclor-1268 (4)	ADEC
Aroclor 1268 [2C]	ADEC,DoD-ELAP,NELAP,WADOE
Aroclor-1268 (1) [2C]	ADEC
Aroclor-1268 (2) [2C]	ADEC
Aroclor-1268 (3) [2C]	ADEC
Aroclor-1268 (4) [2C]	ADEC

EPA 8270E in Solid

Phenol	DoD-ELAP,NELAP,WADOE
bis(2-chloroethyl) ether	DoD-ELAP,NELAP,WADOE
2-Chlorophenol	DoD-ELAP,NELAP,WADOE
1,3-Dichlorobenzene	DoD-ELAP,NELAP,WADOE
1,4-Dichlorobenzene	DoD-ELAP,NELAP,WADOE
1,2-Dichlorobenzene	DoD-ELAP,NELAP,WADOE
Benzyl Alcohol	DoD-ELAP,NELAP,WADOE
2,2'-Oxybis(1-chloropropane)	DoD-ELAP,NELAP
2-Methylphenol	DoD-ELAP,NELAP,WADOE
Hexachloroethane	DoD-ELAP,NELAP,WADOE
N-Nitroso-di-n-Propylamine	DoD-ELAP,NELAP,WADOE
4-Methylphenol	DoD-ELAP,NELAP,WADOE
Nitrobenzene	DoD-ELAP,NELAP,WADOE
Isophorone	DoD-ELAP,NELAP,WADOE
2-Nitrophenol	DoD-ELAP,NELAP,WADOE



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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

2,4-Dimethylphenol	DoD-ELAP,NELAP,WADOE
Bis(2-Chloroethoxy)methane	DoD-ELAP,NELAP,WADOE
2,4-Dichlorophenol	DoD-ELAP,NELAP,WADOE
1,2,4-Trichlorobenzene	DoD-ELAP,NELAP,WADOE
Naphthalene	DoD-ELAP,NELAP,WADOE,ADEC
Benzoic acid	DoD-ELAP,NELAP,WADOE
4-Chloroaniline	DoD-ELAP,NELAP,WADOE
Hexachlorobutadiene	DoD-ELAP,NELAP,WADOE
4-Chloro-3-Methylphenol	DoD-ELAP,NELAP,WADOE
2-Methylnaphthalene	DoD-ELAP,NELAP,WADOE,ADEC
Hexachlorocyclopentadiene	DoD-ELAP,NELAP,WADOE
2,4,6-Trichlorophenol	DoD-ELAP,NELAP,WADOE
2,4,5-Trichlorophenol	DoD-ELAP,NELAP,WADOE
2-Chloronaphthalene	DoD-ELAP,NELAP,WADOE
2-Nitroaniline	DoD-ELAP,NELAP,WADOE
Acenaphthylene	DoD-ELAP,NELAP,WADOE,ADEC
Dimethylphthalate	DoD-ELAP,NELAP,WADOE
2,6-Dinitrotoluene	DoD-ELAP,NELAP,WADOE
Acenaphthene	DoD-ELAP,NELAP,WADOE,ADEC
3-Nitroaniline	DoD-ELAP,NELAP,WADOE
2,4-Dinitrophenol	DoD-ELAP,NELAP,WADOE
Dibenzofuran	DoD-ELAP,NELAP,WADOE,ADEC
4-Nitrophenol	DoD-ELAP,NELAP,WADOE
2,4-Dinitrotoluene	DoD-ELAP,NELAP,WADOE
Fluorene	DoD-ELAP,NELAP,WADOE,ADEC
4-Chlorophenylphenyl ether	DoD-ELAP,NELAP
Diethyl phthalate	DoD-ELAP,NELAP,WADOE
4-Nitroaniline	DoD-ELAP,NELAP,WADOE
4,6-Dinitro-2-methylphenol	DoD-ELAP,NELAP,WADOE
N-Nitrosodiphenylamine	DoD-ELAP,NELAP,WADOE
4-Bromophenyl phenyl ether	DoD-ELAP,NELAP,WADOE
Hexachlorobenzene	DoD-ELAP,NELAP,WADOE
Pentachlorophenol	DoD-ELAP,NELAP,WADOE
Phenanthrene	DoD-ELAP,NELAP,WADOE,ADEC
Anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Carbazole	DoD-ELAP,NELAP,WADOE,ADEC
Di-n-Butylphthalate	DoD-ELAP,NELAP,WADOE
Fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Pyrene	DoD-ELAP,NELAP,WADOE,ADEC



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

Project: Lower Duwamish
Project Number: 21-12596
Project Manager: Meg Strong

Reported:
30-Jul-2021 14:10

Butylbenzylphthalate	DoD-ELAP,NELAP,WADOE
Benzo(a)anthracene	DoD-ELAP,NELAP,WADOE,ADEC
3,3'-Dichlorobenzidine	DoD-ELAP,NELAP,WADOE
Chrysene	DoD-ELAP,NELAP,WADOE,ADEC
bis(2-Ethylhexyl)phthalate	DoD-ELAP,NELAP,WADOE
Di-n-Octylphthalate	DoD-ELAP,NELAP,WADOE
Benzo(b)fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(k)fluoranthene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(a)fluoranthene, Total	WADOE,ADEC
Benzo(a)pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Indeno(1,2,3-cd)pyrene	DoD-ELAP,NELAP,WADOE,ADEC
Dibenzo(a,h)anthracene	DoD-ELAP,NELAP,WADOE,ADEC
Benzo(g,h,i)perylene	DoD-ELAP,NELAP,WADOE,ADEC
N-Nitrosodimethylamine	DoD-ELAP,NELAP,WADOE
Aniline	DoD-ELAP,NELAP,WADOE
Retene	DoD-ELAP,NELAP,WADOE
Pyridine	DoD-ELAP,NELAP,WADOE
1-Methylnaphthalene	DoD-ELAP,NELAP,WADOE,ADEC
Azobenzene (1,2-DP-Hydrazine)	NELAP,WADOE
2,3,4,6-Tetrachlorophenol	DoD-ELAP,WADOE
Benzidine	DoD-ELAP,NELAP
Tetrachloroguaiacol	DoD-ELAP,WADOE
3,4,5-Trichloroguaiacol	WADOE
3,4,6-Trichloroguaiacol	WADOE
4,5,6-Trichloroguaiacol	WADOE
Guaiacol	WADOE

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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Reported:
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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.
M	Estimated value for a GC/MS analyte detected and confirmed by an analyst but with low spectral match parameters.
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.



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)
21E0174

Associated SDG ID(s)
N/A

Susan Dunnihoo

Digitally signed by Susan
Dunnihoo
Date: 2021.12.13 16:14:19 -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: 21E0174		Turn-around Requested: Standard		Page: 1 of 1											
ARI Client Company: Shannon & Wilson		Phone: 206-695-6811		Date: 5/13/21	Ice Present? Yes										
Client Contact: Shoshem Howard		No. of Coolers: 2		Cooler Temps: 5.9, 0.5											
Client Project Name: LDW		Analysis Requested													
Client Project #: 21-1-12596		Samplers: RRP1 CTC													
Sample ID	Date	Time	Matrix	No. Containers	TPH-G	TPH-Dx	BTEX	HVOCs	MTBE	PAHs	Full List SVOCs	Limited SVOCs	PCB Analytes	Metals (Total + Individual)	Notes/Comments
MW-66-20211305	5/13/21	1108	W	11		X	X	X		X			X	X ¹	1 = Arsenic, barium, chromium, manganese, nickel, cadmium, cobalt, copper, iron, lead, mercury, selenium, silver, vanadium, zinc
TB-1-20211305		1300	W	5	X		X	X							
MW-76-20211305		1251	W	11		X	X	X		X	X		X ¹		
MW-65-20211305		1350	W	15	X	X	X	X		X		X	X ¹		
MW-6-20211305		1450	W	11	X	X	X	X					X ²		
No Further															
Comments/Special Instructions *Lab to filter for dissolved metals *Refer to project methods and analyte lists					Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Received by: (Signature)				
					Printed Name: Christian Carfield		Printed Name: Kenny Dang		Printed Name:		Printed Name:				
					Company: Shannon & Wilson, Inc.		Company: ARI		Company:		Company:				
					Date & Time: 5/13/21 1537		Date & Time: 5/13/21 1537		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

Reported:
13-Dec-2021 15:53

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-66-20211305	21E0174-01	Water	13-May-2021 11:08	13-May-2021 15:37
MW-66-20211305	21E0174-02	Water	13-May-2021 11:08	13-May-2021 15:37
TB-1-20211305	21E0174-03	Water	13-May-2021 14:50	13-May-2021 15:37
MW-76-20211305	21E0174-04	Water	13-May-2021 12:51	13-May-2021 15:37
MW-76-20211305	21E0174-05	Water	13-May-2021 12:51	13-May-2021 15:37
MW-65-20211305	21E0174-06	Water	13-May-2021 13:50	13-May-2021 15:37
MW-65-20211305	21E0174-07	Water	13-May-2021 13:50	13-May-2021 15:37
MW-6-20211305	21E0174-08	Water	13-May-2021 14:50	13-May-2021 15:37
MW-6-20211305	21E0174-09	Water	13-May-2021 14:50	13-May-2021 15:37



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 15:53

Work Order Case Narrative

Client: Shannon & Wilson, Inc
Project: Lower Duwamish
Work Order: 21E0174

Sample receipt

Samples as listed on the preceding page were received 13-May-2021 15:37 under ARI work order 21E0174. 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 except Hexabromobiphenyl which was out of control in the continuing calibration verification (CCV5 and CCV6) which was out of control high on column zb-35. Passes on column zb-5. All samples were non-detects.

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-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



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Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
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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.

Initial and continuing calibrations were within method requirements except 4-Chlorophenylphenyl ether and Carbazole which were out of control low and 2-Nitroaniline 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 initial calibration verification (ICV), the blank spike (BS) and samples 21E0174-04 and 21E0174-06. All 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 except 2-Nitroaniline which was out of control high and 4-Chloroaniline which was out of control low. All deviations have been flagged within the QC section of this report.

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 and surrogate Dibenzo(a,h)anthracene-d14 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 Dibenzo(a,h)anthracene-d14 which was out of control in the ICV and has been flagged.



Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: Lower Duwamish
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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.

Sample specific QC was performed in association with sample 21E0174-01 in Total Metals batch BJE0678, in association with sample 21E0174-01RE1 in Total Iron batch BJE0723 and in association with sample 21E0174-02 in Dissolved Metals batch BJE0648. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Total Hg - 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 21E0174-01 in Total Metals batch BJE0554 and in association with sample 21E0174-02 in Dissolved Mercury batch BJE0554. 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.



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 15:53

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

REVISION 1 to correct VOC list



WORK ORDER

21E0174

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH
21E0174-01 A	HDPE NM, 1000 mL, 1:1 HNO3	<2 Pass
21E0174-01 B	Glass NM, Amber, 1000 mL	
21E0174-01 C	Glass NM, Amber, 1000 mL	
21E0174-01 D	Glass NM, Amber, 500 mL	
21E0174-01 E	Glass NM, Amber, 500 mL	
21E0174-01 F	Glass NM, Amber, 500 mL	
21E0174-01 G	Glass NM, Amber, 500 mL	
21E0174-01 H	VOA Vial, Clear, 40 mL, HCL	
21E0174-01 I	VOA Vial, Clear, 40 mL, HCL	
21E0174-01 J	VOA Vial, Clear, 40 mL, HCL	
21E0174-02 A	Large OJ, 1000 mL	>2 Fail
21E0174-03 A	VOA Vial, Clear, 40 mL, HCL	
21E0174-03 B	VOA Vial, Clear, 40 mL, HCL	
21E0174-03 C	VOA Vial, Clear, 40 mL, HCL	
21E0174-03 D	VOA Vial, Clear, 40 mL, HCL	
21E0174-03 E	VOA Vial, Clear, 40 mL, HCL	
21E0174-04 A	HDPE NM, 1000 mL, 1:1 HNO3	<2 Pass
21E0174-04 B	Glass NM, Amber, 500 mL	
21E0174-04 C	Glass NM, Amber, 500 mL	
21E0174-04 D	Glass NM, Amber, 500 mL	
21E0174-04 E	Glass NM, Amber, 500 mL	
21E0174-04 F	Glass NM, Amber, 500 mL	
21E0174-04 G	Glass NM, Amber, 500 mL	
21E0174-04 H	VOA Vial, Clear, 40 mL, HCL	
21E0174-04 I	VOA Vial, Clear, 40 mL, HCL	
21E0174-04 J	VOA Vial, Clear, 40 mL, HCL	Bubble
21E0174-05 A	Large OJ, 1000 mL	>2 Fail
21E0174-06 A	HDPE NM, 1000 mL, 1:1 HNO3	<2 Pass
21E0174-06 B	Glass NM, Amber, 1000 mL	
21E0174-06 C	Glass NM, Amber, 1000 mL	
21E0174-06 D	Glass NM, Amber, 500 mL	
21E0174-06 E	Glass NM, Amber, 500 mL	
21E0174-06 F	Glass NM, Amber, 500 mL	
21E0174-06 G	Glass NM, Amber, 500 mL	
21E0174-06 H	Glass NM, Amber, 500 mL	



WORK ORDER

21E0174

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0174-06 I	Glass NM, Amber, 500 mL	
21E0174-06 J	VOA Vial, Clear, 40 mL, HCL	
21E0174-06 K	VOA Vial, Clear, 40 mL, HCL	
21E0174-06 L	VOA Vial, Clear, 40 mL, HCL	
21E0174-06 M	VOA Vial, Clear, 40 mL, HCL	
21E0174-06 N	VOA Vial, Clear, 40 mL, HCL	Bubble
21E0174-07 A	Large OJ, 1000 mL	> 2 Fail
21E0174-08 A	HDPE NM, 1000 mL, 1:1 HNO3	
21E0174-08 B	Glass NM, Amber, 1000 mL	
21E0174-08 C	Glass NM, Amber, 1000 mL	
21E0174-08 D	Glass NM, Amber, 500 mL	
21E0174-08 E	Glass NM, Amber, 500 mL	
21E0174-08 F	VOA Vial, Clear, 40 mL, HCL	
21E0174-08 G	VOA Vial, Clear, 40 mL, HCL	
21E0174-08 H	VOA Vial, Clear, 40 mL, HCL	
21E0174-08 I	VOA Vial, Clear, 40 mL, HCL	
21E0174-08 J	VOA Vial, Clear, 40 mL, HCL	
21E0174-09 A	Large OJ, 1000 mL	> 2 Fail

KD

Preservation Confirmed By

5/14/21

Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon

Project Name: LDW

COC No(s): NA

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

Assigned ARI Job No: 21E0174

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 1537

5.4 0.5

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

Temp Gun ID#: DOO 5206

Cooler Accepted by: KD

Date: 5/13/21

Time: 1537

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 YES NO

How were bottles sealed in plastic bags? Individually Grouped Not KD

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

Were all bottle labels complete and legible? YES YES NO

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

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

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

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

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

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

Date VOC Trip Blank was made at ARI: NA 5/15/21

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

Samples Logged by: KD Date: 5/14/21 Time: 0840 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:

vials contained air bubbles, please see preservation sheet.

By: KD

Date: 5/14/21



WORK ORDER

21E0174

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0174-01 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0174-01 B	Glass NM, Amber, 1000 mL		
21E0174-01 C	Glass NM, Amber, 1000 mL		
21E0174-01 D	Glass NM, Amber, 500 mL		
21E0174-01 E	Glass NM, Amber, 500 mL		
21E0174-01 F	Glass NM, Amber, 500 mL		
21E0174-01 G	Glass NM, Amber, 500 mL		
21E0174-01 H	VOA Vial, Clear, 40 mL, HCL		
21E0174-01 I	VOA Vial, Clear, 40 mL, HCL		
21E0174-01 J	VOA Vial, Clear, 40 mL, HCL		
21E0174-02 A	Large OJ, 1000 mL	> 2	Fail ①
21E0174-03 A	VOA Vial, Clear, 40 mL, HCL		
21E0174-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0174-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0174-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0174-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0174-04 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0174-04 B	Glass NM, Amber, 500 mL		
21E0174-04 C	Glass NM, Amber, 500 mL		
21E0174-04 D	Glass NM, Amber, 500 mL		
21E0174-04 E	Glass NM, Amber, 500 mL		
21E0174-04 F	Glass NM, Amber, 500 mL		
21E0174-04 G	Glass NM, Amber, 500 mL		
21E0174-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0174-04 I	VOA Vial, Clear, 40 mL, HCL		
21E0174-04 J	VOA Vial, Clear, 40 mL, HCL		Bubble
21E0174-05 A	Large OJ, 1000 mL	> 2	Fail ①
21E0174-06 A	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0174-06 B	Glass NM, Amber, 1000 mL		
21E0174-06 C	Glass NM, Amber, 1000 mL		
21E0174-06 D	Glass NM, Amber, 500 mL		
21E0174-06 E	Glass NM, Amber, 500 mL		
21E0174-06 F	Glass NM, Amber, 500 mL		
21E0174-06 G	Glass NM, Amber, 500 mL		
21E0174-06 H	Glass NM, Amber, 500 mL		



WORK ORDER

21E0174

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0174-06 I	Glass NM, Amber, 500 mL	
21E0174-06 J	VOA Vial, Clear, 40 mL, HCL	
21E0174-06 K	VOA Vial, Clear, 40 mL, HCL	
21E0174-06 L	VOA Vial, Clear, 40 mL, HCL	
21E0174-06 M	VOA Vial, Clear, 40 mL, HCL	
21E0174-06 N	VOA Vial, Clear, 40 mL, HCL	
21E0174-07 A	Large OJ, 1000 mL	> 2 Fail ① Bubble
21E0174-08 A	HDPE NM, 1000 mL, 1:1 HNO ₃	
21E0174-08 B	Glass NM, Amber, 1000 mL	
21E0174-08 C	Glass NM, Amber, 1000 mL	
21E0174-08 D	Glass NM, Amber, 500 mL	
21E0174-08 E	Glass NM, Amber, 500 mL	
21E0174-08 F	VOA Vial, Clear, 40 mL, HCL	
21E0174-08 G	VOA Vial, Clear, 40 mL, HCL	
21E0174-08 H	VOA Vial, Clear, 40 mL, HCL	
21E0174-08 I	VOA Vial, Clear, 40 mL, HCL	
21E0174-08 J	VOA Vial, Clear, 40 mL, HCL	
21E0174-09 A	Large OJ, 1000 mL	> 2 Fail ①

KD

Preservation Confirmed By

Date

5/14/21

① Filtered at 0.45 um and
preserved to pH < 2.0 with 0.75ml
Conc. HNO₃ (J2314). ML 5/14/21



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 15:53

MW-66-20211305

21E0174-01 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/13/2021 11:08

Instrument: NT2 Analyst: PKC

Analyzed: 05/14/2021 13:52

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0174-01 H

Preparation Batch: BJE0359

Sample Size: 10 mL

Prepared: 05/14/2021

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 %	95.9	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	92.4	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	



Analytical Report

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

Reported:
13-Dec-2021 15:53

MW-66-20211305

21E0174-01 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/13/2021 11:08

Instrument: NT11 Analyst: VTS

Analyzed: 06/04/2021 15:30

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0174-01 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-01 F 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	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	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 %	62.7 %	
Surrogate: Dibenzo[a,h]anthracene-d14					29-120 %	84.6 %	Q
Surrogate: Fluoranthene-d10					57-120 %	74.4 %	


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

Reported:
 13-Dec-2021 15:53

MW-66-20211305
21E0174-01 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/13/2021 11:08

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 15:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0174-01 D 01

Preparation Batch: BJE0409

Sample Size: 500 mL

Prepared: 05/19/2021

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>78.6</i>	<i>%</i>	



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 15:53

MW-66-20211305

21E0174-01 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/13/2021 11:08

Instrument: ECD7 Analyst: JGR

Analyzed: 05/20/2021 20:35

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0411 Prepared: 05/18/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0174-01 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0136 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-01 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0134 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-01 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0135 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-01 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 %	56.4	%	
Surrogate: Tetrachlorometaxylene				32-120 %	49.6	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	58.0	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	41.0	%	


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

Reported:
 13-Dec-2021 15:53

MW-66-20211305
21E0174-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/13/2021 11:08

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 18:39

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0678 Sample Size: 25 mL
 Prepared: 05/27/2021 Final Volume: 25 mL

Extract ID: 21E0174-01 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	5	0.710	2.50	525	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 19:00

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0678 Sample Size: 25 mL
 Prepared: 05/27/2021 Final Volume: 25 mL

Extract ID: 21E0174-01 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	1	0.114	0.500	3.53	ug/L	
Chromium	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt	7440-48-4	1	0.0173	0.200	0.517	ug/L	
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	1	0.0556	0.200	2.77	ug/L	


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

Reported:
 13-Dec-2021 15:53

MW-66-20211305
21E0174-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/13/2021 11:08

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 19:00

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0678 Sample Size: 25 mL
 Prepared: 05/27/2021 Final Volume: 25 mL

Extract ID: 21E0174-01 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	2.77	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	0.536	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	0.985	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 15:53

MW-66-20211305

21E0174-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/13/2021 11:08

Instrument: HYDRA Analyst: ML

Analyzed: 05/25/2021 13:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0174-01 A

Preparation Batch: BJE0554

Sample Size: 20 mL

Prepared: 05/25/2021

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
Seattle WA, 98103-8636

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

Reported:
13-Dec-2021 15:53

MW-66-20211305
21E0174-01RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/13/2021 11:08

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 19:49

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJE0723 Sample Size: 25 mL
Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0174-01RE1 A 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Iron	7439-89-6	5	91.0	180	17400	ug/L	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:
 13-Dec-2021 15:53

MW-66-20211305
21E0174-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/13/2021 11:08

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 17:16

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0174-02 A 02
	Preparation Batch: BJE0680	Filtration Batch: BJE0371
	Prepared: 05/27/2021	Filtration Date: 05/14/2021 14:43
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Manganese, Dissolved	7439-96-5	5	0.710	2.50	505	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 20:09

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0174-02 A 02
	Preparation Batch: BJE0680	Filtration Batch: BJE0371
	Prepared: 05/27/2021	Filtration Date: 05/14/2021 14:43
	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	1.31	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	0.385	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.165	ug/L	J


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

Reported:
 13-Dec-2021 15:53

MW-66-20211305
21E0174-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/13/2021 11:08

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 20:09

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0174-02 A 02

Preparation Batch: BJE0680

Sample Size: 25 mL

Filtration Batch: BJE0371

Prepared: 05/27/2021

Final Volume: 25 mL

Filtration Date: 05/14/2021 14:43

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	1.52	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	0.223	ug/L	J
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	0.764	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 15:53

MW-66-20211305

21E0174-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/13/2021 11:08

Instrument: HYDRA Analyst: ML

Analyzed: 05/26/2021 13:03

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0174-02 A 01

Preparation Batch: BJE0648

Sample Size: 20 mL

Filtration Batch: BJE0371

Prepared: 05/26/2021

Final Volume: 20 mL

Filtration Date: 05/14/2021 14:43

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 Resources, LLC
Analytical Chemists and Consultants

Analytical Report

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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 15:53

MW-66-20211305
21E0174-02RE1 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/13/2021 11:08

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 20:34

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0174-02RE1 A 03
	Preparation Batch: BJE0722	Filtration Batch: BJE0371
	Prepared: 05/28/2021	Filtration Date: 05/14/2021 14:43
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Iron, Dissolved	7439-89-6	5	91.0	180	12400	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:
13-Dec-2021 15:53

TB-1-20211305
21E0174-03 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/13/2021 14:50

Instrument: NT2 Analyst: PKC

Analyzed: 05/14/2021 12:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0174-03 B

Preparation Batch: BJE0359

Sample Size: 10 mL

Prepared: 05/14/2021

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>98.4</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>94.4</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>101</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:
13-Dec-2021 15:53

TB-1-20211305
21E0174-03 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/13/2021 14:50

Instrument: NT2 Analyst: PKC

Analyzed: 05/14/2021 12:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0174-03 B

Preparation Batch: BJE0359

Sample Size: 10 mL

Prepared: 05/14/2021

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 %	94.4	%	



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 15:53

MW-76-20211305

21E0174-04 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/13/2021 12:51

Instrument: NT2 Analyst: PKC

Analyzed: 05/14/2021 14:14

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0174-04 I

Preparation Batch: BJE0359

Sample Size: 10 mL

Prepared: 05/14/2021

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 %	103	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.7	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	91.4	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	102	%	



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 15:53

MW-76-20211305

21E0174-04 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/13/2021 12:51

Instrument: NT10 Analyst: VTS

Analyzed: 05/19/2021 12:10

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJE0412
Prepared: 05/18/2021

Sample Size: 1000 mL
Final Volume: 1 mL

Extract ID: 21E0174-04 F 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	0.3	ug/L	J
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	0.5	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:
13-Dec-2021 15:53

MW-76-20211305

21E0174-04 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/13/2021 12:51

Instrument: NT10 Analyst: VTS

Analyzed: 05/19/2021 12:10

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	0.5	ug/L	
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
<i>Surrogate: 2-Fluorophenol</i>					30-160 %	57.8 %	
<i>Surrogate: Phenol-d5</i>					30-160 %	39.5 %	
<i>Surrogate: 2-Chlorophenol-d4</i>					30-160 %	95.4 %	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>					30-160 %	80.8 %	
<i>Surrogate: Nitrobenzene-d5</i>					30-160 %	109 %	



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 15:53

MW-76-20211305

21E0174-04 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/13/2021 12:51

Instrument: NT10 Analyst: VTS

Analyzed: 05/19/2021 12:10

Analysis by: Analytical Resources, LLC

Analyte	CAS Number	Recovery	Recovery	Units	Notes
		Limits			
Surrogate: 2-Fluorobiphenyl		30-160 %	96.3	%	
Surrogate: 2,4,6-Tribromophenol		30-160 %	165	%	*, Q
Surrogate: p-Terphenyl-d14		30-160 %	103	%	



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 15:53

MW-76-20211305

21E0174-04 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/13/2021 12:51

Instrument: NT11 Analyst: VTS

Analyzed: 06/04/2021 16:02

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0174-04 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-04 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	0.001	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	0.452	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	0.015	ug/L	
Phenanthrene	85-01-8	1	0.001	0.010	0.437	ug/L	
Anthracene	120-12-7	1	0.001	0.010	0.020	ug/L	
Carbazole	86-74-8	1	0.001	0.010	ND	ug/L	U
Fluoranthene	206-44-0	1	0.002	0.010	0.017	ug/L	
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	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	0.012	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 %	67.5	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	81.8	%	Q
Surrogate: Fluoranthene-d10				57-120 %	77.3	%	


 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:
 13-Dec-2021 15:53

MW-76-20211305
21E0174-04 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/13/2021 12:51

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 15:59

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0174-04 B 01

Preparation Batch: BJE0409

Sample Size: 500 mL

Prepared: 05/19/2021

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>77.4</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 15:53

MW-76-20211305
21E0174-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/13/2021 12:51

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 17:20

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0678 Sample Size: 25 mL
 Prepared: 05/27/2021 Final Volume: 25 mL

Extract ID: 21E0174-04 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	5	0.710	2.50	722	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 18:42

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0678 Sample Size: 25 mL
 Prepared: 05/27/2021 Final Volume: 25 mL

Extract ID: 21E0174-04 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	1	0.114	0.500	9.34	ug/L	
Chromium	7440-47-3	1	0.260	0.500	0.947	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	0.558	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.294	ug/L	
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	4.01	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:
 13-Dec-2021 15:53

MW-76-20211305
21E0174-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/13/2021 12:51

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 18:42

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0174-04 A 01

Preparation Batch: BJE0678

Sample Size: 25 mL

Prepared: 05/27/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	2.09	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	1.89	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	0.818	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 15:53

MW-76-20211305

21E0174-04 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/13/2021 12:51

Instrument: HYDRA Analyst: ML

Analyzed: 05/25/2021 13:49

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0174-04 A

Preparation Batch: BJE0554

Sample Size: 20 mL

Prepared: 05/25/2021

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
Seattle WA, 98103-8636

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

Reported:
13-Dec-2021 15:53

MW-76-20211305
21E0174-04RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/13/2021 12:51

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 19:40

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
Preparation Batch: BJE0723 Sample Size: 25 mL
Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0174-04RE1 A 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Iron	7439-89-6	5	91.0	180	22900	ug/L	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:
 13-Dec-2021 15:53

MW-76-20211305
21E0174-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/13/2021 12:51

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 17:24

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0174-05 A 02
	Preparation Batch: BJE0680	Filtration Batch: BJE0371
	Prepared: 05/27/2021	Filtration Date: 05/14/2021 14:43
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Manganese, Dissolved	7439-96-5	5	0.710	2.50	677	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 20:15

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0174-05 A 02
	Preparation Batch: BJE0680	Filtration Batch: BJE0371
	Prepared: 05/27/2021	Filtration Date: 05/14/2021 14:43
	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	0.827	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	0.218	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium, Dissolved	7440-62-2	1	0.0556	0.200	0.0900	ug/L	J


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

Reported:
 13-Dec-2021 15:53

MW-76-20211305
21E0174-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/13/2021 12:51

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 20:15

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0174-05 A 02

Preparation Batch: BJE0680

Sample Size: 25 mL

Filtration Batch: BJE0371

Prepared: 05/27/2021

Final Volume: 25 mL

Filtration Date: 05/14/2021 14:43

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	1.19	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	0.157	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
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 15:53

MW-76-20211305

21E0174-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/13/2021 12:51

Instrument: HYDRA Analyst: ML

Analyzed: 05/26/2021 13:17

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0174-05 A 01

Preparation Batch: BJE0648

Sample Size: 20 mL

Filtration Batch: BJE0371

Prepared: 05/26/2021

Final Volume: 20 mL

Filtration Date: 05/14/2021 14:43

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-76-20211305
21E0174-05RE1 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/13/2021 12:51

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 20:38

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0174-05RE1 A 03
	Preparation Batch: BJE0722	Filtration Batch: BJE0371
	Prepared: 05/28/2021	Filtration Date: 05/14/2021 14:43
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Iron, Dissolved	7439-89-6	5	91.0	180	14600	ug/L	D



Analytical Report

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

Reported:
13-Dec-2021 15:53

MW-65-20211305

21E0174-06 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/13/2021 13:50

Instrument: NT2 Analyst: PKC

Analyzed: 05/14/2021 14:37

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0174-06 J

Preparation Batch: BJE0359

Sample Size: 10 mL

Prepared: 05/14/2021

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	0.25	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	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 %	95.8	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	90.3	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	



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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 15:53

MW-65-20211305

21E0174-06 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/13/2021 13:50

Instrument: NT2 Analyst: PKC

Analyzed: 05/14/2021 14:37

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0174-06 J

Preparation Batch: BJE0359

Sample Size: 10 mL

Prepared: 05/14/2021

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 %	90.3	%	



Analytical Report

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Project: Lower Duwamish
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Reported:
13-Dec-2021 15:53

MW-65-20211305

21E0174-06 (Water)

Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/13/2021 13:50

Instrument: NT10 Analyst: VTS

Analyzed: 05/19/2021 12:48

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0174-06 C 01

Preparation Batch: BJE0412

Sample Size: 1000 mL

Prepared: 05/18/2021

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	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

57.7 %

Surrogate: Phenol-d5

30-160 %

37.9 %

Surrogate: 2-Chlorophenol-d4

30-160 %

99.6 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

84.6 %

Surrogate: Nitrobenzene-d5

30-160 %

112 %

Surrogate: 2-Fluorobiphenyl

30-160 %

101 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

182 %

*, Q

Surrogate: p-Terphenyl-d14

30-160 %

113 %



Analytical Report

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

Reported:
13-Dec-2021 15:53

MW-65-20211305

21E0174-06 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/13/2021 13:50

Instrument: NT11 Analyst: VTS

Analyzed: 06/04/2021 16:35

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0174-06 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-06 F 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	0.001	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	0.004	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	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	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 %	64.5	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	84.4	%	Q
Surrogate: Fluoranthene-d10				57-120 %	78.0	%	


