Apex Laboratories, LLC
6700 SW Sandburg St. Tigard, Oregon 97223
503.718.2323

Level IV Data Package for

Anchor QEA, LLC

Port of Portland - T4 - PDI

Apex Laboratories Work Order #:

A9I0297

APEX LABORATORIES, LLC
6700 SW Sandburg St. Tigard, OR 97223 phone 503-718-2323

Table of Contents
A9I0297

Analytical Case Narrative

Analytical Case Narrative

Client: Anchor QEA, LLC Date: 10/24/2019
Project: Port of Portland - T4 - PDI
Apex Work Order Number: A9I0297

This data package contains data associated with analysis of samples for the above referenced Apex work order numbers. The data package Table of Contents, along with the PDF bookmarks, allow for ease of navigation and location of items within the data deliverable.

The Sample Receipt Documentation section of this package contains sample receipt information, including sample temperature and condition of receipt documented on Cooler Receipt Form(s). Apex analyzed the samples by the methods indicated on the Chain of Custody. Any additional analyses requested are indicated on the Apex Work Order.

If any anomalies were encountered during analysis that could potentially impact data quality, sample results are qualified and/or a separate Case Narrative is included in the Analytical Report. Please refer to the Notes and Definition section of the Analytical Report(s) for Qualifier explanations, Conventions, and the Blank Policy.

Data represented in this package are in compliance with the referenced method(s), both technically and for completeness, for all conditions other than those stated above and/or noted by qualification of the reported data. The signature below verifies that the Laboratory Director or his designee has authorized release of this data package.

Estella Rieben,
Quality Systems Manager
Apex Laboratories, LLC

Analytical Report

Apex Laboratories, LLC

6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Friday, October 18, 2019

Cindy Fields
Anchor QEA, LLC
6720 SW Macadam Ave. Suite 125
Portland, OR 97219

RE: A9I0297 - Port of Portland - T4 - PDI - 050332-01.32

Thank you for using Apex Laboratories. We greatly appreciate your business and strive to provide the highest quality services to the environmental industry.

Enclosed are the results of analyses for work order A9I0297, which was received by the laboratory on 5/23/2019 at 10:00:00AM.

If you have any questions concerning this report or the services we offer, please feel free to contact me by email at: dthomas@apex-labs.com, or by phone at 503-718-2323.

Please note: All samples will be disposed of within 30 days of final reporting, unless prior arrangements have been made.

Cooler Receipt Information

(See Cooler Receipt Form for details)

Cooler #1	2.2 degC	Cooler #2	0.8 degC
Cooler #3	0.6 degC		

This Final Report is the official version of the data results for this sample submission, unless superseded by a subsequent, labeled amended report.
All other deliverables derived from this data, including Electronic Data Deliverables (EDDs), CLP-like forms, client requested summary sheets, and all other products are considered secondary to this report.

Apex Laboratories

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Darwin Thomas, Business Development Director

Apex Laboratories, LLC

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Anchor QEA, LLC	Project: **Port of Portland - T4 - PDI**	
6720 SW Macadam Ave. Suite 125	Project Number: **050332-01.32**	**Report ID:**
Portland, OR 97219	Project Manager: **Cindy Fields**	**A9I0297 - 10 18 19 1234**

ANALYTICAL REPORT FOR SAMPLES

SAMPLE INFORMATION

Client Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
T4-PDI2019-SC47-190522-01-03	A9I0297-01	Sediment	05/22/19 14:26	05/23/19 10:00
T4-PDI2019-SC47-190522-03-05	A9I0297-02	Sediment	05/22/19 14:26	05/23/19 10:00

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Portland, OR 97219	Project Manager: **Cindy Fields**	**A9I0297 - 10 18 19 1234**

ANALYTICAL SAMPLE RESULTS

Demand Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
T4-PDI2019-SC47-190522-01-03 (A9I0297-01)				**Matrix: Sediment**				
Batch: 9090855								
Total Organic Carbon	**2.3**	0.020	0.020	% by Weight	1	09/19/19 10:56	EPA 9060Amod	**H-08**
T4-PDI2019-SC47-190522-03-05 (A9I0297-02)				**Matrix: Sediment**				
Batch: 9090855								
Total Organic Carbon	**1.2**	0.020	0.020	% by Weight	1	09/19/19 11:35	EPA 9060Amod	**H-08**

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ANALYTICAL SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
T4-PDI2019-SC47-190522-01-03 (A9I0297-01)				**Matrix: Sediment**				
Batch: 9091020								
Total Solids	**54.9**	1.00	1.00	% by Weight	1	09/19/19 18:17	PSEP 1986	
T4-PDI2019-SC47-190522-03-05 (A9I0297-02)				**Matrix: Sediment**				
Batch: 9091020								
Total Solids	**66.2**	1.00	1.00	% by Weight	1	09/19/19 18:17	PSEP 1986	

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ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
T4-PDI2019-SC47-190522-01-03 (A9I0297-01)				**Matrix: Sediment**		**Batch: 9091242**		
Gravel (>2.00mm)	**0.30**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**0.19**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**0.11**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**27.9**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**0.12**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**3.21**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**11.5**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**6.62**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**2.07**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**2.79**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.063 mm sieve (#230)	**1.62**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**51.0**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Clay (< 0.005 mm)	**20.8**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
T4-PDI2019-SC47-190522-03-05 (A9I0297-02)				**Matrix: Sediment**		**Batch: 9091242**		
Gravel (>2.00mm)	**0.37**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 4.75 mm sieve (#4)	**0.22**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 2.00 mm sieve (#10)	**0.15**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Sand (0.063mm - 2.00mm)	**52.2**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.85 mm sieve (#20)	**0.89**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.425 mm sieve (#40)	**12.3**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.250 mm sieve (#60)	**24.8**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.150 mm sieve (#100)	**9.22**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.106 mm sieve (#140)	**1.98**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Percent Retained 0.075 mm sieve (#200)	**1.99**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**

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EPA ID: OR01039

Anchor QEA, LLC	Project: **Port of Portland - T4 - PDI**	
6720 SW Macadam Ave. Suite 125	Project Number: **050332-01.32**	**Report ID:**
Portland, OR 97219	Project Manager: **Cindy Fields**	**A9I0297 - 10 18 19 1234**

ANALYTICAL SAMPLE RESULTS

Grain Size by ASTM D 422m/PSET Parameters

Analyte	Sample Result	Detection Limit	Reporting Limit	Units	Dilution	Date Analyzed	Method Ref.	Notes
T4-PDI2019-SC47-190522-03-05 (A9I0297-02)				**Matrix: Sediment**		**Batch: 9091242**		
Percent Retained 0.063 mm sieve (#230)	**0.97**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Silt (0.005mm < 0.063mm)	**32.1**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**
Clay (< 0.005 mm)	**15.4**	0.01	0.01	% of Total	1	09/30/19 14:51	D422mod	**GS-01**

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QUALITY CONTROL (QC) SAMPLE RESULTS

Demand Parameters

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9090855 - PSEP-5310B TOC							**Sediment**					
Blank (9090855-BLK1)			Prepared: 09/16/19 07:20		Analyzed: 09/19/19 08:54							
EPA 9060Amod												
Total Organic Carbon	ND	0.020	0.020	% by Weight	1	---	---	---	---	---	---	
LCS (9090855-BS1)			Prepared: 09/16/19 07:20		Analyzed: 09/19/19 09:09							
EPA 9060Amod												
Total Organic Carbon	10000			mg/kg	1	10000	---	104	90-110%	---	---	
Duplicate (9090855-DUP1)			Prepared: 09/16/19 07:20		Analyzed: 09/19/19 10:15							
QC Source Sample: Non-SDG (A9I0248-01)												
Total Organic Carbon	**3.4**	0.020	0.020	% by Weight	1	---	2.8	---	---	20	20%	

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QUALITY CONTROL (QC) SAMPLE RESULTS

Solid and Moisture Determinations

Analyte	Result	Detection Limit	Reporting Limit	Units	Dilution	Spike Amount	Source Result	% REC	% REC Limits	RPD	RPD Limit	Notes
Batch 9091020 - Total Solids (SM2540G/PSEP)							**Sediment**					
Duplicate (9091020-DUP1)			Prepared: 09/18/19 17:41		Analyzed: 09/19/19 18:17							
QC Source Sample: T4-PDI2019-SC47-190522-01-03 (A9I0297-01)												
PSEP 1986												
Total Solids	**54.4**	1.00	1.00	% by Weight	1	---	54.9	---	---	0.9	20%	

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SAMPLE PREPARATION INFORMATION

Demand Parameters

Prep: PSEP-5310B TOC

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9090855							
A9I0297-01	Sediment	EPA 9060Amod	05/22/19 14:26	09/16/19 07:20			NA
A9I0297-02	Sediment	EPA 9060Amod	05/22/19 14:26	09/16/19 07:20			NA

Solid and Moisture Determinations

Prep: Total Solids (SM2540G/PSEP)

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091020							
A9I0297-01	Sediment	PSEP 1986	05/22/19 14:26	09/18/19 17:41			NA
A9I0297-02	Sediment	PSEP 1986	05/22/19 14:26	09/18/19 17:41			NA

Grain Size by ASTM D 422m/PSET Parameters

Prep: ASTM D 421

Lab Number	Matrix	Method	Sampled	Prepared	Sample Initial/Final	Default Initial/Final	RL Prep Factor
Batch: 9091242							
A9I0297-01	Sediment	D422mod	05/22/19 14:26	09/26/19 11:00			NA
A9I0297-02	Sediment	D422mod	05/22/19 14:26	09/26/19 11:22			NA

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QUALIFIER DEFINITIONS

Client Sample and Quality Control (QC) Sample Qualifier Definitions:

Apex Laboratories

GS-01	See detailed Particle Size Analysis results, accumulation curves, and Case Narratives at the end of this report.
H-08	Sample hold time extended by freezing at -18 degrees C. Total time at 4 degrees C was less than the standard hold time.

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REPORTING NOTES AND CONVENTIONS:

Abbreviations:

DET Analyte DETECTED at or above the detection or reporting limit.

ND Analyte NOT DETECTED at or above the detection or reporting limit.

NR Result Not Reported

RPD Relative Percent Difference. RPDs for Matrix Spikes and Matrix Spike Duplicates are based on concentration, not recovery.

Detection Limits: Limit of Detection (LOD)

Limits of Detection (LODs) are normally set at a level of one half the validated Limit of Quantitation (LOQ).
If no value is listed ('-----'), then the data has not been evaluated below the Reporting Limit.

Reporting Limits: Limit of Quantitation (LOQ)

Validated Limits of Quantitation (LOQs) are reported as the Reporting Limits for all analyses where the LOQ, MRL, PQL or CRL are requested. The LOQ represents a level at or above the low point of the calibration curve, that has been validated according to Apex Laboratories' comprehensive LOQ policies and procedures.

Reporting Conventions:

Basis: Results for soil samples are generally reported on a 100% dry weight basis.
The Result Basis is listed following the units as " dry", " wet", or " " (blank) designation.

" dry" Sample results and Reporting Limits are reported on a dry weight basis. (i.e. "ug/kg dry")
See Percent Solids section for details of dry weight analysis.

" wet" Sample results and Reporting Limits for this analysis are normally dry weight corrected, but have not been modified in this case.

" " Results without 'wet' or 'dry' designation are not normally dry weight corrected. These results are considered 'As Received'.

QC Source:

In cases where there is insufficient sample provided for Sample Duplicates and/or Matrix Spikes, a Lab Control Sample Duplicate (LCS Dup) may be analyzed to demonstrate accuracy and precision of the extraction batch.

Non-Client Batch QC Samples (Duplicates and Matrix Spike/Duplicates) may not be included in this report. Please request a Full QC report if this data is required.

Miscellaneous Notes:

" --- " QC results are not applicable. For example, % Recoveries for Blanks and Duplicates, % RPD for Blanks, Blank Spikes and Matrix Spikes, etc.

" *** " Used to indicate a possible discrepancy with the Sample and Sample Duplicate results when the %RPD is not available. In this case, either the Sample or the Sample Duplicate has a reportable result for this analyte, while the other is Non Detect (ND).

Blanks:

Standard practice is to evaluate the results from Blank QC Samples down to a level equal to ½ the Reporting Limit (RL).
-For Blank hits falling between ½ the RL and the RL (J flagged hits), the associated sample and QC data will receive a 'B-02' qualifier.
-For Blank hits above the RL, the associated sample and QC data will receive a 'B' qualifier, per Apex Laboratories' Blank Policy.
For further details, please request a copy of this document.

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REPORTING NOTES AND CONVENTIONS (Cont.):

Blanks (Cont.):

Sample results flagged with a 'B' or 'B-02' qualifier are potentially biased high if the sample results are less than ten times the level found in the blank for inorganic analyses, or less than five times the level found in the blank for organic analyses.

