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June 28, 2017

Analytical Report for Service Request No: K1706431

Cliff Whitmus
AMEC Foster Wheeler E & I (Lynwood, WA)
3500 188th St SW, Suite 601
Lynwood, WA 98037

RE: LDW p-roject set up under AMEC/Lynnwood / TBD

Dear Cliff,

Enclosed are the results of the sample(s) submitted to our laboratory June 19, 2017
For your reference, these analyses have been assigned our service request number **K1706431.**

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. The test results meet requirements of the current NELAP standards, where applicable, and except as noted in the laboratory case narrative provided. For a specific list of NELAP-accredited analytes, refer to the certifications section at www.alsglobal.com. All results are intended to be considered in their entirety, and ALS Group USA Corp. dba ALS Environmental (ALS) is not responsible for use of less than the complete report. Results apply only to the items submitted to the laboratory for analysis and individual items (samples) analyzed, as listed in the report.

Please contact me if you have any questions. My extension is 3364. You may also contact me via email at howard.holmes@alsglobal.com.

Respectfully submitted,

ALS Group USA, Corp. dba ALS Environmental

Howard Holmes
Project Manager

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Acronyms

ASTM	American Society for Testing and Materials
A2LA	American Association for Laboratory Accreditation
CARB	California Air Resources Board
CAS Number	Chemical Abstract Service registry Number
CFC	Chlorofluorocarbon
CFU	Colony-Forming Unit
DEC	Department of Environmental Conservation
DEQ	Department of Environmental Quality
DHS	Department of Health Services
DOE	Department of Ecology
DOH	Department of Health
EPA	U. S. Environmental Protection Agency
ELAP	Environmental Laboratory Accreditation Program
GC	Gas Chromatography
GC/MS	Gas Chromatography/Mass Spectrometry
LOD	Limit of Detection
LOQ	Limit of Quantitation
LUFT	Leaking Underground Fuel Tank
M	Modified
MCL	Maximum Contaminant Level is the highest permissible concentration of a substance allowed in drinking water as established by the USEPA.
MDL	Method Detection Limit
MPN	Most Probable Number
MRL	Method Reporting Limit
NA	Not Applicable
NC	Not Calculated
NCASI	National Council of the Paper Industry for Air and Stream Improvement
ND	Not Detected
NIOSH	National Institute for Occupational Safety and Health
PQL	Practical Quantitation Limit
RCRA	Resource Conservation and Recovery Act
SIM	Selected Ion Monitoring
TPH	Total Petroleum Hydrocarbons
tr	Trace level is the concentration of an analyte that is less than the PQL but greater than or equal to the MDL.

Inorganic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
E	The result is an estimate amount because the value exceeded the instrument calibration range.
J	The result is an estimated value.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.
H	The holding time for this test is immediately following sample collection. The samples were analyzed as soon as possible after receipt by the laboratory.

Metals Data Qualifiers

#	The control limit criteria is not applicable. See case narrative.
J	The result is an estimated value.
E	The percent difference for the serial dilution was greater than 10%, indicating a possible matrix interference in the sample.
M	The duplicate injection precision was not met.
N	The Matrix Spike sample recovery is not within control limits. See case narrative.
S	The reported value was determined by the Method of Standard Additions (MSA).
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
W	The post-digestion spike for furnace AA analysis is out of control limits, while sample absorbance is less than 50% of spike absorbance.
i	The MRL/MDL or LOQ/LOD is elevated due to a matrix interference.
X	See case narrative.
+	The correlation coefficient for the MSA is less than 0.995.
Q	See case narrative. One or more quality control criteria was outside the limits.

Organic Data Qualifiers

*	The result is an outlier. See case narrative.
#	The control limit criteria is not applicable. See case narrative.
A	A tentatively identified compound, a suspected aldol-condensation product.
B	The analyte was found in the associated method blank at a level that is significant relative to the sample result as defined by the DOD or NELAC standards.
C	The analyte was qualitatively confirmed using GC/MS techniques, pattern recognition, or by comparing to historical data.
D	The reported result is from a dilution.
E	The result is an estimated value.
J	The result is an estimated value.
N	The result is presumptive. The analyte was tentatively identified, but a confirmation analysis was not performed.
P	The GC or HPLC confirmation criteria was exceeded. The relative percent difference is greater than 40% between the two analytical results.
U	The analyte was analyzed for, but was not detected ("Non-detect") at or above the MRL/MDL. *DOD-QSM 4.2 definition* : Analyte was not detected and is reported as less than the LOD or as defined by the project. The detection limit is adjusted for dilution.
i	The MRL/MDL or LOQ/LOD is elevated due to a chromatographic interference.
X	See case narrative.
Q	See case narrative. One or more quality control criteria was outside the limits.