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

Reported:
 13-Dec-2021 15:53

MW-65-20211305
21E0174-06 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/13/2021 13:50

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 16:20

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0174-06 D 01

Preparation Batch: BJE0409

Sample Size: 500 mL

Prepared: 05/19/2021

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 %	73.8	%	



Analytical Report

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

Reported:
13-Dec-2021 15:53

MW-65-20211305

21E0174-06 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/13/2021 13:50

Instrument: ECD7 Analyst: JGR

Analyzed: 05/20/2021 20:56

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0411 Prepared: 05/18/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0174-06 B 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0136 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-06 B 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0134 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-06 B 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0135 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-06 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 %	56.8	%	
Surrogate: Tetrachlorometaxylene				32-120 %	50.5	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	56.9	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	41.3	%	


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 15:53

MW-65-20211305
21E0174-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/13/2021 13:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 17:07

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0678 Sample Size: 25 mL
 Prepared: 05/27/2021 Final Volume: 25 mL

Extract ID: 21E0174-06 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Manganese	7439-96-5	20	2.84	10.0	2530	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 18:49

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0678 Sample Size: 25 mL
 Prepared: 05/27/2021 Final Volume: 25 mL

Extract ID: 21E0174-06 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	1	0.114	0.500	20.5	ug/L	
Chromium	7440-47-3	1	0.260	0.500	ND	ug/L	U
Cobalt	7440-48-4	1	0.0173	0.200	0.477	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0780	ug/L	J
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U
Vanadium	7440-62-2	1	0.0556	0.200	0.0640	ug/L	J


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

Reported:
 13-Dec-2021 15:53

MW-65-20211305
21E0174-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/13/2021 13:50

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 18:49

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0174-06 A 01

Preparation Batch: BJE0678

Sample Size: 25 mL

Prepared: 05/27/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	1.88	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	0.279	ug/L	J
Nickel	7440-02-0	1	0.0792	0.500	5.65	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 15:53

MW-65-20211305

21E0174-06 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/13/2021 13:50

Instrument: HYDRA Analyst: ML

Analyzed: 05/25/2021 13:52

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0174-06 A

Preparation Batch: BJE0554

Sample Size: 20 mL

Prepared: 05/25/2021

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 15:53

MW-65-20211305
21E0174-06RE1 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/13/2021 13:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 19:45

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO₃ matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0174-06RE1 A 02

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Iron	7439-89-6	5	91.0	180	18000	ug/L	D


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

Reported:
 13-Dec-2021 15:53

MW-65-20211305
21E0174-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/13/2021 13:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 17:11

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0174-07 A 02
	Preparation Batch: BJE0680	Filtration Batch: BJE0371
	Prepared: 05/27/2021	Filtration Date: 05/14/2021 14:43
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Manganese, Dissolved	7439-96-5	20	2.84	10.0	2230	ug/L	D

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 20:21

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0174-07 A 02
	Preparation Batch: BJE0680	Filtration Batch: BJE0371
	Prepared: 05/27/2021	Filtration Date: 05/14/2021 14:43
	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	13.2	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	0.398	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
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


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

Reported:
 13-Dec-2021 15:53

MW-65-20211305
21E0174-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/13/2021 13:50

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 20:21

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0174-07 A 02

Preparation Batch: BJE0680

Sample Size: 25 mL

Filtration Batch: BJE0371

Prepared: 05/27/2021

Final Volume: 25 mL

Filtration Date: 05/14/2021 14:43

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.353	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	4.81	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
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Project: Lower Duwamish
Project Number: Lower Duwamish
Project Manager: Meg Strong

Reported:
13-Dec-2021 15:53

MW-65-20211305

21E0174-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/13/2021 13:50

Instrument: HYDRA Analyst: ML

Analyzed: 05/26/2021 13:19

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0174-07 A 01

Preparation Batch: BJE0648

Sample Size: 20 mL

Filtration Batch: BJE0371

Prepared: 05/26/2021

Final Volume: 20 mL

Filtration Date: 05/14/2021 14:43

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 Manager: Meg Strong

Reported:
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MW-65-20211305
21E0174-07RE1 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/13/2021 13:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/28/2021 20:43

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0174-07RE1 A 03
	Preparation Batch: BJE0722	Filtration Batch: BJE0371
	Prepared: 05/28/2021	Filtration Date: 05/14/2021 14:43
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Iron, Dissolved	7439-89-6	2	36.4	72.0	3790	ug/L	D



Analytical Report

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

Reported:
13-Dec-2021 15:53

MW-6-20211305

21E0174-08 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/13/2021 14:50

Instrument: NT2 Analyst: PKC

Analyzed: 05/14/2021 14:59

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0174-08 I

Preparation Batch: BJE0359

Sample Size: 10 mL

Prepared: 05/14/2021

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 %	106	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	98.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	90.2	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	100	%	



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 15:53

MW-6-20211305

21E0174-08 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/13/2021 14:50

Instrument: NT2 Analyst: PKC

Analyzed: 05/14/2021 14:59

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0174-08 I

Preparation Batch: BJE0359

Sample Size: 10 mL

Prepared: 05/14/2021

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 %	88.6	%	


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Reported:
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MW-6-20211305
21E0174-08 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/13/2021 14:50

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 16:42

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0174-08 D 01

Preparation Batch: BJE0409

Sample Size: 500 mL

Prepared: 05/19/2021

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>77.8</i>	<i>%</i>	



Analytical Report

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

Reported:
13-Dec-2021 15:53

MW-6-20211305

21E0174-08 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/13/2021 14:50

Instrument: ECD7 Analyst: JGR

Analyzed: 05/20/2021 21:18

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0411 Prepared: 05/18/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0174-08 C 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0136 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-08 C 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0134 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-08 C 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0135 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0174-08 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 %	50.6	%	
Surrogate: Tetrachlorometaxylene				32-120 %	45.2	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	51.3	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	37.4	%	


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-6-20211305
21E0174-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/13/2021 14:50

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 18:54

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0174-08 A 01

Preparation Batch: BJE0678

Sample Size: 25 mL

Prepared: 05/27/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	32.3	ug/L	
Copper	7440-50-8	1	0.173	0.500	1.06	ug/L	


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 Project: Lower Duwamish
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Reported:
 13-Dec-2021 15:53

MW-6-20211305
21E0174-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/13/2021 14:50

Instrument: ICPMS2 Analyst: MCB

Analyzed: 05/27/2021 20:26

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0174-09 A 02

Preparation Batch: BJE0680

Sample Size: 25 mL

Filtration Batch: BJE0371

Prepared: 05/27/2021

Final Volume: 25 mL

Filtration Date: 05/14/2021 14:43

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	10.2	ug/L	
Copper, Dissolved	7440-50-8	1	0.173	0.500	0.193	ug/L	J


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

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Volatile Organic Compounds - Quality Control
Batch BJE0359 - 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 (BJE0359-BLK1)		Prepared: 14-May-2021 Analyzed: 14-May-2021 12:01								
Gasoline Range Organics (Tol-Nap)	ND	100	ug/L							U
Surrogate: Toluene-d8	4.81		ug/L	5.00		96.1	80-120			
Surrogate: 4-Bromofluorobenzene	4.76		ug/L	5.00		95.3	80-120			
Blank (BJE0359-BLK2)		Prepared: 14-May-2021 Analyzed: 14-May-2021 12:01								
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	4.97		ug/L	5.00		99.4	80-129			
Surrogate: Toluene-d8	4.81		ug/L	5.00		96.1	80-120			
Surrogate: 4-Bromofluorobenzene	4.76		ug/L	5.00		95.3	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	5.06		ug/L	5.00		101	80-120			
LCS (BJE0359-BS1)		Prepared: 14-May-2021 Analyzed: 14-May-2021 09:50								
Gasoline Range Organics (Tol-Nap)	1010	100	ug/L	1000		101	72-128			
Surrogate: Toluene-d8	5.00		ug/L	5.00		100	80-120			
Surrogate: 4-Bromofluorobenzene	5.05		ug/L	5.00		101	80-120			
LCS (BJE0359-BS2)		Prepared: 14-May-2021 Analyzed: 14-May-2021 10:11								
Vinyl Chloride	8.90	0.08	0.20	ug/L	10.0	89.0	66-133			
1,1-Dichloroethene	9.23	0.08	0.20	ug/L	10.0	92.3	69-135			
trans-1,2-Dichloroethene	9.45	0.07	0.20	ug/L	10.0	94.5	78-128			
cis-1,2-Dichloroethene	9.56	0.08	0.20	ug/L	10.0	95.6	80-121			
Benzene	9.68	0.05	0.20	ug/L	10.0	96.8	80-120			
Trichloroethene	9.48	0.07	0.20	ug/L	10.0	94.8	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 15:53

Analysis by: Analytical Resources, LLC

Volatile Organic Compounds - Quality Control

Batch BJE0359 - 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 (BJE0359-BS2)						Prepared: 14-May-2021	Analyzed: 14-May-2021 10:11				
Toluene	9.41	0.05	0.20	ug/L	10.0		94.1	80-120			
Tetrachloroethene	9.56	0.09	0.20	ug/L	10.0		95.6	80-120			
Ethylbenzene	9.67	0.05	0.20	ug/L	10.0		96.7	80-120			
m,p-Xylene	20.0	0.14	0.40	ug/L	20.0		100	80-121			
o-Xylene	10.3	0.08	0.20	ug/L	10.0		103	80-121			
Xylenes, total	30.3	0.22	0.60	ug/L	30.0		101	76-127			
Surrogate: 1,2-Dichloroethane-d4	4.73			ug/L	5.00		94.6	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	4.96			ug/L	5.00		99.2	80-120			
LCS Dup (BJE0359-BSD1)						Prepared: 14-May-2021	Analyzed: 14-May-2021 10:33				
Gasoline Range Organics (Tol-Nap)	1000		100	ug/L	1000		100	72-128	0.43	30	
Surrogate: Toluene-d8	5.09			ug/L	5.00		102	80-120			
Surrogate: 4-Bromofluorobenzene	5.02			ug/L	5.00		100	80-120			
LCS Dup (BJE0359-BSD2)						Prepared: 14-May-2021	Analyzed: 14-May-2021 10:55				
Vinyl Chloride	9.18	0.08	0.20	ug/L	10.0		91.8	66-133	3.06	30	
1,1-Dichloroethene	9.54	0.08	0.20	ug/L	10.0		95.4	69-135	3.30	30	
trans-1,2-Dichloroethene	9.84	0.07	0.20	ug/L	10.0		98.4	78-128	4.12	30	
cis-1,2-Dichloroethene	9.80	0.08	0.20	ug/L	10.0		98.0	80-121	2.52	30	
Benzene	10.0	0.05	0.20	ug/L	10.0		100	80-120	3.58	30	
Trichloroethene	9.73	0.07	0.20	ug/L	10.0		97.3	80-120	2.64	30	
Toluene	9.77	0.05	0.20	ug/L	10.0		97.7	80-120	3.80	30	
Tetrachloroethene	9.78	0.09	0.20	ug/L	10.0		97.8	80-120	2.27	30	
Ethylbenzene	10.1	0.05	0.20	ug/L	10.0		101	80-120	4.06	30	
m,p-Xylene	20.8	0.14	0.40	ug/L	20.0		104	80-121	4.08	30	
o-Xylene	10.6	0.08	0.20	ug/L	10.0		106	80-121	3.66	30	
Xylenes, total	31.5	0.22	0.60	ug/L	30.0		105	76-127	3.93	30	
Surrogate: 1,2-Dichloroethane-d4	4.69			ug/L	5.00		93.8	80-129			
Surrogate: Toluene-d8	4.97			ug/L	5.00		99.4	80-120			
Surrogate: 4-Bromofluorobenzene	4.94			ug/L	5.00		98.8	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.98			ug/L	5.00		99.6	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 15:53

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0412 - 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 (BJE0412-BLK1)						Prepared: 18-May-2021 Analyzed: 19-May-2021 10:18					
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
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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0412 - 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 (BJE0412-BLK1)						Prepared: 18-May-2021 Analyzed: 19-May-2021 10:18					
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	4.15			ug/L	7.50		55.4	30-160			
Surrogate: Phenol-d5	2.68			ug/L	7.50		35.8	30-160			
Surrogate: 2-Chlorophenol-d4	6.79			ug/L	7.50		90.5	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:
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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0412 - 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 (BJE0412-BLK1)					Prepared: 18-May-2021		Analyzed: 19-May-2021 10:18				
Surrogate: 1,2-Dichlorobenzene-d4	3.51			ug/L	5.00		70.2	30-160			
Surrogate: Nitrobenzene-d5	4.87			ug/L	5.00		97.4	30-160			
Surrogate: 2-Fluorobiphenyl	4.23			ug/L	5.00		84.6	30-160			
Surrogate: 2,4,6-Tribromophenol	10.8			ug/L	7.50		143	30-160			Q
Surrogate: p-Terphenyl-d14	4.91			ug/L	5.00		98.2	30-160			
LCS (BJE0412-BS1)					Prepared: 18-May-2021		Analyzed: 19-May-2021 10:55				
Phenol	1.9	0.01	0.2	ug/L	5.00		37.4	30-160			
bis(2-chloroethyl) ether	4.5	0.03	0.2	ug/L	5.00		89.9	30-160			
2-Chlorophenol	3.7	0.03	0.2	ug/L	5.00		74.4	30-160			
1,3-Dichlorobenzene	3.6	0.03	0.2	ug/L	5.00		72.2	30-160			
1,4-Dichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.3	30-160			
1,2-Dichlorobenzene	3.7	0.03	0.2	ug/L	5.00		73.2	30-160			
Benzyl Alcohol	3.1	0.02	0.2	ug/L	5.00		62.4	30-160			
2,2'-Oxybis(1-chloropropane)	3.7	0.03	0.2	ug/L	5.00		74.5	30-160			
2-Methylphenol	3.4	0.03	0.2	ug/L	5.00		67.9	30-160			
Hexachloroethane	3.4	0.04	0.2	ug/L	5.00		67.8	30-160			
N-Nitroso-di-n-Propylamine	5.0	0.04	0.2	ug/L	5.00		101	30-160			
4-Methylphenol	3.4	0.03	0.2	ug/L	5.00		67.5	30-160			
Nitrobenzene	4.7	0.03	0.2	ug/L	5.00		94.2	30-160			
Isophorone	4.6	0.03	0.2	ug/L	5.00		91.7	30-160			
2-Nitrophenol	4.0	0.04	1.0	ug/L	5.00		79.3	30-160			
2,4-Dimethylphenol	11.1	0.3	1.0	ug/L	13.0		85.4	30-160			
Bis(2-Chloroethoxy)methane	4.0	0.03	0.2	ug/L	5.00		80.1	30-160			
2,4-Dichlorophenol	13.8	0.1	1.0	ug/L	13.0		106	30-160			
1,2,4-Trichlorobenzene	3.5	0.03	0.2	ug/L	5.00		69.2	30-160			
Naphthalene	4.1	0.03	0.2	ug/L	5.00		81.3	30-160			
Benzoic acid	9.8	0.1	2.0	ug/L	23.0		42.5	30-160			
4-Chloroaniline	2.3	0.04	1.0	ug/L	13.0		17.9	30-160			*
Hexachlorobutadiene	2.9	0.04	0.2	ug/L	5.00		57.6	30-160			
4-Chloro-3-Methylphenol	14.0	0.1	1.0	ug/L	13.0		108	30-160			
2-Methylnaphthalene	4.0	0.03	0.2	ug/L	5.00		80.1	30-160			
Hexachlorocyclopentadiene	8.4	0.1	1.0	ug/L	13.0		64.3	30-160			
2,4,6-Trichlorophenol	13.6	0.2	1.0	ug/L	13.0		105	30-160			
2,4,5-Trichlorophenol	13.5	0.1	1.0	ug/L	13.0		104	30-160			


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Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0412 - 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 (BJE0412-BS1)					Prepared: 18-May-2021 Analyzed: 19-May-2021 10:55						
2-Chloronaphthalene	4.3	0.03	0.2	ug/L	5.00		85.5	30-160			
2-Nitroaniline	20.5	0.2	1.0	ug/L	13.0		157	30-160			Q
Acenaphthylene	4.1	0.02	0.2	ug/L	5.00		81.2	30-160			
Dimethylphthalate	4.4	0.04	0.2	ug/L	5.00		88.3	30-160			
2,6-Dinitrotoluene	15.1	0.2	1.0	ug/L	13.0		116	30-160			
Acenaphthene	4.4	0.03	0.2	ug/L	5.00		87.7	30-160			
3-Nitroaniline	13.7	0.2	1.0	ug/L	13.0		105	30-160			
2,4-Dinitrophenol	19.9	0.2	2.0	ug/L	23.0		86.3	30-160			
Dibenzofuran	4.5	0.02	0.2	ug/L	5.00		89.3	30-160			
4-Nitrophenol	6.7	0.06	1.0	ug/L	13.0		51.2	30-160			
2,4-Dinitrotoluene	15.9	0.1	1.0	ug/L	13.0		123	30-160			
Fluorene	3.7	0.02	0.2	ug/L	5.00		73.9	30-160			
4-Chlorophenylphenyl ether	3.4	0.02	0.2	ug/L	5.00		68.0	30-160			Q
Diethyl phthalate	4.4	0.06	0.2	ug/L	5.00		88.6	30-160			
4-Nitroaniline	12.5	0.2	1.0	ug/L	13.0		95.9	30-160			
4,6-Dinitro-2-methylphenol	24.0	0.4	2.0	ug/L	23.0		104	30-160			
N-Nitrosodiphenylamine	3.9	0.03	0.2	ug/L	5.00		78.6	30-160			
4-Bromophenyl phenyl ether	4.8	0.02	0.2	ug/L	5.00		96.6	30-160			
Hexachlorobenzene	4.9	0.04	0.2	ug/L	5.00		97.4	30-160			
Pentachlorophenol	15.3	0.1	1.0	ug/L	13.0		118	30-160			
Phenanthrene	4.4	0.02	0.2	ug/L	5.00		88.7	30-160			
Anthracene	4.3	0.03	0.2	ug/L	5.00		86.1	30-160			
Carbazole	3.8	0.04	0.2	ug/L	5.00		76.4	30-160			Q
Di-n-Butylphthalate	4.4	0.05	0.2	ug/L	5.00		88.1	30-160			
Fluoranthene	4.5	0.03	0.2	ug/L	5.00		89.3	30-160			
Pyrene	4.4	0.03	0.2	ug/L	5.00		88.7	30-160			
Butylbenzylphthalate	4.9	0.07	0.2	ug/L	5.00		97.6	30-160			
Benzo(a)anthracene	4.0	0.04	0.2	ug/L	5.00		79.9	30-160			
3,3'-Dichlorobenzidine	5.8	0.3	1.0	ug/L	8.00		72.8	30-160			
Chrysene	3.9	0.04	0.2	ug/L	5.00		77.3	30-160			
bis(2-Ethylhexyl)phthalate	4.3	0.2	0.2	ug/L	5.00		85.3	30-160			
Di-n-Octylphthalate	3.8	0.05	0.2	ug/L	5.00		76.1	30-160			
Benzo(a)fluoranthene, Total	8.3	0.08	0.4	ug/L	10.0		83.1	30-160			
Benzo(a)pyrene	3.9	0.05	0.2	ug/L	5.00		77.0	30-160			
Indeno(1,2,3-cd)pyrene	3.9	0.06	0.2	ug/L	5.00		78.1	30-160			



Analytical Report

Shannon & Wilson, Inc
400 N 34th St., Suite 100
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Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - Quality Control

Batch BJE0412 - 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 (BJE0412-BS1)						Prepared: 18-May-2021 Analyzed: 19-May-2021 10:55					
Dibenzo(a,h)anthracene	3.9	0.07	0.2	ug/L	5.00		77.1	30-160			
Benzo(g,h,i)perylene	3.8	0.04	0.2	ug/L	5.00		76.4	30-160			
1-Methylnaphthalene	4.2	0.03	0.2	ug/L	5.00		83.4	30-160			
Surrogate: 2-Fluorophenol	5.00			ug/L	7.50		66.7	30-160			
Surrogate: Phenol-d5	3.58			ug/L	7.50		47.8	30-160			
Surrogate: 2-Chlorophenol-d4	7.84			ug/L	7.50		105	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	4.11			ug/L	5.00		82.2	30-160			
Surrogate: Nitrobenzene-d5	5.83			ug/L	5.00		117	30-160			
Surrogate: 2-Fluorobiphenyl	5.18			ug/L	5.00		104	30-160			
Surrogate: 2,4,6-Tribromophenol	13.1			ug/L	7.50		175	30-160			*, Q
Surrogate: p-Terphenyl-d14	5.66			ug/L	5.00		113	30-160			
LCS Dup (BJE0412-BSD1)						Prepared: 18-May-2021 Analyzed: 19-May-2021 11:33					
Phenol	2.0	0.01	0.2	ug/L	5.00		39.1	30-160	4.59	30	
bis(2-chloroethyl) ether	4.6	0.03	0.2	ug/L	5.00		91.0	30-160	1.19	30	
2-Chlorophenol	3.9	0.03	0.2	ug/L	5.00		77.3	30-160	3.85	30	
1,3-Dichlorobenzene	3.6	0.03	0.2	ug/L	5.00		72.3	30-160	0.20	30	
1,4-Dichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.5	30-160	0.39	30	
1,2-Dichlorobenzene	3.7	0.03	0.2	ug/L	5.00		73.8	30-160	0.79	30	
Benzyl Alcohol	3.3	0.02	0.2	ug/L	5.00		65.0	30-160	4.12	30	
2,2'-Oxybis(1-chloropropane)	3.6	0.03	0.2	ug/L	5.00		72.7	30-160	2.34	30	
2-Methylphenol	3.5	0.03	0.2	ug/L	5.00		69.8	30-160	2.71	30	
Hexachloroethane	3.5	0.04	0.2	ug/L	5.00		70.7	30-160	4.24	30	
N-Nitroso-di-n-Propylamine	5.1	0.04	0.2	ug/L	5.00		101	30-160	0.33	30	
4-Methylphenol	3.6	0.03	0.2	ug/L	5.00		71.3	30-160	5.51	30	
Nitrobenzene	4.7	0.03	0.2	ug/L	5.00		94.3	30-160	0.06	30	
Isophorone	4.7	0.03	0.2	ug/L	5.00		93.3	30-160	1.72	30	
2-Nitrophenol	4.2	0.04	1.0	ug/L	5.00		83.7	30-160	5.50	30	
2,4-Dimethylphenol	11.0	0.3	1.0	ug/L	13.0		84.4	30-160	1.08	30	
Bis(2-Chloroethoxy)methane	4.0	0.03	0.2	ug/L	5.00		80.9	30-160	1.07	30	
2,4-Dichlorophenol	13.7	0.1	1.0	ug/L	13.0		105	30-160	0.58	30	
1,2,4-Trichlorobenzene	3.4	0.03	0.2	ug/L	5.00		68.2	30-160	1.40	30	
Naphthalene	4.0	0.03	0.2	ug/L	5.00		80.9	30-160	0.45	30	
Benzoic acid	11.4	0.1	2.0	ug/L	23.0		49.6	30-160	15.30	30	
4-Chloroaniline	3.0	0.04	1.0	ug/L	13.0		23.0	30-160	25.00	30	*



Analytical Report

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Semivolatile Organic Compounds - Quality Control

Batch BJE0412 - 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 (BJE0412-BSD1)					Prepared: 18-May-2021 Analyzed: 19-May-2021 11:33						
Hexachlorobutadiene	3.0	0.04	0.2	ug/L	5.00		59.7	30-160	3.64	30	
4-Chloro-3-Methylphenol	14.1	0.1	1.0	ug/L	13.0		108	30-160	0.64	30	
2-Methylnaphthalene	3.9	0.03	0.2	ug/L	5.00		78.6	30-160	1.86	30	
Hexachlorocyclopentadiene	8.4	0.1	1.0	ug/L	13.0		64.8	30-160	0.79	30	
2,4,6-Trichlorophenol	13.4	0.2	1.0	ug/L	13.0		103	30-160	1.71	30	
2,4,5-Trichlorophenol	13.5	0.1	1.0	ug/L	13.0		104	30-160	0.23	30	
2-Chloronaphthalene	4.3	0.03	0.2	ug/L	5.00		85.1	30-160	0.53	30	
2-Nitroaniline	21.2	0.2	1.0	ug/L	13.0		163	30-160	3.77	30	*, Q
Acenaphthylene	4.1	0.02	0.2	ug/L	5.00		82.6	30-160	1.69	30	
Dimethylphthalate	4.4	0.04	0.2	ug/L	5.00		88.9	30-160	0.60	30	
2,6-Dinitrotoluene	15.7	0.2	1.0	ug/L	13.0		121	30-160	3.88	30	
Acenaphthene	4.4	0.03	0.2	ug/L	5.00		88.0	30-160	0.38	30	
3-Nitroaniline	14.0	0.2	1.0	ug/L	13.0		108	30-160	2.21	30	
2,4-Dinitrophenol	21.0	0.2	2.0	ug/L	23.0		91.3	30-160	5.58	30	
Dibenzofuran	4.5	0.02	0.2	ug/L	5.00		89.4	30-160	0.18	30	
4-Nitrophenol	7.1	0.06	1.0	ug/L	13.0		54.9	30-160	6.92	30	
2,4-Dinitrotoluene	16.1	0.1	1.0	ug/L	13.0		124	30-160	1.20	30	
Fluorene	3.8	0.02	0.2	ug/L	5.00		75.6	30-160	2.28	30	
4-Chlorophenylphenyl ether	3.4	0.02	0.2	ug/L	5.00		67.5	30-160	0.72	30	Q
Diethyl phthalate	4.6	0.06	0.2	ug/L	5.00		92.6	30-160	4.35	30	
4-Nitroaniline	12.5	0.2	1.0	ug/L	13.0		96.1	30-160	0.13	30	
4,6-Dinitro-2-methylphenol	24.9	0.4	2.0	ug/L	23.0		108	30-160	3.64	30	
N-Nitrosodiphenylamine	4.0	0.03	0.2	ug/L	5.00		80.3	30-160	2.09	30	
4-Bromophenyl phenyl ether	4.8	0.02	0.2	ug/L	5.00		95.2	30-160	1.54	30	
Hexachlorobenzene	5.1	0.04	0.2	ug/L	5.00		101	30-160	3.75	30	
Pentachlorophenol	15.7	0.1	1.0	ug/L	13.0		121	30-160	2.46	30	
Phenanthrene	4.5	0.02	0.2	ug/L	5.00		90.9	30-160	2.42	30	
Anthracene	4.3	0.03	0.2	ug/L	5.00		86.1	30-160	0.02	30	
Carbazole	3.9	0.04	0.2	ug/L	5.00		77.1	30-160	0.98	30	Q
Di-n-Butylphthalate	4.5	0.05	0.2	ug/L	5.00		89.3	30-160	1.35	30	
Fluoranthene	4.5	0.03	0.2	ug/L	5.00		90.4	30-160	1.18	30	
Pyrene	4.4	0.03	0.2	ug/L	5.00		87.3	30-160	1.59	30	
Butylbenzylphthalate	4.9	0.07	0.2	ug/L	5.00		98.6	30-160	0.95	30	
Benzo(a)anthracene	4.1	0.04	0.2	ug/L	5.00		81.0	30-160	1.37	30	
3,3'-Dichlorobenzidine	5.5	0.3	1.0	ug/L	8.00		68.8	30-160	5.58	30	


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QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
LCS Dup (BJE0412-BSD1)					Prepared: 18-May-2021 Analyzed: 19-May-2021 11:33						
Chrysene	4.1	0.04	0.2	ug/L	5.00		81.6	30-160	5.36	30	
bis(2-Ethylhexyl)phthalate	4.5	0.2	0.2	ug/L	5.00		89.3	30-160	4.64	30	
Di-n-Octylphthalate	3.9	0.05	0.2	ug/L	5.00		78.4	30-160	2.92	30	
Benzo(a)fluoranthene, Total	8.7	0.08	0.4	ug/L	10.0		86.6	30-160	4.14	30	
Benzo(a)pyrene	4.0	0.05	0.2	ug/L	5.00		80.3	30-160	4.21	30	
Indeno(1,2,3-cd)pyrene	4.1	0.06	0.2	ug/L	5.00		81.0	30-160	3.66	30	
Dibenzo(a,h)anthracene	4.0	0.07	0.2	ug/L	5.00		79.8	30-160	3.42	30	
Benzo(g,h,i)perylene	4.0	0.04	0.2	ug/L	5.00		79.7	30-160	4.13	30	
1-Methylnaphthalene	4.1	0.03	0.2	ug/L	5.00		82.1	30-160	1.66	30	
Surrogate: 2-Fluorophenol	4.81			ug/L	7.50		64.1	30-160			
Surrogate: Phenol-d5	3.59			ug/L	7.50		47.9	30-160			
Surrogate: 2-Chlorophenol-d4	7.41			ug/L	7.50		98.8	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.86			ug/L	5.00		77.1	30-160			
Surrogate: Nitrobenzene-d5	5.56			ug/L	5.00		111	30-160			
Surrogate: 2-Fluorobiphenyl	4.83			ug/L	5.00		96.6	30-160			
Surrogate: 2,4,6-Tribromophenol	12.3			ug/L	7.50		164	30-160			* , Q
Surrogate: p-Terphenyl-d14	5.43			ug/L	5.00		109	30-160			


 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 15:53

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0432 - 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 (BJE0432-BLK1)						Prepared: 19-May-2021 Analyzed: 04-Jun-2021 14:24					
Naphthalene	0.001	0.001	0.010	ug/L							J
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	0.001	0.001	0.010	ug/L							J
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>	0.185			ug/L	0.300		61.5	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.248			ug/L	0.300		82.6	29-120			Q
<i>Surrogate: Fluoranthene-d10</i>	0.219			ug/L	0.300		73.0	57-120			
LCS (BJE0432-BS1)						Prepared: 19-May-2021 Analyzed: 04-Jun-2021 14:57					
Naphthalene	0.211	0.001	0.010	ug/L	0.300		70.4	37-120			
2-Methylnaphthalene	0.203	0.001	0.010	ug/L	0.300		67.7	37-120			
1-Methylnaphthalene	0.203	0.0009	0.010	ug/L	0.300		67.6	29-120			
Acenaphthylene	0.205	0.002	0.010	ug/L	0.300		68.5	41-120			
Acenaphthene	0.214	0.003	0.010	ug/L	0.300		71.5	41-120			
Dibenzofuran	0.211	0.002	0.010	ug/L	0.300		70.3	38-120			
Fluorene	0.221	0.002	0.010	ug/L	0.300		73.6	43-120			