'B' and 'B-02' qualifications are only applied to sample results detected above the Reporting Level.

Preparation Notes:

Mixed Matrix Samples:

Water Samples:

Water samples containing significant amounts of sediment are decanted or separated prior to extraction, and only the water portion analyzed, unless otherwise directed by the client.

Soil and Sediment Samples:

Soil and Sediment samples containing significant amounts of water are decanted prior to extraction, and only the solid portion analyzed, unless otherwise directed by the client.

Sampling and Preservation Notes:

Certain regulatory programs, such as National Pollutant Discharge Elimination System (NPDES), require that activities such as sample filtration (for dissolved metals, orthophosphate, hexavalent chromium, etc.) and testing of short hold analytes (pH, Dissolved Oxygen, etc.) be performed in the field (on-site) within a short time window. In addition, sample matrix spikes are required for some analyses, and sufficient volume must be provided, and billable site specific QC requested, if this is required. All regulatory permits should be reviewed to ensure that these requirements are being met.

Data users should be aware of which regulations pertain to the samples they submit for testing. If related sample collection activities are not approved for a particular regulatory program, results should be considered estimates. Apex Laboratories will qualify these analytes according to the most stringent requirements, however results for samples that are for non-regulatory purposes may be acceptable.

Samples that have been filtered and preserved at Apex Laboratories per client request are listed in the preparation section of the report with the date and time of filtration listed.

Apex Laboratories maintains detailed records on sample receipt, including client label verification, cooler temperature, sample preservation, hold time compliance and field filtration. Data is qualified as necessary, and the lack of qualification indicates compliance with required parameters.

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LABORATORY ACCREDITATION INFORMATION

TNI Certification ID: OR100062 (Primary Accreditation) - EPA ID: OR01039

All methods and analytes reported from work performed at Apex Laboratories are included on Apex Laboratories' ORELAP Scope of Certification, with the exception of any analyte(s) listed below:

Apex Laboratories

Matrix	Analysis	TNI_ID	Analyte	TNI_ID	Accreditation

All reported analytes are included in Apex Laboratories' current ORELAP scope.

Secondary Accreditations

Apex Laboratories also maintains reciprocal accreditation with non-TNI states (Washington DOE), as well as other state specific accreditations not listed here.

Subcontract Laboratory Accreditations

Subcontracted data falls outside of Apex Laboratories' Scope of Accreditation.
Please see the Subcontract Laboratory report for full details, or contact your Project Manager for more information.

Field Testing Parameters

Results for Field Tested data are provded by the client or sampler, and fall outside of Apex Laboratories' Scope of Accreditation.

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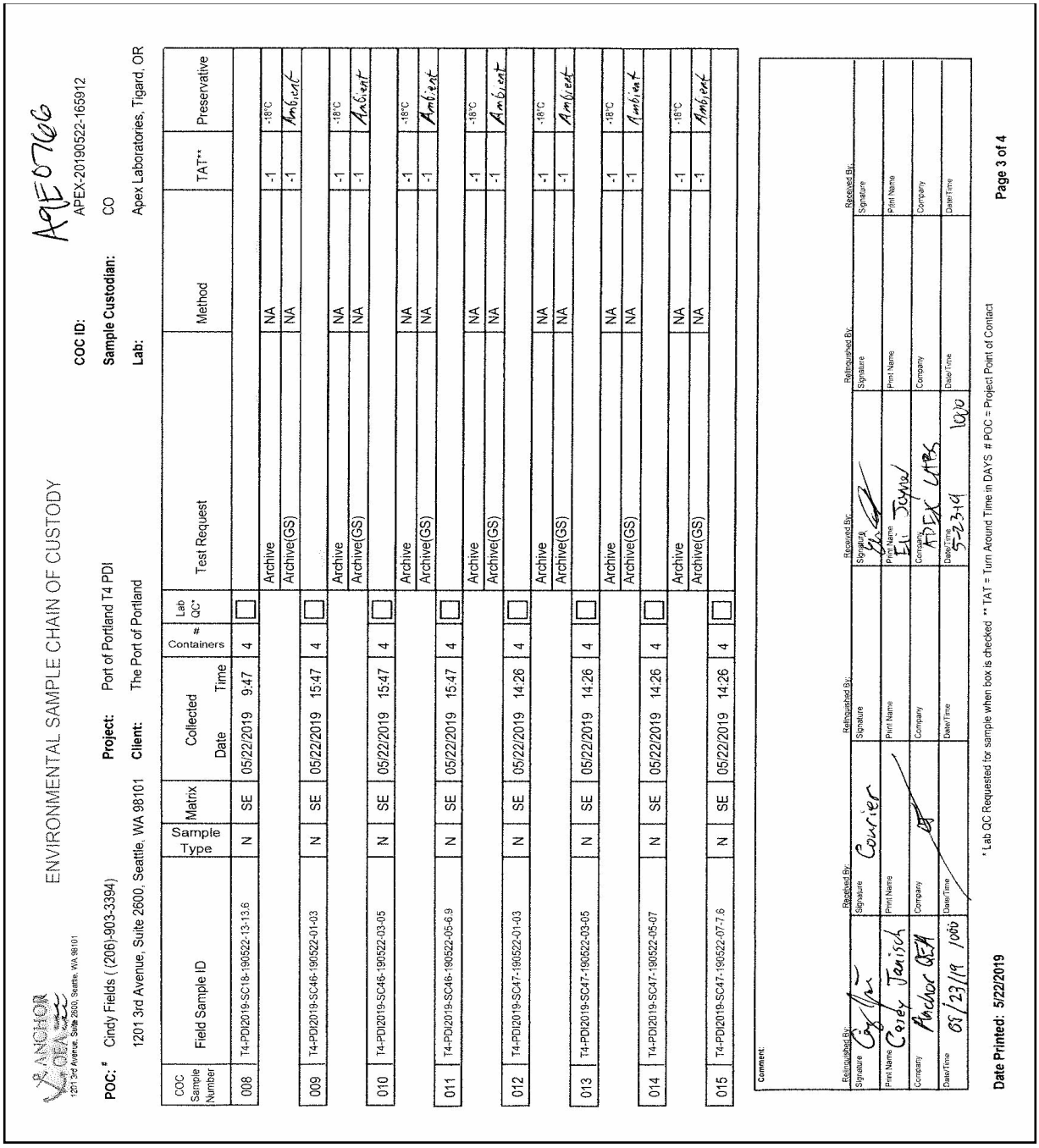


ENVIRONMENTAL SAMPLE CHAIN OF CUSTODY

ANCHOR QEA, LLC
1201 3rd Avenue, Suite 2600, Seattle, WA 98101

APEX-20190522-165912

COC ID:
Sample Custodian: CO
Lab: Apex Laboratories, Tigard, OR

POC: # Cindy Fields ((206)-903-3394)
1201 3rd Avenue, Suite 2600, Seattle, WA 98101
Project: Port of Portland T4 PDI
Client: The Port of Portland

COC Sample Number	Field Sample ID	Sample Type	Matrix	Collected Date	Collected Time	# Containers	Lab QC*	Test Request	Method	TAT**	Preservative
008	T4-PDI2019-SC18-190522-13-13.6	N	SE	05/22/2019	9:47	4	☐	Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
009	T4-PDI2019-SC46-190522-01-03	N	SE	05/22/2019	15:47	4	☐	Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
010	T4-PDI2019-SC46-190522-03-05	N	SE	05/22/2019	15:47	4	☐	Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
011	T4-PDI2019-SC46-190522-05-6.9	N	SE	05/22/2019	15:47	4	☐	Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
012	T4-PDI2019-SC47-190522-01-03	N	SE	05/22/2019	14:26	4	☐	Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
013	T4-PDI2019-SC47-190522-03-05	N	SE	05/22/2019	14:26	4	☐	Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
014	T4-PDI2019-SC47-190522-05-07	N	SE	05/22/2019	14:26	4	☐	Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
015	T4-PDI2019-SC47-190522-07-7.6	N	SE	05/22/2019	14:26	4	☐	Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient

Comment:

Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature:	Signature: Courier	Signature:	Signature:	Signature:	Signature:
Print Name: Cindy Fields	Print Name: Courier Tanisch	Print Name:	Print Name: Eli Tyme	Print Name:	Print Name:
Company: Anchor QEA	Company:	Company:	Company: APEX LABS	Company:	Company:
Date/Time: 05/23/19 1000	Date/Time:	Date/Time:	Date/Time: 5-23-19 1000	Date/Time:	Date/Time:

* Lab QC Requested for sample when box is checked ** TAT = Turn Around Time in DAYS # POC = Project Point of Contact

Date Printed: 5/22/2019

Page 3 of 4

Apex Laboratories

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.

Darwin Thomas, Business Development Director

Apex Laboratories, LLC
6700 S.W. Sandburg Street
Tigard, OR 97223
503-718-2323
EPA ID: OR01039

Anchor QEA, LLC	Project: **Port of Portland - T4 - PDI**	
6720 SW Macadam Ave. Suite 125	Project Number: **050332-01.32**	**Report ID:**
Portland, OR 97219	Project Manager: **Cindy Fields**	**A9I0297 - 10 18 19 1234**

APEX LABS COOLER RECEIPT FORM

Client: Anchor QEA Element WO#: A9 E0766

Project/Project #: Port of Portland T4 PDI

Delivery Info:

Date/time received: 5-23-19 @ 1000 By: EJ

Delivered by: Apex X Client ESS FedEx UPS Swift Senvoy SDS Other

Cooler Inspection Date/time inspected: 5-23-19 @ 1103 By: EJ

Chain of Custody included? Yes X No Custody seals? Yes X No

Signed/dated by client? Yes X No

Signed/dated by Apex? Yes X No

	Cooler #1	Cooler #2	Cooler #3	Cooler #4	Cooler #5	Cooler #6	Cooler #7
Temperature (°C)	2.2	0.8	0.6				
Received on ice? (Y/N)	Y	Y	Y				
Temp. blanks? (Y/N)	Y	Y	Y				
Ice type: (Gel/Real/Other)	Real	Real	Real				
Condition:	good	good	good				

Cooler out of temp? (Y(N) Possible reason why:

If some coolers are in temp and some out, were green dots applied to out of temperature samples? Yes/No/(NA)

Out of temperature samples form initiated? Yes/No/(NA)

Samples Inspection: Date/time inspected: 5-22-19 @ 12:15 By: TAM

All samples intact? Yes Y No Comments:

Bottle labels/COCs agree? Yes Y No Comments: FD-20190522 0947

no time on COC. Time on cont. reads 09:47 (Field Dup).

COC/container discrepancies form initiated? Yes No NA Y

Containers/volumes received appropriate for analysis? Yes Y No Comments:

Do VOA vials have visible headspace? Yes No NA Y

Comments

Water samples: pH checked: Yes No NA Y pH appropriate? Yes No NA Y

Comments:

Additional information:

Labeled by: CD Witness: CFH Cooler Inspected by: TAM See Project Contact Form: Y

Apex Laboratories

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.

Darwin Thomas, Business Development Director

Anchor QEA, LLC	Project: **Port of Portland - T4 - PDI**	
6720 SW Macadam Ave. Suite 125	Project Number: **050332-01.32**	**Report ID:**
Portland, OR 97219	Project Manager: **Cindy Fields**	**A9I0297 - 10 18 19 1234**

ANCHOR QEA
1201 3rd Avenue, Suite 2600, Seattle, WA 98101

ENVIRONMENTAL SAMPLE CHAIN OF CUSTODY A9I0297 Re-log A9E0766

POC: # Cindy Fields ((206)-903-3394)
1201 3rd Avenue, Suite 2600, Seattle, WA 98101

Project: Port of Portland T4 PDI
Client: The Port of Portland

COC ID: APEX-20190522-165912
Sample Custodian: CO
Lab: Apex Laboratories, Tigard, OR

COC Sample Number	Field Sample ID	Sample Type	Matrix	Collected Date	Collected Time	# Containers	Lab QC*	Test Request	Method	TAT**	Preservative
008	T4-PDI2019-SC18-190522-13-13.6	N	SE	05/22/2019	9:47	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
009	T4-PDI2019-SC46-190522-01-03	N	SE	05/22/2019	15:47	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
010	T4-PDI2019-SC46-190522-03-05	N	SE	05/22/2019	15:47	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
011	T4-PDI2019-SC46-190522-05-6.9	N	SE	05/22/2019	15:47	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
012	T4-PDI2019-SC47-190522-01-03	N	SE	05/22/2019	14:26	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
013	T4-PDI2019-SC47-190522-03-05	N	SE	05/22/2019	14:26	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
014	T4-PDI2019-SC47-190522-05-07	N	SE	05/22/2019	14:26	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
015	T4-PDI2019-SC47-190522-07-7.6	N	SE	05/22/2019	14:26	4	☐				

Comment:

	Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	[signature]	Courier		[signature]		
Print Name	Corey Janisch			Eli Joyner		
Company	Anchor QEA			APEX LABS		
Date/Time	05/23/19 1000			5-23-19 1000		

* Lab QC Requested for sample when box is checked. ** TAT = Turn Around Time in DAYS. # POC = Project Point of Contact

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.