Additional Petroleum Hydrocarbon Specific Qualifiers

F	The chromatographic fingerprint of the sample matches the elution pattern of the calibration standard.
L	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of lighter molecular weight constituents than the calibration standard.
H	The chromatographic fingerprint of the sample resembles a petroleum product, but the elution pattern indicates the presence of a greater amount of heavier molecular weight constituents than the calibration standard.
O	The chromatographic fingerprint of the sample resembles an oil, but does not match the calibration standard.
Y	The chromatographic fingerprint of the sample resembles a petroleum product eluting in approximately the correct carbon range, but the elution pattern does not match the calibration standard.
Z	The chromatographic fingerprint does not resemble a petroleum product.

ALS Group USA Corp. dba ALS Environmental (ALS) - Kelso
State Certifications, Accreditations, and Licenses

Agency	Web Site	Number
Alaska DEH	http://dec.alaska.gov/eh/lab/cs/csapproval.htm	UST-040
Arizona DHS	http://www.azdhs.gov/lab/license/env.htm	AZ0339
Arkansas - DEQ	http://www.adeq.state.ar.us/techsvs/labcert.htm	88-0637
California DHS (ELAP)	http://www.cdph.ca.gov/certlic/labs/Pages/ELAP.aspx	2795
DOD ELAP	http://www.denix.osd.mil/edqw/Accreditation/AccreditedLabs.cfm	L14-51
Florida DOH	http://www.doh.state.fl.us/lab/EnvLabCert/WaterCert.htm	E87412
Hawaii DOH	http://health.hawaii.gov/	-
ISO 17025	http://www.pjlabs.com/	L16-57
Louisiana DEQ	http://www.deq.louisiana.gov/page/la-lab-accreditation	03016
Maine DHS	http://www.maine.gov/dhhs/	WA01276
Minnesota DOH	http://www.health.state.mn.us/accreditation	053-999-457
Nevada DEP	http://ndep.nv.gov/bsdw/labservice.htm	WA01276
New Jersey DEP	http://www.nj.gov/dep/enforcement/oqa.html	WA005
New York - DOH	https://www.wadsworth.org/regulatory/elap	12060
North Carolina DEQ	https://deq.nc.gov/about/divisions/water-resources/water-resources-data/water-sciences-home-page/laboratory-certification-branch/non-field-lab-certification	605
Oklahoma DEQ	http://www.deq.state.ok.us/CSDnew/labcert.htm	9801
Oregon – DEQ (NELAP)	http://public.health.oregon.gov/LaboratoryServices/EnvironmentalLaboratoryAccreditation/Pages/index.aspx	WA100010
South Carolina DHEC	http://www.scdhec.gov/environment/EnvironmentalLabCertification/	61002
Texas CEQ	http://www.tceq.texas.gov/field/qa/env_lab_accreditation.html	T104704427
Washington DOE	http://www.ecy.wa.gov/programs/eap/labs/lab-accreditation.html	C544
Wyoming (EPA Region 8)	https://www.epa.gov/region8-waterops/epa-region-8-certified-drinking-water-	-
Kelso Laboratory Website	www.alsglobal.com	NA

Analyses were performed according to our laboratory's NELAP-approved quality assurance program. A complete listing of specific NELAP-certified analytes, can be found in the certification section at www.ALSGlobal.com or at the accreditation bodies web site.
Please refer to the certification and/or accreditation body's web site if samples are submitted for compliance purposes. The states highlighted above, require the analysis be listed on the state certification if used for compliance purposes and if the method/anlayte is offered by that state.