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

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0432 - 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 (BJE0432-BS1)						Prepared: 19-May-2021 Analyzed: 04-Jun-2021 14:57					
Phenanthrene	0.222	0.001	0.010	ug/L	0.300		74.0	41-120			
Anthracene	0.211	0.001	0.010	ug/L	0.300		70.3	40-120			
Carbazole	0.225	0.001	0.010	ug/L	0.300		75.1	30-160			
Fluoranthene	0.230	0.002	0.010	ug/L	0.300		76.7	45-120			
Pyrene	0.228	0.001	0.010	ug/L	0.300		75.9	41-120			
Benzo(a)anthracene	0.232	0.0008	0.010	ug/L	0.300		77.2	42-120			
Chrysene	0.219	0.0009	0.010	ug/L	0.300		73.1	44-120			
Benzo(b)fluoranthene	0.249	0.0005	0.010	ug/L	0.300		83.1	44-120			
Benzo(k)fluoranthene	0.231	0.003	0.010	ug/L	0.300		77.1	50-120			
Benzo(j)fluoranthene	0.199	0.002	0.010	ug/L	0.300		66.4	39-160			
Benzofluoranthenes, Total	0.680	0.004	0.010	ug/L	0.900		75.5	46-120			
Benzo(a)pyrene	0.219	0.002	0.010	ug/L	0.300		72.9	35-120			
Perylene	0.202	0.006	0.010	ug/L	0.300		67.4	30-160			
Indeno(1,2,3-cd)pyrene	0.265	0.001	0.010	ug/L	0.300		88.3	37-120			
Dibenzo(a,h)anthracene	0.263	0.001	0.010	ug/L	0.300		87.7	34-120			
Benzo(g,h,i)perylene	0.300	0.001	0.010	ug/L	0.300		100	38-120			Q
Surrogate: 2-Methylnaphthalene-d10	0.203			ug/L	0.300		67.6	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.265			ug/L	0.300		88.3	29-120			Q
Surrogate: Fluoranthene-d10	0.226			ug/L	0.300		75.3	57-120			


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

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJE0409 - 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 (BJE0409-BLK1)		Prepared: 19-May-2021 Analyzed: 25-May-2021 14:35							
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>	0.166		mg/L	0.225	73.7	50-150			
LCS (BJE0409-BS1)		Prepared: 19-May-2021 Analyzed: 25-May-2021 14:56							
Diesel Range Organics (C12-C24)	2.24	0.100	mg/L	3.00	74.6	56-120			
<i>Surrogate: o-Terphenyl</i>	0.167		mg/L	0.225	74.0	50-150			
LCS Dup (BJE0409-BSD1)		Prepared: 19-May-2021 Analyzed: 25-May-2021 15:17							
Diesel Range Organics (C12-C24)	2.30	0.100	mg/L	3.00	76.8	56-120	2.86	30	
<i>Surrogate: o-Terphenyl</i>	0.170		mg/L	0.225	75.7	50-150			


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

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Aroclor PCB - Quality Control
Batch BJE0411 - 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 (BJE0411-BLK1)					Prepared: 18-May-2021 Analyzed: 20-May-2021 19:30						
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	0.0110			ug/L	0.0200	54.8		29-120			
Surrogate: Tetrachlorometaxylene	0.00928			ug/L	0.0200	46.4		32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0111			ug/L	0.0200	55.6		29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00775			ug/L	0.0200	38.8		32-120			
LCS (BJE0411-BS1)					Prepared: 18-May-2021 Analyzed: 20-May-2021 19:51						
Aroclor 1016 [2C]	0.033	0.002	0.010	ug/L	0.0500	65.8		54-120			
Aroclor 1260 [2C]	0.032	0.003	0.010	ug/L	0.0500	64.5		51-128			
Surrogate: Decachlorobiphenyl	0.0117			ug/L	0.0200	58.4		29-120			
Surrogate: Tetrachlorometaxylene	0.0105			ug/L	0.0200	52.3		32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0120			ug/L	0.0200	59.9		29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00837			ug/L	0.0200	41.8		32-120			
LCS Dup (BJE0411-BSD1)					Prepared: 18-May-2021 Analyzed: 20-May-2021 20:13						
Aroclor 1016 [2C]	0.031	0.002	0.010	ug/L	0.0500	61.9		54-120	6.19	30	
Aroclor 1260 [2C]	0.031	0.003	0.010	ug/L	0.0500	61.8		51-128	4.32	30	
Surrogate: Decachlorobiphenyl	0.0107			ug/L	0.0200	53.3		29-120			
Surrogate: Tetrachlorometaxylene	0.00955			ug/L	0.0200	47.8		32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0109			ug/L	0.0200	54.6		29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00810			ug/L	0.0200	40.5		32-120			


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

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJE0554 - 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 (BJE0554-BLK1)					Prepared: 24-May-2021 Analyzed: 25-May-2021 13:33						
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJE0554-BS1)					Prepared: 24-May-2021 Analyzed: 25-May-2021 13:36						
Mercury	0.00168	0.000013	0.000100	mg/L	0.00200		83.8	80-120			
Duplicate (BJE0554-DUP1)					Source: 21E0174-01 Prepared: 24-May-2021 Analyzed: 25-May-2021 13:40						
Mercury	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJE0554-MS1)					Source: 21E0174-01 Prepared: 24-May-2021 Analyzed: 25-May-2021 13:43						
Mercury	0.000897	0.000013	0.000100	mg/L	0.00100	ND	89.7	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJE0554-MSD1)					Source: 21E0174-01 Prepared: 24-May-2021 Analyzed: 25-May-2021 13:45						
Mercury	0.000835	0.000013	0.000100	mg/L	0.00100	ND	83.5	75-125	7.26	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 15:53

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJE0678 - 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 (BJE0678-DUP2)		Source: 21E0174-01		Prepared: 27-May-2021		Analyzed: 28-May-2021 18:43						
Manganese	55	516	0.710	2.50	ug/L		525			1.65	20	D

Matrix Spike (BJE0678-MS2)		Source: 21E0174-01		Prepared: 27-May-2021		Analyzed: 28-May-2021 18:48						
Manganese	55	544	0.710	2.50	ug/L	25.0	525	77.3	75-125			HC, D

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

Matrix Spike Dup (BJE0678-MSD2)		Source: 21E0174-01		Prepared: 27-May-2021		Analyzed: 28-May-2021 18:53						
Manganese	55	540	0.710	2.50	ug/L	25.0	525	60.0	75-125	0.80	20	HC, D

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

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 (BJE0678-BLK1)				Prepared: 27-May-2021		Analyzed: 27-May-2021 17:32						
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


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

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJE0678 - 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 (BJE0678-BS1)		Prepared: 27-May-2021 Analyzed: 27-May-2021 17:37										
Barium	135	25.3	0.114	0.500	ug/L	25.0		101	80-120			
Barium	137	25.4	0.0765	0.500	ug/L	25.0		102	80-120			
Chromium	52	26.0	0.260	0.500	ug/L	25.0		104	80-120			
Chromium	53	25.1	0.239	0.500	ug/L	25.0		100	80-120			
Cobalt	59	25.9	0.0173	0.200	ug/L	25.0		104	80-120			
Lead	208	26.4	0.0513	0.100	ug/L	25.0		106	80-120			
Manganese	55	26.0	0.142	0.500	ug/L	25.0		104	80-120			
Silver	107	26.7	0.0220	0.200	ug/L	25.0		107	80-120			
Vanadium	51a	24.9	0.0556	0.200	ug/L	25.0		99.5	80-120			
Vanadium	51b	24.6	0.0521	0.200	ug/L	25.0		98.5	80-120			
Arsenic	75a	24.4	0.0373	0.200	ug/L	25.0		97.6	80-120			
Cadmium	111	24.7	0.0300	0.100	ug/L	25.0		98.7	80-120			
Cadmium	114	24.4	0.0400	0.100	ug/L	25.0		97.8	80-120			
Copper	63	26.7	0.173	0.500	ug/L	25.0		107	80-120			
Copper	65	26.5	0.350	0.500	ug/L	25.0		106	80-120			
Nickel	60	25.9	0.0792	0.500	ug/L	25.0		104	80-120			
Nickel	62	25.3	0.220	0.500	ug/L	25.0		101	80-120			
Selenium	78	76.7	0.179	0.500	ug/L	80.0		95.9	80-120			
Zinc	66	79.3	2.92	6.00	ug/L	80.0		99.1	80-120			
Zinc	67	74.7	0.940	6.00	ug/L	80.0		93.4	80-120			
Duplicate (BJE0678-DUP1)		Source: 21E0174-01 Prepared: 27-May-2021 Analyzed: 27-May-2021 19:08										
Barium	135	3.67	0.114	0.500	ug/L		3.53			4.08	20	
Chromium	52	ND	0.260	0.500	ug/L		ND					U
Cobalt	59	0.521	0.0173	0.200	ug/L		0.517			0.77	20	
Lead	208	ND	0.0513	0.100	ug/L		ND					U
Silver	107	ND	0.0220	0.200	ug/L		ND					U
Vanadium	51a	2.76	0.0556	0.200	ug/L		2.77			0.29	20	
Arsenic	75a	2.73	0.0373	0.200	ug/L		2.77			1.64	20	
Cadmium	111	0.0310	0.0300	0.100	ug/L		ND					J
Copper	63	0.447	0.173	0.500	ug/L		0.536			18.10	20	J
Nickel	60	1.07	0.0792	0.500	ug/L		0.985			8.55	20	
Selenium	78	ND	0.179	0.500	ug/L		ND					U
Zinc	66	ND	2.92	6.00	ug/L		ND					U
Matrix Spike (BJE0678-MS1)		Source: 21E0174-01 Prepared: 27-May-2021 Analyzed: 27-May-2021 19:13										


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

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJE0678 - 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 (BJE0678-MS1)		Source: 21E0174-01			Prepared: 27-May-2021		Analyzed: 27-May-2021 19:13					
Barium	135	29.5	0.114	0.500	ug/L	25.0	3.53	104	75-125			
Chromium	52	23.0	0.260	0.500	ug/L	25.0	ND	91.9	75-125			
Cobalt	59	26.4	0.0173	0.200	ug/L	25.0	0.517	104	75-125			
Lead	208	25.8	0.0513	0.100	ug/L	25.0	ND	103	75-125			
Silver	107	25.9	0.0220	0.200	ug/L	25.0	ND	104	75-125			
Vanadium	51a	24.7	0.0556	0.200	ug/L	25.0	2.77	87.7	75-125			
Arsenic	75a	26.6	0.0373	0.200	ug/L	25.0	2.77	95.2	75-125			
Cadmium	111	24.6	0.0300	0.100	ug/L	25.0	ND	98.3	75-125			
Copper	63	26.5	0.173	0.500	ug/L	25.0	0.536	104	75-125			
Nickel	60	26.9	0.0792	0.500	ug/L	25.0	0.985	103	75-125			
Selenium	78	74.4	0.179	0.500	ug/L	80.0	ND	93.0	75-125			
Zinc	66	78.5	2.92	6.00	ug/L	80.0	ND	98.1	75-125			

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

Matrix Spike Dup (BJE0678-MSD1)		Source: 21E0174-01			Prepared: 27-May-2021		Analyzed: 27-May-2021 19:20					
Barium	135	29.2	0.114	0.500	ug/L	25.0	3.53	103	75-125	1.29	20	
Chromium	52	22.8	0.260	0.500	ug/L	25.0	ND	91.4	75-125	0.57	20	
Cobalt	59	26.7	0.0173	0.200	ug/L	25.0	0.517	105	75-125	1.28	20	
Lead	208	25.5	0.0513	0.100	ug/L	25.0	ND	102	75-125	0.93	20	
Silver	107	25.5	0.0220	0.200	ug/L	25.0	ND	102	75-125	1.53	20	
Vanadium	51a	24.6	0.0556	0.200	ug/L	25.0	2.77	87.2	75-125	0.55	20	
Arsenic	75a	26.5	0.0373	0.200	ug/L	25.0	2.77	94.9	75-125	0.35	20	
Cadmium	111	24.7	0.0300	0.100	ug/L	25.0	ND	98.7	75-125	0.43	20	
Copper	63	26.0	0.173	0.500	ug/L	25.0	0.536	102	75-125	1.74	20	
Nickel	60	26.2	0.0792	0.500	ug/L	25.0	0.985	101	75-125	2.58	20	
Selenium	78	74.9	0.179	0.500	ug/L	80.0	ND	93.6	75-125	0.60	20	
Zinc	66	76.9	2.92	6.00	ug/L	80.0	ND	96.2	75-125	2.01	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:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJE0723 - 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 (BJE0723-BLK1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 15:55						
Iron	54	ND	18.2	36.0	ug/L							U
Iron	57	ND	6.63	36.0	ug/L							U
LCS (BJE0723-BS1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 16:00						
Iron	54	5030	18.2	36.0	ug/L	5000		101	80-120			
Iron	57	4990	6.63	36.0	ug/L	5000		99.7	80-120			
Duplicate (BJE0723-DUP1)						Source: 21E0174-01RE1 Prepared: 28-May-2021 Analyzed: 28-May-2021 19:54						
Iron	54	16700	91.0	180	ug/L		17400			4.28	20	D
Matrix Spike (BJE0723-MS1)						Source: 21E0174-01RE1 Prepared: 28-May-2021 Analyzed: 28-May-2021 19:58						
Iron	54	22600	91.0	180	ug/L	5000	17400	102	75-125			D

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

Matrix Spike Dup (BJE0723-MSD1)						Source: 21E0174-01RE1 Prepared: 28-May-2021 Analyzed: 28-May-2021 20:02						
Iron	54	21500	91.0	180	ug/L	5000	17400	80.0	75-125	5.07	20	D

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


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 Seattle WA, 98103-8636

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

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0648 - 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
LCS (BJE0648-BS1)					Prepared: 26-May-2021		Analyzed: 26-May-2021 13:01				
Mercury, Dissolved	0.00202	0.000013	0.000100	mg/L	0.00200		101	80-120			
Duplicate (BJE0648-DUP1)					Source: 21E0174-02		Prepared: 26-May-2021		Analyzed: 26-May-2021 13:05		
Mercury, Dissolved	ND	0.000013	0.000100	mg/L		ND					U
Matrix Spike (BJE0648-MS1)					Source: 21E0174-02		Prepared: 26-May-2021		Analyzed: 26-May-2021 13:12		
Mercury, Dissolved	0.00103	0.000013	0.000100	mg/L	0.00100	ND	103	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJE0648-MSD1)					Source: 21E0174-02		Prepared: 26-May-2021		Analyzed: 26-May-2021 13:15		
Mercury, Dissolved	0.00104	0.000013	0.000100	mg/L	0.00100	ND	104	75-125	0.71	20	
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											


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

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0680 - 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 (BJE0680-DUP2)		Source: 21E0174-09		Prepared: 27-May-2021		Analyzed: 28-May-2021 17:33						
Manganese, Dissolved	55	364	0.710	2.50	ug/L		384			5.20	20	D
Matrix Spike (BJE0680-MS2)		Source: 21E0174-09		Prepared: 27-May-2021		Analyzed: 28-May-2021 17:38						
Manganese, Dissolved	55	397	0.710	2.50	ug/L	25.0	384	52.8	75-125			HC, D

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

Matrix Spike Dup (BJE0680-MSD2)		Source: 21E0174-09		Prepared: 27-May-2021		Analyzed: 28-May-2021 17:43						
Manganese, Dissolved	55	406	0.710	2.50	ug/L	25.0	384	88.9	75-125	2.25	20	HC, D

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

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 (BJE0680-BLK1)				Prepared: 27-May-2021		Analyzed: 27-May-2021 17:20						
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	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


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

Reported:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0680 - 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 (BJE0680-BS1)		Prepared: 27-May-2021 Analyzed: 27-May-2021 17:25										
Barium, Dissolved	135	25.0	0.114	0.500	ug/L	25.0		100	80-120			
Barium, Dissolved	137	25.3	0.0765	0.500	ug/L	25.0		101	80-120			
Chromium, Dissolved	52	25.6	0.260	0.500	ug/L	25.0		102	80-120			
Cobalt, Dissolved	59	25.3	0.0173	0.200	ug/L	25.0		101	80-120			
Chromium, Dissolved	53	24.9	0.239	0.500	ug/L	25.0		99.4	80-120			
Lead, Dissolved	208	26.0	0.0513	0.100	ug/L	25.0		104	80-120			
Manganese, Dissolved	55	25.1	0.142	0.500	ug/L	25.0		100	80-120			
Silver, Dissolved	107	26.5	0.0220	0.200	ug/L	25.0		106	80-120			
Vanadium, Dissolved	51a	24.1	0.0556	0.200	ug/L	25.0		96.3	80-120			
Vanadium, Dissolved	51b	23.9	0.0521	0.200	ug/L	25.0		95.6	80-120			
Arsenic, Dissolved	75a	24.4	0.0373	0.200	ug/L	25.0		97.6	80-120			
Cadmium, Dissolved	111	25.1	0.0300	0.100	ug/L	25.0		100	80-120			
Cadmium, Dissolved	114	25.4	0.0400	0.100	ug/L	25.0		101	80-120			
Copper, Dissolved	63	26.5	0.173	0.500	ug/L	25.0		106	80-120			
Copper, Dissolved	65	26.2	0.350	0.500	ug/L	25.0		105	80-120			
Nickel, Dissolved	60	25.5	0.0792	0.500	ug/L	25.0		102	80-120			
Nickel, Dissolved	62	25.5	0.220	0.500	ug/L	25.0		102	80-120			
Selenium, Dissolved	78	77.6	0.179	0.500	ug/L	80.0		96.9	80-120			
Zinc, Dissolved	66	81.1	2.92	5.00	ug/L	80.0		101	80-120			
Zinc, Dissolved	67	74.8	0.940	4.00	ug/L	80.0		93.4	80-120			
Duplicate (BJE0680-DUP1)		Source: 21E0174-09 Prepared: 27-May-2021 Analyzed: 27-May-2021 20:32										
Barium, Dissolved	135	0.402	0.114	0.500	ug/L		0.419			4.14	20	J
Chromium, Dissolved	52	0.441	0.260	0.500	ug/L		0.477			7.84	20	J
Cobalt, Dissolved	59	0.0900	0.0173	0.200	ug/L		0.100			10.50	20	J
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	0.662	0.0556	0.200	ug/L		0.714			7.56	20	
Arsenic, Dissolved	75a	10.0	0.0373	0.200	ug/L		10.2			2.35	20	
Cadmium, Dissolved	111	ND	0.0300	0.100	ug/L		ND					U
Copper, Dissolved	63	0.194	0.173	0.500	ug/L		0.193			0.52	20	J
Nickel, Dissolved	60	0.201	0.0792	0.500	ug/L		0.240			17.70	20	J
Selenium, Dissolved	78	ND	0.179	0.500	ug/L		0.201					U
Zinc, Dissolved	66	ND	2.92	5.00	ug/L		ND					U
Matrix Spike (BJE0680-MS1)		Source: 21E0174-09 Prepared: 27-May-2021 Analyzed: 27-May-2021 20:38										


 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 15:53

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0680 - 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 (BJE0680-MS1)		Source: 21E0174-09			Prepared: 27-May-2021		Analyzed: 27-May-2021 20:38					
Barium, Dissolved	135	27.0	0.114	0.500	ug/L	25.0	0.419	106	75-125			
Chromium, Dissolved	52	23.6	0.260	0.500	ug/L	25.0	0.477	92.4	75-125			
Cobalt, Dissolved	59	24.2	0.0173	0.200	ug/L	25.0	0.100	96.4	75-125			
Lead, Dissolved	208	22.9	0.0513	0.100	ug/L	25.0	ND	91.8	75-125			
Silver, Dissolved	107	23.7	0.0220	0.200	ug/L	25.0	ND	94.8	75-125			
Vanadium, Dissolved	51a	23.4	0.0556	0.200	ug/L	25.0	0.714	90.8	75-125			
Arsenic, Dissolved	75a	34.8	0.0373	0.200	ug/L	25.0	10.2	98.3	75-125			
Cadmium, Dissolved	111	24.5	0.0300	0.100	ug/L	25.0	ND	98.0	75-125			
Copper, Dissolved	63	24.4	0.173	0.500	ug/L	25.0	0.193	96.9	75-125			
Nickel, Dissolved	60	24.4	0.0792	0.500	ug/L	25.0	0.240	96.6	75-125			
Selenium, Dissolved	78	76.3	0.179	0.500	ug/L	80.0	0.201	95.2	75-125			
Zinc, Dissolved	66	73.2	2.92	5.00	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 (BJE0680-MSD1)		Source: 21E0174-09			Prepared: 27-May-2021		Analyzed: 27-May-2021 20:46					
Barium, Dissolved	135	26.8	0.114	0.500	ug/L	25.0	0.419	106	75-125	0.49	20	
Chromium, Dissolved	52	23.7	0.260	0.500	ug/L	25.0	0.477	92.8	75-125	0.43	20	
Cobalt, Dissolved	59	24.8	0.0173	0.200	ug/L	25.0	0.100	98.8	75-125	2.45	20	
Lead, Dissolved	208	22.7	0.0513	0.100	ug/L	25.0	ND	90.9	75-125	0.95	20	
Silver, Dissolved	107	23.9	0.0220	0.200	ug/L	25.0	ND	95.7	75-125	0.89	20	
Vanadium, Dissolved	51a	23.4	0.0556	0.200	ug/L	25.0	0.714	90.8	75-125	0.01	20	
Arsenic, Dissolved	75a	35.1	0.0373	0.200	ug/L	25.0	10.2	99.4	75-125	0.78	20	
Cadmium, Dissolved	111	23.6	0.0300	0.100	ug/L	25.0	ND	94.4	75-125	3.73	20	
Copper, Dissolved	63	24.8	0.173	0.500	ug/L	25.0	0.193	98.4	75-125	1.59	20	
Nickel, Dissolved	60	24.2	0.0792	0.500	ug/L	25.0	0.240	95.7	75-125	0.94	20	
Selenium, Dissolved	78	79.3	0.179	0.500	ug/L	80.0	0.201	98.9	75-125	3.88	20	
Zinc, Dissolved	66	74.2	2.92	5.00	ug/L	80.0	ND	92.7	75-125	1.29	20	

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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:
 13-Dec-2021 15:53

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0722 - 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 (BJE0722-BLK1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 20:25						
Iron, Dissolved	54	ND	18.2	36.0	ug/L							U
Iron, Dissolved	57	7.85	6.63	20.0	ug/L							J
LCS (BJE0722-BS1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 21:30						
Iron, Dissolved	54	5210	18.2	36.0	ug/L	5000		104	80-120			
Iron, Dissolved	57	5250	6.63	20.0	ug/L	5000		105	80-120			
Duplicate (BJE0722-DUP1)						Source: 21E0174-07RE1 Prepared: 28-May-2021 Analyzed: 28-May-2021 21:37						
Iron, Dissolved	54	3960	36.4	72.0	ug/L		3790			4.37	20	D
Matrix Spike (BJE0722-MS1)						Source: 21E0174-07RE1 Prepared: 28-May-2021 Analyzed: 28-May-2021 20:52						
Iron, Dissolved	54	8880	36.4	72.0	ug/L	5000	3790	102	75-125			D

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

Matrix Spike Dup (BJE0722-MSD1)						Source: 21E0174-07RE1 Prepared: 28-May-2021 Analyzed: 28-May-2021 20:57						
Iron, Dissolved	54	8780	36.4	72.0	ug/L	5000	3790	99.9	75-125	1.08	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:
13-Dec-2021 15:53

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


 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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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)
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.
NRS	This surrogate not reported due to chromatographic interference
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)
21E0190

Associated SDG ID(s)
N/A

**Susan
Dunnihoo**

Digitally signed by Susan
Dunnihoo
Date: 2021.12.13
16:31:43 -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: <u>21E0190</u>		Turn-around Requested: <u>Standard</u>		Page: <u>1</u> of <u>1</u>			
ARI Client Company: <u>Shannon & Wilson</u>		Phone: <u>206-695-6811</u>		Date: <u>5/14/21</u>	Ice Present? <u>Y</u>		
Client Contact: <u>Shoshana Howard</u>		No. of Coolers: <u>3</u>		Cooler Temps: <u>3.3, 1.7, 3.6</u>			
Client Project Name: <u>EDW</u>		 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					
Client Project #: <u>21-1-12596</u>							
Samplers: <u>RBP+etc</u>		Analysis Requested					
Sample ID	Date	Time	Matrix	No. Containers	TPH-G TPH-D* BTEX HVCs MTBE PAHs Full List SAGs Limited SAGs PCBs Metals (Total + Dissolved) Hex Chrome (Total) Attenuation Nitrate, Nitrite Chloride, Sulfate Sulfide, Ferrous Iron Diss. Manganese Methane, Ethane Ethene	Notes/Comments	
MW-55-20211405	5/14/21	1006	W	9	X X X	① X	① = Arsenic, barium, chromium, manganese, nickel, cadmium, cobalt, copper, iron, lead, mercury, selenium, silver, vanadium, zinc
TB-2-20211405		1015		5	X X X		① = Arsenic, barium, chromium, cobalt, copper, iron, lead, mercury, selenium, silver, vanadium, zinc
MW-46-20211405		1100		13	X X X X	X ② X	② = Arsenic, chromium, manganese, nickel, cobalt, copper, lead, mercury, selenium, silver, zinc
MW-23-20211405		1150		16	X X	X ③ X X	③ = Arsenic, chromium, manganese, nickel, cobalt, copper, lead, mercury, selenium, silver, zinc
MW-14-20211405		1300		18	X X X X X	X ④ X	④ = Arsenic, chromium, manganese, nickel, cobalt, copper, lead, mercury, selenium, silver, zinc
MW-15-20211405		1405		16	X X X	⑤ X	⑤ = Arsenic, chromium, manganese, nickel, cobalt, copper, lead, mercury, selenium, silver, zinc
MW-34-20211405		1449		4	X X		③ = Arsenic, chromium, manganese
Comments/Special Instructions *Lab to filter for dissolved metals *refer to project methods and analyze lists		Relinquished by: <u>[Signature]</u>		Received by: <u>[Signature]</u>			
		Printed Name: <u>Christian Canfield</u>		Printed Name: <u>Kenny Dong</u>			
		Company: <u>Shannon & Wilson, Inc.</u>		Company: <u>ARI</u>			
		Date & Time: <u>5/14/2021 1522</u>		Date & Time: <u>5/14/21 1522</u>			
		Relinquished by:		Received by:			
		Printed Name:		Printed Name:			
		Company:		Company:			
		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
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

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ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
MW-55-20211405	21E0190-01	Water	14-May-2021 10:06	14-May-2021 15:22
MW-55-20211405	21E0190-02	Water	14-May-2021 10:06	14-May-2021 15:22
TB-2-20211405	21E0190-03	Water	14-May-2021 10:06	14-May-2021 15:22
MW-46-20211405	21E0190-04	Water	14-May-2021 11:00	14-May-2021 15:22
MW-46-20211405	21E0190-05	Water	14-May-2021 11:00	14-May-2021 15:22
MW-23-20211405	21E0190-06	Water	14-May-2021 11:50	14-May-2021 15:22
MW-23-20211405	21E0190-07	Water	14-May-2021 11:50	14-May-2021 15:22
MW-14-20211405	21E0190-08	Water	14-May-2021 13:00	14-May-2021 15:22
MW-14-20211405	21E0190-09	Water	14-May-2021 13:00	14-May-2021 15:22
MW-15-20211405	21E0190-10	Water	14-May-2021 14:05	14-May-2021 15:22
MW-15-20211405	21E0190-11	Water	14-May-2021 14:05	14-May-2021 15:22
MW-34-20211405	21E0190-12	Water	14-May-2021 14:49	14-May-2021 15:22


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 Project Manager: Meg Strong

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Work Order Case Narrative

Client: Shannon & Wilson, Inc

Project: Lower Duwamish

Work Order: 21E0190

Sample receipt

Samples as listed on the preceding page were received 14-May-2021 15:22 under ARI work order 21E0190. For details regarding sample receipt, please refer to the Cooler Receipt Form.

There was some confusion in sample collection. Sulfide containers were provided but the project was built with Sulfite analysis. Sulfide was cancelled and Sulfite could not be performed as no preserved bottle was provided. Without preservation analyte dissipates rapidly.

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 except Hexabromobiphenyl which was out of control high in the continuing calibration verification (CCV5/CCV6) on column zb-35. All samples were non-detects.

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.

The analyst noted that that the Gasoline Range Organics (GRO) detection was nearly all Naphthalene.

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

Sample specific QC was performed in association with sample 21E0190-04 in batch BJE0456. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory 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.

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 2,4,6- Tribromophenol which was out of control high in samples 21E0190-04 and 21E0190-08 as well as the blank spike and blank spike duplicate. All 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 except Benzo(g,h,i)perylene and surrogate


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Dibenzo(a,h)anthracene 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 Dibenzo(a,h)anthracene which was out of control high in the ICV and 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

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 21E0190-01 in Total Metals batch BJE0723 and in association with sample 21E0190-11 in Dissolved Metals batch BJE0735. 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.

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 21E0190-01 in Hexavalent Chromium batch BJE0380 and 21E0190-06 in Anions batch BJE0379 and Ferrous Iron batch BJE0377. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.

Total and Dissolved Hg - 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: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

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 21E0190-01 in Total Mercury batch BJE0681 and in association with sample 21E0190-02 in Dissolved Mercury batch BJE0682. 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.

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.

REVISION to correct VOC list, RSK-175 list.



