King County
Department of Natural Resources and Parks
Water and Land Resources Division
Environmental Laboratory
322 W. Ewing Street
Seattle, WA 98119-1507
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TTY Relay: 711

September 15, 2021

TO: Debra Williston, King County Wastewater Treatment Division

FROM: Erin McCabe

CC: Amara Vandervort, Windward Environmental

SUBJECT: Report for Project 423589-360-1, LDW Sediments for TOC analysis, Collected July 7, 2021

The attached report is for the sediment samples delivered to the laboratory on July 27, 2021. The samples were analyzed in the Conventionals units of the laboratory. QA/QC data summaries are included for your information.

Conventionals
Samples were analyzed for total organic carbon (TOC) using method SW846 9060, PSEP96. The data have passed all internal QA/QC checks for accuracy and completeness and may be used without qualification with the following exceptions:

The sample results were qualified in LIMS with "H" to indicate that the KCEL QA policy 14-day non-frozen holding time was exceeded for these samples.

Samples were collected on July 7 and received to KCEL on July 27, 2021. The samples were stored unfrozen at 6°C during that time. KCEL's analysis holding time for solid-matrix TOC samples is 14 days at 4°C or 6 months when frozen at -20°C.

The project QAPP, which was reviewed and approved by EPA QA Officer, pertaining to these samples has differing sample storage and analysis criteria. According to those criteria, the solid-matrix TOC analysis holding time is 28 days at 6°C. Samples L77445-4 and -5 were analyzed on August 5, 2021, 1 day past the QAPP-required 28-day holding time.

Per the project QAPP, samples L77445-1, -2, -3, -3LD (WG177043-4) and -3MS (WG177043-6) were analyzed within the 28-day holding time. However, samples L77445-4 and -5 were analyzed one day past the 28-day holding time.

The project QAPP also specifies that these samples be analyzed using ≥ 250 mg of mass. Because of the high level of carbon present in these samples, samples L77445-1, -2, -3, -3LD (WG177043-4) and -3MS (WG177043-6) were analyzed with < 250 mg of sample. This was necessary in order to obtain

reportable results within the linear range of the instrument. Samples L77445-4 and -5 had lower levels of carbon and were analyzed using approximately 250 mg of mass.

If you have any questions or need additional information, please call me at 206-477-7205.

Erin McCabe
Laboratory Project Manager/Water Quality Planner III
King County Environmental Lab
206.477.7205

King County Environmental Lab Analytical Report

	Project:	423589-360-1					Project:	423589-360-1					Project:	423589-360-1				
	Locator:	NONE					Locator:	NONE					Locator:	NONE				
	Descrip:	UNKNOWN LOCATOR					Descrip:	UNKNOWN LOCATOR					Descrip:	UNKNOWN LOCATOR				
	Sample:	L77445-1					Sample:	L77445-2					Sample:	L77445-3				
	Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED				
	ColDate:	7/7/21 14:51					ColDate:	7/7/21 15:40					ColDate:	7/7/21 16:20				
	ClientLoc:	LDW21-IT615A					ClientLoc:	LDW21-IT617A					ClientLoc:	LDW21-IT618A				
	WET Weight Basis						**WET Weight Basis**						**WET Weight Basis**					
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**
CV SW846 9060 PSEP96																	
Total Organic Carbon	116000	H	1380	1380	mg/Kg		72100	H	645	645	mg/Kg		57900	H	556	556	mg/Kg
ES NONE																	
Client Locator	LDW21-IT615A				none		LDW21-IT617A				none		LDW21-IT618A				none

King County Environmental Lab Analytical Report

	Project:	423589-360-1					Project:	423589-360-1			
	Locator:	NONE					Locator:	NONE			
	Descrip:	UNKNOWN LOCATOR					Descrip:	UNKNOWN LOCATOR			
	Sample:	L77445-4					Sample:	L77445-5			
	Matrix:	SF SALTWTRSED					Matrix:	SF SALTWTRSED			
	ColDate:	7/7/21 17:02					ColDate:	7/7/21 18:32			
	ClientLoc:	LDW21-IT624A					ClientLoc:	LDW21-IT626A			
	WET Weight Basis						**WET Weight Basis**				
Parameters	**Value**	**Qual**	**MDL**	**RDL**	**Units**		**Value**	**Qual**	**MDL**	**RDL**	**Units**
CV SW846 9060 PSEP96											
Total Organic Carbon	2780	H	396	396	mg/Kg		1220	H	396	396	mg/Kg
ES NONE											
Client Locator	LDW21-IT624A				none		LDW21-IT626A				none

Login: P77445 LDW Sediment TC: _____

Project: 423589-360-1 *CHAIN OF CUSTODY* LPM: _____

Relinquished by	*Date*	*Time*
Received by	*Date* 7-27-21	*Time* 1146
Sample Numbers		*[All]*