Darwin Thomas, Business Development Director

Sample Receipt Documentation
(Work orders, Chain of Custody & Cooler Receipt Forms)

A9I0297

Apex Laboratories

Client:	**Anchor QEA, LLC**	**Project Manager:**	**Darwin Thomas**
Project:	**Port of Portland - T4 - PDI**	**Project Number:**	**050332-01.32**

Report To:

Anchor QEA, LLC
Cindy Fields
6720 SW Macadam Ave. Suite 125
Portland, OR 97219
Phone: (503) 670-1108
Fax: na

Invoice To:

Anchor QEA, LLC
Cindy Fields
6720 SW Macadam Ave. Suite 125
Portland, OR 97219
Phone :(503) 670-1108
Fax: na

Date Due:	09/25/19 17:00 (86 day TAT)		
Received By:	Eli S. Joyner	Date Received:	05/23/19 10:00
Logged In By:	Susan L. Treat	Date Logged In:	09/11/19 12:59

Cooler #1 received at 2.2°C

Custody Seals	Yes	Containers Intact	Yes	COC/Labels Agree	Yes	PH Confirmed	No	Received On Ice	Yes
Temperature OK	Yes								

Cooler #2 received at 0.8°C

Custody Seals	Yes	Containers Intact	Yes	COC/Labels Agree	Yes	PH Confirmed	No	Received On Ice	Yes
Temperature OK	Yes								

Cooler #3 received at 0.6°C

Custody Seals	Yes	Containers Intact	Yes	COC/Labels Agree	Yes	PH Confirmed	No	Received On Ice	Yes
Temperature OK	Yes								

Analysis	Due	TAT	Expires	Comments
A9I0297-01 T4-PDI2019-SC47-190522-01-03 [Sediment] Sampled 05/22/19 14:26 (GMT-08:00) Pacific Time (US & Canada) 3 Containers				**Copy/relog from A9E0766**
Dry Weight				
Dry Weight	05/29/19 17:00	3	11/18/19 14:26	**USE SOLIDS DATA** Make Not Reportable.
Geotechnical				
Grain Size (D422m/PSET)	09/25/19 17:00	15	11/18/19 14:26	
Project Mgmt				
Data Package	06/21/19 17:00	20	08/29/19 14:26	
Wet Chem				
Solids, PSEP 1986	09/25/19 17:00	10	11/18/19 14:26	Enter TS data for DW. (Units=%)
Total Organic Carbon - Soil (9060A)	09/25/19 17:00	10	06/19/19 14:26	Units=%
A9I0297-02 T4-PDI2019-SC47-190522-03-05 [Sediment] Sampled 05/22/19 14:26 (GMT-08:00) Pacific Time (US & Canada) 3 Containers				**Copy/relog from A9E0766**
Dry Weight				
Dry Weight	05/29/19 17:00	3	11/18/19 14:26	**USE SOLIDS DATA** Make Not Reportable.
Geotechnical				
Grain Size (D422m/PSET)	09/25/19 17:00	15	11/18/19 14:26	
Wet Chem				
Solids, PSEP 1986	09/25/19 17:00	10	11/18/19 14:26	Enter TS data for DW. (Units=%)
Total Organic Carbon - Soil (9060A)	09/25/19 17:00	10	06/19/19 14:26	Units=%

Reviewed By

Date

A9I0297

Apex Laboratories

Client:	**Anchor QEA, LLC**	**Project Manager:**	**Darwin Thomas**
Project:	**Port of Portland - T4 - PDI**	**Project Number:**	**050332-01.32**

Reviewed By

Date

ANCHOR QEA
1201 3rd Avenue, Suite 2600, Seattle, WA 98101

ENVIRONMENTAL SAMPLE CHAIN OF CUSTODY

A9I0297
Re-log

A9E0766

COC ID: APEX-20190522-165912

POC: [#] Cindy Fields ((206)-903-3394)
1201 3rd Avenue, Suite 2600, Seattle, WA 98101

Project: Port of Portland T4 PDI

Client: The Port of Portland

Sample Custodian: CO

Lab: Apex Laboratories, Tigard, OR

COC Sample Number	Field Sample ID	Sample Type	Matrix	Collected Date	Collected Time	# Containers	Lab QC*	Test Request	Method	TAT**	Preservative
008	T4-PDI2019-SC18-190522-13-13.6	N	SE	05/22/2019	9:47	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
009	T4-PDI2019-SC46-190522-01-03	N	SE	05/22/2019	15:47	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
010	T4-PDI2019-SC46-190522-03-05	N	SE	05/22/2019	15:47	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
011	T4-PDI2019-SC46-190522-05-6.9	N	SE	05/22/2019	15:47	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
012	T4-PDI2019-SC47-190522-01-03	N	SE	05/22/2019	14:26	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
013	T4-PDI2019-SC47-190522-03-05	N	SE	05/22/2019	14:26	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
014	T4-PDI2019-SC47-190522-05-07	N	SE	05/22/2019	14:26	4	☐				
								Archive	NA	-1	-18°C
								Archive(GS)	NA	-1	Ambient
015	T4-PDI2019-SC47-190522-07-7.6	N	SE	05/22/2019	14:26	4	☐				

Comment:

	Relinquished By:	Received By:	Relinquished By:	Received By:	Relinquished By:	Received By:
Signature	[signature]	Courier		[signature]		
Print Name	Casey Janisch			Eli Jayne		
Company	Anchor QEA			APEX LABS		
Date/Time	05/23/19 1000			5-23-19 1000		

* Lab QC Requested for sa[illegible] [illegible] Point of Contact

CLP-Like Forms

Apex Laboratories

SDG: A9I0297

CLASS: WET

METHOD: EPA 9060Amod

ANALYSES DATA PACKAGE COVER PAGE

EPA 9060Amod

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI

Client Sample Id:	Lab Sample Id:	Matrix
T4-PDI2019-SC47-190522-01-03	A9I0297-01	Sediment
T4-PDI2019-SC47-190522-03-05	A9I0297-02	Sediment

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 above. Release of the data contained in this hardcopy data package and in computer-readable data submitted on diskette has been autorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures.

Signature: 
Name: David G. Jack

Forms Created: 10/22/2019 11:06AM
Title: Technical Manager

METHOD DETECTION AND REPORTING LIMITS

EPA 9060Amod

Laboratory: Apex Laboratories **SDG:** A9I0297

Client: Anchor QEA, LLC **Project:** Port of Portland - T4 - PDI

Batch Matrix: Sediment

Analyte	MDL	MRL	Units
Total Organic Carbon	0.020	0.020	% by Weight

Note: MDLs are listed only if the corresponding analyte was evalutated to the MDL in this report .

INORGANIC ANALYSIS DATA SHEET

EPA 9060Amod

T4-PDI2019-SC47-190522-01-03

Laboratory: Apex Laboratories SDG: A9I0297

Client: Anchor QEA, LLC Project: Port of Portland - T4 - PDI

Matrix: Sediment Laboratory ID: A9I0297-01

Sampled: 05/22/19 14:26 Prepared: 09/16/19 07:20 Analyzed: 09/19/19 10:56

Solids: 54.94 Preparation: PSEP-5310B TOC Initial/Final: 5 N/A / 5 N/A

Batch: 9090855 Sequence: 9I19027 Calibration: A8B0203 Instrument: TOC

CAS NO.	Analyte	Concentration (% by Weight)	Dilution Factor	Q	Method
TOC	Total Organic Carbon	2.3	1		EPA 9060Amod

INORGANIC ANALYSIS DATA SHEET

EPA 9060Amod

T4-PDI2019-SC47-190522-03-05

Laboratory: Apex Laboratories SDG: A9I0297

Client: Anchor QEA, LLC Project: Port of Portland - T4 - PDI

Matrix: Sediment Laboratory ID: A9I0297-02

Sampled: 05/22/19 14:26 Prepared: 09/16/19 07:20 Analyzed: 09/19/19 11:35

Solids: 66.21 Preparation: PSEP-5310B TOC Initial/Final: 5 N/A / 5 N/A

Batch: 9090855 Sequence: 9I19027 Calibration: A8B0203 Instrument: TOC

CAS NO.	Analyte	Concentration (% by Weight)	Dilution Factor	Q	Method
TOC	Total Organic Carbon	1.2	1		EPA 9060Amod

PREPARATION BATCH SUMMARY

EPA 9060Amod

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI
Batch: 9090855 Batch Matrix: Sediment Preparation: PSEP-5310B TOC

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
Blank	9090855-BLK1		09/16/19 07:20	
LCS	9090855-BS1		09/16/19 07:20	
T4-PDI2019-SC47-190522-01-03	A9I0297-01		09/16/19 07:20	
T4-PDI2019-SC47-190522-03-05	A9I0297-02		09/16/19 07:20	

Note: Client samples are listed only if they are included in this report.
Duplicates and Matrix Spike/Duplicates QC Samples are only listed if sourced from a sample included in this report.

METHOD BLANK DATA SHEET

EPA 9060Amod

Laboratory:	Apex Laboratories			SDG:	A9I0297
Client:	Anchor QEA, LLC			Project:	Port of Portland - T4 - PDI
Matrix:	Sediment	Laboratory ID:	9090855-BLK1	File ID:	
Prepared:	09/16/19 07:20	Preparation:	PSEP-5310B TOC	Initial/Final:	5 N/A / 5 N/A
Analyzed:	09/19/19 08:54	Instrument:	TOC		
Batch:	9090855	Sequence:	9I19027	Calibration:	A8B0203

CAS NO.	COMPOUND	CONC. (% by Weight)	Q
TOC	Total Organic Carbon	0.020	U

LCS / LCS DUPLICATE RECOVERY

EPA 9060Amod

Laboratory:	Apex Laboratories	SDG:	A9I0297
Client:	Anchor QEA, LLC	Project:	Port of Portland - T4 - PDI
Matrix:	Sediment		
Batch:	9090855	Laboratory ID:	9090855-BS1
Preparation:	PSEP-5310B TOC	Initial/Final:	5 N/A / 5 N/A

COMPOUND	SPIKE ADDED (mg/kg)	LCS CONCENTRATION (mg/kg)	LCS % REC. (*=Out)	QC LIMITS REC.
Total Organic Carbon	10000	10000	104	90 - 110

* = Values outside of QC limits

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9060Amod

Laboratory:	Apex Laboratories	SDG:	A9I0297
Client:	Anchor QEA, LLC	Project:	Port of Portland - T4 - PDI
Sequence:	8B02022	Instrument:	TOC
Matrix:	Sediment	Calibration:	A8B0203

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Cal Standard	8B02022-CAL2		02/02/18 17:35
Cal Standard	8B02022-CAL3		02/02/18 17:35
Cal Standard	8B02022-CAL4		02/02/18 17:35
Cal Standard	8B02022-CAL5		02/02/18 17:35
Cal Standard	8B02022-CAL6		02/02/18 17:35
Cal Standard	8B02022-CAL7		02/02/18 17:35
Cal Standard	8B02022-CAL8		02/02/18 17:35
Cal Standard	8B02022-CAL9		02/02/18 17:35
Cal Standard	8B02022-CALA		02/02/18 17:35
Cal Standard	8B02022-CALB		02/02/18 17:35
Initial Cal Check	8B02022-ICV2		02/02/18 17:35
Initial Cal Blank	8B02022-ICB2		02/02/18 17:35

Note: Client samples are listed only if they are included in this report.
Duplicates and Matrix Spike/Duplicates QC Samples are only listed if sourced from a sample included in this report.

ANALYSIS BATCH (SEQUENCE) SUMMARY

EPA 9060Amod

Laboratory:	Apex Laboratories	SDG:	A9I0297
Client:	Anchor QEA, LLC	Project:	Port of Portland - T4 - PDI
Sequence:	9I19027	Instrument:	TOC
Matrix:	Sediment	Calibration:	A8B0203

Sample Name	Lab Sample ID	Lab File ID	Analysis Date/Time
Calibration Check	9I19027-CCV1		09/19/19 08:11
Calibration Blank	9I19027-CCB1		09/19/19 08:41
Blank	9090855-BLK1		09/19/19 08:54
LCS	9090855-BS1		09/19/19 09:09
T4-PDI2019-SC47-190522-01-03	A9I0297-01		09/19/19 10:56
T4-PDI2019-SC47-190522-03-05	A9I0297-02		09/19/19 11:35
Calibration Check	9I19027-CCV2		09/19/19 17:00
Calibration Blank	9I19027-CCB2		09/19/19 17:22
Calibration Check	9I19027-CCV3		09/19/19 18:44
Calibration Blank	9I19027-CCB3		09/19/19 19:04

Note: Client samples are listed only if they are included in this report.
Duplicates and Matrix Spike/Duplicates QC Samples are only listed if sourced from a sample included in this report.