WORK ORDER

21E0190

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH
21E0190-01 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2 Pass
21E0190-01 B	Glass NM, Amber, 500 mL	
21E0190-01 C	Glass NM, Amber, 500 mL	
21E0190-01 D	Glass NM, Amber, 500 mL	
21E0190-01 E	Glass NM, Amber, 500 mL	
21E0190-01 F	VOA Vial, Clear, 40 mL, HCL	
21E0190-01 G	VOA Vial, Clear, 40 mL, HCL	
21E0190-01 H	VOA Vial, Clear, 40 mL, HCL	
21E0190-02 A	Large OJ, 1000 mL	7.2 Fail
21E0190-03 A	VOA Vial, Clear, 40 mL, HCL	
21E0190-03 B	VOA Vial, Clear, 40 mL, HCL	
21E0190-03 C	VOA Vial, Clear, 40 mL, HCL	
21E0190-03 D	VOA Vial, Clear, 40 mL, HCL	
21E0190-03 E	VOA Vial, Clear, 40 mL, HCL	
21E0190-04 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2 Pass
21E0190-04 B	Glass NM, Amber, 500 mL	
21E0190-04 C	Glass NM, Amber, 500 mL	
21E0190-04 D	Glass NM, Amber, 500 mL	
21E0190-04 E	Glass NM, Amber, 500 mL	
21E0190-04 F	Glass NM, Amber, 500 mL	
21E0190-04 G	Glass NM, Amber, 500 mL	
21E0190-04 H	VOA Vial, Clear, 40 mL, HCL	
21E0190-04 I	VOA Vial, Clear, 40 mL, HCL	
21E0190-04 J	VOA Vial, Clear, 40 mL, HCL	
21E0190-04 K	VOA Vial, Clear, 40 mL, HCL	
21E0190-04 L	VOA Vial, Clear, 40 mL, HCL	
21E0190-05 A	Large OJ, 1000 mL	7.2 Fail
21E0190-06 A	Small OJ, 500 mL	
21E0190-06 B	HDPE NM, 500 mL	KD
21E0190-06 C	Small OJ, 500 mL, ZnOAC	7.9 Fail
21E0190-06 D	Glass NM, Amber, 500 mL, HCL	
21E0190-06 E	HDPE NM, 1000 mL, 1:1 HNO3	7.2 Pass
21E0190-06 F	Glass NM, Amber, 1000 mL	
21E0190-06 G	Glass NM, Amber, 1000 mL	
21E0190-06 H	Glass NM, Amber, 500 mL	



WORK ORDER

21E0190

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0190-06 I	Glass NM, Amber, 500 mL		
21E0190-06 J	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 K	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 L	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 M	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 N	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 O	VOA Vial, Clear, 40 mL, HCL		
21E0190-07 A	Large OJ, 1000 mL	72	Fail
21E0190-08 A	Small OJ, 500 mL		
21E0190-08 B	HDPE NM, 500 mL	KD	
21E0190-08 C	Small OJ, 500 mL, ZnOAC	< 29	Fail
21E0190-08 D	Glass NM, Amber, 500 mL, HCL		
21E0190-08 E	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0190-08 F	Glass NM, Amber, 500 mL		
21E0190-08 G	Glass NM, Amber, 500 mL		
21E0190-08 H	Glass NM, Amber, 500 mL		
21E0190-08 I	Glass NM, Amber, 500 mL		
21E0190-08 J	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0190-08 K	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0190-08 L	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 M	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 N	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 O	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 P	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 Q	VOA Vial, Clear, 40 mL, HCL		
21E0190-09 A	Large OJ, 1000 mL	72	Fail
21E0190-10 A	Small OJ, 500 mL		
21E0190-10 B	HDPE NM, 500 mL	KD	
21E0190-10 C	Small OJ, 500 mL, ZnOAC	< 29	Fail
21E0190-10 D	Glass NM, Amber, 500 mL, HCL		
21E0190-10 E	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0190-10 F	Glass NM, Amber, 500 mL		
21E0190-10 G	Glass NM, Amber, 500 mL		
21E0190-10 H	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0190-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0190-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0190-10 K	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21E0190

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0190-10 L	VOA Vial, Clear, 40 mL, HCL
21E0190-10 M	VOA Vial, Clear, 40 mL, HCL
21E0190-10 N	VOA Vial, Clear, 40 mL, HCL
21E0190-10 O	VOA Vial, Clear, 40 mL, HCL
21E0190-11 A	Large OJ, 1000 mL
21E0190-12 A	Glass NM, Amber, 500 mL
21E0190-12 B	Glass NM, Amber, 500 mL
21E0190-12 C	VOA Vial, Clear, 40 mL, HCL
21E0190-12 D	VOA Vial, Clear, 40 mL, HCL

72

Far 1

KD

Preservation Confirmed By

5/14/21

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: 21E0190

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 1500 3.3 1.7 3.6

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

Temp Gun ID#: DOO 5206

Cooler Accepted by: KD Date: 5/14/21 Time: 1500

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) KD

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: 05/05/2001

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

Samples Logged by: JDW Date: 05/14/2001 Time: 1603 Labels checked by: JDW

**** 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.

By: JDW Date: 05/14/2001



WORK ORDER

21E0190

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0190-01 A	HDPE NM, 1000 mL, 1:1 HNO3	~2	Pass
21E0190-01 B	Glass NM, Amber, 500 mL		
21E0190-01 C	Glass NM, Amber, 500 mL		
21E0190-01 D	Glass NM, Amber, 500 mL		
21E0190-01 E	Glass NM, Amber, 500 mL		
21E0190-01 F	VOA Vial, Clear, 40 mL, HCL		
21E0190-01 G	VOA Vial, Clear, 40 mL, HCL		
21E0190-01 H	VOA Vial, Clear, 40 mL, HCL		
21E0190-02 A	Large OJ, 1000 mL		
21E0190-03 A	VOA Vial, Clear, 40 mL, HCL		
21E0190-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0190-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0190-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0190-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0190-04 A	HDPE NM, 1000 mL, 1:1 HNO3	~2	Pass
21E0190-04 B	Glass NM, Amber, 500 mL		
21E0190-04 C	Glass NM, Amber, 500 mL		
21E0190-04 D	Glass NM, Amber, 500 mL		
21E0190-04 E	Glass NM, Amber, 500 mL		
21E0190-04 F	Glass NM, Amber, 500 mL		
21E0190-04 G	Glass NM, Amber, 500 mL		
21E0190-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0190-04 I	VOA Vial, Clear, 40 mL, HCL		
21E0190-04 J	VOA Vial, Clear, 40 mL, HCL		
21E0190-04 K	VOA Vial, Clear, 40 mL, HCL		
21E0190-04 L	VOA Vial, Clear, 40 mL, HCL		
21E0190-05 A	Large OJ, 1000 mL		
21E0190-06 A	Small OJ, 500 mL		
21E0190-06 B	HDPE NM, 500 mL	KD	
21E0190-06 C	Small OJ, 500 mL, ZnOAC	< 9	Fail
21E0190-06 D	Glass NM, Amber, 500 mL, HCl		
21E0190-06 E	HDPE NM, 1000 mL, 1:1 HNO3	~2	Pass
21E0190-06 F	Glass NM, Amber, 1000 mL		
21E0190-06 G	Glass NM, Amber, 1000 mL		
21E0190-06 H	Glass NM, Amber, 500 mL		



WORK ORDER

21E0190

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0190-06 I	Glass NM, Amber, 500 mL		
21E0190-06 J	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 K	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 L	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 M	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 N	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 O	VOA Vial, Clear, 40 mL, HCL		
21E0190-07 A	Large OJ, 1000 mL		
21E0190-08 A	Small OJ, 500 mL		
21E0190-08 B	HDPE NM, 500 mL	KD	
21E0190-08 C	Small OJ, 500 mL, ZnOAC	< 29 Fail	①
21E0190-08 D	Glass NM, Amber, 500 mL, HCL		②
21E0190-08 E	HDPE NM, 1000 mL, 1:1 HNO3	< 2 Pass	
21E0190-08 F	Glass NM, Amber, 500 mL		
21E0190-08 G	Glass NM, Amber, 500 mL		
21E0190-08 H	Glass NM, Amber, 500 mL		
21E0190-08 I	Glass NM, Amber, 500 mL		
21E0190-08 J	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0190-08 K	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0190-08 L	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 M	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 N	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 O	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 P	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 Q	VOA Vial, Clear, 40 mL, HCL		
21E0190-09 A	Large OJ, 1000 mL		
21E0190-10 A	Small OJ, 500 mL		
21E0190-10 B	HDPE NM, 500 mL	KD	
21E0190-10 C	Small OJ, 500 mL, ZnOAC	< 29 Fail	①
21E0190-10 D	Glass NM, Amber, 500 mL, HCL		②
21E0190-10 E	HDPE NM, 1000 mL, 1:1 HNO3	< 2 Pass	
21E0190-10 F	Glass NM, Amber, 500 mL		
21E0190-10 G	Glass NM, Amber, 500 mL		
21E0190-10 H	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0190-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0190-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0190-10 K	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21E0190

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0190-10 L	VOA Vial, Clear, 40 mL, HCL
21E0190-10 M	VOA Vial, Clear, 40 mL, HCL
21E0190-10 N	VOA Vial, Clear, 40 mL, HCL
21E0190-10 O	VOA Vial, Clear, 40 mL, HCL
21E0190-11 A	Large OJ, 1000 mL
21E0190-12 A	Glass NM, Amber, 500 mL
21E0190-12 B	Glass NM, Amber, 500 mL
21E0190-12 C	VOA Vial, Clear, 40 mL, HCL
21E0190-12 D	VOA Vial, Clear, 40 mL, HCL

KD

Preservation Confirmed By

5/14/21

Date

① added 2 mL NaOH 6N
pH > 12

uw 5-14-21

② pH < 2 passing
significant headspace
5/14/21 15:17:15
BF



WORK ORDER

21E0190

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0190-01 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0190-01 B	Glass NM, Amber, 500 mL		
21E0190-01 C	Glass NM, Amber, 500 mL		
21E0190-01 D	Glass NM, Amber, 500 mL		
21E0190-01 E	Glass NM, Amber, 500 mL		
21E0190-01 F	VOA Vial, Clear, 40 mL, HCL		
21E0190-01 G	VOA Vial, Clear, 40 mL, HCL		
21E0190-01 H	VOA Vial, Clear, 40 mL, HCL		
21E0190-02 A	Large OJ, 1000 mL	7.2	Fail ①
21E0190-03 A	VOA Vial, Clear, 40 mL, HCL		
21E0190-03 B	VOA Vial, Clear, 40 mL, HCL		
21E0190-03 C	VOA Vial, Clear, 40 mL, HCL		
21E0190-03 D	VOA Vial, Clear, 40 mL, HCL		
21E0190-03 E	VOA Vial, Clear, 40 mL, HCL		
21E0190-04 A	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0190-04 B	Glass NM, Amber, 500 mL		
21E0190-04 C	Glass NM, Amber, 500 mL		
21E0190-04 D	Glass NM, Amber, 500 mL		
21E0190-04 E	Glass NM, Amber, 500 mL		
21E0190-04 F	Glass NM, Amber, 500 mL		
21E0190-04 G	Glass NM, Amber, 500 mL		
21E0190-04 H	VOA Vial, Clear, 40 mL, HCL		
21E0190-04 I	VOA Vial, Clear, 40 mL, HCL		
21E0190-04 J	VOA Vial, Clear, 40 mL, HCL		
21E0190-04 K	VOA Vial, Clear, 40 mL, HCL		
21E0190-04 L	VOA Vial, Clear, 40 mL, HCL		
21E0190-05 A	Large OJ, 1000 mL	7.2	Fail ①
21E0190-06 A	Small OJ, 500 mL		
21E0190-06 B	HDPE NM, 500 mL	KD	
21E0190-06 C	Small OJ, 500 mL, ZnOAC	7.2	Fail
21E0190-06 D	Glass NM, Amber, 500 mL, HCL		
21E0190-06 E	HDPE NM, 1000 mL, 1:1 HNO3	7.2	Pass
21E0190-06 F	Glass NM, Amber, 1000 mL		
21E0190-06 G	Glass NM, Amber, 1000 mL		
21E0190-06 H	Glass NM, Amber, 500 mL		



WORK ORDER

21E0190

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0190-06 I	Glass NM, Amber, 500 mL		
21E0190-06 J	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 K	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 L	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 M	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 N	VOA Vial, Clear, 40 mL, HCL		
21E0190-06 O	VOA Vial, Clear, 40 mL, HCL		
21E0190-07 A	Large OJ, 1000 mL	72	Fail (1)
21E0190-08 A	Small OJ, 500 mL		
21E0190-08 B	HDPE NM, 500 mL	KD	
21E0190-08 C	Small OJ, 500 mL, ZnOAC	< 29	Fail
21E0190-08 D	Glass NM, Amber, 500 mL, HCL		
21E0190-08 E	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0190-08 F	Glass NM, Amber, 500 mL		
21E0190-08 G	Glass NM, Amber, 500 mL		
21E0190-08 H	Glass NM, Amber, 500 mL		
21E0190-08 I	Glass NM, Amber, 500 mL		
21E0190-08 J	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0190-08 K	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0190-08 L	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 M	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 N	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 O	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 P	VOA Vial, Clear, 40 mL, HCL		
21E0190-08 Q	VOA Vial, Clear, 40 mL, HCL		
21E0190-09 A	Large OJ, 1000 mL	72	Fail (1)
21E0190-10 A	Small OJ, 500 mL		
21E0190-10 B	HDPE NM, 500 mL	KD	
21E0190-10 C	Small OJ, 500 mL, ZnOAC	< 29	Fail
21E0190-10 D	Glass NM, Amber, 500 mL, HCL		
21E0190-10 E	HDPE NM, 1000 mL, 1:1 HNO3	< 2	Pass
21E0190-10 F	Glass NM, Amber, 500 mL		
21E0190-10 G	Glass NM, Amber, 500 mL		
21E0190-10 H	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0190-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0190-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0190-10 K	VOA Vial, Clear, 40 mL, HCL		



WORK ORDER

21E0190

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0190-10 L	VOA Vial, Clear, 40 mL, HCL
21E0190-10 M	VOA Vial, Clear, 40 mL, HCL
21E0190-10 N	VOA Vial, Clear, 40 mL, HCL
21E0190-10 O	VOA Vial, Clear, 40 mL, HCL
21E0190-11 A	Large OJ, 1000 mL
21E0190-12 A	Glass NM, Amber, 500 mL
21E0190-12 B	Glass NM, Amber, 500 mL
21E0190-12 C	VOA Vial, Clear, 40 mL, HCL
21E0190-12 D	VOA Vial, Clear, 40 mL, HCL

77

For: 1 (1)

KD

Preservation Confirmed By

5/14/21

Date

① Filtered at 0.45 um and
preserved to pH 2.0 with 0.75ml
conc. HNO₃ (12314) mL 5/17/21


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-55-20211405
21E0190-01 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/14/2021 10:06

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 11:45

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0190-01 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 %	110	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	98.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	92.7	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	102	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-55-20211405
21E0190-01 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/14/2021 10:06

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 18:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0190-01 C 01

Preparation Batch: BJE0409

Sample Size: 500 mL

Prepared: 05/19/2021

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>67.8</i>	<i>%</i>	


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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-55-20211405
21E0190-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/14/2021 10:06

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:27

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0190-01 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Barium	7440-39-3	1	0.114	0.500	4.15	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	0.219	ug/L	
Lead	7439-92-1	1	0.0513	0.100	0.0780	ug/L	J
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/02/2021 00:34

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0190-01 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chromium	7440-47-3	2	0.520	1.00	ND	ug/L	U
Iron	7439-89-6	2	13.3	72.0	7500	ug/L	D
Manganese	7439-96-5	2	0.284	1.00	230	ug/L	D
Vanadium	7440-62-2	2	0.111	0.400	4.35	ug/L	D


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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-55-20211405
21E0190-01 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/14/2021 10:06

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:27

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0190-01 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	1.62	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	1.04	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	0.468	ug/L	J
Selenium	7782-49-2	1	0.179	0.500	0.287	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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-55-20211405

21E0190-01 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/14/2021 10:06

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 11:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0190-01 A

Preparation Batch: BJE0681

Sample Size: 20 mL

Prepared: 05/27/2021

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: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-55-20211405
21E0190-01 (Water)
Wet Chemistry

Method: SM 3500-Cr B-09

Sampled: 05/14/2021 10:06

Instrument: UV1800-1 Analyst: RMS

Analyzed: 05/14/2021 18:40

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0190-01 B 01

Preparation Batch: BJE0380

Sample Size: 40 mL

Prepared: 05/14/2021

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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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-55-20211405
21E0190-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/14/2021 10:06

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:05

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0190-02 A 02

Preparation Batch: BJE0735

Sample Size: 25 mL

Filtration Batch: BJE0406

Prepared: 05/28/2021

Final Volume: 25 mL

Filtration Date: 05/17/2021 13:20

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium, Dissolved	7440-39-3	1	0.114	0.500	1.06	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	0.141	ug/L	J
Iron, Dissolved	7439-89-6	1	18.2	36.0	188	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	197	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	0.140	ug/L	J


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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-55-20211405
21E0190-02 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/14/2021 10:06

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:05

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0190-02 A 02

Preparation Batch: BJE0735

Sample Size: 25 mL

Filtration Batch: BJE0406

Prepared: 05/28/2021

Final Volume: 25 mL

Filtration Date: 05/17/2021 13:20

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.272	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	0.234	ug/L	J
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.271	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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-55-20211405

21E0190-02 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/14/2021 10:06

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 13:04

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0190-02 A 01

Preparation Batch: BJE0682

Sample Size: 20 mL

Filtration Batch: BJE0406

Prepared: 05/27/2021

Final Volume: 20 mL

Filtration Date: 05/17/2021 13:20

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000034	mg/L	J


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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

TB-2-20211405
21E0190-03 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/14/2021 10:06

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 10:16

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0190-03 A

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 %	104	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.4	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	93.7	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	102	%	



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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

TB-2-20211405
21E0190-03 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/14/2021 10:06

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 10:16

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0190-03 A

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 %	96.4	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	93.7	%	


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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-46-20211405
21E0190-04 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/14/2021 11:00

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 12:08

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0190-04 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	ND	ug/L	U
Benzene	71-43-2	1	0.05	0.20	0.06	ug/L	J
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	0.05	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	0.05	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	0.09	ug/L	J
Xylenes, total	1330-20-7	1	0.22	0.60	0.22	ug/L	J
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	110	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	95.3	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	92.2	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	105	%	


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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-46-20211405
21E0190-04 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/14/2021 11:00

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 12:08

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0190-04 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	132	ug/L	
HC ID: GRO						
Surrogate: Toluene-d8			80-120 %	95.3	%	
Surrogate: 4-Bromofluorobenzene			80-120 %	92.2	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-46-20211405
21E0190-04 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/14/2021 11:00

Instrument: NT10 Analyst: VTS

Analyzed: 05/19/2021 13:26

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0190-04 G 01

Preparation Batch: BJE0412

Sample Size: 1000 mL

Prepared: 05/18/2021

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	0.8	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	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

63.5 %

Surrogate: Phenol-d5

30-160 %

43.1 %

Surrogate: 2-Chlorophenol-d4

30-160 %

105 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

86.2 %

Surrogate: Nitrobenzene-d5

30-160 %

119 %

Surrogate: 2-Fluorobiphenyl

30-160 %

111 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

196 %

*, Q

Surrogate: p-Terphenyl-d14

30-160 %

109 %



Analytical Report

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

Project: Lower Duwamish
Project Number: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-46-20211405

21E0190-04 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/14/2021 11:00

Instrument: NT11 Analyst: VTS

Analyzed: 06/04/2021 17:08

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0190-04 E 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0190-04 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	4.09	ug/L	E
2-Methylnaphthalene	91-57-6	1	0.001	0.010	1.61	ug/L	E
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	1.47	ug/L	E
Acenaphthylene	208-96-8	1	0.002	0.010	0.076	ug/L	
Acenaphthene	83-32-9	1	0.003	0.010	2.96	ug/L	E
Dibenzofuran	132-64-9	1	0.002	0.010	0.593	ug/L	
Fluorene	86-73-7	1	0.002	0.010	1.54	ug/L	E
Phenanthrene	85-01-8	1	0.001	0.010	1.41	ug/L	E
Anthracene	120-12-7	1	0.001	0.010	0.104	ug/L	
Carbazole	86-74-8	1	0.001	0.010	0.753	ug/L	
Fluoranthene	206-44-0	1	0.002	0.010	0.069	ug/L	
Pyrene	129-00-0	1	0.001	0.010	0.027	ug/L	
Benzo(a)anthracene	56-55-3	1	0.0008	0.010	0.001	ug/L	J
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	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 %	70.3	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	83.0	%	Q
Surrogate: Fluoranthene-d10				57-120 %	74.4	%	


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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-46-20211405
21E0190-04 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/14/2021 11:00

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 18:27

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0190-04 C 01

Preparation Batch: BJE0409

Sample Size: 500 mL

Prepared: 05/19/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	0.300	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	86.9	%	


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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
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MW-46-20211405
21E0190-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/14/2021 11:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:13

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0190-04 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Lead	7439-92-1	1	0.0513	0.100	0.0830	ug/L	J
Silver	7440-22-4	1	0.0220	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/02/2021 00:14

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0190-04 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chromium	7440-47-3	10	2.60	5.00	ND	ug/L	U
Manganese	7439-96-5	10	1.42	5.00	1120	ug/L	D


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Reported:
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MW-46-20211405
21E0190-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/14/2021 11:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:13

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0190-04 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	19.9	ug/L	
Copper	7440-50-8	1	0.173	0.500	0.257	ug/L	J
Nickel	7440-02-0	1	0.0792	0.500	0.378	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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
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MW-46-20211405

21E0190-04 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/14/2021 11:00

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:13

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0190-04 A

Preparation Batch: BJE0681

Sample Size: 20 mL

Prepared: 05/27/2021

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
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Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-46-20211405

21E0190-04 (Water)

Wet Chemistry

Method: SM 3500-Cr B-09

Sampled: 05/14/2021 11:00

Instrument: UV1800-1 Analyst: RMS

Analyzed: 05/14/2021 18:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0190-04 B 01

Preparation Batch: BJE0380

Sample Size: 40 mL

Prepared: 05/14/2021

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



Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-46-20211405 21E0190-04RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/14/2021 11:00

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 18:01

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0190-04RE1 E 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0190-04RE1 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	100	0.131	1.00	17.6	ug/L	D
2-Methylnaphthalene	91-57-6	100	0.102	1.00	2.24	ug/L	D
1-Methylnaphthalene	90-12-0	100	0.091	1.00	1.93	ug/L	D
Acenaphthylene	208-96-8	100	0.185	1.00	ND	ug/L	U
Acenaphthene	83-32-9	100	0.289	1.00	6.29	ug/L	D
Dibenzofuran	132-64-9	100	0.152	1.00	0.730	ug/L	J, D
Fluorene	86-73-7	100	0.152	1.00	2.02	ug/L	D
Phenanthrene	85-01-8	100	0.130	1.00	2.56	ug/L	D
Anthracene	120-12-7	100	0.116	1.00	0.365	ug/L	J, D
Carbazole	86-74-8	100	0.121	1.00	0.889	ug/L	J, D
Fluoranthene	206-44-0	100	0.171	1.00	ND	ug/L	U
Pyrene	129-00-0	100	0.118	1.00	ND	ug/L	U
Benzo(a)anthracene	56-55-3	100	0.075	1.00	ND	ug/L	U
Chrysene	218-01-9	100	0.090	1.00	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	100	0.046	1.00	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	100	0.321	1.00	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	100	0.187	1.00	ND	ug/L	U
Benzofluoranthenes, Total		100	0.356	1.00	ND	ug/L	U
Benzo(a)pyrene	50-32-8	100	0.248	1.00	ND	ug/L	U
Perylene	1985-5-0	100	0.586	1.00	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	100	0.101	1.00	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	100	0.134	1.00	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	100	0.142	1.00	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %		DI	D1
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %		DI	D1
Surrogate: Fluoranthene-d10				57-120 %		DI	D1


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 Project: Lower Duwamish
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 Project Manager: Meg Strong

Reported:
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MW-46-20211405
21E0190-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/14/2021 11:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:09

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0190-05 A 02
	Preparation Batch: BJE0735	Filtration Batch: BJE0406
	Prepared: 05/28/2021	Filtration Date: 05/17/2021 13:20
	Sample Size: 25 mL	
	Final Volume: 25 mL	

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

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/02/2021 00:19

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0190-05 A 02
	Preparation Batch: BJE0735	Filtration Batch: BJE0406
	Prepared: 05/28/2021	Filtration Date: 05/17/2021 13:20
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chromium, Dissolved	7440-47-3	10	2.60	5.00	ND	ug/L	U
Manganese, Dissolved	7439-96-5	10	1.42	5.00	959	ug/L	D


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 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
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MW-46-20211405
21E0190-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/14/2021 11:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:09

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0190-05 A 02

Preparation Batch: BJE0735

Sample Size: 25 mL

Filtration Batch: BJE0406

Prepared: 05/28/2021

Final Volume: 25 mL

Filtration Date: 05/17/2021 13:20

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	1.60	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	0.216	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



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Analytical Report

Shannon & Wilson, Inc
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Project: Lower Duwamish
Project Number: 21-1-1-12596
Project Manager: Meg Strong

Reported:
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MW-46-20211405

21E0190-05 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/14/2021 11:00

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 13:14

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0190-05 A 01

Preparation Batch: BJE0682

Sample Size: 20 mL

Filtration Batch: BJE0406

Prepared: 05/27/2021

Final Volume: 20 mL

Filtration Date: 05/17/2021 13:20

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000054	mg/L	J


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 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
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MW-23-20211405
21E0190-06 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/14/2021 11:50

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 12:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0190-06 N

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	0.86	ug/L	
Trichloroethene	79-01-6	1	0.07	0.20	0.26	ug/L	
Tetrachloroethene	127-18-4	1	0.09	0.20	0.62	ug/L	
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	108	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	95.5	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	91.3	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	105	%	


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Reported:
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MW-23-20211405
21E0190-06 (Water)
Dissolved Gases

Method: EPA RSK-175

Sampled: 05/14/2021 11:50

Instrument: FID6 Analyst: PB

Analyzed: 05/19/2021 09:05

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0190-06 O

Preparation Batch: BJE0454

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	507	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>96.3</i>	<i>%</i>	


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Reported:
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MW-23-20211405
21E0190-06 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/14/2021 11:50

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 18:49

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0190-06 H 01

Preparation Batch: BJE0409

Sample Size: 500 mL

Prepared: 05/19/2021

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>80.4</i>	<i>%</i>	



Analytical Report

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Project: Lower Duwamish
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Reported:
13-Dec-2021 16:21

MW-23-20211405

21E0190-06 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/14/2021 11:50

Instrument: ECD7 Analyst: JGR

Analyzed: 05/20/2021 21:39

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0411 Prepared: 05/18/2021	Sample Size: 1000 mL Final Volume: 0.5 mL	Extract ID: 21E0190-06 F 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0136 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0190-06 F 01
Sample Cleanup:	Cleanup Method: Sulfuric Acid Cleanup Batch: CJE0134 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0190-06 F 01
Sample Cleanup:	Cleanup Method: Sulfur Cleanup Batch: CJE0135 Cleaned: 19-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0190-06 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 %	58.4	%	
Surrogate: Tetrachlorometaxylene				32-120 %	53.6	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	60.6	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	42.3	%	


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 Project Manager: Meg Strong

Reported:
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MW-23-20211405
21E0190-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/14/2021 11:50

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/02/2021 00:24

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0190-06 E 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium	7440-47-3	10	2.60	5.00	ND	ug/L	U
Manganese	7439-96-5	10	1.42	5.00	1730	ug/L	D



Analytical Resources, LLC
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Analytical Report

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Project: Lower Duwamish
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Project Manager: Meg Strong

Reported:
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MW-23-20211405

21E0190-06 (Water)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/14/2021 11:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0190-06 E 01

Preparation Batch: BJE0723

Sample Size: 25 mL

Prepared: 05/28/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	25.7	ug/L	


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 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
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MW-23-20211405
21E0190-06 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/14/2021 11:50

Instrument: IC930 Analyst: CDE

Analyzed: 05/15/2021 09:51

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep - Volatiles

Extract ID: 21E0190-06 B

Preparation Batch: BJE0379

Sample Size: 10 mL

Prepared: 05/14/2021

Final Volume: 10 mL

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

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	0.100	7.95	mg/L	



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Analytical Report

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Project: Lower Duwamish
Project Number: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-23-20211405

21E0190-06 (Water)

Wet Chemistry

Method: SM 3500-Cr B-09

Sampled: 05/14/2021 11:50

Instrument: UV1800-1 Analyst: RMS

Analyzed: 05/14/2021 18:45

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0190-06 A 01

Preparation Batch: BJE0380

Sample Size: 40 mL

Prepared: 05/14/2021

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



Analytical Resources, LLC
Analytical Chemists and Consultants

Analytical Report

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400 N 34th St., Suite 100
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Project: Lower Duwamish
Project Number: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-23-20211405
21E0190-06RE1 (Water)

Wet Chemistry

Method: EPA 300.0

Sampled: 05/14/2021 11:50

Instrument: IC930 Analyst: CDE

Analyzed: 05/15/2021 11:31

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep - Volatiles

Extract ID: 21E0190-06RE1 B

Preparation Batch: BJE0379

Sample Size: 10 mL

Prepared: 05/14/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	12	1.20	1.20	53.7	mg/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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-23-20211405
21E0190-06RE2 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 05/14/2021 11:50

Instrument: UV1800-2 Analyst: BF

Analyzed: 05/14/2021 18:12

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0190-06RE2 D

Preparation Batch: BJE0377

Sample Size: 5 mL

Prepared: 05/14/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		50	2.00	2.00	47.2	mg/L	D


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-23-20211405
21E0190-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/14/2021 11:50

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/02/2021 00:29

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0190-07 A 02

Preparation Batch: BJE0735

Sample Size: 25 mL

Filtration Batch: BJE0406

Prepared: 05/28/2021

Final Volume: 25 mL

Filtration Date: 05/17/2021 13:20

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium, Dissolved	7440-47-3	10	2.60	5.00	ND	ug/L	U
Manganese, Dissolved	7439-96-5	10	1.42	5.00	1620	ug/L	D


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-23-20211405
21E0190-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/14/2021 11:50

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 03:22

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0190-07 A 02

Preparation Batch: BJE0735

Sample Size: 25 mL

Filtration Batch: BJE0406

Prepared: 05/28/2021

Final Volume: 25 mL

Filtration Date: 05/17/2021 13:20

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	5.69	ug/L	


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-14-20211405
21E0190-08 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/14/2021 13:00

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 12:53

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0190-08 N

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
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 %	111	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	97.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	88.9	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	102	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-14-20211405
21E0190-08 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/14/2021 13:00

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 12:53

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0190-08 N

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 %	97.2	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	87.5	%	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-14-20211405
21E0190-08 (Water)
Dissolved Gases

Method: EPA RSK-175

Sampled: 05/14/2021 13:00

Instrument: FID6 Analyst: PB

Analyzed: 05/19/2021 09:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0190-08 Q

Preparation Batch: BJE0454

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	1030	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>97.0</i>	<i>%</i>	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-14-20211405
21E0190-08 (Water)
Semivolatile Organic Compounds

Method: EPA 8270E

Sampled: 05/14/2021 13:00

Instrument: NT10 Analyst: VTS

Analyzed: 05/19/2021 14:04

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0190-08 H 01

Preparation Batch: BJE0412

Sample Size: 1000 mL

Prepared: 05/18/2021

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	0.2	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	ND	ug/L	U

Surrogate: 2-Fluorophenol

30-160 %

60.0 %

Surrogate: Phenol-d5

30-160 %

42.2 %

Surrogate: 2-Chlorophenol-d4

30-160 %

100 %

Surrogate: 1,2-Dichlorobenzene-d4

30-160 %

84.5 %

Surrogate: Nitrobenzene-d5

30-160 %

114 %

Surrogate: 2-Fluorobiphenyl

30-160 %

103 %

Surrogate: 2,4,6-Tribromophenol

30-160 %

179 %

*, Q

Surrogate: p-Terphenyl-d14

30-160 %

123 %



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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-14-20211405

21E0190-08 (Water)

Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/14/2021 13:00

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 19:52

Analysis by: Analytical Resources, LLC

Sample Preparation: Preparation Method: EPA 3510C SepF
Preparation Batch: BJE0409
Prepared: 05/19/2021

Sample Size: 500 mL
Final Volume: 1 mL

Extract ID: 21E0190-08 F 01

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>76.1</i>	<i>%</i>	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-14-20211405
21E0190-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/14/2021 13:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:22

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0190-08 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cobalt	7440-48-4	1	0.0173	0.200	0.492	ug/L	
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

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/01/2021 22:55

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0190-08 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chromium	7440-47-3	2	0.520	1.00	0.834	ug/L	J, D
Manganese	7439-96-5	2	0.284	1.00	162	ug/L	D


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-14-20211405
21E0190-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/14/2021 13:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 02:22

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0723 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

Extract ID: 21E0190-08 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Arsenic	7440-38-2	1	0.0373	0.200	4.71	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	0.886	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	1.15	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: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-14-20211405
21E0190-08 (Water)
Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/14/2021 13:00

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:16

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0190-08 E

Preparation Batch: BJE0681

Sample Size: 20 mL

Prepared: 05/27/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	0.000027	mg/L	J


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-14-20211405
21E0190-08 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/14/2021 13:00

Instrument: IC930 Analyst: CDE

Analyzed: 05/15/2021 10:51

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep - Volatiles

Extract ID: 21E0190-08 B

Preparation Batch: BJE0379

Sample Size: 10 mL

Prepared: 05/14/2021

Final Volume: 10 mL

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

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	0.100	3.63	mg/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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-14-20211405
21E0190-08RE1 (Water)

Wet Chemistry

Method: EPA 300.0

Sampled: 05/14/2021 13:00

Instrument: IC930 Analyst: CDE

Analyzed: 05/15/2021 13:10

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep - Volatiles

Extract ID: 21E0190-08RE1 B

Preparation Batch: BJE0379

Sample Size: 10 mL

Prepared: 05/14/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	3	0.300	0.300	12.5	mg/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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-14-20211405
21E0190-08RE2 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 05/14/2021 13:00

Instrument: UV1800-2 Analyst: BF

Analyzed: 05/14/2021 18:14

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0190-08RE2 D

Preparation Batch: BJE0377

Sample Size: 5 mL

Prepared: 05/14/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		10	0.400	0.400	12.0	mg/L	D


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-14-20211405
21E0190-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/14/2021 13:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 03:26

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0190-09 A 02
	Preparation Batch: BJE0735	Filtration Batch: BJE0406
	Sample Size: 25 mL	
	Prepared: 05/28/2021	Filtration Date: 05/17/2021 13:20
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.461	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/01/2021 23:00