Case Narrative

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ALS ENVIRONMENTAL

Client:	AMEC Foster Wheeler E & I	**Service Request No.:**	K1706431
Project:	LDW ENR/ AC Pilot Study	**Date Received:**	06/19/17
Sample Matrix:	Soil		

Case Narrative

All analyses were performed consistent with the quality assurance program of ALS Environmental. This report contains analytical results for samples designated for Tier II data deliverables. When appropriate to the method, method blank results have been reported with each analytical test. Additional quality control analyses reported herein include: Laboratory Duplicate (DUP), Matrix Spike (MS), and Matrix/Duplicate Matrix Spike (MS/DMS).

Sample Receipt

Two soil samples were received for analysis at ALS Environmental on 06/19/17. The samples were received in good condition and consistent with the accompanying chain of custody form. The samples were stored in a refrigerator at 4ºC upon receipt at the laboratory.

General Chemistry Parameters

Total Organic Carbon by EPA Method 9060:
Samples LDW-BA-PC-ENRMAT-SAND2 and LDW-BA-PC-ENRMAT-SAND3 were received past holding time. The analysis was performed as soon as possible after receipt by the laboratory. The data was flagged to indicate the holding time violation.

No other anomalies associated with the analysis of these samples were observed.

Approved by_____

Chain of Custody

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SR# K1706431
PAGE 1 OF 1

Project Name: LDW ENR/AC Pilot Study **Project Number:** TBD
Project Manager: Cliff Whitmus - see below for POC **Company:** AMEC Foster Wheeler
Company/Address: 3500 188th St. SW, Suite 601 **Phone:** 425-921-4023
City, State, Zip: Lynnwood, WA 98037 **E-mail:** cliff.whitmus@amecfw.com
Sampler's Signature: _____

Sample I.D.	Date	Time	LAB ID	Matrix	Number of Containers	TOC - EPA 9060					REMARKS
						Analysis Requested					
LDW-BA-PC-ENRMAT-SAND2	2/2/17	1225		sediment		X					run in triplicate burns
LDW-BA-PC-ENRMAT-SAND3	2/2/17	1230		sediment		X					run in triplicate burns

TURNAROUND REQUIREMENTS
____ 24 hr ____ 48 hr __X__ 5 day
____ Standard (21 days)
____ Provide FAX Preliminary Results
Requested Report Date:_____

Invoice Information
P.O. # _____
Bill to: Diane Shannon and Jessica Youngblood at AMEC Foster Wheeler

REPORT REQUIREMENTS
__X__ I. Routine Report: Results, Method Blank, Surrogate, as required
_____ II. Report Dup., MS, MSD as required
_____ III. Data Validation Report (includes raw data)
_____ IV. CLP Deliverable Report
_____ V. EDD

Comments/Special Instructions:
ALS Quote # 42097
POC: Gretchen Heavner - gretchen.heavner@floydsnider.com #206-292-2078
Invoices: email to diane.shannon@amecfw.com and jessica.youngblood@amecfw.com

Note samples can be shipped without ice or ice packs. Prior to taking a sample aliquot, please mix the sample thoroughly. Then take as large an aliquot as possible (preferrably ~20g) to dry and grind.

RELINQUISHED BY:	RECEIVED BY:	RELINQUISHED BY:	RECEIVED BY:
Signature: Frederick Grothkopp	Signature: [illegible]	Signature:	Signature:
Printed Name: FREDERICK W GROTHKOPP	Printed Name: BRICKMAN	Printed Name:	Printed Name:
Firm: KCEL	Firm: ALS	Firm:	Firm:
Date/Time: 6-16-17 0845	Date/Time: 6/19/17 1000	Date/Time:	Date/Time:

PC 1/2

Cooler Receipt and Preservation Form

Client amec Service Request K17 06431

Received: 6/19/17 Opened: 6/19/17 By: BR Unloaded: 6/19/17 By: BR

1. Samples were received via? *USPS* *Fed Ex* *UPS* *DHL* *PDX* *Courier* *Hand Delivered*
2. Samples were received in: (circle) *Cooler* *Box* *Envelope* *Other* _____ *NA*
3. Were custody seals on coolers? NA Y N If yes, how many and where? _____

   If present, were custody seals intact? Y N If present, were they signed and dated? Y N