INITIAL CALIBRATION DATA (Summary)

EPA 9060Amod

Laboratory: Apex Laboratories SDG: A9I0297

Client: Anchor QEA, LLC Project: Port of Portland - T4 - PDI

Calibration: A8B0203 Date: 02/02/18 15:56 Instrument: TOC

Compound	Mean RF	FIT	RF RSD	Mean RT	RT RSD	Linear r	Quad COD	LIMIT	Q
Total Organic Carbon		Lin				0.00000			

Note: ** Quad COD may be incorrect if weighting (1/a) or (1/a2) used. Weighting not shown here. Please see instrument calibration printouts for validation.

INITIAL CALIBRATION DATA

EPA 9060Amod

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI
Calibration: A8B0203
Instrument: TOC
Calibration Date: 02/02/18 15:56

Compound	Level 01		Level 02		Level 03		Level 04		Level 05		Level 06	
	mg/kg	RF	mg/kg	RF	mg/kg	RF	mg/kg	RF	mg/kg	RF	mg/kg	RF
Total Organic Carbon	1000		2500		5000		10000		15000		20000	

INITIAL CALIBRATION DATA (Continued)

EPA 9060Amod

Laboratory:	Apex Laboratories	SDG:	A9I0297
Client:	Anchor QEA, LLC	Project:	Port of Portland - T4 - PDI
Calibration:	A8B0203	Instrument:	TOC
Matrix:		Calibration Date:	02/02/18 15:56

Compound	Level 07		Level 08		Level 09		Level 10		Level 11		Level 12	
	mg/kg	RF	mg/kg	RF	mg/kg	RF	mg/kg	RF	mg/kg	RF	mg/kg	RF
Total Organic Carbon	25000		30000		35000		40000					

INITIAL AND CONTINUING CALIBRATION CHECK

EPA 9060Amod

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI
Instrument ID: TOC
Calibration: A8B0203
Control Limt: +/- 10.00%
Sequence: 8B02022

Lab Sample ID	Analyte	True	Found	%R	Units	Method
8B02022-ICV2	Total Organic Carbon	10000	10000	104	mg/kg	EPA 9060Amod

* Values outside of QC limits

INITIAL AND CONTINUING CALIBRATION CHECK

EPA 9060Amod

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI
Instrument ID: TOC
Calibration: A8B0203
Control Limt: +/- 10.00%
Sequence: 9I19027

Lab Sample ID	Analyte	True	Found	%R	Units	Method
9I19027-CCV1	Total Organic Carbon	10000	11000	108	mg/kg	EPA 9060Amod
9I19027-CCV2	Total Organic Carbon	10000	10000	104	mg/kg	EPA 9060Amod
9I19027-CCV3	Total Organic Carbon	10000	9200	92	mg/kg	EPA 9060Amod

* Values outside of QC limits

INSTRUMENT BLANKS
EPA 9060Amod

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Instrument ID: TOC
Project: Port of Portland - T4 - PDI
Sequence: 8B02022
Calibration: A8B0203

Lab Sample ID	Analyte	Found	RL	Units	C	Method
8B02022-ICB2	Total Organic Carbon	260	200 (Inst)	mg/kg	*	EPA 9060Amod

(Inst) indicates on-Instrument Result and Reporting Level. Used for non-digested Instrument Blanks.

INSTRUMENT BLANKS
EPA 9060Amod

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Instrument ID: TOC
Project: Port of Portland - T4 - PDI
Sequence: 9I19027
Calibration: A8B0203

Lab Sample ID	Analyte	Found	RL	Units	C	Method
9I19027-CCB1	Total Organic Carbon	ND	200 (Inst)	mg/kg		EPA 9060Amod
9I19027-CCB2	Total Organic Carbon	ND	200 (Inst)	mg/kg		EPA 9060Amod
9I19027-CCB3	Total Organic Carbon	ND	200 (Inst)	mg/kg		EPA 9060Amod

(Inst) indicates on-Instrument Result and Reporting Level. Used for non-digested Instrument Blanks.

HOLDING TIME SUMMARY

EPA 9060Amod

Laboratory: Apex Laboratories SDG: A9I0297

Client: Anchor QEA, LLC Project: Port of Portland - T4 - PDI

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
T4-PDI2019-SC47-190522-01-03	05/22/19 14:26	05/23/19 10:00	09/16/19 07:20	116.70	28.00	09/19/19 10:56	119.85	28.00	*
T4-PDI2019-SC47-190522-03-05	05/22/19 14:26	05/23/19 10:00	09/16/19 07:20	116.70	28.00	09/19/19 11:35	119.88	28.00	*

Apex Laboratories

SDG: A9I0297

CLASS: WET

METHOD: PSEP 1986

ANALYSES DATA PACKAGE COVER PAGE

PSEP 1986

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI

Client Sample Id:	Lab Sample Id:	Matrix
T4-PDI2019-SC47-190522-01-03	A9I0297-01	Sediment
T4-PDI2019-SC47-190522-03-05	A9I0297-02	Sediment

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 above. Release of the data contained in this hardcopy data package and in computer-readable data submitted on diskette has been autorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures.

Signature: 
Name: David G. Jack

Forms Created: 10/22/2019 11:06AM
Title: Technical Manager

METHOD DETECTION AND REPORTING LIMITS

PSEP 1986

Laboratory: Apex Laboratories **SDG:** A9I0297

Client: Anchor QEA, LLC **Project:** Port of Portland - T4 - PDI

Batch Matrix: Sediment

Analyte	MDL	MRL	Units
Total Solids	1.00	1.00	% by Weight

Note: MDLs are listed only if the corresponding analyte was evalutated to the MDL in this report .

INORGANIC ANALYSIS DATA SHEET

PSEP 1986

T4-PDI2019-SC47-190522-01-03

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI
Matrix: Sediment
Laboratory ID: A9I0297-01
Sampled: 05/22/19 14:26
Prepared: 09/18/19 17:41
Analyzed: 09/19/19 18:17
Solids: 54.94
Preparation: Total Solids (SM2540G/PSEP)
Initial/Final: 1 N/A / 1 N/A
Batch: 9091020
Calibration:
Instrument: Wet Chem Balance 1

CAS NO.	Analyte	Concentration (% by Weight)	Dilution Factor	Q	Method
TS	Total Solids	54.9	1		PSEP 1986

INORGANIC ANALYSIS DATA SHEET

PSEP 1986

T4-PDI2019-SC47-190522-03-05

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI
Matrix: Sediment
Laboratory ID: A9I0297-02
Sampled: 05/22/19 14:26
Prepared: 09/18/19 17:41
Analyzed: 09/19/19 18:17
Solids: 66.21
Preparation: Total Solids (SM2540G/PSEP)
Initial/Final: 1 N/A / 1 N/A
Batch: 9091020
Calibration:
Instrument: Wet Chem Balance 1

CAS NO.	Analyte	Concentration (% by Weight)	Dilution Factor	Q	Method
TS	Total Solids	66.2	1		PSEP 1986

PREPARATION BATCH SUMMARY

PSEP 1986

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI
Batch: 9091020 Batch Matrix: Sediment Preparation: Total Solids (SM2540G/PSEP)

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
T4-PDI2019-SC47-190522-01-03 (D	9091020-DUP1		09/18/19 17:41	
T4-PDI2019-SC47-190522-01-03	A9I0297-01		09/18/19 17:41	
T4-PDI2019-SC47-190522-03-05	A9I0297-02		09/18/19 17:41	

Note: Client samples are listed only if they are included in this report.
Duplicates and Matrix Spike/Duplicates QC Samples are only listed if sourced from a sample included in this report.

DUPLICATES

PSEP 1986

T4-PDI2019-SC47-190522-01-03

Laboratory: Apex Laboratories
Client: Anchor QEA, LLC
Matrix: Sediment
Batch: 9091020
Preparation: Total Solids (SM2540G/PSEP)
Source Sample Name: T4-PDI2019-SC47-190522-01-03

SDG: A9I0297
Project: Port of Portland - T4 - PDI
Laboratory ID: 9091020-DUP1
Lab Source ID: A9I0297-01
Initial/Final: 1 N/A / 1 N/A
% Solids: 54.94

ANALYTE	CONTROL LIMIT	SAMPLE CONCENTRATION (% by Weight)	C	DUPLICATE CONCENTRATION (% by Weight)	C	RPD %	Q	METHOD
Total Solids	20	54.9		54.4		0.9		PSEP 1986

* Values outside of QC limits

HOLDING TIME SUMMARY

PSEP 1986

Laboratory: Apex Laboratories SDG: A9I0297

Client: Anchor QEA, LLC Project: Port of Portland - T4 - PDI

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
T4-PDI2019-SC47-190522-01-03	05/22/19 14:26	05/23/19 10:00	09/18/19 17:41	119.14	180.00	09/19/19 18:17	1.02		
T4-PDI2019-SC47-190522-03-05	05/22/19 14:26	05/23/19 10:00	09/18/19 17:41	119.14	180.00	09/19/19 18:17	1.02		

Apex Laboratories

SDG: A9I0297

CLASS: WET

METHOD: D422mod

ANALYSES DATA PACKAGE COVER PAGE

D422mod

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI

Client Sample Id:	Lab Sample Id:	Matrix
T4-PDI2019-SC47-190522-01-03	A9I0297-01	Sediment
T4-PDI2019-SC47-190522-03-05	A9I0297-02	Sediment

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 above. Release of the data contained in this hardcopy data package and in computer-readable data submitted on diskette has been autorized by the Laboratory Manager or the Manager's designee, as verified by the following signatures.

Signature: 
Name: David G. Jack

Forms Created: 10/22/2019 11:06AM
Title: Technical Manager

METHOD DETECTION AND REPORTING LIMITS

D422mod

Laboratory: Apex Laboratories **SDG:** A9I0297

Client: Anchor QEA, LLC **Project:** Port of Portland - T4 - PDI

Batch Matrix: Soil

Analyte	MDL	MRL	Units
Gravel (>2.00mm)	0.01	0.01	% of Total
Percent Retained 4.75 mm sieve (#4)	0.01	0.01	% of Total
Percent Retained 2.00 mm sieve (#10)	0.01	0.01	% of Total
Sand (0.063mm - 2.00mm)	0.01	0.01	% of Total
Percent Retained 0.85 mm sieve (#20)	0.01	0.01	% of Total
Percent Retained 0.425 mm sieve (#40)	0.01	0.01	% of Total
Percent Retained 0.250 mm sieve (#60)	0.01	0.01	% of Total
Percent Retained 0.150 mm sieve (#100)	0.01	0.01	% of Total
Percent Retained 0.106 mm sieve (#140)	0.01	0.01	% of Total
Percent Retained 0.075 mm sieve (#200)	0.01	0.01	% of Total
Percent Retained 0.063 mm sieve (#230)	0.01	0.01	% of Total
Silt (0.005mm < 0.063mm)	0.01	0.01	% of Total
Clay (< 0.005 mm)	0.01	0.01	% of Total

Note: MDLs are listed only if the corresponding analyte was evalutated to the MDL in this report .