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0190-09 A 02
	Preparation Batch: BJE0735	Filtration Batch: BJE0406
	Sample Size: 25 mL	
	Prepared: 05/28/2021	Filtration Date: 05/17/2021 13:20
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chromium, Dissolved	7440-47-3	2	0.520	1.00	0.740	ug/L	J, D
Manganese, Dissolved	7439-96-5	2	0.284	1.00	164	ug/L	D


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-14-20211405
21E0190-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/14/2021 13:00

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 03:26

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0190-09 A 02

Preparation Batch: BJE0735

Sample Size: 25 mL

Filtration Batch: BJE0406

Prepared: 05/28/2021

Final Volume: 25 mL

Filtration Date: 05/17/2021 13:20

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	3.61	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	0.402	ug/L	J
Nickel, Dissolved	7440-02-0	1	0.0792	0.500	1.05	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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-14-20211405

21E0190-09 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/14/2021 13:00

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 13:16

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0190-09 A 01

Preparation Batch: BJE0682

Sample Size: 20 mL

Filtration Batch: BJE0406

Prepared: 05/27/2021

Final Volume: 20 mL

Filtration Date: 05/17/2021 13:20

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000060	mg/L	J


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-15-20211405
21E0190-10 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/14/2021 14:05

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 13:15

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0190-10 K

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
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 %	96.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	89.4	%	
<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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-15-20211405

21E0190-10 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/14/2021 14:05

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 13:15

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0190-10 K

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 %	96.0	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	89.4	%	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-15-20211405
21E0190-10 (Water)
Dissolved Gases

Method: EPA RSK-175

Sampled: 05/14/2021 14:05

Instrument: FID6 Analyst: PB

Analyzed: 05/19/2021 09:31

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0190-10 H

Preparation Batch: BJE0454

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	586	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>96.1</i>	<i>%</i>	


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-15-20211405
21E0190-10 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/14/2021 14:05

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 20:13

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0190-10 F 01

Preparation Batch: BJE0409

Sample Size: 500 mL

Prepared: 05/19/2021

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>71.0</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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-15-20211405

21E0190-10 (Water)

Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/14/2021 14:05

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 01:24

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0190-10 E 02

Preparation Batch: BJF0053

Sample Size: 25 mL

Prepared: 06/02/2021

Final Volume: 25 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cobalt	7440-48-4	1	0.0173	0.200	1.13	ug/L	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-15-20211405
21E0190-10 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/14/2021 14:05

Instrument: IC930 Analyst: CDE

Analyzed: 05/15/2021 11:11

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep - Volatiles

Extract ID: 21E0190-10 B

Preparation Batch: BJE0379

Sample Size: 10 mL

Prepared: 05/14/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	0.100	2.60	mg/L	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrate-N	14797-55-8	1	0.100	0.100	1.37	mg/L	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Nitrite-N	14797-65-0	1	0.100	0.100	ND	mg/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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-15-20211405

21E0190-10 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 05/14/2021 14:05

Instrument: UV1800-2 Analyst: BF

Analyzed: 05/14/2021 17:32

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0190-10 D

Preparation Batch: BJE0377

Sample Size: 5 mL

Prepared: 05/14/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		1	0.040	0.040	0.055	mg/L	


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-15-20211405
21E0190-10RE1 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/14/2021 14:05

Instrument: IC930 Analyst: CDE

Analyzed: 05/15/2021 13:30

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep - Volatiles

Extract ID: 21E0190-10RE1 B

Preparation Batch: BJE0379

Sample Size: 10 mL

Prepared: 05/14/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	2	0.200	0.200	9.11	mg/L	D


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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-15-20211405
21E0190-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/14/2021 14:05

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 03:31

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0190-11 A 02

Preparation Batch: BJE0735

Sample Size: 25 mL

Filtration Batch: BJE0406

Prepared: 05/28/2021

Final Volume: 25 mL

Filtration Date: 05/17/2021 13:20

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.194	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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

MW-34-20211405

21E0190-12 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/14/2021 14:49

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 13:37

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0190-12 D

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 %	95.5	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	88.9	%	


 Shannon & Wilson, Inc
 400 N 34th St., Suite 100
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

MW-34-20211405
21E0190-12 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/14/2021 14:49

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 20:34

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0190-12 A 01

Preparation Batch: BJE0409

Sample Size: 500 mL

Prepared: 05/19/2021

Final Volume: 1 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Diesel Range Organics (C12-C24)	DRO	1	0.100	3.07	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	0.635	mg/L	
HC ID: MOTOR OIL						
Surrogate: o-Terphenyl			50-150 %	64.0	%	



Analytical Report

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Project: Lower Duwamish
Project Number: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

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
Methyl tert-butyl Ether	ND	0.14	0.50	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			


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

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					
Trichloroethene	10.0	0.07	0.20	ug/L	10.0		100	80-120			
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			
Methyl tert-butyl Ether	9.84	0.14	0.50	ug/L	10.0		98.4	71-132			
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.92			ug/L	5.00		98.5	80-129			
<i>Surrogate: Toluene-d8</i>	5.04			ug/L	5.00		101	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	5.17			ug/L	5.00		103	80-120			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	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	
<i>Surrogate: Toluene-d8</i>	5.10			ug/L	5.00		102	80-120			
<i>Surrogate: 4-Bromofluorobenzene</i>	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	
Methyl tert-butyl Ether	10.2	0.14	0.50	ug/L	10.0		102	71-132	3.44	30	
<i>Surrogate: 1,2-Dichloroethane-d4</i>	4.89			ug/L	5.00		97.7	80-129			
<i>Surrogate: Toluene-d8</i>	5.09			ug/L	5.00		102	80-120			


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

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 Dup (BJE0456-BSD2)					Prepared: 19-May-2021		Analyzed: 19-May-2021 09:10				
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			
Matrix Spike (BJE0456-MS2)					Source: 21E0190-04		Prepared: 19-May-2021		Analyzed: 19-May-2021 19:06		
Gasoline Range Organics (Tol-Nap)	1140		100	ug/L	1000	132	101	72-128			
Surrogate: Toluene-d8	4.94			ug/L	5.00	4.76	98.7	80-120			
Surrogate: 4-Bromofluorobenzene	4.72			ug/L	5.00	4.61	94.4	80-120			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJE0456-MSD2)					Source: 21E0190-04		Prepared: 19-May-2021		Analyzed: 19-May-2021 19:27		
Gasoline Range Organics (Tol-Nap)	1070		100	ug/L	1000	132	93.8	72-128	6.18	30	
Surrogate: Toluene-d8	4.98			ug/L	5.00	4.76	99.7	80-120			
Surrogate: 4-Bromofluorobenzene	4.81			ug/L	5.00	4.61	96.3	80-120			

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: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Dissolved Gases - Quality Control
Batch BJE0454 - 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 (BJE0454-BLK1)		Prepared: 19-May-2021 Analyzed: 19-May-2021 08:52								
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>	1950		ug/L	1800		108	72-122			
LCS (BJE0454-BS1)		Prepared: 19-May-2021 Analyzed: 19-May-2021 07:22								
Methane	675	0.65	ug/L	656		103	80-120			
Ethane	1370	1.23	ug/L	1230		111	80-120			
Ethene	1070	1.14	ug/L	1150		92.6	80-120			
<i>Surrogate: Propane</i>	2050		ug/L	1800		114	62-122			
LCS Dup (BJE0454-BS1)		Prepared: 19-May-2021 Analyzed: 19-May-2021 07:49								
Methane	659	0.65	ug/L	656		100	80-120	2.42	30	
Ethane	1300	1.23	ug/L	1230		105	80-120	5.32	30	
Ethene	1020	1.14	ug/L	1150		88.4	80-120	4.68	30	
<i>Surrogate: Propane</i>	2000		ug/L	1800		111	62-122			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0412 - 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 (BJE0412-BLK1)						Prepared: 18-May-2021 Analyzed: 19-May-2021 10:18					
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>	4.15			ug/L	7.50		55.4	30-160			
<i>Surrogate: Phenol-d5</i>	2.68			ug/L	7.50		35.8	30-160			
<i>Surrogate: 2-Chlorophenol-d4</i>	6.79			ug/L	7.50		90.5	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	3.51			ug/L	5.00		70.2	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	4.87			ug/L	5.00		97.4	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	4.23			ug/L	5.00		84.6	30-160			
<i>Surrogate: 2,4,6-Tribromophenol</i>	10.8			ug/L	7.50		143	30-160			Q
<i>Surrogate: p-Terphenyl-d14</i>	4.91			ug/L	5.00		98.2	30-160			
LCS (BJE0412-BS1)						Prepared: 18-May-2021 Analyzed: 19-May-2021 10:55					
1,4-Dichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.3	30-160			
1,2-Dichlorobenzene	3.7	0.03	0.2	ug/L	5.00		73.2	30-160			
2,4-Dimethylphenol	11.1	0.3	1.0	ug/L	13.0		85.4	30-160			
Benzoic acid	9.8	0.1	2.0	ug/L	23.0		42.5	30-160			
N-Nitrosodiphenylamine	3.9	0.03	0.2	ug/L	5.00		78.6	30-160			
Pentachlorophenol	15.3	0.1	1.0	ug/L	13.0		118	30-160			
Di-n-Butylphthalate	4.4	0.05	0.2	ug/L	5.00		88.1	30-160			
Butylbenzylphthalate	4.9	0.07	0.2	ug/L	5.00		97.6	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>	5.00			ug/L	7.50		66.7	30-160			
<i>Surrogate: Phenol-d5</i>	3.58			ug/L	7.50		47.8	30-160			
<i>Surrogate: 2-Chlorophenol-d4</i>	7.84			ug/L	7.50		105	30-160			
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.11			ug/L	5.00		82.2	30-160			
<i>Surrogate: Nitrobenzene-d5</i>	5.83			ug/L	5.00		117	30-160			
<i>Surrogate: 2-Fluorobiphenyl</i>	5.18			ug/L	5.00		104	30-160			


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - Quality Control
Batch BJE0412 - 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 (BJE0412-BS1)						Prepared: 18-May-2021	Analyzed: 19-May-2021 10:55				
Surrogate: 2,4,6-Tribromophenol	13.1			ug/L	7.50		175	30-160			*, Q
Surrogate: p-Terphenyl-d14	5.66			ug/L	5.00		113	30-160			
LCS Dup (BJE0412-BSD1)						Prepared: 18-May-2021	Analyzed: 19-May-2021 11:33				
1,4-Dichlorobenzene	3.3	0.03	0.2	ug/L	5.00		66.5	30-160	0.39	30	
1,2-Dichlorobenzene	3.7	0.03	0.2	ug/L	5.00		73.8	30-160	0.79	30	
2,4-Dimethylphenol	11.0	0.3	1.0	ug/L	13.0		84.4	30-160	1.08	30	
Benzoic acid	11.4	0.1	2.0	ug/L	23.0		49.6	30-160	15.30	30	
N-Nitrosodiphenylamine	4.0	0.03	0.2	ug/L	5.00		80.3	30-160	2.09	30	
Pentachlorophenol	15.7	0.1	1.0	ug/L	13.0		121	30-160	2.46	30	
Di-n-Butylphthalate	4.5	0.05	0.2	ug/L	5.00		89.3	30-160	1.35	30	
Butylbenzylphthalate	4.9	0.07	0.2	ug/L	5.00		98.6	30-160	0.95	30	
bis(2-Ethylhexyl)phthalate	4.5	0.2	0.2	ug/L	5.00		89.3	30-160	4.64	30	
Surrogate: 2-Fluorophenol	4.81			ug/L	7.50		64.1	30-160			
Surrogate: Phenol-d5	3.59			ug/L	7.50		47.9	30-160			
Surrogate: 2-Chlorophenol-d4	7.41			ug/L	7.50		98.8	30-160			
Surrogate: 1,2-Dichlorobenzene-d4	3.86			ug/L	5.00		77.1	30-160			
Surrogate: Nitrobenzene-d5	5.56			ug/L	5.00		111	30-160			
Surrogate: 2-Fluorobiphenyl	4.83			ug/L	5.00		96.6	30-160			
Surrogate: 2,4,6-Tribromophenol	12.3			ug/L	7.50		164	30-160			*, Q
Surrogate: p-Terphenyl-d14	5.43			ug/L	5.00		109	30-160			



Analytical Report

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

Project: Lower Duwamish
Project Number: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BJE0432 - 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 (BJE0432-BLK1)						Prepared: 19-May-2021 Analyzed: 04-Jun-2021 14:24					
Naphthalene	0.001	0.001	0.010	ug/L							J
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	0.001	0.001	0.010	ug/L							J
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	0.185			ug/L	0.300		61.5	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.248			ug/L	0.300		82.6	29-120			Q
Surrogate: Fluoranthene-d10	0.219			ug/L	0.300		73.0	57-120			
LCS (BJE0432-BS1)						Prepared: 19-May-2021 Analyzed: 04-Jun-2021 14:57					
Naphthalene	0.211	0.001	0.010	ug/L	0.300		70.4	37-120			
2-Methylnaphthalene	0.203	0.001	0.010	ug/L	0.300		67.7	37-120			
1-Methylnaphthalene	0.203	0.0009	0.010	ug/L	0.300		67.6	29-120			
Acenaphthylene	0.205	0.002	0.010	ug/L	0.300		68.5	41-120			
Acenaphthene	0.214	0.003	0.010	ug/L	0.300		71.5	41-120			
Dibenzofuran	0.211	0.002	0.010	ug/L	0.300		70.3	38-120			
Fluorene	0.221	0.002	0.010	ug/L	0.300		73.6	43-120			


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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0432 - 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 (BJE0432-BS1)						Prepared: 19-May-2021 Analyzed: 04-Jun-2021 14:57					
Phenanthrene	0.222	0.001	0.010	ug/L	0.300		74.0	41-120			
Anthracene	0.211	0.001	0.010	ug/L	0.300		70.3	40-120			
Carbazole	0.225	0.001	0.010	ug/L	0.300		75.1	30-160			
Fluoranthene	0.230	0.002	0.010	ug/L	0.300		76.7	45-120			
Pyrene	0.228	0.001	0.010	ug/L	0.300		75.9	41-120			
Benzo(a)anthracene	0.232	0.0008	0.010	ug/L	0.300		77.2	42-120			
Chrysene	0.219	0.0009	0.010	ug/L	0.300		73.1	44-120			
Benzo(b)fluoranthene	0.249	0.0005	0.010	ug/L	0.300		83.1	44-120			
Benzo(k)fluoranthene	0.231	0.003	0.010	ug/L	0.300		77.1	50-120			
Benzo(j)fluoranthene	0.199	0.002	0.010	ug/L	0.300		66.4	39-160			
Benzofluoranthenes, Total	0.680	0.004	0.010	ug/L	0.900		75.5	46-120			
Benzo(a)pyrene	0.219	0.002	0.010	ug/L	0.300		72.9	35-120			
Perylene	0.202	0.006	0.010	ug/L	0.300		67.4	30-160			
Indeno(1,2,3-cd)pyrene	0.265	0.001	0.010	ug/L	0.300		88.3	37-120			
Dibenzo(a,h)anthracene	0.263	0.001	0.010	ug/L	0.300		87.7	34-120			
Benzo(g,h,i)perylene	0.300	0.001	0.010	ug/L	0.300		100	38-120			Q
Surrogate: 2-Methylnaphthalene-d10	0.203			ug/L	0.300		67.6	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.265			ug/L	0.300		88.3	29-120			Q
Surrogate: Fluoranthene-d10	0.226			ug/L	0.300		75.3	57-120			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Petroleum Hydrocarbons - Quality Control
Batch BJE0409 - 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 (BJE0409-BLK1)		Prepared: 19-May-2021 Analyzed: 25-May-2021 14:35							
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>	0.166		mg/L	0.225	73.7	50-150			
LCS (BJE0409-BS1)		Prepared: 19-May-2021 Analyzed: 25-May-2021 14:56							
Diesel Range Organics (C12-C24)	2.24	0.100	mg/L	3.00	74.6	56-120			
<i>Surrogate: o-Terphenyl</i>	0.167		mg/L	0.225	74.0	50-150			
LCS Dup (BJE0409-BSD1)		Prepared: 19-May-2021 Analyzed: 25-May-2021 15:17							
Diesel Range Organics (C12-C24)	2.30	0.100	mg/L	3.00	76.8	56-120	2.86	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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC

Aroclor PCB - Quality Control

Batch BJE0411 - 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 (BJE0411-BLK1)						Prepared: 18-May-2021 Analyzed: 20-May-2021 19:30					
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	0.0110			ug/L	0.0200		54.8	29-120			
Surrogate: Tetrachlorometaxylene	0.00928			ug/L	0.0200		46.4	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0111			ug/L	0.0200		55.6	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00775			ug/L	0.0200		38.8	32-120			
LCS (BJE0411-BS1)						Prepared: 18-May-2021 Analyzed: 20-May-2021 19:51					
Aroclor 1016 [2C]	0.033	0.002	0.010	ug/L	0.0500		65.8	54-120			
Aroclor 1260 [2C]	0.032	0.003	0.010	ug/L	0.0500		64.5	51-128			
Surrogate: Decachlorobiphenyl	0.0117			ug/L	0.0200		58.4	29-120			
Surrogate: Tetrachlorometaxylene	0.0105			ug/L	0.0200		52.3	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0120			ug/L	0.0200		59.9	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00837			ug/L	0.0200		41.8	32-120			
LCS Dup (BJE0411-BSD1)						Prepared: 18-May-2021 Analyzed: 20-May-2021 20:13					
Aroclor 1016 [2C]	0.031	0.002	0.010	ug/L	0.0500		61.9	54-120	6.19	30	
Aroclor 1260 [2C]	0.031	0.003	0.010	ug/L	0.0500		61.8	51-128	4.32	30	
Surrogate: Decachlorobiphenyl	0.0107			ug/L	0.0200		53.3	29-120			
Surrogate: Tetrachlorometaxylene	0.00955			ug/L	0.0200		47.8	32-120			
Surrogate: Decachlorobiphenyl [2C]	0.0109			ug/L	0.0200		54.6	29-120			
Surrogate: Tetrachlorometaxylene [2C]	0.00810			ug/L	0.0200		40.5	32-120			


 Shannon & Wilson, Inc
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 Seattle WA, 98103-8636

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJE0681 - 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 (BJE0681-BLK1)						Prepared: 27-May-2021 Analyzed: 01-Jun-2021 11:45					
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJE0681-BS1)						Prepared: 27-May-2021 Analyzed: 01-Jun-2021 11:48					
Mercury	0.00191	0.000013	0.000100	mg/L	0.00200		95.5	80-120			
Duplicate (BJE0681-DUP1)						Source: 21E0190-01 Prepared: 27-May-2021 Analyzed: 01-Jun-2021 11:52					
Mercury	0.000031	0.000013	0.000100	mg/L		ND					J
Matrix Spike (BJE0681-MS1)						Source: 21E0190-01 Prepared: 27-May-2021 Analyzed: 01-Jun-2021 11:55					
Mercury	0.00103	0.000013	0.000100	mg/L	0.00100	ND	103	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJE0681-MSD1)						Source: 21E0190-01 Prepared: 27-May-2021 Analyzed: 01-Jun-2021 11:57					
Mercury	0.000936	0.000013	0.000100	mg/L	0.00100	ND	93.6	75-125	9.55	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: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJE0723 - 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 (BJE0723-BLK1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 15:55						
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 (BJE0723-BS1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 16:00						
Barium	135	23.9	0.114	0.500	ug/L	25.0		95.5	80-120			
Barium	137	23.8	0.0765	0.500	ug/L	25.0		95.3	80-120			
Chromium	52	25.0	0.260	0.500	ug/L	25.0		99.8	80-120			
Chromium	53	25.1	0.239	0.500	ug/L	25.0		100	80-120			
Cobalt	59	24.6	0.0173	0.200	ug/L	25.0		98.4	80-120			
Iron	54	5030	18.2	36.0	ug/L	5000		101	80-120			
Iron	57	4990	6.63	36.0	ug/L	5000		99.7	80-120			
Lead	208	24.8	0.0513	0.100	ug/L	25.0		99.2	80-120			
Manganese	55	25.7	0.142	0.500	ug/L	25.0		103	80-120			
Silver	107	24.0	0.0220	0.200	ug/L	25.0		95.9	80-120			
Vanadium	51a	24.3	0.0556	0.200	ug/L	25.0		97.0	80-120			


 Shannon & Wilson, Inc
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 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds - Quality Control
Batch BJE0723 - 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 (BJE0723-BS1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 16:00						
Vanadium	51b	24.3	0.0521	0.200	ug/L	25.0		97.1	80-120			
Arsenic	75a	24.2	0.0373	0.200	ug/L	25.0		96.6	80-120			
Cadmium	111	25.2	0.0300	0.100	ug/L	25.0		101	80-120			
Cadmium	114	24.8	0.0400	0.100	ug/L	25.0		99.1	80-120			
Copper	63	25.2	0.173	0.500	ug/L	25.0		101	80-120			
Copper	65	25.2	0.350	0.500	ug/L	25.0		101	80-120			
Nickel	60	24.6	0.0792	0.500	ug/L	25.0		98.5	80-120			
Nickel	62	24.7	0.220	0.500	ug/L	25.0		98.8	80-120			
Selenium	78	75.9	0.179	0.500	ug/L	80.0		94.8	80-120			
Zinc	66	79.6	2.92	6.00	ug/L	80.0		99.5	80-120			
Zinc	67	75.6	0.940	6.00	ug/L	80.0		94.5	80-120			
Duplicate (BJE0723-DUP2)						Source: 21E0190-01 Prepared: 28-May-2021 Analyzed: 29-May-2021 02:32						
Barium	135	4.32	0.114	0.500	ug/L		4.15			4.01	20	
Cobalt	59	0.219	0.0173	0.200	ug/L		0.219			0.00		
Lead	208	0.0740	0.0513	0.100	ug/L		0.0780			5.26	20	J
Silver	107	ND	0.0220	0.200	ug/L		ND					U
Arsenic	75a	1.62	0.0373	0.200	ug/L		1.62			0.31	20	
Cadmium	111	ND	0.0300	0.100	ug/L		ND					U
Copper	63	1.02	0.173	0.500	ug/L		1.04			2.03	20	
Nickel	60	0.504	0.0792	0.500	ug/L		0.468			7.41	20	
Selenium	78	0.253	0.179	0.500	ug/L		0.287			12.60	20	J
Zinc	66	ND	2.92	6.00	ug/L		ND					U
Matrix Spike (BJE0723-MS2)						Source: 21E0190-01 Prepared: 28-May-2021 Analyzed: 29-May-2021 02:37						
Barium	135	29.2	0.114	0.500	ug/L	25.0	4.15	100	75-125			
Cobalt	59	25.7	0.0173	0.200	ug/L	25.0	0.219	102	75-125			
Lead	208	24.6	0.0513	0.100	ug/L	25.0	0.0780	98.1	75-125			
Silver	107	23.8	0.0220	0.200	ug/L	25.0	ND	95.0	75-125			
Arsenic	75a	26.2	0.0373	0.200	ug/L	25.0	1.62	98.2	75-125			
Cadmium	111	25.0	0.0300	0.100	ug/L	25.0	ND	100	75-125			
Copper	63	26.4	0.173	0.500	ug/L	25.0	1.04	102	75-125			
Nickel	60	25.9	0.0792	0.500	ug/L	25.0	0.468	102	75-125			
Selenium	78	74.2	0.179	0.500	ug/L	80.0	0.287	92.3	75-125			
Zinc	66	77.4	2.92	6.00	ug/L	80.0	ND	96.8	75-125			



Analytical Report

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

Project: Lower Duwamish
Project Number: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJE0723 - 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
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Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJE0723-MSD2)			Source: 21E0190-01			Prepared: 28-May-2021			Analyzed: 29-May-2021 02:42			
Barium	135	31.4	0.114	0.500	ug/L	25.0	4.15	109	75-125	7.16	20	
Cobalt	59	27.8	0.0173	0.200	ug/L	25.0	0.219	110	75-125	7.90	20	
Lead	208	26.2	0.0513	0.100	ug/L	25.0	0.0780	105	75-125	6.39	20	
Silver	107	25.9	0.0220	0.200	ug/L	25.0	ND	104	75-125	8.69	20	
Arsenic	75a	27.7	0.0373	0.200	ug/L	25.0	1.62	104	75-125	5.54	20	
Cadmium	111	26.2	0.0300	0.100	ug/L	25.0	ND	105	75-125	4.59	20	
Copper	63	28.1	0.173	0.500	ug/L	25.0	1.04	108	75-125	6.20	20	
Nickel	60	28.1	0.0792	0.500	ug/L	25.0	0.468	111	75-125	8.21	20	
Selenium	78	78.9	0.179	0.500	ug/L	80.0	0.287	98.2	75-125	6.15	20	
Zinc	66	82.1	2.92	6.00	ug/L	80.0	ND	103	75-125	5.83	20	

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

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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Duplicate (BJE0723-DUP4)			Source: 21E0190-01			Prepared: 28-May-2021			Analyzed: 02-Jun-2021 18:54			
Chromium	52	ND	0.520	1.00	ug/L		ND					U
Iron	57	8130	13.3	72.0	ug/L		7500			8.05	20	D
Manganese	55	232	0.284	1.00	ug/L		230			1.21	20	D
Vanadium	51a	4.18	0.111	0.400	ug/L		4.35			4.13	20	D

Matrix Spike (BJE0723-MS4)			Source: 21E0190-01			Prepared: 28-May-2021			Analyzed: 02-Jun-2021 00:45			
Chromium	52	24.7	0.520	1.00	ug/L	25.0	ND	98.7	75-125			D
Iron	57	12800	13.3	72.0	ug/L	5000	7500	106	75-125			D
Manganese	55	257	0.284	1.00	ug/L	25.0	230	109	75-125			D
Vanadium	51a	28.5	0.111	0.400	ug/L	25.0	4.35	96.4	75-125			D

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

Matrix Spike Dup (BJE0723-MSD4)			Source: 21E0190-01			Prepared: 28-May-2021			Analyzed: 02-Jun-2021 00:51			
Chromium	52	26.4	0.520	1.00	ug/L	25.0	ND	105	75-125	6.65	20	D
Iron	57	12700	13.3	72.0	ug/L	5000	7500	104	75-125	0.76	20	D
Manganese	55	258	0.284	1.00	ug/L	25.0	230	115	75-125	0.60	20	D
Vanadium	51a	30.2	0.111	0.400	ug/L	25.0	4.35	103	75-125	5.85	20	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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJE0723 - 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.


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

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 Limits	RPD	RPD Limit	Notes
Blank (BJF0053-BLK1)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 18:44					
Cobalt	59	ND	0.0173	0.200	ug/L						U
LCS (BJF0053-BS1)						Prepared: 02-Jun-2021 Analyzed: 02-Jun-2021 18:49					
Cobalt	59	25.4	0.0173	0.200	ug/L	25.0	102	80-120			


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0682 - 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 (BJE0682-BLK1)						Prepared: 27-May-2021 Analyzed: 01-Jun-2021 13:00					
Mercury, Dissolved	0.000049	0.000013	0.000100	mg/L							J
LCS (BJE0682-BS1)						Prepared: 27-May-2021 Analyzed: 01-Jun-2021 13:02					
Mercury, Dissolved	0.00204	0.000013	0.000100	mg/L	0.00200		102	80-120			
Duplicate (BJE0682-DUP1)						Source: 21E0190-02 Prepared: 27-May-2021 Analyzed: 01-Jun-2021 13:07					
Mercury, Dissolved	0.000051	0.000013	0.000100	mg/L		0.000034			38.70	20	L, J
Matrix Spike (BJE0682-MS1)						Source: 21E0190-02 Prepared: 27-May-2021 Analyzed: 01-Jun-2021 13:09					
Mercury, Dissolved	0.000919	0.000013	0.000100	mg/L	0.00100	0.000034	88.5	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike Dup (BJE0682-MSD1)						Source: 21E0190-02 Prepared: 27-May-2021 Analyzed: 01-Jun-2021 13:11					
Mercury, Dissolved	0.000969	0.000013	0.000100	mg/L	0.00100	0.000034	93.4	75-125	5.20	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: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0735 - 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 (BJE0735-BLK1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 23:55						
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 (BJE0735-BS1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 23:59						
Barium, Dissolved	135	25.3	0.114	0.500	ug/L	25.0		101	80-120			
Barium, Dissolved	137	25.0	0.0765	0.500	ug/L	25.0		100	80-120			
Chromium, Dissolved	52	26.1	0.260	0.500	ug/L	25.0		104	80-120			
Chromium, Dissolved	53	26.8	0.239	0.500	ug/L	25.0		107	80-120			
Cobalt, Dissolved	59	25.4	0.0173	0.200	ug/L	25.0		102	80-120			
Iron, Dissolved	54	5370	18.2	36.0	ug/L	5000		107	80-120			
Iron, Dissolved	57	5310	6.63	20.0	ug/L	5000		106	80-120			
Lead, Dissolved	208	24.9	0.0513	0.100	ug/L	25.0		99.5	80-120			
Manganese, Dissolved	55	26.8	0.142	0.500	ug/L	25.0		107	80-120			
Silver, Dissolved	107	24.4	0.0220	0.200	ug/L	25.0		97.7	80-120			
Vanadium, Dissolved	51a	25.5	0.0556	0.200	ug/L	25.0		102	80-120			


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0735 - 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 (BJE0735-BS1)						Prepared: 28-May-2021 Analyzed: 28-May-2021 23:59						
Vanadium, Dissolved	51b	25.7	0.0521	0.200	ug/L	25.0		103	80-120			
Arsenic, Dissolved	75a	25.0	0.0373	0.200	ug/L	25.0		99.9	80-120			
Cadmium, Dissolved	111	25.5	0.0300	0.100	ug/L	25.0		102	80-120			
Cadmium, Dissolved	114	25.2	0.0400	0.100	ug/L	25.0		101	80-120			
Copper, Dissolved	63	25.8	0.173	0.500	ug/L	25.0		103	80-120			
Copper, Dissolved	65	25.9	0.350	0.500	ug/L	25.0		104	80-120			
Nickel, Dissolved	60	25.7	0.0792	0.500	ug/L	25.0		103	80-120			
Nickel, Dissolved	62	25.8	0.220	0.500	ug/L	25.0		103	80-120			
Selenium, Dissolved	78	77.0	0.179	0.500	ug/L	80.0		96.2	80-120			
Zinc, Dissolved	66	80.3	2.92	5.00	ug/L	80.0		100	80-120			
Zinc, Dissolved	67	74.9	0.940	4.00	ug/L	80.0		93.6	80-120			
Duplicate (BJE0735-DUP1)						Source: 21E0190-11 Prepared: 28-May-2021 Analyzed: 29-May-2021 03:35						
Barium, Dissolved	135	1.96	0.114	0.500	ug/L	1.90				3.05	20	
Cobalt, Dissolved	59	0.206	0.0173	0.200	ug/L	0.194				6.00	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
Arsenic, Dissolved	75a	0.521	0.0373	0.200	ug/L	0.469				10.50	20	
Cadmium, Dissolved	111	0.0470	0.0300	0.100	ug/L	0.0540				13.90	20	J
Copper, Dissolved	63	2.35	0.173	0.500	ug/L	2.25				4.43	20	
Nickel, Dissolved	60	2.13	0.0792	0.500	ug/L	2.06				3.25	20	
Selenium, Dissolved	78	0.233	0.179	0.500	ug/L	ND						J
Zinc, Dissolved	66	12.8	2.92	5.00	ug/L	12.5				2.55	20	
Matrix Spike (BJE0735-MS1)						Source: 21E0190-11 Prepared: 28-May-2021 Analyzed: 29-May-2021 03:40						
Barium, Dissolved	135	27.3	0.114	0.500	ug/L	25.0	1.90	102	75-125			
Cobalt, Dissolved	59	25.1	0.0173	0.200	ug/L	25.0	0.194	99.8	75-125			
Lead, Dissolved	208	24.1	0.0513	0.100	ug/L	25.0	ND	96.4	75-125			
Silver, Dissolved	107	23.2	0.0220	0.200	ug/L	25.0	ND	93.0	75-125			
Arsenic, Dissolved	75a	25.0	0.0373	0.200	ug/L	25.0	0.469	98.2	75-125			
Cadmium, Dissolved	111	25.0	0.0300	0.100	ug/L	25.0	0.0540	99.8	75-125			
Copper, Dissolved	63	27.1	0.173	0.500	ug/L	25.0	2.25	99.3	75-125			
Nickel, Dissolved	60	27.0	0.0792	0.500	ug/L	25.0	2.06	99.9	75-125			
Selenium, Dissolved	78	73.1	0.179	0.500	ug/L	80.0	ND	91.3	75-125			
Zinc, Dissolved	66	87.2	2.92	5.00	ug/L	80.0	12.5	93.4	75-125			


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Metals and Metallic Compounds (dissolved) - Quality Control
Batch BJE0735 - 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
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Recovery limits for target analytes in MS/MSD QC samples are advisory only.