Raw Cooler Temp	Corrected Cooler Temp	Raw Temp Blank	Corrected Temp Blank	Corr. Factor	Thermometer ID	Cooler/COC ID NA	Tracking Number NA	Filed
20.2	20.0	—	—	-0.2	375		7974210006824	

4. Packing material: *Inserts* *Baggies* *Bubble Wrap* *Gel Packs* *Wet Ice* *Dry Ice* *Sleeves* Pkg peanuts
5. Were custody papers properly filled out (ink, signed, etc.)? NA Y N
6. Were samples received in good condition (temperature, unbroken)? *Indicate in the table below.* NA Y N

   If applicable, tissue samples were received: *Frozen* *Partially Thawed* *Thawed*
7. Were all sample labels complete (i.e analysis, preservation, etc.)? NA Y N
8. Did all sample labels and tags agree with custody papers? *Indicate major discrepancies in the table on page 2.* NA Y N
9. Were appropriate bottles/containers and volumes received for the tests indicated? NA Y N
10. Were the pH-preserved bottles (*see SMO GEN SOP*) received at the appropriate pH? *Indicate in the table below* NA Y N
11. Were VOA vials received without headspace? *Indicate in the table below.* NA Y N
12. Was C12/Res negative? NA Y N

Sample ID on Bottle	Sample ID on COC	Identified by:

Sample ID	Bottle Count Bottle Type	Out of Temp	Head-space	Broke	pH	Reagent	Volume added	Reagent Lot Number	Initials	Time

Notes, Discrepancies, & Resolutions: _____

7/25/16

Page ____ ***of*** ____

Total Solids

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Analytical Report

Client:	Floyd Snider	**Service Request:**	K1706431
Project:	LDW ENR/AC Pilot Study/TBD	**Date Collected:**	02/2/17
Sample Matrix:	Soil	**Date Received:**	06/19/17
Analysis Method:	160.3 Modified	**Units:**	Percent
Prep Method:	None	**Basis:**	As Received

Solids, Total

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Q
LDW-BA-PC-ENRMAT-SAND2	K1706431-001	**99.8**	-	1	06/21/17 17:37	
LDW-BA-PC-ENRMAT-SAND3	K1706431-002	**99.6**	-	1	06/21/17 17:37	

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QA/QC Report

Client:	Floyd Snider	**Service Request:**	K1706431
Project	LDW ENR/AC Pilot Study/TBD	**Date Collected:**	02/02/17
Sample Matrix:	Soil	**Date Received:**	06/19/17
Analysis Method:	160.3 Modified	**Units:**	Percent
Prep Method:	None	**Basis:**	As Received

Replicate Sample Summary
Inorganic Parameters

Sample Name:	Lab Code:	MRL	Sample Result	Duplicate Result	Average	RPD	RPD Limit	Date Analyzed
Batch QC	K1706231-005DUP	-	81.9	81.7	81.8	<1	20	06/21/17
Batch QC	K1706373-001DUP	-	29.9	30.0	30.0	<1	20	06/21/17
Batch QC	K1706381-001DUP	-	83.8	82.4	83.1	2	20	06/21/17
LDW-BA-PC-ENRMAT-SAND2	K1706431-001DUP	-	99.8	99.9	99.9	<1	20	06/21/17

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

General Chemistry

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dba ALS Environmental

Analytical Report

Client:	AMEC Foster Wheeler E & I (Lynwood, WA)	**Service Request:**	K1706431
Project:	LDW p-roject set up under AMEC/Lynnwood/TBD	**Date Collected:**	02/2/17
Sample Matrix:	Sediment	**Date Received:**	06/19/17
Analysis Method:	9060	**Units:**	Percent
Prep Method:	Method	**Basis:**	Dry, per Method

Carbon, Total Organic (TOC)

Sample Name	Lab Code	Result	MRL	Dil.	Date Analyzed	Date Extracted	Q
LDW-BA-PC-ENRMAT-SAND2	K1706431-001	**2.29**	0.10	1	06/26/17 15:12	6/26/17	*
LDW-BA-PC-ENRMAT-SAND3	K1706431-002	**3.82**	0.10	1	06/26/17 15:12	6/26/17	*
Method Blank	K1706431-MB	ND U	0.10	1	06/26/17 15:12	6/26/17	