INORGANIC ANALYSIS DATA SHEET

D422mod

T4-PDI2019-SC47-190522-01-03

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI
Matrix: Sediment
Laboratory ID: A9I0297-01
Sampled: 05/22/19 14:26
Prepared: 09/26/19 11:00
Analyzed: 09/30/19 14:51
Solids: 54.94
Preparation: ASTM D 421
Initial/Final: 1 N/A / 1 N/A
Batch: 9091242
Calibration:
Instrument: Inst

CAS NO.	Analyte	Concentration (% of Total)	Dilution Factor	Q	Method
GS-Gravel	Gravel (>2.00mm)	0.30	1		D422mod
GS-4.75	Percent Retained 4.75 mm sieve (#4)	0.19	1		D422mod
GS-2.00	Percent Retained 2.00 mm sieve (#10)	0.11	1		D422mod
GS-Sand	Sand (0.063mm - 2.00mm)	27.9	1		D422mod
GS-0.850	Percent Retained 0.85 mm sieve (#20)	0.12	1		D422mod
GS-0.425	Percent Retained 0.425 mm sieve (#40)	3.21	1		D422mod
GS-0.250	Percent Retained 0.250 mm sieve (#60)	11.5	1		D422mod
GS-0.150	Percent Retained 0.150 mm sieve (#100)	6.62	1		D422mod
GS-0.106	Percent Retained 0.106 mm sieve (#140)	2.07	1		D422mod
GS-0.075	Percent Retained 0.075 mm sieve (#200)	2.79	1		D422mod
GS-0.063	Percent Retained 0.063 mm sieve (#230)	1.62	1		D422mod
GS-SILT	Silt (0.005mm < 0.063mm)	51.0	1		D422mod
GS-Clay	Clay (< 0.005 mm)	20.8	1		D422mod

INORGANIC ANALYSIS DATA SHEET

D422mod

T4-PDI2019-SC47-190522-03-05

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI
Matrix: Sediment
Laboratory ID: A9I0297-02
Sampled: 05/22/19 14:26
Prepared: 09/26/19 11:22
Analyzed: 09/30/19 14:51
Solids: 66.21
Preparation: ASTM D 421
Initial/Final: 1 N/A / 1 N/A
Batch: 9091242
Calibration:
Instrument: Inst

CAS NO.	Analyte	Concentration (% of Total)	Dilution Factor	Q	Method
GS-Gravel	Gravel (>2.00mm)	0.37	1		D422mod
GS-4.75	Percent Retained 4.75 mm sieve (#4)	0.22	1		D422mod
GS-2.00	Percent Retained 2.00 mm sieve (#10)	0.15	1		D422mod
GS-Sand	Sand (0.063mm - 2.00mm)	52.2	1		D422mod
GS-0.850	Percent Retained 0.85 mm sieve (#20)	0.89	1		D422mod
GS-0.425	Percent Retained 0.425 mm sieve (#40)	12.3	1		D422mod
GS-0.250	Percent Retained 0.250 mm sieve (#60)	24.8	1		D422mod
GS-0.150	Percent Retained 0.150 mm sieve (#100)	9.22	1		D422mod
GS-0.106	Percent Retained 0.106 mm sieve (#140)	1.98	1		D422mod
GS-0.075	Percent Retained 0.075 mm sieve (#200)	1.99	1		D422mod
GS-0.063	Percent Retained 0.063 mm sieve (#230)	0.97	1		D422mod
GS-SILT	Silt (0.005mm < 0.063mm)	32.1	1		D422mod
GS-Clay	Clay (< 0.005 mm)	15.4	1		D422mod

PREPARATION BATCH SUMMARY

D422mod

Laboratory: Apex Laboratories
SDG: A9I0297
Client: Anchor QEA, LLC
Project: Port of Portland - T4 - PDI
Batch: 9091242 Batch Matrix: Soil Preparation: ASTM D 421

SAMPLE NAME	LAB SAMPLE ID	LAB FILE ID	DATE PREPARED	OBSERVATIONS
T4-PDI2019-SC47-190522-01-03	A9I0297-01		09/26/19 11:00	
T4-PDI2019-SC47-190522-03-05	A9I0297-02		09/26/19 11:22	

Note: Client samples are listed only if they are included in this report.
Duplicates and Matrix Spike/Duplicates QC Samples are only listed if sourced from a sample included in this report.

HOLDING TIME SUMMARY

D422mod

Laboratory: Apex Laboratories SDG: A9I0297

Client: Anchor QEA, LLC Project: Port of Portland - T4 - PDI

Sample Name	Date Collected	Date Received	Date Prepared	Days to Prep	Max Days to Prep	Date Analyzed	Days to Analysis	Max Days to Analysis	Q
T4-PDI2019-SC47-190522-01-03	05/22/19 14:26	05/23/19 10:00	09/26/19 11:00	126.86	180.00	09/30/19 14:51	131.02	180.00	
T4-PDI2019-SC47-190522-03-05	05/22/19 14:26	05/23/19 10:00	09/26/19 11:22	126.87	180.00	09/30/19 14:51	131.02	180.00	

Raw Data

Conventional Chemistry Parameters
Total Organic Carbon (EPA 9060A mod)
Benchsheet & Analysis Sequence Data

Batch 9090855
Sequence 9I19027 (A9I0297-01,02)

Apex Laboratories

PREPARATION BENCH SHEET

SEP 2 0 2019

BATCH #: 9090855 (Sediment)

Prep Method: PSEP TOC

#	Lab Number		Analysis	Prepared	Initial (g)	Final (g)	Spike ID	Source ID	ul Spike	ul Surr.	Sample ID	Extraction Comments	pH <2	pH Other	pH >11
	9090855-BLK1		QC	09/16/19 07:20	5	5									
	9090855-BS1		QC	09/16/19 07:20	5	5	A19C282		1						
	A9I0248-01	A	Total Organic Carbon - Soil (9060A)	09/16/19 07:20	5	5					SS-090619				
	9090855-DUP1		QC	09/16/19 07:20	5	5		A9I0248-01							
	A9I0297-01	A	Total Organic Carbon - Soil (9060A)	09/16/19 07:20	5	5					T4-PDI2019-SC47-190522-01-03	Units=%			
	A9I0297-02	A	Total Organic Carbon - Soil (9060A)	09/16/19 07:20	5	5					T4-PDI2019-SC47-190522-03-05	Units=%			
	A9I0305-01	A	Total Organic Carbon - Soil (9060A)	09/16/19 07:20	5	5					T4-PDI2019-SC24-190529-01-02	Units=%			
	A9I0305-02	A	Total Organic Carbon - Soil (9060A)	09/16/19 07:20	5	5					T4-PDI2019-SC24-190529-02-2.2	Units=%			
	A9I0305-03	A	Total Organic Carbon - Soil (9060A)	09/16/19 07:20	5	5					T4-PDI2019-SC25-190529-01-02	Units=%			
	A9I0305-04	A	Total Organic Carbon - Soil (9060A)	09/16/19 07:20	5	5					T4-PDI2019-SC25-190529-02-2.21	Units=%			
	A9I0309-01	A	Total Organic Carbon - Soil (9060A)	09/16/19 07:20	5	5					T4-PDI2019-SC26-190530-01-02	Units=%			
	A9I0309-02	A	Total Organic Carbon - Soil (9060A)	09/16/19 07:20	5	5					T4-PDI2019-SC26-190530-02-2.27	Units=%			

Standards/Reagents

Reagent(s)			Analyte Spike(s)			Surrogate(s)		
Std ID	Exp. Date	Description	Std ID	Exp. Date	Description	Std ID	Exp. Date	Description
A13L221	11/30/23	Wet Chem Balance 3 ✓	A19C282	09/22/19 ✓	TOC 10k ppm secondary			

JKP 9-16-19
Prepared By: Date

Reviewed By: 9/20/19
Date

Batch 9091085S TOC PSEP preweigh Analyst JKP

9-17-19 0835

Date/Time: 9-16-19					Effervesces?	Comments
T(°C) IN / OUT: 9-16-19 68.2 / 69.0	69.1 / 68.3	/	/			
Sample ID	Wt 1(g)	Wt 2(g)	Wt 3(g)	Wt 4(g)	(yes/no)	
AGI0248-01	9.2569	9.2550			no	rocks
AGI0248-01DUP	10.3020	10.3002			no	rocks
AGI0297-01	9.0753	9.0726			no	
AGI0297-02	9.7613	9.7593			no	
AGI0305-01	10.3484	10.3479			no	rocks / sticks
AGI0305-02	11.8240	11.8202			no	rocks / sticks
AGI0305-03	13.4909	13.4882			no	
AGI0305-04	14.2036	14.1997			no	rocks
AGI0309-01	11.8895	11.8992			no	
AGI0309-02	11.7026	11.7007			no	sticks

In oven @ 0720 on 9-16-19 JKP

APEX LABORATORIES

ELEMENT SEQUENCE LOG

Apex Laboratories

SEP 2 0 2019

Sequence: 9I19027 Instrument: TOC

Date: 09/19/19 12:29 Calibration: A8B0203

#	Lab Number	Matrix	Analysis	Client	Due	Batch	ISTD ID	STD ID
1	9I19027-CCV1	Sediment	QC	QC				A19G013
2	9I19027-CCB1	Sediment	QC	QC				
3	9090855-BLK1	Sediment	QC	QC		9090855		
4	9090855-BS1	Sediment	QC	QC		9090855		
5	A9I0248-01	Sediment	Total Organic Carbon - Soil (9060A)		09/19/19	9090855		
6	9090855-DUP1	Sediment	QC	QC		9090855		
7	A9I0297-01	Sediment	Total Organic Carbon - Soil (9060A)	Anchor QEA, LLC	09/25/19	9090855		
8	A9I0297-02	Sediment	Total Organic Carbon - Soil (9060A)	Anchor QEA, LLC	09/25/19	9090855		
9	A9I0305-01	Sediment	Total Organic Carbon - Soil (9060A)	Anchor QEA, LLC	09/25/19	9090855		
10	A9I0305-02	Sediment	Total Organic Carbon - Soil (9060A)	Anchor QEA, LLC	09/25/19	9090855		
11	A9I0305-03	Sediment	Total Organic Carbon - Soil (9060A)	Anchor QEA, LLC	09/25/19	9090855		
12	A9I0305-04	Sediment	Total Organic Carbon - Soil (9060A)	Anchor QEA, LLC	09/25/19	9090855		
13	9I19027-CCV2	Sediment	QC	QC				A19G013
14	9I19027-CCB2	Sediment	QC	QC				
15	A9I0309-01	Sediment	Total Organic Carbon - Soil (9060A)	Anchor QEA, LLC	09/25/19	9090855		
16	A9I0309-02	Sediment	Total Organic Carbon - Soil (9060A)	Anchor QEA, LLC	09/25/19	9090855		
17	9I19027-CCV3	Sediment	QC	QC				A19G013
18	9I19027-CCB3	Sediment	QC	QC				

Data Entered By: WW 9/19/19 Comments:

Data Reviewed By: AMF 9/20/19

TOC Data

Sample ID (Reporting Levels based on lowest amount used.)	Rep #	Amount (mg or ul)	instrument response (ug C)	Calculated ug C	TOC (mg/kg or mg/l)	Average TOC (mg/kg or mg/l)	Date and Time
9I19027-CCV1	1	20	289.10	215.74	10,787.02	10,810	09/19/19 08:11 AM
	2	20	289.90	216.65	10,832.32		
9I19027-CCB1	1	100	0	5.15	51.53	52	09/19/19 08:41 AM
	2	100	0	5.15	51.53		
9090855-BLK1	1	97.7	1.764	6.81	69.73	68	09/19/19 08:54 AM
	2	94.3	1.603	6.66	70.64		
	3	99.3	1.219	6.3	63.46		
9090855-BS1	1	20.0	274	199.46	9,973.10	10,424	09/19/19 09:09 AM
	2	20.0	290.6	217.44	10,872.14		
	3	20.0	282.6	208.54	10,427.24		
A9I0248-01	1	16.2	406.4	408.73	25,230.20	28,124	09/19/19 09:49 AM
	2	15.6	441.1	494.94	31,726.88		
	3	14.2	397.6	389.29	27,414.57		9/19/19
9090855-DUP1	1	15.7	492.5	653.74	41,639.20	34,244	~~04/26/20~~ 10:15 ~~PM~~ AM
	2	16.6	450	519.66	31,304.53		CMC 9/20/19
	3	13.2	399.4	393.19	29,786.97		9/19/19
A9I0297-01	1	10.9	351.3	301.43	27,654.31	23,196	~~04/26/20~~ 10:56 ~~PM~~ AM
	2	10.3	299.1	227.4	22,077.36		CMC 9/20/19
	3	10.9	289.7	216.42	19,855.00		
A9I0297-02	1	13.2	232.4	161.68	12,248.67	12,166	09/19/19 11:35 AM
	2	14.3	231.7	161.12	11,267.33		
	3	14.2	258.6	184.36	12,982.99		
A9I0305-01	1	11.1	57.95	51.69	4,657.13	5,356	09/19/19 12:15 PM
	2	13.7	87.53	70.75	5,164.30		
	3	12.0	94.52	74.97	6,247.42		

TOC Data

Sample ID (Reporting Levels based on lowest amount used.)	Rep #	Amount (mg or ul)	instrument response (ug C)	Calculated ug C	TOC (mg/kg or mg/l)	Average TOC (mg/kg or mg/l)	Date and Time
A9I0305-02	1	10.8	347	294.41	27,260.04	26,477	~~04/27/20 01:14 AM~~
	2	11.8	308.4	238.91	20,246.56		9/19/19 1314 AMF 9/20/19
	3	12.0	394.7	383.08	31,923.56		
A9I0305-03	1	13.7	268.6	194	14,160.72	15,222	09/19/19 01:58 PM
	2	13.8	312.3	243.94	17,676.73		
	3	12.4	244.2	171.46	13,827.58		
A9I0305-04	1	12.3	276	201.53	16,384.64	15,824	09/19/19 02:29 PM
	2	12.7	282.6	208.54	16,420.86		
	3	13.1	266.7	192.12	14,665.93		
9I19027-CCV2	1	20.0	265.3	190.75	9,537.69	10,388	09/19/19 05:00 PM
	2	20.0	296.9	224.77	11,238.48		
9I19027-CCB2	1	100.0	0.01	5.16	51.59	52	~~04/27/20 05:22 AM~~ AMF 9/20/19
	2	100.0	0	5.15	51.53		9/19/19 1722
A9I0309-01	1	10.1	480.000	611.44	60,538.23	58,533	09/19/19 06:09 PM
	2	11.1	501.100	684.29	61,647.91		
	3	10.8	469.200	576.85	53,411.78		
A9I0309-02	1	10.5	252.3	178.58	17,007.49	18,662	09/19/19 06:43 PM
	2	11.3	302.3	231.28	20,467.54		
	3	12.6	303.9	233.26	18,512.35		
Sample ID	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	3			5.15	#DIV/0!		
Sample ID	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	3			5.15	#DIV/0!		
Sample ID	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	3			5.15	#DIV/0!		