Matrix Spike Dup (BJE0735-MSD1)			Source: 21E0190-11			Prepared: 28-May-2021			Analyzed: 29-May-2021 03:46			
Barium, Dissolved	135	27.4	0.114	0.500	ug/L	25.0	1.90	102	75-125	0.15	20	
Cobalt, Dissolved	59	26.0	0.0173	0.200	ug/L	25.0	0.194	103	75-125	3.47	20	
Lead, Dissolved	208	24.5	0.0513	0.100	ug/L	25.0	ND	98.0	75-125	1.61	20	
Silver, Dissolved	107	24.0	0.0220	0.200	ug/L	25.0	ND	96.0	75-125	3.24	20	
Arsenic, Dissolved	75a	25.6	0.0373	0.200	ug/L	25.0	0.469	101	75-125	2.34	20	
Cadmium, Dissolved	111	25.1	0.0300	0.100	ug/L	25.0	0.0540	100	75-125	0.52	20	
Copper, Dissolved	63	28.3	0.173	0.500	ug/L	25.0	2.25	104	75-125	4.25	20	
Nickel, Dissolved	60	27.4	0.0792	0.500	ug/L	25.0	2.06	101	75-125	1.46	20	
Selenium, Dissolved	78	75.5	0.179	0.500	ug/L	80.0	ND	94.4	75-125	3.27	20	
Zinc, Dissolved	66	88.8	2.92	5.00	ug/L	80.0	12.5	95.4	75-125	1.79	20	

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

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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Duplicate (BJE0735-DUP2)			Source: 21E0190-11			Prepared: 28-May-2021			Analyzed: 01-Jun-2021 23:10			
Chromium, Dissolved	52	ND	0.520	1.00	ug/L		ND					U
Iron, Dissolved	54	ND	36.4	72.0	ug/L		ND					U
Manganese, Dissolved	55	7.18	0.284	1.00	ug/L		6.89			4.15	20	D
Vanadium, Dissolved	51a	1.63	0.111	0.400	ug/L		1.58			3.24	20	D

Matrix Spike (BJE0735-MS2)			Source: 21E0190-11			Prepared: 28-May-2021			Analyzed: 01-Jun-2021 23:16			
Chromium, Dissolved	52	24.2	0.520	1.00	ug/L	25.0	ND	96.7	75-125			D
Iron, Dissolved	54	4740	36.4	72.0	ug/L	5000	ND	94.9	75-125			D
Manganese, Dissolved	55	30.3	0.284	1.00	ug/L	25.0	6.89	93.6	75-125			D
Vanadium, Dissolved	51a	25.7	0.111	0.400	ug/L	25.0	1.58	96.5	75-125			D

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

Matrix Spike Dup (BJE0735-MSD2)			Source: 21E0190-11			Prepared: 28-May-2021			Analyzed: 01-Jun-2021 23:22			
Chromium, Dissolved	52	24.6	0.520	1.00	ug/L	25.0	ND	98.5	75-125	1.84	20	D
Iron, Dissolved	54	4760	36.4	72.0	ug/L	5000	ND	95.1	75-125	0.26	20	D
Manganese, Dissolved	55	31.4	0.284	1.00	ug/L	25.0	6.89	98.0	75-125	3.55	20	D
Vanadium, Dissolved	51a	26.0	0.111	0.400	ug/L	25.0	1.58	97.8	75-125	1.23	20	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: 21-1-1-12596
Project Manager: Meg Strong

Reported:
13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds (dissolved) - Quality Control

Batch BJE0735 - 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.


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJE0377 - 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 (BJE0377-BLK1)						Prepared: 14-May-2021 Analyzed: 14-May-2021 17:28					
Ferrous Iron	ND	0.040	0.040	mg/L							U
LCS (BJE0377-BS1)						Prepared: 14-May-2021 Analyzed: 14-May-2021 17:29					
Ferrous Iron	0.495	0.040	0.040	mg/L	0.500		99.0	90-110			
Duplicate (BJE0377-DUP3)						Source: 21E0190-06RE2 Prepared: 14-May-2021 Analyzed: 14-May-2021 18:12					
Ferrous Iron	45.8	2.00	2.00	mg/L		47.2			3.01	20	D
Matrix Spike (BJE0377-MS3)						Source: 21E0190-06RE2 Prepared: 14-May-2021 Analyzed: 14-May-2021 18:13					
Ferrous Iron	62.2	2.00	2.00	mg/L	20.0	47.2	75.0	75-125			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: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJE0379 - No Prep - Volatiles

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 (BJE0379-BLK1)						Prepared: 14-May-2021 Analyzed: 15-May-2021 09:11					
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 (BJE0379-BS1)						Prepared: 14-May-2021 Analyzed: 15-May-2021 09:31					
Chloride	5.03	0.100	0.100	mg/L	5.00		101	90-110			
Nitrate-N	4.63	0.100	0.100	mg/L	5.00		92.5	90-110			
Nitrite-N	5.06	0.100	0.100	mg/L	5.00		101	90-110			
Sulfate	4.60	0.100	0.100	mg/L	5.00		91.9	90-110			
Duplicate (BJE0379-DUP1)						Source: 21E0190-06 Prepared: 14-May-2021 Analyzed: 15-May-2021 10:11					
Nitrate-N	ND	0.100	0.100	mg/L		ND					U
Nitrite-N	ND	0.100	0.100	mg/L		ND					U
Sulfate	7.94	0.100	0.100	mg/L		7.95			0.13	20	
Duplicate (BJE0379-DUP2)						Source: 21E0190-06RE1 Prepared: 14-May-2021 Analyzed: 15-May-2021 11:50					
Chloride	52.4	1.20	1.20	mg/L		53.7			2.44	20	D
Matrix Spike (BJE0379-MS1)						Source: 21E0190-06 Prepared: 14-May-2021 Analyzed: 15-May-2021 10:31					
Nitrate-N	1.79	0.100	0.100	mg/L	2.00	ND	89.5	75-125			
Nitrite-N	1.77	0.100	0.100	mg/L	2.00	ND	88.7	75-125			
Sulfate	9.94	0.100	0.100	mg/L	2.00	7.95	99.3	75-125			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.											
Matrix Spike (BJE0379-MS2)						Source: 21E0190-06RE1 Prepared: 14-May-2021 Analyzed: 15-May-2021 12:50					
Chloride	55.4	1.20	1.20	mg/L	2.00	53.7	81.7	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: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

Analysis by: Analytical Resources, LLC
Wet Chemistry - Quality Control
Batch BJE0380 - No Prep Wet Chem

Instrument: UV1800-1 Analyst: RMS

QC Sample/Analyte	Result	Detection Limit	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Blank (BJE0380-BLK1)						Prepared: 14-May-2021 Analyzed: 14-May-2021 18:39					
Hexavalent Chromium	ND	0.013	0.013	mg/L							U
LCS (BJE0380-BS1)						Prepared: 14-May-2021 Analyzed: 14-May-2021 18:39					
Hexavalent Chromium	0.626	0.013	0.013	mg/L	0.625		100	85-115			D
Duplicate (BJE0380-DUP1)						Source: 21E0190-01 Prepared: 14-May-2021 Analyzed: 14-May-2021 18:41					
Hexavalent Chromium	ND	0.013	0.013	mg/L		ND					U
Matrix Spike (BJE0380-MS1)						Source: 21E0190-01 Prepared: 14-May-2021 Analyzed: 14-May-2021 18:42					
Hexavalent Chromium	0.062	0.013	0.013	mg/L	0.0625	ND	98.5	85-115			D

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



Analytical Report

Shannon & Wilson, Inc
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Seattle WA, 98103-8636

Project: Lower Duwamish
Project Number: 21-1-1-12596
Project Manager: Meg Strong

Reported:
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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



Analytical Report

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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 in Water

Phenol	NELAP,DoD-ELAP
bis(2-chloroethyl) ether	NELAP,DoD-ELAP


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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
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


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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
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


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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
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


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

 Project: Lower Duwamish
 Project Number: 21-1-1-12596
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:21

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-Cr B-09 in Water

Hexavalent Chromium	WADOE,NELAP
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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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Reported:
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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)
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
NRS	This surrogate not reported due to chromatographic interference
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)
21E0194

Associated SDG ID(s)
N/A

Susan Dunninghoo

Digitally signed by Susan
Dunninghoo
Date: 2021.12.13 16:38:55 -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 Dunninghoo 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

Need small OS

Draft for Public Comment

ARI Assigned Number: 21E0194	Turn-around Requested: Standard	Page: 1 of 1
ARI Client Company: Shannon & Wilson	Phone: 206-695	Date: 2/17/21 Ice Present? Yes
Client Contact: Shannon & Wilson	No. of Coolers: 3	Cooler Temps: 5.9, 4.9, 1.2



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

Sample ID	Date	Time	Matrix	No. Containers	Analysis Requested										Notes/Comments		
					TAH-G	TAH-DX	CTEX	HVOLS	MTBE	PAHs	Full List SVOCs	Limited List SVOCs	PCBs	Metals (40+)		Natural Attenuation	
JB-3-20211705	5/17/21	0926	W	5	X		X	X									* = nitrate, nitrite, chloride, sulfate, sulfide, ferrous iron, dissolved manganese, methane
MW-56-20211705		0913		16		X	X	X		X			①	*			① = Arsenic, barium,
MS/MSD-MW-58-20211705		0913		9		X	X	X		X			①				Chromium, manganese, nickel, cadmium,
EB-1-20211705		1028		15	X	X	X	X		X		X	①				Cobalt, copper, iron,
MW-58-20211705		1118		16		X	X	X		X			①	*			mercury, lead, selenium, silver
MW-60-20211705		1251		20	X	X	X	X		X		X	①	*			Vanadium, Zinc
MW-36-20211705		1419		15	X	X	X	X					②	*			② Arsenic, chromium, manganese, nickel, cadmium, cobalt, copper, lead, mercury, selenium, silver, zinc
Comments/Special Instructions Note 1: Lab to filter for dissolved metals. Note 2: Refer to project methods and analyte list.					Relinquished by: (Signature) <i>[Signature]</i>		Received by: (Signature) <i>[Signature]</i>		Relinquished by: (Signature)		Received by: (Signature)						
					Printed Name: RYAN PETERSON		Printed Name: Kenny Dang		Printed Name:		Printed Name:						
					Company: Shannon & Wilson		Company: ARI		Company:		Company:						
					Date & Time: 5/17/21 1513		Date & Time: 5/17/21 1513		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

Reported:
 13-Dec-2021 16:25

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
TB-3-20211705	21E0194-01	Water	17-May-2021 14:19	17-May-2021 15:13
MW-56-20211705	21E0194-02	Water	17-May-2021 09:13	17-May-2021 15:13
MW-56-20211705	21E0194-03	Water	17-May-2021 09:13	17-May-2021 15:13
EB-1-20211705	21E0194-04	Water	17-May-2021 10:28	17-May-2021 15:13
EB-1-20211705	21E0194-05	Water	17-May-2021 10:28	17-May-2021 15:13
MW-58-20211705	21E0194-06	Water	17-May-2021 11:18	17-May-2021 15:13
MW-58-20211705	21E0194-07	Water	17-May-2021 11:18	17-May-2021 15:13
MW-60-20211705	21E0194-08	Water	17-May-2021 12:51	17-May-2021 15:13
MW-60-20211705	21E0194-09	Water	17-May-2021 12:51	17-May-2021 15:13
MW-36-20211705	21E0194-10	Water	17-May-2021 14:19	17-May-2021 15:13
MW-60-20211705	21E0194-11	Water	17-May-2021 12:51	17-May-2021 15:13


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

Reported:
 13-Dec-2021 16:25

Work Order Case Narrative

Client: Shannon & Wilson, Inc

Project: Lower Duwamish

Work Order: 21E0194

Sample receipt

Samples as listed on the preceding page were received 17-May-2021 15:13 under ARI work order 21E0194. For details regarding sample receipt, please refer to the Cooler Receipt Form.

There was some confusion in sample collection. Sulfide containers were provided but the project was built with Sulfite analysis. Sulfide was cancelled and Sulfite could not be performed as no preserved bottle was provided. Without preservation analyte dissipates rapidly.

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 except Tetrachlorometaxylene which was out of control low in sample 21E0194-08 on column zb -35. Data reported from passing column zb-5.

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

The blank spike/blank spike duplicate (BS/BSD aka LCS/LCSD) percent recoveries and relative percent difference (RPD) 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)


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

Reported:
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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.

Sample specific QC was performed in association with sample 21E0194-02 in batch BJE0456. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory 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 Benzo(g,h,i)perylene and surrogate Dibenzo(a,h)anthracene-d14 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 Dibenzo(a,h)anthracene-d14 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 (BS/LCS) percent recoveries were within control limits.

Sample specific QC was performed in association with sample 21E0194-02 in batch BJE0432. The matrix spike/matrix spike duplicate (MS/MSD) percent recoveries and relative percent difference (RPD) were within advisory control limits except as flagged which were out of control low. Analyst noted that some of the extract was spilled. Based upon surrogate recovery ~80% was spilled. No corrective action taken.

Total and Dissolved Metals - EPA Method 6020B


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 Seattle WA, 98103-8636

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 Project Manager: Meg Strong

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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.

Sample specific QC was performed in association with sample 21E0194-02 in Total Metals batch BJE0053 and in association with sample 21E0194-03 in Dissolved Metals batch BJE0737. The duplicate (DUP) relative percent difference (RPD) were within advisory control limits. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits except Dissolved Iron which was out of control high in the MSD and has been flagged within the QC section of this report.

Wet Chemistry

The sample(s) were prepared and analyzed within the recommended holding times except Nitrate and Nitrite in sample 21E0194-06, 21E0194-08 and 21E0194-10 and data has been flagged. The instrument stopped analyzing samples midway through a sequence. This was discovered after hold time had expired. Samples were analyzed as soon as discovery was made.

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 21E0194-02 in Anions batch BJE0445 and Ferrous Iron batch BJE419. 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 21E0194-02 in Total Mercury batch BJE0681 and in association with sample 21E0194-03 in Dissolved Mercury batch BJE0741. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory control limits.



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Project: Lower Duwamish
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Reported:
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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.

Sample specific QC was performed in association with sample 21E0194-02 in batch BJE0459. The matrix spike (MS) percent recoveries and the duplicate (DUP) relative percent difference (RPD) were within advisory 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.

Sample specific QC was performed in association with sample 2E0194-02 in batch BJE0456. The matrix spike/matrix spike duplicate (MS/MSD) spike recoveries and relative percent difference (RPD) were within advisory control limits except Methane percent recovery which were out of control high in the MS and MSD and have been flagged.

REVISION to correct VOA list and RSK-175 list.



WORK ORDER

21E0194

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0194-01 A	VOA Vial, Clear, 40 mL, HCL		
21E0194-01 B	VOA Vial, Clear, 40 mL, HCL		
21E0194-01 C	VOA Vial, Clear, 40 mL, HCL		
21E0194-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0194-01 E	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0194-02 B	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0194-02 C	HDPE NM, 500 mL		
21E0194-02 D	Glass NM, Amber, 500 mL		
21E0194-02 E	Glass NM, Amber, 500 mL		
21E0194-02 F	Glass NM, Amber, 500 mL		
21E0194-02 G	Glass NM, Amber, 500 mL		
21E0194-02 H	Glass NM, Amber, 500 mL		
21E0194-02 I	Glass NM, Amber, 500 mL		
21E0194-02 J	Glass NM, Amber, 500 mL		
21E0194-02 K	Glass NM, Amber, 500 mL		
21E0194-02 L	Glass NM, Amber, 500 mL, HCl		
21E0194-02 M	Small OJ, 500 mL, ZnOAC	5.9	Fail
21E0194-02 N	Small OJ, 500 mL		
21E0194-02 O	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 P	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 Q	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 R	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 S	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 T	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 U	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 V	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0194-02 W	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0194-03 A	Large OJ, 1000 mL	7.2	Fail
21E0194-03 B	Large OJ, 1000 mL	7.2	Fail
21E0194-04 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0194-04 B	Glass NM, Amber, 1000 mL		
21E0194-04 C	Glass NM, Amber, 1000 mL		
21E0194-04 D	Glass NM, Amber, 500 mL		
21E0194-04 E	Glass NM, Amber, 500 mL		



WORK ORDER

21E0194

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0194-04 F	Glass NM, Amber, 500 mL		
21E0194-04 G	Glass NM, Amber, 500 mL		
21E0194-04 H	Glass NM, Amber, 500 mL		
21E0194-04 I	Glass NM, Amber, 500 mL		
21E0194-04 J	VOA Vial, Clear, 40 mL, HCL		
21E0194-04 K	VOA Vial, Clear, 40 mL, HCL		
21E0194-04 L	VOA Vial, Clear, 40 mL, HCL		
21E0194-04 M	VOA Vial, Clear, 40 mL, HCL		
21E0194-04 N	VOA Vial, Clear, 40 mL, HCL		
21E0194-05 A	Large OJ, 1000 mL	72	Fail
21E0194-06 A	HDPE NM, 1000 mL, 1:1 HNO3	52	Pass
21E0194-06 B	HDPE NM, 500 mL		
21E0194-06 C	Glass NM, Amber, 500 mL		
21E0194-06 D	Glass NM, Amber, 500 mL		
21E0194-06 E	Glass NM, Amber, 500 mL		
21E0194-06 F	Glass NM, Amber, 500 mL		
21E0194-06 G	Glass NM, Amber, 500 mL, HCL		
21E0194-06 H	Small OJ, 500 mL, ZnOAC	59	Fail
21E0194-06 I	Small OJ, 500 mL		
21E0194-06 J	VOA Vial, Clear, 40 mL, HCL		
21E0194-06 K	VOA Vial, Clear, 40 mL, HCL		
21E0194-06 L	VOA Vial, Clear, 40 mL, HCL		
21E0194-06 M	VOA Vial, Clear, 40 mL, HCL		
21E0194-06 N	VOA Vial, Clear, 40 mL, HCL		
21E0194-06 O	VOA Vial, Clear, 40 mL, HCL		
21E0194-07 A	Large OJ, 1000 mL	72	Fail
21E0194-08 A	HDPE NM, 1000 mL, 1:1 HNO3	52	Pass
21E0194-08 B	Glass NM, Amber, 1000 mL		
21E0194-08 C	Glass NM, Amber, 1000 mL		
21E0194-08 D	HDPE NM, 500 mL		
21E0194-08 E	Glass NM, Amber, 500 mL		
21E0194-08 F	Glass NM, Amber, 500 mL		
21E0194-08 G	Glass NM, Amber, 500 mL		
21E0194-08 H	Glass NM, Amber, 500 mL		
21E0194-08 I	Glass NM, Amber, 500 mL, HCL		
21E0194-08 J	Small OJ, 500 mL, ZnOAC	59	Fail
21E0194-08 K	Small OJ, 500 mL		



WORK ORDER

21E0194

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0194-08 L	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 M	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 N	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 O	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 P	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 Q	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 R	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 S	VOA Vial, Clear, 40 mL, HCL		
21E0194-09 A	Large OJ, 1000 mL	72	Fail
21E0194-10 A	HDPE NM, 1000 mL, 1:1 HNO3	62	Pass
21E0194-10 B	HDPE NM, 500 mL		
21E0194-10 C	Glass NM, Amber, 500 mL		
21E0194-10 D	Glass NM, Amber, 500 mL		
21E0194-10 E	Glass NM, Amber, 500 mL, HCL		
21E0194-10 F	Small OJ, 500 mL, ZnOAC	69	Fail
21E0194-10 G	Small OJ, 500 mL		
21E0194-10 H	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 M	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 N	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 O	VOA Vial, Clear, 40 mL, HCL		
21E0194-11 A	Large OJ, 1000 mL	72	Fail

JSW for KD
Preservation Confirmed By

05/17/2021
Date



Analytical Resources, Incorporated
Analytical Chemists and Consultants

Cooler Receipt Form

ARI Client: Shannon E Wilson

Project Name: LDW

COC No(s): NA

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

Assigned ARI Job No: 21E0194

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 1513

5.9 4.9 1.0

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

Temp Gun ID#: DOO 2565

Cooler Accepted by: KD Date: 5/17/21 Time: 1513

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)? 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 5/5/21

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

Samples Logged by: KD Date: 5/17/21 Time: 1538 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:

mw-36-20211705 says 15 containers on COC, received 16.

By: KD Date: 5/17/21



WORK ORDER

21E0194

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

Preservation Confirmation

Container ID	Container Type	pH	
21E0194-01 A	VOA Vial, Clear, 40 mL, HCL		
21E0194-01 B	VOA Vial, Clear, 40 mL, HCL		
21E0194-01 C	VOA Vial, Clear, 40 mL, HCL		
21E0194-01 D	VOA Vial, Clear, 40 mL, HCL		
21E0194-01 E	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0194-02 B	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0194-02 C	HDPE NM, 500 mL		
21E0194-02 D	Glass NM, Amber, 500 mL		
21E0194-02 E	Glass NM, Amber, 500 mL		
21E0194-02 F	Glass NM, Amber, 500 mL		
21E0194-02 G	Glass NM, Amber, 500 mL		
21E0194-02 H	Glass NM, Amber, 500 mL		
21E0194-02 I	Glass NM, Amber, 500 mL		
21E0194-02 J	Glass NM, Amber, 500 mL		
21E0194-02 K	Glass NM, Amber, 500 mL		
21E0194-02 L	Glass NM, Amber, 500 mL, HCl		
21E0194-02 M	Small OJ, 500 mL, ZnOAC	5.9	Fail
21E0194-02 N	Small OJ, 500 mL		
21E0194-02 O	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 P	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 Q	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 R	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 S	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 T	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 U	VOA Vial, Clear, 40 mL, HCL		
21E0194-02 V	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0194-02 W	VOA Vial, Clear, 40 mL, HCL	Bubble	
21E0194-03 A	Large OJ, 1000 mL	7.2	Fail
21E0194-03 B	Large OJ, 1000 mL	7.2	Fail ①
21E0194-04 A	HDPE NM, 1000 mL, 1:1 HNO3	5.2	Pass
21E0194-04 B	Glass NM, Amber, 1000 mL		
21E0194-04 C	Glass NM, Amber, 1000 mL		
21E0194-04 D	Glass NM, Amber, 500 mL		
21E0194-04 E	Glass NM, Amber, 500 mL		



WORK ORDER

21E0194

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0194-04 F	Glass NM, Amber, 500 mL		
21E0194-04 G	Glass NM, Amber, 500 mL		
21E0194-04 H	Glass NM, Amber, 500 mL		
21E0194-04 I	Glass NM, Amber, 500 mL		
21E0194-04 J	VOA Vial, Clear, 40 mL, HCL		
21E0194-04 K	VOA Vial, Clear, 40 mL, HCL		
21E0194-04 L	VOA Vial, Clear, 40 mL, HCL		
21E0194-04 M	VOA Vial, Clear, 40 mL, HCL		
21E0194-04 N	VOA Vial, Clear, 40 mL, HCL		
21E0194-05 A	Large OJ, 1000 mL	72	Fail ①
21E0194-06 A	HDPE NM, 1000 mL, 1:1 HNO3	62	Pass
21E0194-06 B	HDPE NM, 500 mL		
21E0194-06 C	Glass NM, Amber, 500 mL		
21E0194-06 D	Glass NM, Amber, 500 mL		
21E0194-06 E	Glass NM, Amber, 500 mL		
21E0194-06 F	Glass NM, Amber, 500 mL		
21E0194-06 G	Glass NM, Amber, 500 mL, HCl		
21E0194-06 H	Small OJ, 500 mL, ZnOAC	69	Fail
21E0194-06 I	Small OJ, 500 mL		
21E0194-06 J	VOA Vial, Clear, 40 mL, HCL		
21E0194-06 K	VOA Vial, Clear, 40 mL, HCL		
21E0194-06 L	VOA Vial, Clear, 40 mL, HCL		
21E0194-06 M	VOA Vial, Clear, 40 mL, HCL		
21E0194-06 N	VOA Vial, Clear, 40 mL, HCL		
21E0194-06 O	VOA Vial, Clear, 40 mL, HCL		
21E0194-07 A	Large OJ, 1000 mL	72	Fail ①
21E0194-08 A	HDPE NM, 1000 mL, 1:1 HNO3	62	Pass
21E0194-08 B	Glass NM, Amber, 1000 mL		
21E0194-08 C	Glass NM, Amber, 1000 mL		
21E0194-08 D	HDPE NM, 500 mL		
21E0194-08 E	Glass NM, Amber, 500 mL		
21E0194-08 F	Glass NM, Amber, 500 mL		
21E0194-08 G	Glass NM, Amber, 500 mL		
21E0194-08 H	Glass NM, Amber, 500 mL		
21E0194-08 I	Glass NM, Amber, 500 mL, HCl		
21E0194-08 J	Small OJ, 500 mL, ZnOAC	69	Fail
21E0194-08 K	Small OJ, 500 mL		



WORK ORDER

21E0194

Client: Shannon & Wilson, Inc

Project Manager: Shelly Fishel

Project: Lower Duwamish

Project Number: Lower Duwamish

21E0194-08 L	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 M	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 N	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 O	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 P	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 Q	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 R	VOA Vial, Clear, 40 mL, HCL		
21E0194-08 S	VOA Vial, Clear, 40 mL, HCL		
21E0194-09 A	Large OJ, 1000 mL	72	Fail ①
21E0194-10 A	HDPE NM, 1000 mL, 1:1 HNO ₃	<2	Pass
21E0194-10 B	HDPE NM, 500 mL		
21E0194-10 C	Glass NM, Amber, 500 mL		
21E0194-10 D	Glass NM, Amber, 500 mL		
21E0194-10 E	Glass NM, Amber, 500 mL, HCl		
21E0194-10 F	Small OJ, 500 mL, ZnOAC	<9	Fail
21E0194-10 G	Small OJ, 500 mL		
21E0194-10 H	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 I	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 J	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 K	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 L	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 M	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 N	VOA Vial, Clear, 40 mL, HCL		
21E0194-10 O	VOA Vial, Clear, 40 mL, HCL		
21E0194-11 A	Large OJ, 1000 mL	72	Fail ①

ISA for KD
Preservation Confirmed By

05/17/2021 ① Filtered at 0.45um and
Date preserved to pH <2.0 with 0.75ml
conc. HNO₃ (J2314). mL 5/18/21


 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

TB-3-20211705
21E0194-01 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/17/2021 14:19

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 10:38

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0194-01 D

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 %	104	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	95.6	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	93.2	%	
<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
Seattle WA, 98103-8636

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

Reported:
13-Dec-2021 16:25

TB-3-20211705
21E0194-01 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/17/2021 14:19

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 10:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0194-01 D

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 %	95.6	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	91.8	%	


 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:
 13-Dec-2021 16:25

MW-56-20211705
21E0194-02 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/17/2021 09:13

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 14:00

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0194-02 Q

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>				<i>80-129 %</i>	<i>110</i>	<i>%</i>	
<i>Surrogate: Toluene-d8</i>				<i>80-120 %</i>	<i>96.4</i>	<i>%</i>	
<i>Surrogate: 4-Bromofluorobenzene</i>				<i>80-120 %</i>	<i>88.8</i>	<i>%</i>	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				<i>80-120 %</i>	<i>104</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:
 13-Dec-2021 16:25

MW-56-20211705
21E0194-02 (Water)
Dissolved Gases

Method: EPA RSK-175

Sampled: 05/17/2021 09:13

Instrument: FID6 Analyst: PB

Analyzed: 05/19/2021 09:45

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0194-02 U

Preparation Batch: BJE0454

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	6350	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>96.9</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 16:25

MW-56-20211705

21E0194-02 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/17/2021 09:13

Instrument: NT11 Analyst: VTS

Analyzed: 06/04/2021 17:40

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0194-02 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0194-02 D 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	0.002	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	0.102	ug/L	
Dibenzofuran	132-64-9	1	0.002	0.010	ND	ug/L	U
Fluorene	86-73-7	1	0.002	0.010	0.005	ug/L	J
Phenanthrene	85-01-8	1	0.001	0.010	0.006	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	0.002	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	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 %	66.9	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	77.0	%	Q
Surrogate: Fluoranthene-d10				57-120 %	81.6	%	


 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:
 13-Dec-2021 16:25

MW-56-20211705
21E0194-02 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/17/2021 09:13

Instrument: FID4 Analyst: CTO

Analyzed: 05/25/2021 21:59

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0194-02 G 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	0.207	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	81.1	%	


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

Reported:
 13-Dec-2021 16:25

MW-56-20211705
21E0194-02 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/17/2021 09:13

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 02:29

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0194-02 B 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	3.10	ug/L	
Chromium	7440-47-3	1	0.260	0.500	0.438	ug/L	J
Cobalt	7440-48-4	1	0.0173	0.200	0.188	ug/L	J
Iron	7439-89-6	10	66.3	360	26500	ug/L	D
Lead	7439-92-1	1	0.0513	0.100	0.228	ug/L	
Manganese	7439-96-5	10	1.42	5.00	705	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	1.25	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:
 13-Dec-2021 16:25

MW-56-20211705
21E0194-02 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 09:13

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 02:29

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: 21E0194-02 B 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	0.676	ug/L	
Copper	7440-50-8	1	0.173	0.500	0.531	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	0.257	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:
13-Dec-2021 16:25

MW-56-20211705

21E0194-02 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/17/2021 09:13

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:04

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0194-02 A

Preparation Batch: BJE0681

Sample Size: 20 mL

Prepared: 05/27/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	0.000022	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 16:25

MW-56-20211705
21E0194-02 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/17/2021 09:13

Instrument: IC930 Analyst: CDE

Analyzed: 05/18/2021 17:13

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-02 C

Preparation Batch: BJE0445

Sample Size: 10 mL

Prepared: 05/18/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	0.100	3.66	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	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	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 16:25

MW-56-20211705

21E0194-02 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 05/17/2021 09:13

Instrument: UV1800-2 Analyst: BF

Analyzed: 05/17/2021 18:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-02 L

Preparation Batch: BJE0419

Sample Size: 5 mL

Prepared: 05/17/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		20	0.800	0.800	29.2	mg/L	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:
 13-Dec-2021 16:25

MW-56-20211705
21E0194-02RE1 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 09:13

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 22:54

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: 21E0194-02RE1 B 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


 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

MW-56-20211705
21E0194-02RE1 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/17/2021 09:13

Instrument: IC930 Analyst: CDE

Analyzed: 05/21/2021 22:14

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-02RE1 C

Preparation Batch: BJE0445

Sample Size: 10 mL

Prepared: 05/18/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	0.100	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 16:25