Sample Number	**P77445-1**	**P77445-2**	**P77445-3**
QC Link			
Locator	**NONE**	**NONE**	**NONE**
Short Loc Desc	UNKNOWNLOC	UNKNOWNLOC	UNKNOWNLOC
Locator Desc	UNKNOWN LOCATOR	UNKNOWN LOCATOR	UNKNOWN LOCATOR
Site	NONE	NONE	NONE
Comments			
Start Date/Time			
End Date/Time			
Time Span			
Sample Depth			
CLIENT LOC			
Dept, Matrix, Prod	3 SF TOC-QL	3 SF TOC-QL	3 SF TOC-QL

Login: P77445 LDW Sediment TC: _____

Project: 423589-360-1 LPM: _____

Sample Number	P77445-4	P77445-5	
QC Link			
Locator	NONE	NONE	
Short Loc Desc	UNKNOWNLOC	UNKNOWNLOC	
Locator Desc	UNKNOWN LOCATOR	UNKNOWN LOCATOR	
Site	NONE	NONE	
Comments			
Start Date/Time			
End Date/Time			
Time Span			
Sample Depth			
CLIENT LOC			
Dept, Matrix, Prod	3 SF TOC-QL	3 SF TOC-QL	

CHAIN-OF-CUSTODY/TEST REQUEST FORM

Project/Client Name:	Duwamish AOC4	Ship to:	KC Environmental		No. AOC4ENRTOC
Project Number:	190067-02.02	Attn:	Erin McCabe	Shipping Date:	7/27/21
Contact Name:	Amara Vandervort	Shipper:	Courier	Airbill Number:	———
Sampled By:	Windward	Form filled out by:	AV	Turnaround requested:	STD

Sample Collection Date (m/d/y)	Time	Sample Identification	Volume of Sample / # of Containers	Matrix	Test(s) Requested (check test(s) required) TOC EPA 9060A							Comments / Instructions [Composite/Bag ID]
7/7/2021	1451	LDW21-IT615A	1	sediment	X							
7/7/2021	1540	LDW21-IT617A	1	sediment	X							
7/7/2021	1620	LDW21-IT618A	1	sediment	X							
7/7/2021	1702	LDW21-IT624A	1	sediment	X							
7/7/2021	1832	LDW21-IT626A	1	sediment	X							
Total Number of Containers			5	Purchase Order / Statement of Work #CLF-052021								

1) Released by:	1) Rec'd by:	2) Released by:	2) Rec'd by:
Print name: Meghan Carrillo	YARED LISANEWORK	Print name: YARED LISANEWORK	
Signature: Meghan Carrillo	Company: YA YA SAFETY NET	Signature:	Company: KCEL
Company: MTC	Date/Time: 7/27/21 @ 10:02 AM	Company: YA YA SAFETY NET	~~Date/Time:~~ 7-27-21 1146
Date/Time: 7-27-21 @ 10:02 AM		Date/Time: 07/27/21 @ 11:46 AM	

* Distribution: White copies accompany shipment; yellow retained by consignor.

Windward environmental LLC
200 First Avenue West
Suite 500
Seattle, WA 98119
Tel: (206) 378-1364
Fax: (206) 217-9343

To be completed by Laboratory upon sample receipt:

Date of receipt:	Laboratory W.O. #:
Condition upon receipt:	Time of receipt:
Cooler temperature:	Received by:

King County Environmental Laboratory Batch Report

LDW Sediments, L77445, July 7, 2021

WG177043 Total Organic Carbon

Sample	Project	Project Description	List Type	Matrix	Collect Date	Prep Date	Anal Date	QC Association	Comments
L77445-1	423589-360-1	LDW Sediment	CVTOC-QL	SALTWTRSED	7/7/2021 14:51	7/28/2021 12:15	8/4/2021 11:07	WG177043-3,-4,-6,-2,-1,-7	
L77445-2	423589-360-1	LDW Sediment	CVTOC-QL	SALTWTRSED	7/7/2021 15:40	7/28/2021 12:15	8/4/2021 11:39	WG177043-3,-4,-6,-2,-1,-7	
L77445-3	423589-360-1	LDW Sediment	CVTOC-QL	SALTWTRSED	7/7/2021 16:20	7/28/2021 12:15	8/4/2021 12:12	WG177043-3,-4,-6,-2,-1,-7	
L77445-4	423589-360-1	LDW Sediment	CVTOC-QL	SALTWTRSED	7/7/2021 17:02	7/28/2021 12:15	8/5/2021 11:27	WG177043-3,-4,-6,-2,-1,-7	
L77445-5	423589-360-1	LDW Sediment	CVTOC-QL	SALTWTRSED	7/7/2021 18:32	7/28/2021 12:15	8/5/2021 11:52	WG177043-3,-4,-6,-2,-1,-7	
WG177043-1	MB		CVTOC-QL	OTHR SOLID		7/28/2021 12:15	8/5/2021 10:31	WG177043-3,-4,-6,-2,-1,-7	MB1 7/28/2021
WG177043-2	SB		CVTOC-QL	OTHR SOLID		7/28/2021 12:15	8/4/2021 10:11	WG177043-3,-4,-6,-2,-1,-7	WG177043-1
WG177043-3	LCS		CVTOC-QL	OTHR SOLID		8/4/2021 10:35	8/4/2021 10:35	WG177043-3,-4,-6,-2,-1,-7	LEVEL1
WG177043-4	LD		CVTOC-QL	SALTWTRSED		7/28/2021 12:15	8/4/2021 12:53	WG177043-3,-4,-6,-2,-1,-7	L77445-3
WG177043-6	MS		CVTOC-QL	SALTWTRSED		7/28/2021 12:15	8/4/2021 13:41	WG177043-3,-4,-6,-2,-1,-7	L77445-3
WG177043-7	LCS		CVTOC-QL	OTHR SOLID		8/5/2021 7:59	8/5/2021 7:59	WG177043-3,-4,-6,-2,-1,-7	LEVEL1

Workgroup: WG177043 Total Organic Carbon

MB:WG177043-1 Matrix: OTHR SOLID Listtype:CVTOC-QL Method:SW846 9060 PSEP96 Project: Pkey:STD
(Method Blank)

Parameter	MDL	RDL	Units	MB Value	Qual
Total Organic Carbon	200	399	mg/Kg		<QL

SB:WG177043-2 MB:WG177043-1 Matrix: OTHR SOLID Listtype:CVTOC-QL Method:SW846 9060 PSEP96 Project: Pkey:STD
(Spike Blank, Method Blank)

Parameter	MDL	RDL	Units	MB Value	True Value	SB Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	200	399	mg/Kg	<QL	29932.65	29700	99		80--120

LCS:WG177043-3 Matrix: OTHR SOLID Listtype:CVTOC-QL Method:SW846 9060 PSEP96 Project: Pkey:STD
(Lab Control Sample)

Parameter	MDL	RDL	Units	True Value	LCS Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	1420	1420	mg/Kg	44000	48500	110		80--120

LD:WG177043-4 L77445-3 Matrix: SALTWTRSED Listtype:CVTOC-QL Method:SW846 9060 PSEP96 Project:423589-360-1 Pkey:SED
(Lab Duplicate)

Parameter	MDL	RDL	Units	SAMP Value	LD Value	RPD	Qual	Lab Limit
Total Organic Carbon	556	556	mg/Kg	57900	67000	15		0--25

MS:WG177043-6 L77445-3 Matrix: SALTWTRSED Listtype:CVTOC-QL Method:SW846 9060 PSEP96 Project:423589-360-1 Pkey:SED
(Matrix Spike)

Parameter	MDL	RDL	Units	SAMP Value	True Value	MS Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	556	556	mg/Kg	57900	58417.26	115000	99		70--130

LCS:WG177043-7 Matrix: OTHR SOLID Listtype:CVTOC-QL Method:SW846 9060 PSEP96 Project: Pkey:STD
(Lab Control Sample)

Parameter	MDL	RDL	Units	True Value	LCS Value	% Rec.	Qual	Lab Limit
Total Organic Carbon	9610	9610	mg/Kg	44000	42600	97		80--120

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If the following parameters are reported, values in the RPD column are actually Absolute Differences:

- pH, Field
- Salinity, Field
- Sample Depth
- Sample Temperature, Field

Conventionals Data Anomaly Form

Date(s) Occurred: *7/27/2021*

WG #(s): *WG177043*

☐ **All samples in WKGP(s)** **or** ☐ **Sample #(s):** *L77445-1, -2, -3, -3 LD (WG177043-4), -3 MS (WG177043-6), -4 & -5*

Project #(s): *423589-360-1*

Matrix: ☐ **Liquid** ☒ **Solid** ☐ **Air** ☐ **Tissue** ☐ **Calibration** ☐ **Other:**

I. Analysis

☐ Anions:
☐ Chlorophylls:
☐ Cyanides:
☒ Demands: *Total Organic Carbon*
☐ Nutrients:
☐ Particle Size Distribution:
☐ Physicals:
☐ Solids:
☐ Subcontract:
☐ Sulfide:
☐ Other:

II. Instrument

Analytical Balance:	☐ Mettler Toledo XP205 ☐ Ohaus Voyager Pro
	☐ Mettler Toledo AT201
Autoanalyzer:	☐ Astoria2+2 (CONNUTS1) ☐ Astoria2+2 (CONNUTS3)
	☐ Astoria2 (total nutrients system) ☐ Astoria2 (cyanide/TKN system)
Autotitrator:	☐ Metrohm Tiamo 855 Autotitrator with integrated 712 Conductometer
Dissolved Oxygen:	☐ Metrohn 888 Titrando ☐ YSI 5100 ☐ Brinkmann Bottletop Buret 25
Fluorometer:	☐ Turner Trilogy
Ion Chromatography:	☐ Metrohm 882
Laser PSD:	☐ Malvern Mastersizer 2000
pH Probe:	☐ Metrohm 736GP ☐ Hach SensION MM340
Salinometer:	☐ Portosal 8410A
Spectrophotometer:	☐ Hitachi U3900 UV/VIS
	☐ Hach DR 3900
TOC Analyzer:	☐ Skalar Formacs HT ☒ Skalar Primacs SLC ☐ OI 1080
Turbidimeter:	☐ Hach 2100AN
Other:	☐ Description:

III. Type of Sample/Analytical Anomaly

☐ Values Outside of Control Limits:

[1] ☐ Initial Calibration	[4] ☐ MB Anomaly	[7] ☐ MS RPD
[2] ☐ Continuing Calibration Checks	[5] ☐ LCS/SRM Recoveries	[8] ☐ Sample/LD RPD
[3] ☐ SB Spike Recoveries	[6] ☐ Sample/LD/LT RSD	[9] ☐ MS Recoveries

[10] ☒ Holding time exceeded by: 6 days
[11] ☐ Insufficient sample amount.
[12] ☐ Inappropriate storage, container or preservation.
☐ Other

Anomaly Description: *The samples listed above were collected on July 7, 2021 and were received at KCEL on July 27, 2021. The samples were stored unfrozen at 6°C during that time. KCEL's analysis holding time for solid-matrix TOC samples is 14 days at 4°C or 6 months when frozen at -20°C.*

The project QAPP pertaining to these samples has differing sample storage and analysis criteria. According to those criteria, the solid-matrix TOC analysis holding time is 28 days at 6°C. Samples L77445-4 and -5 were analyzed on August 5, 2021, 1 day past the QAPP-required 28-day holding time.

IV. Type of Project Anomaly

☐ SAP/Work Plan specified MDLs not met.
☐ SAP/Work Plan specified QC frequency or QC type not met.
☐ SAP/Work Plan specified methodology not used.
☐ Sample exceeds regulatory and/or hazardous waste limits.
☐ Sample data results are unusual or inconsistent with expected results.
☒ Other

Anomaly Description: *The project QAPP specifies that these samples were to be analyzed using ≥250mg of mass. Samples L77445-1, -2, -3, -3LD (WG177043-4) and -3MS (WG177043-6) were analyzed with <250mg of sample mass because of the high level of carbon present in these samples, to obtain reportable results within the linear range of the instrument. L77445-4 and -5 had lower levels of carbon and were analyzed using approximately 250mg of mass.*

V. Corrective Action Taken

☐ Sample(s) re-analyzed ☐ Sample(s) re-prepared and re-analyzed
☐ Sample(s) reported "AS IS"
☒ Data qualified with the following flags: *H*
☐ Text added:
☐ Other

Corrective Action Description: *Upon receipt at the laboratory, the samples were frozen to -20° C per KCEL QA policy. Also per KCEL QA policy, the sample results were qualified in LIMS with "H" to indicate that the KCEL QA policy 14-day non-frozen holding time was exceeded for these samples.*

Per the project QAPP, samples L77445-1, -2, -3, -3LD (WG177043-4) and -3MS (WG177043-6) were analyzed within the 28-day holding time. However, samples L77445-4 and -5 were analyzed one day past the 28-day holding time.

VI. Potential Effects on Data Quality (explanation mandatory): *According to KCEL QA policy, storage of non-frozen solid-matrix TOC samples for longer than 14 days can result in sample degradation and a corresponding bias to the data. However, the project QAPP requirements were reviewed and approved by the EPA QA Officer who directs the sample requirements for the project. Therefore, per the project QAPP, only the two samples (L77445-4 and -5) which were analyzed one day past the 28-day analysis holding time may potentially be affected. However, any effects to the quality of the data are unknown.*

		Signatures	Signature Dates
Reported by:	***Debbie Osada***	Debbie Osada	9/9/2021
Reviewer:	***Keith Solberg***	Keith Solberg	9/10/21
Supervisor:	***Brian Prosch***	Brian Prosch	9/9/21
QA Officer: **(For QA1 only)**	***Jack Gudeman***		
cc: LPM:	***Erin McCabe***		