Sample ID (Reporting Levels based on lowest amount used.)	**Rep #**	**Amount (mg or ul)**	**instrument response (ug C)**	**Calculated ug C**	**TOC (mg/kg or mg/l)**	**Average TOC (mg/kg or mg/l)**	**Date and Time**
Sample ID	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	3			5.15	#DIV/0!		
Sample ID	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	3			5.15	#DIV/0!		
Sample ID	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	3			5.15	#DIV/0!		
Sample ID	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	3			5.15	#DIV/0!		
Sample ID	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	3			5.15	#DIV/0!		
5D09031-CCV2	1	20.0	259	184.73	9,236.65	9,167	09/19/19 06:44 PM
	2	20.0	256	181.95	9,097.32		
5D09031-CCB2	1	100.0	0.01	5.16	51.62	52	09/19/19 07:04 PM
	2	100.0	0	5.15	51.53		
				5.15	#DIV/0!		
				5.15	#DIV/0!		
				5.15	#DIV/0!		
				5.15	#DIV/0!		
				5.15	#DIV/0!		
				5.15	#DIV/0!		

Sequence 9I19027
Batch 9090855

TOC Soil data log

Date/Time 9/19/19
Analyst LWO

Sample ID	Wt1(mg or ul)** / Wt2(mg or ul)** / Wt3(mg or ul)**	raw TOC (ug)	Comments	Date and Time
9I19027 -CCV1	20 20	289.1 289.9		0811
9I19027 - CCB	100 100 LWO 9/19/19	0 0		0841
(9I19027) 9090855 -BMC	97.7 ~~20~~ 94.3 20 99.3 ~~20~~	1.764 1.603 1.219		0854
9090855 -BS	20 20 20	274 290.6 282.6	Time out	0909
AQI0248 -01	16.2 15.6 14.2	~~406.4~~ ~~241.1~~ 347.6		0949
AQI0248 -01 DUP	15.7 16.6 LWO 9/19/19 13.2 ~~15.2~~	492.5 450 391.4		1015
AQI0297 - 01	~~11.7~~ 10.9 10.3 10.9	~~417.8e~~ 299.1 289.7	351.3 LWO 9/19/19	1056
AQI0297 -02	13.2 14.3 14.2	232.4 231.7 253.6		1135

Sample ID	Wt1(mg or ul)** / Wt2(mg or ul)** / Wt3(mg or ul)**	raw TOC (ug)	Comments	Date and Time
AQI0305 -01	11.1 ~~13.7~~ 13.7 12.0	~~351.3e~~ 87.53 94.52	~~230.2e 338.2~~ 57.95 LWO 9/19/19	1215
AQI0305 -02	10.8 ~~11.8 11.6~~ 12.0	347 ~~486.4e~~ 394.7	LWO 9/19/19 308.4	1314
AQI0305 -03	13.7 13.8 12.4	268.6 312.3 244.2		1358
AQI0305 -04	~~12.7~~ 12.3 ~~10.5~~ ~~13.1~~ 12.7	~~323e~~ ~~269e~~ ~~266.7e~~ 13.1	~~402.2e~~ 276 266.7	1429 LWO 9/19/19
CCV2	20 20	265.3 296.9		~~1500~~ 1700 LWO 9/19/19
CCB2	100 100 10.1	0.607 0 480		~~1522~~ 1722
AQI0309 -01	~~11.7~~ 11.1 10.8	~~404.8e~~ 301.1 269.2	LWO 9/19/19	1809
AQI0309 -02	10.5 11.3 12.6	252.3 302.3 303.9		1843

**Sample mass input into instrument as 1000 mg to output actual ug C

Sequence 9I19027
Batch 9090855

TOC Soil data log

Date/Time ______________
Analyst ______________

Sample ID	Wt1(mg or ul)** / Wt2(mg or ul)** / Wt3(mg or ul)**	raw TOC (ug) / raw TOC (ug) / raw TOC (ug)	Comments	Date and Time
	20	259		1844
	20	256		
CCV3				
	100	0.01		1504
	100	0		
CCB3				

Sample ID	Wt1(mg or ul)** / Wt2(mg or ul)** / Wt3(mg or ul)**	raw TOC (ug) / raw TOC (ug) / raw TOC (ug)	Comments	Date and Time

**Sample mass input into instrument as 1000 mg to output actual ug C

Conventional Chemistry Parameters
Total Organic Carbon (EPA 9060A mod)
Calibration Data

Sequence 8B02022 (Cal ID A8B0203) TOC

ELEMENT SEQUENCE LOG

Apex Laboratories

Sequence:	8B02022	Instrument:	TOC
Date:	02/02/18 10:15	Calibration:	A8B0203

Order	Lab Number	Matrix	Analysis	Client	Due	Batch	ISTD ID	STD ID
1	8B02022-CAL1	Soil	QC	QC				
2	8B02022-CAL2	Soil	QC	QC				A18B030
3	8B02022-CAL3	Soil	QC	QC				A18B029
4	8B02022-CAL4	Soil	QC	QC				A18B028
5	8B02022-CAL5	Soil	QC	QC				A18B027
6	8B02022-CAL6	Soil	QC	QC				A18B026
7	8B02022-CAL7	Soil	QC	QC				A18B025
8	8B02022-CAL8	Soil	QC	QC				A18B024
9	8B02022-CAL9	Soil	QC	QC				A18B023
10	8B02022-CALA	Soil	QC	QC				A18B022
11	8B02022-CALB	Soil	QC	QC				A18B021
12	8B02022-ICV1	Soil	QC	QC				A18B031
13	8B02022-ICB1	Soil	QC	QC				
14	8B02022-ICV2	Soil	QC	QC				A18B031
15	8B02022-ICB2	Soil	QC	QC				

Data Entered By: JKP 2-2-18

Data Reviewed By: JCS 2/14/18

Comments:

2/2/2018 5:40:11PM

TOC Data

Sample ID	Rep #	Amount (mg or ul)	instrument response (ug C)	Calculated ug C	TOC (mg/kg or mg/l)	Average TOC (mg/kg or mg/l)	Date and Time
	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
8B02022-CAL1	1	20	1.847	6.89	344.50	323	
	2	20	1.106	6.2	309.77		
	3	20	1.192	6.28	313.81		
[redacted]	1	20.0	14.4	18.2	909.78	[redacted]	
	2	20.0	16.65	20.13	1,006.70		
	3	20.0	15.74	19.35	967.66		
[redacted]	1	20.0	44.37	42.07	2,103.69	[redacted]	
	2	20.0	48.3	44.93	2,246.27		
	3	20.0	47.81	44.57	2,228.65		
[redacted]	1	20.0	123.9	92.03	4,601.40	[redacted]	
	2	20.0	131.8	96.53	4,826.34		
	3	20.0	132.4	96.87	4,843.42		
[redacted]	1	20.0	278.8	204.47	10,223.57	[redacted]	
	2	20.0	287.6	214.05	10,702.70		
	3	20.0	284.1	210.18	10,508.98		
[redacted]	1	20.0	350.7	300.44	15,022.06	[redacted]	
	2	20.0	345	291.2	14,560.12		
	3	20.0	361	317.95	15,897.40		
[redacted]	1	20.0	399.1	392.54	19,626.76	[redacted]	
	2	20.0	402.2	399.33	19,966.67		
	3	20.0	410.3	417.65	20,882.38		

TOC Data

Sample ID	Rep #	Amount (mg or ul)	instrument response (ug C)	Calculated ug C	TOC (mg/kg or mg/l)	Average TOC (mg/kg or mg/l)	Date and Time
8B02022-CAL8	1	20.0	437.8	486.05	24,302.72	24,424	
	2	20.0	440.9	494.4	24,719.83		
	3	20.0	437.4	484.99	24,249.38		
8B02022-CAL9	1	20.0	473.2	589.45	29,472.51	29,844	
	2	20.0	473.6	590.72	29,536.19		
	3	20.0	479.7	610.45	30,522.56		
8B02022-CAL10	1	20.0	503.7	693.77	34,688.41	34,786	
	2	20.0	504.4	696.34	34,816.94		
	3	20.0	504.6	697.07	34,853.73		
	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
8B02022-CAL11	1	20	529.100	792.36	39,618.21	40,444	
	2	20	532.500	806.41	40,320.67		
	3	20	537.600	827.87	41,393.75		
8B02022-ICV1	1	20.0	298.2	226.32	11,315.89	11,747	
	2	20.0	312	243.55	12,177.38		
	3			5.15	#DIV/0!		
8B022-ICB1	1	20.0	0	5.15	257.64	258	
	2	20.0	0	5.15	257.64		
	3			5.15	#DIV/0!		
8B02022-ICV2	1	20.0	277.9	203.52	10,176.04	10,428	
	2	20.0	287.2	213.61	10,680.34		
	3			5.15	#DIV/0!		
8B02022-ICB2	1	20.0	0	5.15	257.64	258	
	2	20.0	0	5.15	257.64		
	3			5.15	#DIV/0!		

⇒ ICV1 failed high. Reprepped and reanalyzed below as ICV2. JKP 2-2-18

Sequence 8B02022
Batch

TOC Soil data log

Date/Time 2-2-18 @ 1735 ~~1520~~
Analyst JKP JKP 2-2-18

Sample ID	Wt1(mg or ul)**	raw TOC (ug)	Comments
	Wt2(mg or ul)**	raw TOC (ug)	
	Wt3(mg or ul)**	raw TOC (ug)	
8B02022-Cal1	20	1.847	
	20	1.106	
	20	1.192	
8B02022-Cal2	20	14.4	Time Out
	20	16.65	
	20	15.74	
8B02022-Cal3	20	44.37	
	20	48.3	
	20	47.81	
8B02022-Cal4	20	123.9	Time Out
	20	131.8	
	20	132.4	
8B02022-Cal5	20	278.8	
	20	287.6	
	20	284.1	
8B02022-Cal6	20	350.7	Time Out
	20	345	
	20	361	
8B02022-Cal7	20	399.1	Time Out
	20	402.2	
	20	410.3	
8B02022-Cal8	20	437.8	Time Out
	20	440.9	
	20	437.4	

Sample ID	Wt1(mg or ul)**	raw TOC (ug)	Comments
	Wt2(mg or ul)**	raw TOC (ug)	
	Wt3(mg or ul)**	raw TOC (ug)	
8B02022-Cal9	20	473.2	Time Out
	20	473.6	Time Out
	20	479.7	Time Out
8B02022-Cal10A JKP 2-2-18	20	503.7	
	20	504.4	Time Out
	20	504.6	Time Out
8B02022-Cal10B JKP 2-2-18	20	529.1	Time Out
	20	532.5	Time Out
	20	537.6	Time Out
8B02022-ICV1	20	298.2	Time Out
	20	312	Time Out
	JKP 3-2-18 ~~20~~		
8B02022-ICB1	20	0	
	20	0	
	JKP 3-2-18 ~~20~~		
8B02022-ICV2	20	277.9	Time Out
	20	287.2	Time Out
8B02022-ICB2	20	0	
	20	0	