MW-56-20211705
21E0194-03 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/17/2021 09:13

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 04:16

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0194-03 B 02
	Preparation Batch: BJE0737	Filtration Batch: BJE0426
	Prepared: 05/28/2021	Filtration Date: 05/18/2021 10:25
	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	0.249	ug/L	J
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.116	ug/L	J
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/02/2021 02:01

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0194-03 B 02
	Preparation Batch: BJE0737	Filtration Batch: BJE0426
	Prepared: 05/28/2021	Filtration Date: 05/18/2021 10:25
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chromium, Dissolved	7440-47-3	5	1.30	2.50	ND	ug/L	U
Iron, Dissolved	7439-89-6	5	33.2	100	16300	ug/L	D
Manganese, Dissolved	7439-96-5	5	0.710	2.50	620	ug/L	D
Vanadium, Dissolved	7440-62-2	5	0.278	1.00	ND	ug/L	U


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

Reported:
 13-Dec-2021 16:25

MW-56-20211705
21E0194-03 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 09:13

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 04:16

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0737 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

 Extract ID: 21E0194-03 B 02
 Filtration Batch: BJE0426
 Filtration Date: 05/18/2021 10:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	0.341	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	0.162	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


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

Reported:
 13-Dec-2021 16:25

MW-56-20211705
21E0194-03 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/17/2021 09:13

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:37

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0194-03 B 01

Preparation Batch: BJE0741

Sample Size: 20 mL

Filtration Batch: BJE0426

Prepared: 05/28/2021

Final Volume: 20 mL

Filtration Date: 05/18/2021 10:25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000038	mg/L	J



Analytical Report

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

Reported:
13-Dec-2021 16:25

EB-1-20211705
21E0194-04 (Water)

Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/17/2021 10:28

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 11:01

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0194-04 M

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 %	96.5	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	92.3	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	



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 16:25

EB-1-20211705
21E0194-04 (Water)

Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/17/2021 10:28

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 11:01

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0194-04 M

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 %	96.5	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	90.6	%	



Analytical Report

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

Reported:
13-Dec-2021 16:25

EB-1-20211705 21E0194-04 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/17/2021 10:28

Instrument: NT11 Analyst: VTS

Analyzed: 06/04/2021 19:17

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0194-04 D 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0194-04 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	0.001	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	0.003	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	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 %	67.2	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	81.8	%	Q
Surrogate: Fluoranthene-d10				57-120 %	79.1	%	


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

Reported:
 13-Dec-2021 16:25

EB-1-20211705
21E0194-04 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/17/2021 10:28

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 23:02

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: EPA 3510C SepF
 Preparation Batch: BJE0459
 Prepared: 05/20/2021

 Sample Size: 500 mL
 Final Volume: 1 mL

Extract ID: 21E0194-04 E 01

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 %	75.8	%	



Analytical Report

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

Reported:
13-Dec-2021 16:25

EB-1-20211705 21E0194-04 (Water)

Aroclor PCB

Method: EPA 8082A

Sampled: 05/17/2021 10:28

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 21:17

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: 21E0194-04 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: 21E0194-04 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: 21E0194-04 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: 21E0194-04 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 %	63.0	%	
Surrogate: Tetrachlorometaxylene				32-120 %	57.6	%	
Surrogate: Decachlorobiphenyl [2C]				29-120 %	59.9	%	
Surrogate: Tetrachlorometaxylene [2C]				32-120 %	45.1	%	


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

Reported:
 13-Dec-2021 16:25

EB-1-20211705
21E0194-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/17/2021 10:28

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 01:30

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: 21E0194-04 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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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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EB-1-20211705
21E0194-04 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 10:28

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 01:30

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: 21E0194-04 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

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

EB-1-20211705
21E0194-04 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/17/2021 10:28

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:18

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0194-04 A

Preparation Batch: BJE0681

Sample Size: 20 mL

Prepared: 05/27/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	0.000028	mg/L	J


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

Reported:
 13-Dec-2021 16:25

EB-1-20211705
21E0194-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/17/2021 10:28

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 03:08

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0737 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

 Extract ID: 21E0194-05 A 02
 Filtration Batch: BJE0426
 Filtration Date: 05/18/2021 10:25

Analyte	CAS Number	Dilution	Detection		Reporting		Result	Units	Notes
			Limit	Limit	Limit	Limit			
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			0.161	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			ND	ug/L	U


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

Reported:
 13-Dec-2021 16:25

EB-1-20211705
21E0194-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 10:28

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 03:08

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0737 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

 Extract ID: 21E0194-05 A 02
 Filtration Batch: BJE0426
 Filtration Date: 05/18/2021 10:25

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	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 16:25

EB-1-20211705
21E0194-05 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/17/2021 10:28

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:46

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0194-05 A 01

Preparation Batch: BJE0741

Sample Size: 20 mL

Filtration Batch: BJE0426

Prepared: 05/28/2021

Final Volume: 20 mL

Filtration Date: 05/18/2021 10:25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000059	mg/L	J


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

Reported:
 13-Dec-2021 16:25

MW-58-20211705
21E0194-06 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/17/2021 11:18

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 14:22

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0194-06 L

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	50.0	ug/L	
Trichloroethene	79-01-6	1	0.07	0.20	ND	ug/L	U
Toluene	108-88-3	1	0.05	0.20	4.23	ug/L	
Tetrachloroethene	127-18-4	1	0.09	0.20	ND	ug/L	U
Ethylbenzene	100-41-4	1	0.05	0.20	63.8	ug/L	
m,p-Xylene	179601-23-1	1	0.14	0.40	82.0	ug/L	
o-Xylene	95-47-6	1	0.08	0.20	2.87	ug/L	
Xylenes, total	1330-20-7	1	0.22	0.60	84.9	ug/L	
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	119	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	102	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	94.7	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	


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

Reported:
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MW-58-20211705
21E0194-06 (Water)
Dissolved Gases

Method: EPA RSK-175

Sampled: 05/17/2021 11:18

Instrument: FID6 Analyst: PB

Analyzed: 05/19/2021 10:11

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: EPA 5030C (Purge and Trap)
 Preparation Batch: BJE0454
 Prepared: 05/19/2021

 Sample Size: 10 mL
 Final Volume: 10 mL

Extract ID: 21E0194-06 K

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	2630	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>			72-122 %	99.5	%	



Analytical Report

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

Reported:
13-Dec-2021 16:25

MW-58-20211705

21E0194-06 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/17/2021 11:18

Instrument: NT11 Analyst: VTS

Analyzed: 06/04/2021 19:50

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0194-06 C 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0194-06 C 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	2.66	ug/L	E
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.949	ug/L	
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.844	ug/L	
Acenaphthylene	208-96-8	1	0.002	0.010	ND	ug/L	U
Acenaphthene	83-32-9	1	0.003	0.010	0.017	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	0.013	ug/L	
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	0.001	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 %	52.2	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	68.9	%	Q
Surrogate: Fluoranthene-d10				57-120 %	71.0	%	


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

Reported:
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MW-58-20211705
21E0194-06 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/17/2021 11:18

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 23:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0194-06 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	0.144	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	79.8	%	


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

Reported:
 13-Dec-2021 16:25

MW-58-20211705
21E0194-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/17/2021 11:18

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 01:36

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: 21E0194-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	22.4	ug/L	
Chromium	7440-47-3	1	0.260	0.500	1.04	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	3.74	ug/L	
Iron	7439-89-6	10	182	360	55700	ug/L	D
Lead	7439-92-1	1	0.0513	0.100	0.199	ug/L	
Manganese	7439-96-5	10	1.42	5.00	1010	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	6.05	ug/L	


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

Reported:
 13-Dec-2021 16:25

MW-58-20211705
21E0194-06 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 11:18

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 01:36

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: 21E0194-06 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	43.2	ug/L	
Cadmium	7440-43-9	1	0.0300	0.100	ND	ug/L	U
Copper	7440-50-8	1	0.173	0.500	0.764	ug/L	
Nickel	7440-02-0	1	0.0792	0.500	2.97	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.514	ug/L	
Zinc	7440-66-6	1	2.92	6.00	4.61	ug/L	J


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

Reported:
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MW-58-20211705
21E0194-06 (Water)
Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/17/2021 11:18

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:20

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0194-06 A

Preparation Batch: BJE0681

Sample Size: 20 mL

Prepared: 05/27/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	0.000023	mg/L	J


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

Reported:
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MW-58-20211705
21E0194-06 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/17/2021 11:18

Instrument: IC930 Analyst: CDE

Analyzed: 05/19/2021 17:43

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-06 B

Preparation Batch: BJE0445

Sample Size: 10 mL

Prepared: 05/18/2021

Final Volume: 10 mL

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



Analytical Report

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

Reported:
13-Dec-2021 16:25

MW-58-20211705 21E0194-06RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/17/2021 11:18

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 18:33

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0194-06RE1 C 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0194-06RE1 C 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	50	0.066	0.500	9.70	ug/L	D
2-Methylnaphthalene	91-57-6	50	0.051	0.500	1.49	ug/L	D
1-Methylnaphthalene	90-12-0	50	0.046	0.500	1.29	ug/L	D
Acenaphthylene	208-96-8	50	0.093	0.500	ND	ug/L	U
Acenaphthene	83-32-9	50	0.145	0.500	ND	ug/L	U
Dibenzofuran	132-64-9	50	0.076	0.500	ND	ug/L	U
Fluorene	86-73-7	50	0.076	0.500	ND	ug/L	U
Phenanthrene	85-01-8	50	0.065	0.500	0.065	ug/L	J, D
Anthracene	120-12-7	50	0.058	0.500	0.074	ug/L	J, D
Carbazole	86-74-8	50	0.061	0.500	ND	ug/L	U
Fluoranthene	206-44-0	50	0.086	0.500	ND	ug/L	U
Pyrene	129-00-0	50	0.059	0.500	ND	ug/L	U
Benzo(a)anthracene	56-55-3	50	0.038	0.500	ND	ug/L	U
Chrysene	218-01-9	50	0.045	0.500	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	50	0.023	0.500	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	50	0.161	0.500	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	50	0.094	0.500	ND	ug/L	U
Benzofluoranthenes, Total		50	0.178	0.500	ND	ug/L	U
Benzo(a)pyrene	50-32-8	50	0.124	0.500	ND	ug/L	U
Perylene	1985-5-0	50	0.293	0.500	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	50	0.051	0.500	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	50	0.067	0.500	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	50	0.071	0.500	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %		D1	D1
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %		D1	D1
Surrogate: Fluoranthene-d10				57-120 %		D1	D1


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

Reported:
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MW-58-20211705
21E0194-06RE1 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 11:18

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 22:39

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: 21E0194-06RE1 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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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
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MW-58-20211705
21E0194-06RE1 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/17/2021 11:18

Instrument: IC930 Analyst: CDE

Analyzed: 05/21/2021 02:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-06RE1 B

Preparation Batch: BJE0445

Sample Size: 10 mL

Prepared: 05/18/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	9	0.900	0.900	41.1	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	9	0.900	0.900	9.40	mg/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 16:25

MW-58-20211705
21E0194-06RE1 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 05/17/2021 11:18

Instrument: UV1800-2 Analyst: BF

Analyzed: 05/17/2021 19:08

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-06RE1 G

Preparation Batch: BJE0419

Sample Size: 5 mL

Prepared: 05/17/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		50	2.00	2.00	54.8	mg/L	D


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

Reported:
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MW-58-20211705
21E0194-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/17/2021 11:18

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 03:12

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0194-07 A 02
	Preparation Batch: BJE0737	Filtration Batch: BJE0426
	Prepared: 05/28/2021	Filtration Date: 05/18/2021 10:25
	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	5.19	ug/L	
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	3.32	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	0.0760	ug/L	J
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/02/2021 01:51

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0194-07 A 02
	Preparation Batch: BJE0737	Filtration Batch: BJE0426
	Prepared: 05/28/2021	Filtration Date: 05/18/2021 10:25
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chromium, Dissolved	7440-47-3	5	1.30	2.50	ND	ug/L	U
Iron, Dissolved	7439-89-6	5	91.0	180	42600	ug/L	D
Manganese, Dissolved	7439-96-5	5	0.710	2.50	882	ug/L	D
Vanadium, Dissolved	7440-62-2	5	0.278	1.00	1.51	ug/L	D


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

Reported:
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MW-58-20211705
21E0194-07 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 11:18

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 03:12

Analysis by: Analytical Resources, LLC

 Sample Preparation: Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix
 Preparation Batch: BJE0737 Sample Size: 25 mL
 Prepared: 05/28/2021 Final Volume: 25 mL

 Extract ID: 21E0194-07 A 02
 Filtration Batch: BJE0426
 Filtration Date: 05/18/2021 10:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	26.3	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	2.54	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	4.37	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 16:25

MW-58-20211705

21E0194-07 (Water)

Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/17/2021 11:18

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:48

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0194-07 A 01

Preparation Batch: BJE0741

Sample Size: 20 mL

Filtration Batch: BJE0426

Prepared: 05/28/2021

Final Volume: 20 mL

Filtration Date: 05/18/2021 10:25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000068	mg/L	J


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

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-08 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/17/2021 12:51

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 14:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0194-08 P

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	0.09	ug/L	J
m,p-Xylene	179601-23-1	1	0.14	0.40	0.17	ug/L	J
o-Xylene	95-47-6	1	0.08	0.20	0.14	ug/L	J
Xylenes, total	1330-20-7	1	0.22	0.60	0.31	ug/L	J
<i>Surrogate: 1,2-Dichloroethane-d4</i>				80-129 %	101	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	95.3	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	94.4	%	
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>				80-120 %	103	%	


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

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-08 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/17/2021 12:51

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 14:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0194-08 P

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	139	ug/L	
HC ID: GRO						
Surrogate: Toluene-d8			80-120 %	95.3	%	
Surrogate: 4-Bromofluorobenzene			80-120 %	94.4	%	


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

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-08 (Water)
Dissolved Gases

Method: EPA RSK-175

Sampled: 05/17/2021 12:51

Instrument: FID6 Analyst: PB

Analyzed: 05/19/2021 10:24

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0194-08 N

Preparation Batch: BJE0454

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	8940	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>94.2</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:
13-Dec-2021 16:25

MW-60-20211705

21E0194-08 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/17/2021 12:51

Instrument: NT11 Analyst: VTS

Analyzed: 06/04/2021 20:23

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0194-08 E 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0194-08 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	1	0.001	0.010	0.012	ug/L	
2-Methylnaphthalene	91-57-6	1	0.001	0.010	0.014	ug/L	
1-Methylnaphthalene	90-12-0	1	0.0009	0.010	0.868	ug/L	
Acenaphthylene	208-96-8	1	0.002	0.010	0.029	ug/L	
Acenaphthene	83-32-9	1	0.003	0.010	5.13	ug/L	E
Dibenzofuran	132-64-9	1	0.002	0.010	0.031	ug/L	
Fluorene	86-73-7	1	0.002	0.010	1.54	ug/L	E
Phenanthrene	85-01-8	1	0.001	0.010	0.941	ug/L	
Anthracene	120-12-7	1	0.001	0.010	0.062	ug/L	
Carbazole	86-74-8	1	0.001	0.010	0.035	ug/L	
Fluoranthene	206-44-0	1	0.002	0.010	0.009	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 %	62.0	%	
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %	53.7	%	Q
Surrogate: Fluoranthene-d10				57-120 %	66.0	%	


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

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-08 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/17/2021 12:51

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 23:44

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0194-08 F 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	1.08	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	72.4	%	


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

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-08 (Water)
Aroclor PCB

Method: EPA 8082A

Sampled: 05/17/2021 12:51

Instrument: ECD7 Analyst: JGR

Analyzed: 05/28/2021 21:39

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: 21E0194-08 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: 21E0194-08 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: 21E0194-08 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: 21E0194-08 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 %	39.5	%	
<i>Surrogate: Tetrachlorometaxylene</i>				32-120 %	33.2	%	
<i>Surrogate: Decachlorobiphenyl [2C]</i>				29-120 %	38.1	%	
<i>Surrogate: Tetrachlorometaxylene [2C]</i>				32-120 %	29.8	%	*


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

Reported:
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MW-60-20211705
21E0194-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/17/2021 12:51

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 02:19

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: 21E0194-08 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Barium	7440-39-3	1	0.114	0.500	17.4	ug/L	
Chromium	7440-47-3	1	0.260	0.500	1.30	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	0.550	ug/L	
Iron	7439-89-6	10	182	360	53100	ug/L	D
Lead	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Manganese	7439-96-5	10	1.42	5.00	1330	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	5.82	ug/L	


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

Reported:
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MW-60-20211705
21E0194-08 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 12:51

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 02:19

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: 21E0194-08 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic	7440-38-2	1	0.0373	0.200	16.5	ug/L	
Copper	7440-50-8	1	0.173	0.500	0.460	ug/L	J
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



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 16:25

MW-60-20211705

21E0194-08 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/17/2021 12:51

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0194-08 A

Preparation Batch: BJE0681

Sample Size: 20 mL

Prepared: 05/27/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	0.000020	mg/L	J


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

Reported:
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MW-60-20211705
21E0194-08 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/17/2021 12:51

Instrument: IC930 Analyst: CDE

Analyzed: 05/19/2021 18:03

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-08 D

Preparation Batch: BJE0445

Sample Size: 10 mL

Prepared: 05/18/2021

Final Volume: 10 mL

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



Analytical Report

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

Reported:
13-Dec-2021 16:25

MW-60-20211705 21E0194-08RE1 (Water)

Semivolatile Organic Compounds - SIM

Method: EPA 8270E-SIM

Sampled: 05/17/2021 12:51

Instrument: NT11 Analyst: VTS

Analyzed: 06/05/2021 19:05

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: EPA 3510C SepF Preparation Batch: BJE0432 Prepared: 05/19/2021	Sample Size: 500 mL Final Volume: 0.5 mL	Extract ID: 21E0194-08RE1 E 01
Sample Cleanup:	Cleanup Method: Silica Gel Cleanup Batch: CJE0210 Cleaned: 26-May-2021	Initial Volume: 0.5 mL Final Volume: 0.5 mL	Extract ID: 21E0194-08RE1 E 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Naphthalene	91-20-3	100	0.131	1.00	ND	ug/L	U
2-Methylnaphthalene	91-57-6	100	0.102	1.00	ND	ug/L	U
1-Methylnaphthalene	90-12-0	100	0.091	1.00	1.10	ug/L	D
Acenaphthylene	208-96-8	100	0.185	1.00	ND	ug/L	U
Acenaphthene	83-32-9	100	0.289	1.00	27.0	ug/L	D
Dibenzofuran	132-64-9	100	0.152	1.00	ND	ug/L	U
Fluorene	86-73-7	100	0.152	1.00	2.08	ug/L	D
Phenanthrene	85-01-8	100	0.130	1.00	1.45	ug/L	D
Anthracene	120-12-7	100	0.116	1.00	ND	ug/L	U
Carbazole	86-74-8	100	0.121	1.00	ND	ug/L	U
Fluoranthene	206-44-0	100	0.171	1.00	ND	ug/L	U
Pyrene	129-00-0	100	0.118	1.00	ND	ug/L	U
Benzo(a)anthracene	56-55-3	100	0.075	1.00	ND	ug/L	U
Chrysene	218-01-9	100	0.090	1.00	ND	ug/L	U
Benzo(b)fluoranthene	205-99-2	100	0.046	1.00	ND	ug/L	U
Benzo(k)fluoranthene	207-08-9	100	0.321	1.00	ND	ug/L	U
Benzo(j)fluoranthene	205-82-3	100	0.187	1.00	ND	ug/L	U
Benzofluoranthenes, Total		100	0.356	1.00	ND	ug/L	U
Benzo(a)pyrene	50-32-8	100	0.248	1.00	ND	ug/L	U
Perylene	1985-5-0	100	0.586	1.00	ND	ug/L	U
Indeno(1,2,3-cd)pyrene	193-39-5	100	0.101	1.00	ND	ug/L	U
Dibenzo(a,h)anthracene	53-70-3	100	0.134	1.00	ND	ug/L	U
Benzo(g,h,i)perylene	191-24-2	100	0.142	1.00	ND	ug/L	U
Surrogate: 2-Methylnaphthalene-d10				42-120 %		D1	D1
Surrogate: Dibenzo[a,h]anthracene-d14				29-120 %		D1	D1
Surrogate: Fluoranthene-d10				57-120 %		D1	D1



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

MW-60-20211705
21E0194-08RE1 (Water)

Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 12:51

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 22:44

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: 21E0194-08RE1 A 01

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cadmium	7440-43-9	1	0.0300	0.100	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-60-20211705
21E0194-08RE1 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/17/2021 12:51

Instrument: IC930 Analyst: CDE

Analyzed: 05/21/2021 02:26

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-08RE1 D

Preparation Batch: BJE0445

Sample Size: 10 mL

Prepared: 05/18/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	2	0.200	0.200	11.6	mg/L	D

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	2	0.200	0.200	1.37	mg/L	D



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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 16:25

MW-60-20211705
21E0194-08RE1 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 05/17/2021 12:51

Instrument: UV1800-2 Analyst: BF

Analyzed: 05/17/2021 19:08

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-08RE1 I

Preparation Batch: BJE0419

Sample Size: 5 mL

Prepared: 05/17/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		50	2.00	2.00	54.0	mg/L	D


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

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/17/2021 12:51

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 03:17

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0194-09 A 02
	Preparation Batch: BJE0737	Filtration Batch: BJE0426
	Prepared: 05/28/2021	Filtration Date: 05/18/2021 10:25
	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	0.766	ug/L	
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.505	ug/L	
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/02/2021 01:56

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0194-09 A 02
	Preparation Batch: BJE0737	Filtration Batch: BJE0426
	Prepared: 05/28/2021	Filtration Date: 05/18/2021 10:25
	Sample Size: 25 mL	
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chromium, Dissolved	7440-47-3	5	1.30	2.50	ND	ug/L	U
Iron, Dissolved	7439-89-6	5	91.0	180	35100	ug/L	D
Manganese, Dissolved	7439-96-5	5	0.710	2.50	1160	ug/L	D
Vanadium, Dissolved	7440-62-2	5	0.278	1.00	1.35	ug/L	D


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

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 12:51

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 03:17

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0194-09 A 02

Preparation Batch: BJE0737

Sample Size: 25 mL

Filtration Batch: BJE0426

Prepared: 05/28/2021

Final Volume: 25 mL

Filtration Date: 05/18/2021 10:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	10.8	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	1.27	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


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

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-09 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/17/2021 12:51

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:50

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0194-09 A 01

Preparation Batch: BJE0741

Sample Size: 20 mL

Filtration Batch: BJE0426

Prepared: 05/28/2021

Final Volume: 20 mL

Filtration Date: 05/18/2021 10:25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000063	mg/L	J


 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 16:25

MW-36-20211705
21E0194-10 (Water)
Volatile Organic Compounds

Method: EPA 8260D

Sampled: 05/17/2021 14:19

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 15:06

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0194-10 J

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 %	98.4	%	
<i>Surrogate: Toluene-d8</i>				80-120 %	96.3	%	
<i>Surrogate: 4-Bromofluorobenzene</i>				80-120 %	88.1	%	
<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:
 13-Dec-2021 16:25

MW-36-20211705
21E0194-10 (Water)
Volatile Organic Compounds

Method: NWTPHg

Sampled: 05/17/2021 14:19

Instrument: NT2 Analyst: LH

Analyzed: 05/19/2021 15:06

Analysis by: Analytical Resources, LLC

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

Extract ID: 21E0194-10 J

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 %	96.3	%	
<i>Surrogate: 4-Bromofluorobenzene</i>			80-120 %	88.1	%	


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:25

MW-36-20211705
21E0194-10 (Water)
Dissolved Gases

Method: EPA RSK-175

Sampled: 05/17/2021 14:19

Instrument: FID6 Analyst: PB

Analyzed: 05/19/2021 10:38

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 5030C (Purge and Trap)

Extract ID: 21E0194-10 H

Preparation Batch: BJE0454

Sample Size: 10 mL

Prepared: 05/19/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Reporting Limit	Result	Units	Notes
Methane	74-82-8	1	0.65	6220	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>94.0</i>	<i>%</i>	


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

Reported:
 13-Dec-2021 16:25

MW-36-20211705
21E0194-10 (Water)
Petroleum Hydrocarbons

Method: NWTPH-Dx

Sampled: 05/17/2021 14:19

Instrument: FID4 Analyst: CTO

Analyzed: 05/26/2021 00:05

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: EPA 3510C SepF

Extract ID: 21E0194-10 C 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	0.614	mg/L	
HC ID: DRO						
Motor Oil Range Organics (C24-C38)	RRO	1	0.200	ND	mg/L	U
Surrogate: o-Terphenyl			50-150 %	77.9	%	


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 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:25

MW-36-20211705
21E0194-10 (Water)
Metals and Metallic Compounds

Method: EPA 6020B

Sampled: 05/17/2021 14:19

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 02:24

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: 21E0194-10 A 01

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Chromium	7440-47-3	1	0.260	0.500	1.25	ug/L	
Cobalt	7440-48-4	1	0.0173	0.200	0.145	ug/L	J
Lead	7439-92-1	1	0.0513	0.100	0.0570	ug/L	J
Manganese	7439-96-5	20	2.84	10.0	2910	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 16:25

MW-36-20211705
21E0194-10 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 14:19

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 02:24

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0194-10 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	43.1	ug/L	
Copper	7440-50-8	1	0.173	0.500	0.388	ug/L	J
Nickel	7440-02-0	1	0.0792	0.500	0.833	ug/L	
Selenium	7782-49-2	1	0.179	0.500	0.247	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 16:25

MW-36-20211705

21E0194-10 (Water)

Metals and Metallic Compounds

Method: EPA 7470A

Sampled: 05/17/2021 14:19

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:25

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0194-10 A

Preparation Batch: BJE0681

Sample Size: 20 mL

Prepared: 05/27/2021

Final Volume: 20 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury	7439-97-6	1	0.000013	0.000100	0.000023	mg/L	J


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

Reported:
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MW-36-20211705
21E0194-10 (Water)
Wet Chemistry

Method: EPA 300.0

Sampled: 05/17/2021 14:19

Instrument: IC930 Analyst: CDE

Analyzed: 05/19/2021 18:23

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-10 B

Preparation Batch: BJE0445

Sample Size: 10 mL

Prepared: 05/18/2021

Final Volume: 10 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chloride	16887-00-6	1	0.100	0.100	4.54	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

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Sulfate	14808-79-8	1	0.100	0.100	1.08	mg/L	



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Analytical Chemists and Consultants

Analytical Report

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

Reported:
13-Dec-2021 16:25

MW-36-20211705

21E0194-10 (Water)

Wet Chemistry

Method: SM 3500-Fe B-97

Sampled: 05/17/2021 14:19

Instrument: UV1800-2 Analyst: BF

Analyzed: 05/17/2021 18:48

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: No Prep Wet Chem

Extract ID: 21E0194-10 E

Preparation Batch: BJE0419

Sample Size: 5 mL

Prepared: 05/17/2021

Final Volume: 5 mL

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Ferrous Iron		20	0.800	0.800	28.7	mg/L	D


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Reported:
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MW-36-20211705
21E0194-10RE1 (Water)
Metals and Metallic Compounds

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 14:19

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/03/2021 22:49

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: 21E0194-10RE1 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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 Project: Lower Duwamish
 Project Number: Lower Duwamish
 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B

Sampled: 05/17/2021 12:51

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 04:11

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0194-11 A 02
	Preparation Batch: BJE0737	Filtration Batch: BJE0426
	Sample Size: 25 mL	
	Prepared: 05/28/2021	Filtration Date: 05/18/2021 10:25
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Cobalt, Dissolved	7440-48-4	1	0.0173	0.200	0.134	ug/L	J
Lead, Dissolved	7439-92-1	1	0.0513	0.100	ND	ug/L	U
Silver, Dissolved	7440-22-4	1	0.0220	0.200	ND	ug/L	U

Instrument: ICPMS2 Analyst: MCB

Analyzed: 06/02/2021 01:46

Analysis by: Analytical Resources, LLC

Sample Preparation:	Preparation Method: REN EPA 600/4-79-020 4.1.4 HNO3 matrix	Extract ID: 21E0194-11 A 02
	Preparation Batch: BJE0737	Filtration Batch: BJE0426
	Sample Size: 25 mL	
	Prepared: 05/28/2021	Filtration Date: 05/18/2021 10:25
	Final Volume: 25 mL	

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Chromium, Dissolved	7440-47-3	20	5.20	10.0	ND	ug/L	U
Manganese, Dissolved	7439-96-5	20	2.84	10.0	2830	ug/L	D


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

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 6020B UCT-KED

Sampled: 05/17/2021 12:51

Instrument: ICPMS1 Analyst: MCB

Analyzed: 05/29/2021 04:11

Analysis by: Analytical Resources, LLC

Sample Preparation:

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

Extract ID: 21E0194-11 A 02

Preparation Batch: BJE0737

Sample Size: 25 mL

Filtration Batch: BJE0426

Prepared: 05/28/2021

Final Volume: 25 mL

Filtration Date: 05/18/2021 10:25

Analyte	CAS Number	Dilution	Detection	Reporting	Result	Units	Notes
			Limit	Limit			
Arsenic, Dissolved	7440-38-2	1	0.0373	0.200	18.3	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	0.543	ug/L	
Selenium, Dissolved	7782-49-2	1	0.179	0.500	0.214	ug/L	J
Zinc, Dissolved	7440-66-6	1	2.92	5.00	ND	ug/L	U


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 Project Manager: Meg Strong

Reported:
 13-Dec-2021 16:25

MW-60-20211705
21E0194-11 (Water)
Metals and Metallic Compounds (dissolved)

Method: EPA 7470A

Sampled: 05/17/2021 12:51

Instrument: HYDRA Analyst: ML

Analyzed: 06/01/2021 12:53

Analysis by: Analytical Resources, LLC

Sample Preparation:

Preparation Method: TWM EPA 7470A

Extract ID: 21E0194-11 A 01

Preparation Batch: BJE0741

Sample Size: 20 mL

Filtration Batch: BJE0426

Prepared: 05/28/2021

Final Volume: 20 mL

Filtration Date: 05/18/2021 10:25

Analyte	CAS Number	Dilution	Detection Limit	Reporting Limit	Result	Units	Notes
Mercury, Dissolved	7439-97-6	1	0.000013	0.000100	0.000060	mg/L	J


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

Reported:
 13-Dec-2021 16:25

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 16:25

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			



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

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
Matrix Spike (BJE0456-MS1) Source: 21E0194-02 Prepared: 19-May-2021 Analyzed: 19-May-2021 18:23											
Vinyl Chloride	9.16	0.08	0.20	ug/L	10.0	ND	91.6	66-133			
1,1-Dichloroethene	9.97	0.08	0.20	ug/L	10.0	ND	99.7	69-135			
trans-1,2-Dichloroethene	9.70	0.07	0.20	ug/L	10.0	ND	97.0	78-128			
cis-1,2-Dichloroethene	9.99	0.08	0.20	ug/L	10.0	ND	99.9	80-121			
Benzene	10.3	0.05	0.20	ug/L	10.0	ND	103	80-120			
Trichloroethene	9.92	0.07	0.20	ug/L	10.0	ND	99.2	80-120			
Toluene	9.99	0.05	0.20	ug/L	10.0	ND	99.9	80-120			
Tetrachloroethene	10.5	0.09	0.20	ug/L	10.0	ND	105	80-120			
Ethylbenzene	10.6	0.05	0.20	ug/L	10.0	ND	106	80-120			
m,p-Xylene	21.7	0.14	0.40	ug/L	20.0	ND	108	80-121			
o-Xylene	9.81	0.08	0.20	ug/L	10.0	ND	98.1	80-121			
Xylenes, total	31.5	0.22	0.60	ug/L	30.0	ND	105	76-127			
Surrogate: 1,2-Dichloroethane-d4	4.76			ug/L	5.00	5.51	95.2	80-129			
Surrogate: Toluene-d8	4.96			ug/L	5.00	4.82	99.2	80-120			
Surrogate: 4-Bromofluorobenzene	4.77			ug/L	5.00	4.44	95.4	80-120			
Surrogate: 1,2-Dichlorobenzene-d4	4.97			ug/L	5.00	5.19	99.5	80-120			