ALS Group USA, Corp.
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QA/QC Report

Client:	AMEC Foster Wheeler E & I (Lynwood, WA)	**Service Request:**	K1706431
Project	LDW p-roject set up under AMEC/Lynnwood/TBD	**Date Collected:**	02/02/17
Sample Matrix:	Sediment	**Date Received:**	06/19/17
		Date Analyzed:	06/26/17

Triplicate Sample Summary
General Chemistry Parameters

Sample Name:	LDW-BA-PC-ENRMAT-SAND2	**Units:**	Percent
Lab Code:	K1706431-001	**Basis:**	Dry, per Method
Analysis Method:	9060		
Prep Method:	Method		

Analyte Name	MRL	Sample Result	Duplicate K1706431-001DUP Result	Triplicate K1706431-001TRP Result	Average	RSD	RSD Limit
Carbon, Total Organic (TOC)	0.10	2.29	2.30	2.26	2.28	<1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

Percent recoveries and relative percent differences (RPD) are determined by the software using values in the calculation which have not been rounded.

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SuperSet Reference:17-0000426635 rev 00

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QA/QC Report

Client:	AMEC Foster Wheeler E & I (Lynwood, WA)	**Service Request:**	K1706431
Project	LDW p-roject set up under AMEC/Lynnwood/TBD	**Date Collected:**	02/02/17
Sample Matrix:	Sediment	**Date Received:**	06/19/17
		Date Analyzed:	06/26/17

Triplicate Sample Summary
General Chemistry Parameters

Sample Name:	LDW-BA-PC-ENRMAT-SAND3	**Units:**	Percent
Lab Code:	K1706431-002	**Basis:**	Dry, per Method
Analysis Method:	9060		
Prep Method:	Method		

Analyte Name	MRL	Sample Result	Duplicate K1706431-002DUP Result	Triplicate K1706431-002TRP Result	Average	RSD	RSD Limit
Carbon, Total Organic (TOC)	0.10	3.82	3.83	3.73	3.79	1	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

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SuperSet Reference:17-0000426635 rev 00

ALS Group USA, Corp.
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QA/QC Report

Client:	AMEC Foster Wheeler E & I (Lynwood, WA)	**Service Request:**	K1706431
Project:	LDW p-roject set up under AMEC/Lynnwood/TBD	**Date Collected:**	02/02/17
Sample Matrix:	Sediment	**Date Received:**	06/19/17
		Date Analyzed:	06/26/17
		Date Extracted:	06/26/17

Duplicate Matrix Spike Summary
Carbon, Total Organic (TOC)

Sample Name:	LDW-BA-PC-ENRMAT-SAND3	**Units:**	Percent
Lab Code:	K1706431-002	**Basis:**	Dry, per Method
Analysis Method:	9060		
Prep Method:	Method		

		Matrix Spike K1706431-002MS			**Duplicate Matrix Spike** K1706431-002DMS					
Analyte Name	**Sample Result**	**Result**	**Spike Amount**	**% Rec**	**Result**	**Spike Amount**	**% Rec**	**% Rec Limits**	**RPD**	**RPD Limit**
Carbon, Total Organic (TOC)	3.82	6.08	2.39	94	6.23	2.42	99	70-122	2	20

Results flagged with an asterisk (*) indicate values outside control criteria.

Results flagged with a pound (#) indicate the control criteria is not applicable.

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ALS Group USA, Corp.
dba ALS Environmental

QA/QC Report

Client:	AMEC Foster Wheeler E & I (Lynwood, WA)	**Service Request:**	K1706431
Project:	LDW p-roject set up under AMEC/Lynnwood/TBD	**Date Analyzed:**	06/26/17
Sample Matrix:	Sediment	**Date Extracted:**	06/26/17

Lab Control Sample Summary
Carbon, Total Organic (TOC)

Analysis Method:	9060	**Units:**	Percent
Prep Method:	Method	**Basis:**	Dry, per Method
		Analysis Lot:	551289

Sample Name	Lab Code	Result	Spike Amount	% Rec	% Rec Limits
Lab Control Sample	K1706431-LCS	0.72	0.60	119	72-122