ICV1 failed high. Reprepped and reanalyzed below as ICV2
JKP 2-2-18

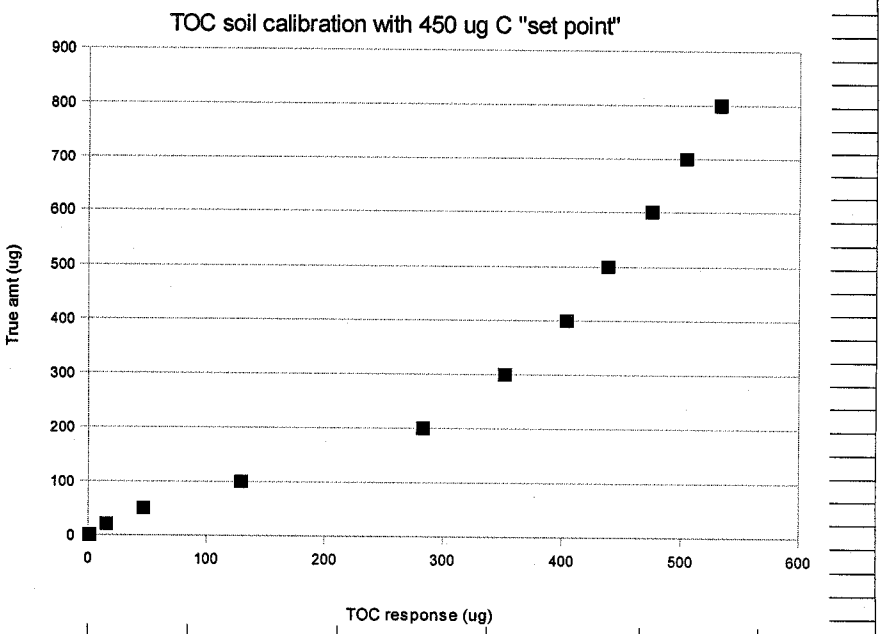
**Sample mass input into instrument as 1000 mg to output actual ug C

Cal Standard	Instrument Reponse	Average Instrument Response
1	1.85	1.38
	1.11	
	1.19	
2	14.4	15.6
	16.65	
	15.74	
3	44.37	46.83
	48.3	
	47.81	
4	123.9	129.37
	131.8	
	132.4	
5	278.8	283.5
	287.6	
	284.1	
6	350.7	352.23
	345	
	361	
7	399.1	403.87
	402.2	
	410.3	
8	437.8	438.7
	440.9	
	437.4	
9	473.2	475.5
	473.6	
	479.7	
10	503.7	504.23
	504.4	
	504.6	
11	529.1	533.07
	532.5	
	537.6	

450 ug curve

TOC resp ug C		True ug C
533.07		800
504.23		700
475.5		600
438.7		500
403.87		400
352.23		300
283.5		200
129.37		100
46.83		50
15.6		20
1.38		0

TOC resp ug C	Requant	% recovery
533.07	808.77	101.1
504.23	695.73	99.39
475.5	596.81	99.47
438.7	488.46	97.69
403.87	403.04	100.76
352.23	302.98	100.99
283.5	209.52	104.76
129.37	95.14	95.14
46.83	43.86	87.73
15.6	19.23	96.15
1.38	6.45	N/A



X (response)	X^2	X^3	y (ug C)
533.07	284160.07	151476261.9	800
504.23	254251.25	128201957.5	700
475.5	226100.25	107510668.9	600
438.7	192457.69	84431188.6	500
403.87	163108.28	65873999.14	400
352.23	124068.32	43700998.31	300
283.5	80372.25	22785532.88	200
129.37	16735.73	2165046.18	100
46.83	2192.74	102678.55	50
15.6	243.26	3793.98	20
1.38	1.91	2.64	0

curve calculations

0.00000740	-0.00289199	0.94586231	5.15285875
0	0	0.14	5.96
0.99945	8.03	#N/A	#N/A
4233.13	7	#N/A	#N/A
818003.66	450.89	#N/A	#N/A

Sample ID	Rep #	Amount (mg or ul)	instrument response (ug C)	Calculated ug C	TOC (mg/kg or mg/l)	Average TOC (mg/kg or mg/l)	Date and Time
	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
8B02022-CAL1	1	20	1.847	6.89	344.50	323	
	2	20	1.106	6.2	309.77		
	3	20	1.192	6.28	313.81		
8B02022-CAL2	1	20.0	14.4	18.2	909.78	961	
	2	20.0	16.65	20.13	1,006.70		
	3	20.0	15.74	19.35	967.66		
8B02022-CAL3	1	20.0	44.37	42.07	2,103.69	2,193	
	2	20.0	48.3	44.93	2,246.27		
	3	20.0	47.81	44.57	2,228.65		
8B02022-CAL4	1	20.0	123.9	92.03	4,601.40	4,757	
	2	20.0	131.8	96.53	4,826.34		
	3	20.0	132.4	96.87	4,843.42		
8B02022-CAL5	1	20.0	278.8	204.47	10,223.57	10,478	
	2	20.0	287.6	214.05	10,702.70		
	3	20.0	284.1	210.18	10,508.98		
8B02022-CAL6	1	20.0	350.7	300.44	15,022.06	15,160	
	2	20.0	345	291.2	14,560.12		
	3	20.0	361	317.95	15,897.40		
8B02022-CAL7	1	20.0	399.1	392.54	19,626.76	20,159	
	2	20.0	402.2	399.33	19,966.67		
	3	20.0	410.3	417.65	20,882.38		

Sample ID	Rep #	Amount (mg or ul)	instrument response (ug C)	Calculated ug C	TOC (mg/kg or mg/l)	Average TOC (mg/kg or mg/l)	Date and Time
8B02022-CAL8	1	20.0	437.8	486.05	24,302.72	24,424	
	2	20.0	440.9	494.4	24,719.83		
	3	20.0	437.4	484.99	24,249.38		
8B02022-CAL9	1	20.0	473.2	589.45	29,472.51	29,844	
	2	20.0	473.6	590.72	29,536.19		
	3	20.0	479.7	610.45	30,522.56		
8B02022-CALA	1	20.0	503.7	693.77	34,688.41	34,786	
	2	20.0	504.4	696.34	34,816.94		
	3	20.0	504.6	697.07	34,853.73		
	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
	1			5.15	#DIV/0!	#DIV/0!	
	2			5.15	#DIV/0!		
8B02022-CALB	1	20	529.100	792.36	39,618.21	40,444	
	2	20	532.500	806.41	40,320.67		
	3	20	537.600	827.87	41,393.75		
8B02022-ICV1	1	20.0	298.2	226.32	11,315.89	11,747	
	2	20.0	312	243.55	12,177.38		
	3			5.15	#DIV/0!		
8B022-ICB1	1	20.0	0	5.15	257.64	258	
	2	20.0	0	5.15	257.64		
	3			5.15	#DIV/0!		
8B02022-ICV2	1	20.0	277.9	203.52	10,176.04	10,428	
	2	20.0	287.2	213.61	10,680.34		
	3			5.15	#DIV/0!		
8B02022-ICB2	1	20.0	0	5.15	257.64	258	
	2	20.0	0	5.15	257.64		
	3			5.15	#DIV/0!		

Conventional Chemistry Parameters
Total Suspended Solids (PSEP 1986)
Benchsheet Data

Batch 9091020 (A9I0297-01,02)

APEX LABORATORIES

Apex Laboratories

PREPARATION BENCH SHEET

SEP 3 0 2019

Percent Solids + Dry Weight Worksheet

BATCH #: 9091020 (Matrix: Sediment)

Lab Number	Analysis	QC Source ID	Prepared (Time In)	Weighed (Time Out)	Tare Wt. (g)	Wet Weight (+Tare) (g)	Dry Weight (+Tare) (g)	% Solids (Calc)	LogComments
A9I0297-01	Dry Weight		09/18/19 17:41		1.3067	29.3233	16.6999	54.9	**USE SOLIDS DATA** Make Not Reportable.
A9I0297-01	Solids, PSEP 1986		09/18/19 17:41		1.3067	29.3233	16.6999	54.9	Enter TS data for DW. (Units=%)
9091020-DUP1	QC	A9I0297-01	09/18/19 17:41		1.3031	30.8442	17.3830	54.4	
A9I0297-02	Dry Weight		09/18/19 17:41		1.3022	28.4420	19.2717	66.2	**USE SOLIDS DATA** Make Not Reportable.
A9I0297-02	Solids, PSEP 1986		09/18/19 17:41		1.3022	28.4420	19.2717	66.2	Enter TS data for DW. (Units=%)
A9I0305-01	Dry Weight		09/18/19 17:41		1.3272	26.9887	20.0297	72.9	**USE SOLIDS DATA** Make Not Reportable.
A9I0305-01	Solids, PSEP 1986		09/18/19 17:41		1.3272	26.9887	20.0297	72.9	Enter TS data for DW. (Units=%)
A9I0305-02	Dry Weight		09/18/19 17:41		1.3049	26.9761	21.2638	77.7	**USE SOLIDS DATA** Make Not Reportable.
A9I0305-02	Solids, PSEP 1986		09/18/19 17:41		1.3049	26.9761	21.2638	77.7	Enter TS data for DW. (Units=%)
A9I0305-03	Dry Weight		09/18/19 17:41		1.3069	31.1001	21.8092	68.8	**USE SOLIDS DATA** Make Not Reportable.
A9I0305-03	Solids, PSEP 1986		09/18/19 17:41		1.3069	31.1001	21.8092	68.8	Enter TS data for DW. (Units=%)
A9I0305-04	Dry Weight		09/18/19 17:41		1.3101	32.0968	22.6607	69.4	**USE SOLIDS DATA** Make Not Reportable.
A9I0305-04	Solids, PSEP 1986		09/18/19 17:41		1.3101	32.0968	22.6607	69.4	Enter TS data for DW. (Units=%)
A9I0309-01	Dry Weight		09/18/19 17:41		1.3041	28.7302	19.2134	65.3	**USE SOLIDS DATA** Make Not Reportable.
A9I0309-01	Solids, PSEP 1986		09/18/19 17:41		1.3041	28.7302	19.2134	65.3	Enter TS data for DW. (Units=%)
A9I0309-02	Dry Weight		09/18/19 17:41		1.3036	30.9430	17.9401 9/23/19	56.1	**USE SOLIDS DATA** Make Not Reportable.
A9I0309-02	Solids, PSEP 1986		09/18/19 17:41		1.3036	30.9430	17.9401	56.1	Enter TS data for DW. (Units=%)

MRE 9-23-19
Prepared By: Date

CMA 9/23/19
Reviewed By: Date

Printed: 9/23/2019 12:04:43PM

Total Solids Worksheet

Analyst: MRF Date: 09/18/19 Batch: 9091020

Sample ID	Vessel ID	Tare Weight (g)	Wet+ Tare Weight (g)	Dry Weight (g)		Comments
				1st weighing	2nd weighing	
9091020-DUP1	1	1.3031	30.8442	17.3954	17.383	
A9I0297-01	2	1.3067	29.3233	16.7067	16.6999	
A9I0297-02	3	1.3022	28.442	19.2785	19.2717	
A9I0305-01	4	1.3272	26.9887	20.0361	20.0297	
A9I0305-02	5	1.3049	26.9761	21.2647	21.2638	
A9I0305-03	6	1.3069	31.1001	21.8092	21.8163	
A9I0305-04	7	1.3101	32.0968	22.664	22.6607	
A9I0309-01	8	1.3041	28.7302	19.215	19.2134	
A9I0309-02	9	1.3036	30.943	17.9454	17.9401	
Oven Temp at Sample Introduction				104.3	103.7	*Constant weight = +/- 50 mg.
Oven Temp at sample removal				105	104.9	
Time/date				16:10 9/19	18:17 9/19	

Total Solids Worksheet

Analyst: MRF Date: 09/18/19 Batch: 9091020

Sample ID	Vessel ID	Tare Weight (g)	Wet+ Tare Weight (g)	Dry Weight (g) 1st weighing	Dry Weight (g) 2nd weighing	Comments
9091020-DUP1	1	1.3031	30.8442	17.3954	17.3830	297-1
A9I0297-01	2	1.3067	29.3233	16.7067	16.6999	
A9I0297-02	3	1.3022	28.4420	19.2785	19.2717	
A9I0305-01	4	1.3272	26.9887	20.0361	20.0297	
A9I0305-02	5	1.3049	26.9761	21.2647	21.2638	
A9I0305-03	6	1.3069	31.1001	21.8092	21.8163	
A9I0305-04	7	1.3101	32.0968	22.6640	22.6607	
A9I0309-01	8	1.3041	28.7302	19.2150	19.2134	
A9I0309-02	9	1.3036	30.9430	17.9454	17.9401	
Oven Temp at Sample Introduction				104.3	103.7	*Constant weight = +/- 50 mg.
Oven Temp at sample removal				105	104.9	
Time/date				16:10 9/19	18:17 9/19	