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

Matrix Spike Dup (BJE0456-MSD1) Source: 21E0194-02 Prepared: 19-May-2021 Analyzed: 19-May-2021 18:44											
Vinyl Chloride	9.83	0.08	0.20	ug/L	10.0	ND	98.3	66-133	7.06	30	
1,1-Dichloroethene	10.1	0.08	0.20	ug/L	10.0	ND	101	69-135	1.10	30	
trans-1,2-Dichloroethene	9.83	0.07	0.20	ug/L	10.0	ND	98.3	78-128	1.31	30	
cis-1,2-Dichloroethene	10.2	0.08	0.20	ug/L	10.0	ND	102	80-121	1.79	30	
Benzene	10.4	0.05	0.20	ug/L	10.0	ND	104	80-120	1.51	30	
Trichloroethene	10.0	0.07	0.20	ug/L	10.0	ND	100	80-120	1.14	30	
Toluene	10.2	0.05	0.20	ug/L	10.0	ND	102	80-120	1.61	30	
Tetrachloroethene	10.6	0.09	0.20	ug/L	10.0	ND	106	80-120	0.91	30	
Ethylbenzene	10.7	0.05	0.20	ug/L	10.0	ND	107	80-120	1.30	30	
m,p-Xylene	22.0	0.14	0.40	ug/L	20.0	ND	110	80-121	1.38	30	
o-Xylene	9.88	0.08	0.20	ug/L	10.0	ND	98.8	80-121	0.70	30	
Xylenes, total	31.9	0.22	0.60	ug/L	30.0	ND	106	76-127	1.17	30	
Surrogate: 1,2-Dichloroethane-d4	4.77			ug/L	5.00	5.51	95.4	80-129			
Surrogate: Toluene-d8	4.98			ug/L	5.00	4.82	99.5	80-120			
Surrogate: 4-Bromofluorobenzene	4.81			ug/L	5.00	4.44	96.2	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:
 13-Dec-2021 16:25

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
Matrix Spike Dup (BJE0456-MSD1)		Source: 21E0194-02		Prepared: 19-May-2021		Analyzed: 19-May-2021 18:44					
<i>Surrogate: 1,2-Dichlorobenzene-d4</i>	4.99			ug/L	5.00	5.19	99.8	80-120			

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 16:25

Analysis by: Analytical Resources, LLC

Dissolved Gases - Quality Control

Batch BJE0454 - 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 (BJE0454-BLK1)		Prepared: 19-May-2021 Analyzed: 19-May-2021 08:52								
Methane	ND	0.65	ug/L							U
Ethane	ND	1.23	ug/L							U
Ethene	ND	1.14	ug/L							U
Surrogate: Propane	1950		ug/L	1800		108	72-122			
LCS (BJE0454-BS1)		Prepared: 19-May-2021 Analyzed: 19-May-2021 07:22								
Methane	675	0.65	ug/L	656		103	80-120			
Ethane	1370	1.23	ug/L	1230		111	80-120			
Ethene	1070	1.14	ug/L	1150		92.6	80-120			
Surrogate: Propane	2050		ug/L	1800		114	62-122			
LCS Dup (BJE0454-BSD1)		Prepared: 19-May-2021 Analyzed: 19-May-2021 07:49								
Methane	659	0.65	ug/L	656		100	80-120	2.42	30	
Ethane	1300	1.23	ug/L	1230		105	80-120	5.32	30	
Ethene	1020	1.14	ug/L	1150		88.4	80-120	4.68	30	
Surrogate: Propane	2000		ug/L	1800		111	62-122			
Duplicate (BJE0454-DUP1)		Source: 21E0194-02		Prepared: 19-May-2021 Analyzed: 19-May-2021 09:58						
Methane	7100	0.65	ug/L		6350			11.20	30	
Ethane	ND	1.23	ug/L		ND					U
Ethene	ND	1.14	ug/L		ND					U
Surrogate: Propane	1750		ug/L	1800	1740	97.2	72-122			
Matrix Spike (BJE0454-MS1)		Source: 21E0194-02		Prepared: 19-May-2021 Analyzed: 19-May-2021 10:51						
Methane	8100	0.65	ug/L	656	6350	267	80-120			*
Ethane	1210	1.23	ug/L	1230	ND	98.5	80-120			
Ethene	950	1.14	ug/L	1150	ND	82.6	80-120			
Surrogate: Propane	1780		ug/L	1800	1740	98.7	62-122			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike Dup (BJE0454-MSD1)		Source: 21E0194-02		Prepared: 19-May-2021 Analyzed: 19-May-2021 11:04						
Methane	7960	0.65	ug/L	656	6350	246	80-120	1.74	30	*
Ethane	1200	1.23	ug/L	1230	ND	97.8	80-120	0.77	30	
Ethene	940	1.14	ug/L	1150	ND	81.7	80-120	1.03	30	


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

Reported:
 13-Dec-2021 16:25

Analysis by: Analytical Resources, LLC
Dissolved Gases - Quality Control
Batch BJE0454 - EPA 5030C (Purge and Trap)

Instrument: FID6 Analyst: PB

QC Sample/Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC Limits	RPD Limit	Notes
Matrix Spike Dup (BJE0454-MSD1)		Source: 21E0194-02		Prepared: 19-May-2021		Analyzed: 19-May-2021 11:04		
<i>Surrogate: Propane</i>	1710		ug/L	1800	1740	94.8	62-122	

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 16:25

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0432 - 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 (BJE0432-BLK1)						Prepared: 19-May-2021 Analyzed: 04-Jun-2021 14:24					
Naphthalene	0.001	0.001	0.010	ug/L							J
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	0.001	0.001	0.010	ug/L							J
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>	0.185			ug/L	0.300		61.5	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.248			ug/L	0.300		82.6	29-120			Q
<i>Surrogate: Fluoranthene-d10</i>	0.219			ug/L	0.300		73.0	57-120			
LCS (BJE0432-BS1)						Prepared: 19-May-2021 Analyzed: 04-Jun-2021 14:57					
Naphthalene	0.211	0.001	0.010	ug/L	0.300		70.4	37-120			
2-Methylnaphthalene	0.203	0.001	0.010	ug/L	0.300		67.7	37-120			
1-Methylnaphthalene	0.203	0.0009	0.010	ug/L	0.300		67.6	29-120			
Acenaphthylene	0.205	0.002	0.010	ug/L	0.300		68.5	41-120			
Acenaphthene	0.214	0.003	0.010	ug/L	0.300		71.5	41-120			
Dibenzofuran	0.211	0.002	0.010	ug/L	0.300		70.3	38-120			
Fluorene	0.221	0.002	0.010	ug/L	0.300		73.6	43-120			


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 Project: Lower Duwamish
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Reported:
 13-Dec-2021 16:25

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0432 - 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 (BJE0432-BS1)						Prepared: 19-May-2021 Analyzed: 04-Jun-2021 14:57					
Phenanthrene	0.222	0.001	0.010	ug/L	0.300		74.0	41-120			
Anthracene	0.211	0.001	0.010	ug/L	0.300		70.3	40-120			
Carbazole	0.225	0.001	0.010	ug/L	0.300		75.1	30-160			
Fluoranthene	0.230	0.002	0.010	ug/L	0.300		76.7	45-120			
Pyrene	0.228	0.001	0.010	ug/L	0.300		75.9	41-120			
Benzo(a)anthracene	0.232	0.0008	0.010	ug/L	0.300		77.2	42-120			
Chrysene	0.219	0.0009	0.010	ug/L	0.300		73.1	44-120			
Benzo(b)fluoranthene	0.249	0.0005	0.010	ug/L	0.300		83.1	44-120			
Benzo(k)fluoranthene	0.231	0.003	0.010	ug/L	0.300		77.1	50-120			
Benzo(j)fluoranthene	0.199	0.002	0.010	ug/L	0.300		66.4	39-160			
Benzofluoranthenes, Total	0.680	0.004	0.010	ug/L	0.900		75.5	46-120			
Benzo(a)pyrene	0.219	0.002	0.010	ug/L	0.300		72.9	35-120			
Perylene	0.202	0.006	0.010	ug/L	0.300		67.4	30-160			
Indeno(1,2,3-cd)pyrene	0.265	0.001	0.010	ug/L	0.300		88.3	37-120			
Dibenzo(a,h)anthracene	0.263	0.001	0.010	ug/L	0.300		87.7	34-120			
Benzo(g,h,i)perylene	0.300	0.001	0.010	ug/L	0.300		100	38-120			Q
Surrogate: 2-Methylnaphthalene-d10	0.203			ug/L	0.300		67.6	42-120			
Surrogate: Dibenzo[a,h]anthracene-d14	0.265			ug/L	0.300		88.3	29-120			Q
Surrogate: Fluoranthene-d10	0.226			ug/L	0.300		75.3	57-120			
Matrix Spike (BJE0432-MS1)						Source: 21E0194-02 Prepared: 19-May-2021 Analyzed: 04-Jun-2021 18:13					
Naphthalene	0.052	0.001	0.010	ug/L	0.300	0.007	14.9	37-120			*
2-Methylnaphthalene	0.049	0.001	0.010	ug/L	0.300	0.002	15.7	37-120			*
1-Methylnaphthalene	0.048	0.0009	0.010	ug/L	0.300	0.001	15.7	29-120			*
Acenaphthylene	0.052	0.002	0.010	ug/L	0.300	ND	17.2	41-120			*
Acenaphthene	0.076	0.003	0.010	ug/L	0.300	0.102	-8.60	41-120			*
Dibenzofuran	0.055	0.002	0.010	ug/L	0.300	ND	18.4	38-120			*
Fluorene	0.056	0.002	0.010	ug/L	0.300	0.005	17.1	43-120			*
Phenanthrene	0.059	0.001	0.010	ug/L	0.300	0.006	17.7	41-120			*
Anthracene	0.051	0.001	0.010	ug/L	0.300	0.001	16.7	40-120			*
Carbazole	0.057	0.001	0.010	ug/L	0.300	ND	19.0	30-160			*
Fluoranthene	0.056	0.002	0.010	ug/L	0.300	0.002	18.0	45-120			*
Pyrene	0.056	0.001	0.010	ug/L	0.300	0.002	17.9	41-120			*
Benzo(a)anthracene	0.057	0.0008	0.010	ug/L	0.300	ND	19.0	42-120			*
Chrysene	0.057	0.0009	0.010	ug/L	0.300	ND	19.1	44-120			*



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 16:25

Analysis by: Analytical Resources, LLC

Semivolatile Organic Compounds - SIM - Quality Control

Batch BJE0432 - 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
Matrix Spike (BJE0432-MS1)		Source: 21E0194-02		Prepared: 19-May-2021		Analyzed: 04-Jun-2021 18:13					
Benzo(b)fluoranthene	0.061	0.0005	0.010	ug/L	0.300	ND	20.4	44-120			*
Benzo(k)fluoranthene	0.055	0.003	0.010	ug/L	0.300	ND	18.2	50-120			*
Benzo(j)fluoranthene	0.046	0.002	0.010	ug/L	0.300	ND	15.4	39-160			*
Benzofluoranthenes, Total	0.162	0.004	0.010	ug/L	0.900	ND	18.0	46-120			*
Benzo(a)pyrene	0.050	0.002	0.010	ug/L	0.300	ND	16.5	35-120			*
Perylene	0.052	0.006	0.010	ug/L	0.300	ND	17.5	30-160			*
Indeno(1,2,3-cd)pyrene	0.056	0.001	0.010	ug/L	0.300	ND	18.8	37-120			*
Dibenzo(a,h)anthracene	0.056	0.001	0.010	ug/L	0.300	ND	18.6	34-120			*
Benzo(g,h,i)perylene	0.067	0.001	0.010	ug/L	0.300	ND	22.5	38-120			*, Q
Surrogate: 2-Methylnaphthalene-d10	0.0487			ug/L	0.300	0.201	16.2	42-120			*
Surrogate: Dibenzo[a,h]anthracene-d14	0.0561			ug/L	0.300	0.231	18.7	29-120			*, Q
Surrogate: Fluoranthene-d10	0.0555			ug/L	0.300	0.245	18.5	57-120			*

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

Matrix Spike Dup (BJE0432-MSD1)		Source: 21E0194-02		Prepared: 19-May-2021		Analyzed: 04-Jun-2021 18:45					
Naphthalene	0.221	0.001	0.010	ug/L	0.300	0.007	71.3	37-120	124.00	30	*
2-Methylnaphthalene	0.220	0.001	0.010	ug/L	0.300	0.002	72.9	37-120	128.00	30	*
1-Methylnaphthalene	0.218	0.0009	0.010	ug/L	0.300	0.001	72.2	29-120	127.00	30	*
Acenaphthylene	0.218	0.002	0.010	ug/L	0.300	ND	72.5	41-120	123.00	30	*
Acenaphthene	0.315	0.003	0.010	ug/L	0.300	0.102	71.0	41-120	122.00	30	*
Dibenzofuran	0.217	0.002	0.010	ug/L	0.300	ND	72.4	38-120	119.00	30	*
Fluorene	0.231	0.002	0.010	ug/L	0.300	0.005	75.2	43-120	122.00	30	*
Phenanthrene	0.228	0.001	0.010	ug/L	0.300	0.006	74.1	41-120	118.00	30	*
Anthracene	0.235	0.001	0.010	ug/L	0.300	0.001	77.8	40-120	128.00	30	*
Carbazole	0.231	0.001	0.010	ug/L	0.300	ND	77.0	30-160	121.00	30	*
Fluoranthene	0.240	0.002	0.010	ug/L	0.300	0.002	79.3	45-120	124.00	30	*
Pyrene	0.239	0.001	0.010	ug/L	0.300	0.002	79.0	41-120	124.00	30	*
Benzo(a)anthracene	0.244	0.0008	0.010	ug/L	0.300	ND	81.4	42-120	124.00	30	*
Chrysene	0.225	0.0009	0.010	ug/L	0.300	ND	75.1	44-120	119.00	30	*
Benzo(b)fluoranthene	0.245	0.0005	0.010	ug/L	0.300	ND	81.7	44-120	120.00	30	*
Benzo(k)fluoranthene	0.232	0.003	0.010	ug/L	0.300	ND	77.3	50-120	124.00	30	*
Benzo(j)fluoranthene	0.204	0.002	0.010	ug/L	0.300	ND	68.0	39-160	126.00	30	*
Benzofluoranthenes, Total	0.681	0.004	0.010	ug/L	0.900	ND	75.6	46-120	123.00	30	*
Benzo(a)pyrene	0.229	0.002	0.010	ug/L	0.300	ND	76.4	35-120	129.00	30	*


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

Reported:
 13-Dec-2021 16:25

Analysis by: Analytical Resources, LLC
Semivolatile Organic Compounds - SIM - Quality Control
Batch BJE0432 - 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
Matrix Spike Dup (BJE0432-MSD1)		Source: 21E0194-02		Prepared: 19-May-2021		Analyzed: 04-Jun-2021 18:45					
Perylene	0.213	0.006	0.010	ug/L	0.300	ND	71.2	30-160	121.00	30	*
Indeno(1,2,3-cd)pyrene	0.241	0.001	0.010	ug/L	0.300	ND	80.2	37-120	124.00	30	*
Dibenzo(a,h)anthracene	0.232	0.001	0.010	ug/L	0.300	ND	77.5	34-120	123.00	30	*
Benzo(g,h,i)perylene	0.275	0.001	0.010	ug/L	0.300	ND	91.7	38-120	121.00	30	*, Q
<i>Surrogate: 2-Methylnaphthalene-d10</i>	0.211			ug/L	0.300	0.201	70.4	42-120			
<i>Surrogate: Dibenzo[a,h]anthracene-d14</i>	0.235			ug/L	0.300	0.231	78.3	29-120			Q
<i>Surrogate: Fluoranthene-d10</i>	0.233			ug/L	0.300	0.245	77.7	57-120			

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 16:25

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	%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			
Matrix Spike (BJE0459-MS1)				Source: 21E0194-02 Prepared: 20-May-2021 Analyzed: 25-May-2021 22:20						
Diesel Range Organics (C12-C24)	2.46	0.100	mg/L	3.00	0.207	75.0	56-120			
<i>Surrogate: o-Terphenyl</i>	0.167		mg/L	0.225	0.182	74.2	50-150			
Recovery limits for target analytes in MS/MSD QC samples are advisory only.										
Matrix Spike Dup (BJE0459-MSD1)				Source: 21E0194-02 Prepared: 20-May-2021 Analyzed: 25-May-2021 22:41						
Diesel Range Organics (C12-C24)	2.34	0.100	mg/L	3.00	0.207	71.0	56-120	5.00	30	
<i>Surrogate: o-Terphenyl</i>	0.159		mg/L	0.225	0.182	70.8	50-150			
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 16:25

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			


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 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 - Quality Control
Batch BJE0681 - 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 (BJE0681-BLK1)						Prepared: 27-May-2021 Analyzed: 01-Jun-2021 11:45					
Mercury	ND	0.000013	0.000100	mg/L							U
LCS (BJE0681-BS1)						Prepared: 27-May-2021 Analyzed: 01-Jun-2021 11:48					
Mercury	0.00191	0.000013	0.000100	mg/L	0.00200		95.5	80-120			
Duplicate (BJE0681-DUP2)						Source: 21E0194-02 Prepared: 27-May-2021 Analyzed: 01-Jun-2021 12:06					
Mercury	0.000041	0.000013	0.000100	mg/L		0.000022			59.90	20	L, J
Matrix Spike (BJE0681-MS2)						Source: 21E0194-02 Prepared: 27-May-2021 Analyzed: 01-Jun-2021 12:09					
Mercury	0.000999	0.000013	0.000100	mg/L	0.00100	0.000022	97.7	75-125			

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 16:25

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			


 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 - Quality Control
Batch BJJ0053 - 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			
Duplicate (BJF0053-DUP1)						Source: 21E0194-02 Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 02:34						
Barium	135	3.08	0.114	0.500	ug/L		3.10			0.65	20	
Chromium	52	0.479	0.260	0.500	ug/L		0.438			8.94	20	J
Cobalt	59	0.212	0.0173	0.200	ug/L		0.188			12.00	20	
Lead	208	0.226	0.0513	0.100	ug/L		0.228			0.88	20	
Silver	107	ND	0.0220	0.200	ug/L		ND					U
Vanadium	51a	1.26	0.0556	0.200	ug/L		1.25			0.48	20	
Arsenic	75a	0.690	0.0373	0.200	ug/L		0.676			2.05	20	
Copper	63	0.589	0.173	0.500	ug/L		0.531			10.40	20	
Nickel	60	0.303	0.0792	0.500	ug/L		0.257			16.40	20	J
Selenium	78	ND	0.179	0.500	ug/L		ND					U
Zinc	66	ND	2.92	6.00	ug/L		ND					U
Duplicate (BJF0053-DUP2)						Source: 21E0194-02 Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 21:53						
Iron	57	26100	66.3	360	ug/L		26500			1.66	20	D
Manganese	55	696	1.42	5.00	ug/L		705			1.38	20	D
Duplicate (BJF0053-DUP3)						Source: 21E0194-02RE1 Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 22:59						
Cadmium	111	ND	0.0300	0.100	ug/L		ND					U
Matrix Spike (BJF0053-MS1)						Source: 21E0194-02 Prepared: 02-Jun-2021 Analyzed: 03-Jun-2021 02:39						
Barium	135	28.4	0.114	0.500	ug/L	25.0	3.10	101	75-125			
Chromium	52	23.2	0.260	0.500	ug/L	25.0	0.438	91.0	75-125			
Cobalt	59	25.1	0.0173	0.200	ug/L	25.0	0.188	99.5	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 16:25

Analysis by: Analytical Resources, LLC

Metals and Metallic Compounds - Quality Control

Batch BJJ0053 - 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 (BJF0053-MS1)		Source: 21E0194-02			Prepared: 02-Jun-2021		Analyzed: 03-Jun-2021 02:39					
Lead	208	23.8	0.0513	0.100	ug/L	25.0	0.228	94.3	75-125			
Silver	107	24.0	0.0220	0.200	ug/L	25.0	ND	96.1	75-125			
Vanadium	51a	22.5	0.0556	0.200	ug/L	25.0	1.25	85.1	75-125			
Arsenic	75a	24.9	0.0373	0.200	ug/L	25.0	0.676	96.8	75-125			
Copper	63	25.6	0.173	0.500	ug/L	25.0	0.531	100	75-125			
Nickel	60	24.8	0.0792	0.500	ug/L	25.0	0.257	98.3	75-125			
Selenium	78	72.6	0.179	0.500	ug/L	80.0	ND	90.8	75-125			
Zinc	66	77.1	2.92	6.00	ug/L	80.0	ND	96.3	75-125			

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

Matrix Spike (BJF0053-MS2)		Source: 21E0194-02			Prepared: 02-Jun-2021		Analyzed: 03-Jun-2021 21:59					
Iron	57	34000	66.3	360	ug/L	5000	26500	149	75-125			HC, D
Manganese	55	721	1.42	5.00	ug/L	25.0	705	64.4	75-125			HC, D

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

Matrix Spike (BJF0053-MS3)		Source: 21E0194-02RE1			Prepared: 02-Jun-2021		Analyzed: 03-Jun-2021 23:04					
Cadmium	111	24.2	0.0300	0.100	ug/L	25.0	ND	96.6	75-125			

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

Matrix Spike Dup (BJF0053-MSD1)		Source: 21E0194-02			Prepared: 02-Jun-2021		Analyzed: 03-Jun-2021 02:46					
Barium	135	28.8	0.114	0.500	ug/L	25.0	3.10	103	75-125	1.69	20	
Chromium	52	23.4	0.260	0.500	ug/L	25.0	0.438	91.8	75-125	0.90	20	
Cobalt	59	24.5	0.0173	0.200	ug/L	25.0	0.188	97.2	75-125	2.25	20	
Lead	208	24.4	0.0513	0.100	ug/L	25.0	0.228	96.7	75-125	2.46	20	
Silver	107	24.2	0.0220	0.200	ug/L	25.0	ND	96.6	75-125	0.54	20	
Vanadium	51a	22.7	0.0556	0.200	ug/L	25.0	1.25	85.7	75-125	0.64	20	
Arsenic	75a	24.3	0.0373	0.200	ug/L	25.0	0.676	94.5	75-125	2.31	20	
Copper	63	25.1	0.173	0.500	ug/L	25.0	0.531	98.3	75-125	2.05	20	
Nickel	60	24.2	0.0792	0.500	ug/L	25.0	0.257	95.8	75-125	2.54	20	
Selenium	78	70.8	0.179	0.500	ug/L	80.0	ND	88.5	75-125	2.55	20	
Zinc	66	74.3	2.92	6.00	ug/L	80.0	ND	92.9	75-125	3.62	20	

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

Matrix Spike Dup (BJF0053-MSD2)		Source: 21E0194-02			Prepared: 02-Jun-2021		Analyzed: 03-Jun-2021 22:06					
Iron	57	34300	66.3	360	ug/L	5000	26500	156	75-125	1.03	20	HC, D


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 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 - 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
Matrix Spike Dup (BJF0053-MSD2)		Source: 21E0194-02		Prepared: 02-Jun-2021		Analyzed: 03-Jun-2021 22:06						
Manganese	55	741	1.42	5.00	ug/L	25.0	705	143	75-125	2.69	20	HC, D
Recovery limits for target analytes in MS/MSD QC samples are advisory only.												
Matrix Spike Dup (BJF0053-MSD3)		Source: 21E0194-02RE1		Prepared: 02-Jun-2021		Analyzed: 03-Jun-2021 23:11						
Cadmium	111	24.1	0.0300	0.100	ug/L	25.0	ND	96.3	75-125	0.32	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:
 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: 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 (BJE0737-BLK1)						Prepared: 28-May-2021 Analyzed: 29-May-2021 00:04						
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
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
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 (BJE0737-BS1)						Prepared: 28-May-2021 Analyzed: 29-May-2021 00:08						
Barium, Dissolved	135	25.8	0.114	0.500	ug/L	25.0		103	80-120			
Barium, Dissolved	137	25.8	0.0765	0.500	ug/L	25.0		103	80-120			
Chromium, Dissolved	52	26.4	0.260	0.500	ug/L	25.0		106	80-120			
Chromium, Dissolved	53	27.2	0.239	0.500	ug/L	25.0		109	80-120			
Cobalt, Dissolved	59	25.5	0.0173	0.200	ug/L	25.0		102	80-120			
Iron, Dissolved	54	5370	18.2	36.0	ug/L	5000		107	80-120			
Iron, Dissolved	57	5320	6.63	20.0	ug/L	5000		106	80-120			
Lead, Dissolved	208	24.8	0.0513	0.100	ug/L	25.0		99.4	80-120			
Manganese, Dissolved	55	27.2	0.142	0.500	ug/L	25.0		109	80-120			
Silver, Dissolved	107	25.3	0.0220	0.200	ug/L	25.0		101	80-120			
Vanadium, Dissolved	51a	25.8	0.0556	0.200	ug/L	25.0		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:
 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: 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 (BJE0737-BS1)						Prepared: 28-May-2021 Analyzed: 29-May-2021 00:08						
Vanadium, Dissolved	51b	26.0	0.0521	0.200	ug/L	25.0		104	80-120			
Arsenic, Dissolved	75a	24.7	0.0373	0.200	ug/L	25.0		98.8	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		98.6	80-120			
Copper, Dissolved	63	25.9	0.173	0.500	ug/L	25.0		104	80-120			
Copper, Dissolved	65	25.6	0.350	0.500	ug/L	25.0		103	80-120			
Nickel, Dissolved	60	25.4	0.0792	0.500	ug/L	25.0		102	80-120			
Nickel, Dissolved	62	25.6	0.220	0.500	ug/L	25.0		103	80-120			
Selenium, Dissolved	78	74.3	0.179	0.500	ug/L	80.0		92.9	80-120			
Zinc, Dissolved	66	79.3	2.92	5.00	ug/L	80.0		99.2	80-120			
Zinc, Dissolved	67	74.8	0.940	4.00	ug/L	80.0		93.5	80-120			
Duplicate (BJE0737-DUP1)						Source: 21E0194-03 Prepared: 28-May-2021 Analyzed: 29-May-2021 04:20						
Barium, Dissolved	135	0.269	0.114	0.500	ug/L		0.249			7.72	20	J
Cobalt, Dissolved	59	0.121	0.0173	0.200	ug/L		0.116			4.22	20	J
Lead, Dissolved	208	ND	0.0513	0.100	ug/L		ND					U
Silver, Dissolved	107	ND	0.0220	0.200	ug/L		ND					U
Arsenic, Dissolved	75a	0.340	0.0373	0.200	ug/L		0.341			0.29	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	0.184	0.0792	0.500	ug/L		0.162			12.70	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
Matrix Spike (BJE0737-MS1)						Source: 21E0194-03 Prepared: 28-May-2021 Analyzed: 29-May-2021 04:25						
Barium, Dissolved	135	25.0	0.114	0.500	ug/L	25.0	0.249	99.2	75-125			
Cobalt, Dissolved	59	25.8	0.0173	0.200	ug/L	25.0	0.116	103	75-125			
Lead, Dissolved	208	24.5	0.0513	0.100	ug/L	25.0	ND	98.2	75-125			
Silver, Dissolved	107	24.4	0.0220	0.200	ug/L	25.0	ND	97.5	75-125			
Arsenic, Dissolved	75a	24.3	0.0373	0.200	ug/L	25.0	0.341	95.6	75-125			
Cadmium, Dissolved	111	24.8	0.0300	0.100	ug/L	25.0	ND	99.4	75-125			
Copper, Dissolved	63	25.3	0.173	0.500	ug/L	25.0	ND	101	75-125			
Nickel, Dissolved	60	25.6	0.0792	0.500	ug/L	25.0	0.162	102	75-125			
Selenium, Dissolved	78	70.8	0.179	0.500	ug/L	80.0	ND	88.5	75-125			
Zinc, Dissolved	66	78.6	2.92	5.00	ug/L	80.0	ND	98.3	75-125			


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 Project: Lower Duwamish
 Project Number: Lower Duwamish
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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: ICPMS1 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.

Matrix Spike Dup (BJE0737-MSD1)			Source: 21E0194-03			Prepared: 28-May-2021			Analyzed: 29-May-2021 04:31			
Barium, Dissolved	135	25.0	0.114	0.500	ug/L	25.0	0.249	99.1	75-125	0.06	20	
Cobalt, Dissolved	59	25.3	0.0173	0.200	ug/L	25.0	0.116	101	75-125	1.64	20	
Lead, Dissolved	208	24.4	0.0513	0.100	ug/L	25.0	ND	97.7	75-125	0.47	20	
Silver, Dissolved	107	23.7	0.0220	0.200	ug/L	25.0	ND	94.7	75-125	2.89	20	
Arsenic, Dissolved	75a	23.9	0.0373	0.200	ug/L	25.0	0.341	94.1	75-125	1.65	20	
Cadmium, Dissolved	111	24.8	0.0300	0.100	ug/L	25.0	ND	99.3	75-125	0.06	20	
Copper, Dissolved	63	25.3	0.173	0.500	ug/L	25.0	ND	101	75-125	0.29	20	
Nickel, Dissolved	60	24.9	0.0792	0.500	ug/L	25.0	0.162	99.0	75-125	2.92	20	
Selenium, Dissolved	78	70.4	0.179	0.500	ug/L	80.0	ND	87.9	75-125	0.63	20	
Zinc, Dissolved	66	76.8	2.92	5.00	ug/L	80.0	ND	96.0	75-125	2.36	20	

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

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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Duplicate (BJE0737-DUP2)			Source: 21E0194-03			Prepared: 28-May-2021			Analyzed: 02-Jun-2021 02:06			
Chromium, Dissolved	52	ND	1.30	2.50	ug/L		ND					U
Iron, Dissolved	57	16700	33.2	100	ug/L		16300			1.92	20	D
Manganese, Dissolved	55	629	0.710	2.50	ug/L		620			1.49	20	D
Vanadium, Dissolved	51a	ND	0.278	1.00	ug/L		ND					U

Matrix Spike (BJE0737-MS2)			Source: 21E0194-03			Prepared: 28-May-2021			Analyzed: 02-Jun-2021 02:11			
Chromium, Dissolved	52	26.0	1.30	2.50	ug/L	25.0	ND	104	75-125			D
Iron, Dissolved	57	20500	33.2	100	ug/L	5000	16300	83.2	75-125			D
Manganese, Dissolved	55	624	0.710	2.50	ug/L	25.0	620	16.2	75-125			HC, D
Vanadium, Dissolved	51a	25.7	0.278	1.00	ug/L	25.0	ND	103	75-125			D

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

Matrix Spike Dup (BJE0737-MSD2)			Source: 21E0194-03			Prepared: 28-May-2021			Analyzed: 02-Jun-2021 18:59			
Chromium, Dissolved	52	25.8	1.30	2.50	ug/L	25.0	ND	103	75-125	0.85	20	D
Iron, Dissolved	57	22600	33.2	100	ug/L	5000	16300	126	75-125	9.88	20	*, D
Manganese, Dissolved	55	638	0.710	2.50	ug/L	25.0	620	71.5	75-125	2.19	20	HC, D
Vanadium, Dissolved	51a	24.2	0.278	1.00	ug/L	25.0	ND	96.7	75-125	6.23	20	D