Grain Size by ASTM D 422m
Benchsheet Data

Batch 9091242 (A9I0297-01,02)

Apex Laboratories

PREPARATION BENCH SHEET

BATCH #: 9091242 (Soil)

Prep Method: ASTM D 421

#	Lab Number		Analysis	Prepared	Initial (N/A)	Final (N/A)	Spike ID	Source ID	ul Spike	ul Surr.	Sample ID	Extraction Comments	pH <2	pH Other	pH >11
	A9I0297-01	A	Grain Size (D422m/PSET)	09/26/19 11:00	1	1					T4-PDI2019-SC4 7-190522-01-03				
	A9I0297-02	A	Grain Size (D422m/PSET)	09/26/19 11:22	1	1					T4-PDI2019-SC4 7-190522-03-05				

Standards/Reagents

Reagent(s)

Std ID	Exp. Date	Description
A13L215	11/30/23	Grain Size Balance
A19I151	10/11/19	Na Hexametaphosphate 40 g/L

✓

Analyte Spike(s)

Std ID	Exp. Date	Description

Surrogate(s)

Std ID	Exp. Date	Description

Prepared By: 9/30/19 Date

Reviewed By: 10/2/19 Date

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9I0297-01		Client Sample ID:	T4-PDI2019-SC47-190522-01-03		Batch Number:	9091242
Data Entered by:	ID	Date:	09/30/19	Data Reviewed by:	JW	Date:	10/02/19
Sample Description:	Clayey SILT with some Sand			Max Particle Size:	Gravel		
Particle Shape:	N/A			Hardness	N/A		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	23.441	1134.631	1111.19	6.67	1041.7

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	1.334	3.338	2.00	2.00	0.2	99.8
10	2.00	1.325	2.496	1.17	3.18	0.1	99.7
Pan		23.453	1128.812	1105.36	1108.53	99.0	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9374		I297-01	1.324	23.013	21.656	6.67

Hydrometer Analysis

Start Date/Time	9/26/2019	11:00	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	52.008		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	99.7		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	48.75		Corrected Dry Weight of Soil Tested (g) (W)	48.90

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	40	19.9	35.18	71.9	9.6	0.01365	0.042	71.72
2	37	19.9	32.18	65.8	10.1	0.01365	0.031	65.61
4	33	20.3	28.28	57.8	10.7	0.01365	0.022	57.66
8	28.5	20.1	23.73	48.5	11.4	0.01365	0.016	48.38
15	25	20.2	20.26	41.4	12	0.01365	0.012	41.30
30	21	20.1	16.23	33.2	12.7	0.01365	0.009	33.09
60	17.5	20	12.71	26.0	13.2	0.01365	0.006	25.90
90	15	19.9	10.18	20.8	13.7	0.01365	0.005	20.76
120	14	19.8	9.16	18.7	13.8	0.01365	0.005	18.67
240	12.5	19.5	7.58	15.5	14	0.01365	0.003	15.45
360	11.5	19.4	6.55	13.4	14.2	0.01382	0.003	13.36
1440	9	19	3.95	8.1	14.7	0.01382	0.001	8.06

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.312	1.373	0.06	4.47	0.1	99.6
40	0.425	1.319	2.890	1.57	37.86	3.2	96.4
60	0.250	1.318	6.922	5.60	156.97	11.5	84.9
100	0.150	1.308	4.547	3.24	225.81	6.6	78.3
140	0.105	1.305	2.317	1.01	247.32	2.1	76.2
200	0.075	1.311	2.673	1.36	276.26	2.8	73.4
230	0.063	1.312	2.103	0.79	293.07	1.6	71.8
			Sum	13.64	230 Minus	35.11	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: T4-PDI2019-SC47-190522-01-03 (A9I0297-01)

Grain Size Analysis Summary from Sieving and Hydrometer Testing	Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel			*0.3*
Retained on No. 4 sieve	4.75	99.81	0.19
Gravel, passing No. 4 sieve and retained on No. 10 sieve	2.00	99.7	0.11
Sand			*27.89*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve	0.8500	99.57	0.12
Medium sand, passing No.20 sieve and retained on No. 40 sieve	0.4250	96.36	3.21
Medium sand, passing No.40 sieve and retained on No. 60 sieve	0.2500	84.9	11.46
Medium sand, passing No. 60 sieve and retained on No.100 sieve	0.1500	78.28	6.62
Fine sand, passing No. 100 sieve and retained on No.140 sieve	0.1060	76.21	2.07
Fine sand passing No. 140 sieve and retained on No. 200 sieve	0.0750	73.42	2.79
Fine sand, passing No. 200 sieve and retained on No. 230 sieve	0.0630	71.8	1.62
Silt and Clay (Measurements in the Clay fraction are noted)			*71.8*
Hydrometer Test	0.0423	71.72	0.08
Hydrometer Test	0.0307	65.61	6.12
Hydrometer Test	0.0223	57.66	7.95
Hydrometer Test	0.0163	48.38	9.28
Hydrometer Test	0.0122	41.3	7.08
Hydrometer Test	0.0089	33.09	8.21
Hydrometer Test	0.0064	25.9	7.19
Hydrometer Test	0.0053	20.76	5.15
Hydrometer Test Clay	0.0046	18.67	2.09
Hydrometer Test Clay	0.0033	15.45	3.21
Hydrometer Test Clay	0.0027	13.36	2.09
Hydrometer Test Clay	0.0014	8.06	5.3

Grain Size Summary	Percent of Total Sample
Gravel	0.3
Sand	27.9
Coarse sand	0.1
Medium sand	21.3
Fine sand	6.5
Silt	51.0
Clay	20.8

Case Narrative for Sample ID: T4-PDI2019-SC47-190522-01-03 (A9I0297-01)

This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

The assumed specific gravity used in the calculations was 2.65.

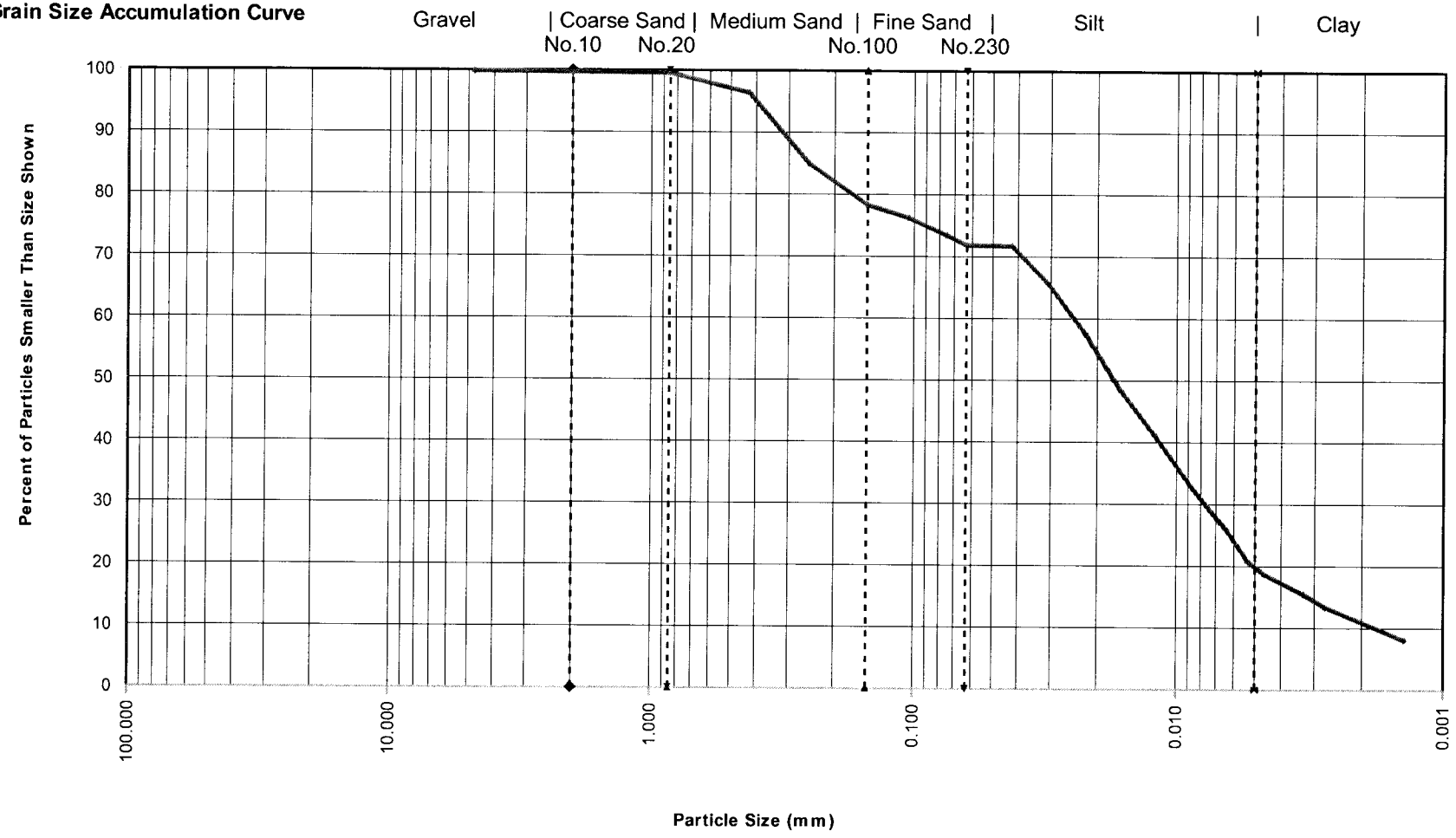
+4 fraction consists entirely of organic material.

+10 fraction consists almost entirely of organic material.

Expires 12/31/19

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	T4-PDI2019-SC47-190522-01-03 (A9I0297-01)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	N/A	N/A	Clayey SILT with some Sand

Hydrometer S/N (drop down):

229773

m	b
-0.2529	9.85

Sample ID: A9I0297-01

Whole Sample

									Total
Tare Values	5.842	5.854	5.866	5.879					23.441
Air Dry + Tare	299.517	275.103	307.005	253.006					1134.631

Sieve Number 4 Enter the weight of soil after wash and oven-dry at 50.

									Total
Tare Values	1.334								1.334
Dry + Tare	3.338								3.338

Sieve Number 10

									Total
Tare Values	1.325								1.325
Dry + Tare	2.496								2.496

Pan

									Total
Tare Values	5.845	5.856	5.869	5.883					23.453
Dry + Tare	295.522	279.353	304.973	248.964					1128.812

Ensure that Total % Retained is ~ 100%. 99.34

APEX
Grain Size Analysis

Analyst	JD
Batch number	9091242
Sample ID	A9I0297-01
Start Date/ Time	09/23/19 15:22

Air Drying

Tare	Air Dry Sample + Tare	Tare	Air Dry Sample + Tare
5.842	299.517		
5.854	275.103		
5.866	307.005		
5.879	253.006		

Post 10 mesh sieving

+4 Fraction

Tare	+4 fraction (air dry) + tare	+4 fraction (oven dry) + tare
1.334	4.679	3.338

+10 Fraction

Tare	+10 fraction (air dry) + tare	+10 fraction (oven dry) + tare
1.325	2.657	2.496

-10 Fraction (Pan)

Tare	Pan fraction (air dry) + tare	Tare	Pan fraction (air dry) + tare
5.845	295.522		
5.856	279.353		
5.869	304.973		
5.883	248.964		

Date/Time/Temp

IN	09/25/19 1200
AMBIENT	111.6
OUT	9/30/19 12:40 112.0

Hygroscopic Moisture Correction

Pan No.	Tare	-10 fraction (air dry) + tare	-10 fraction (oven dry) + tare
I29701	1.324	23.013	21.656

APEX
Grain Size Analysis

Notes

Sample ID: AGI0297-01

T4-PDI2019-SC47_19052201-03

T4 fraction consists entirely of organics

T10 fraction consists almost entirely of organics

Maximum Particle Size: Gravel

Hardness and Shape: N/A

Soil/Sediment Classification:

Clayey SILT w/ some Sand

10/2/19

APEX
Grain Size Analysis

Hydrometer Analysis

Analyst	JD		
Batch Number	9091242		
Sample ID	A9I0297-01		
Start Date/Time	09/26/19 11:00		
Air Dry Sample for Hydrometer Test			52.008
Hydrometer	229773	Dispersant	A19I223

Time/Date: 09/25/19 @ 1130

11:00	Time (min.)	Hydrometer Reading	Temperature (°C)	Amount of Foam
	0.5			
11:01	1	40.0	19.9	
11:02	2	37.0	19.9	
11:04	4	33.0	20.3	
11:08	8	28.5	20.1	
11:15	15	25.0	20.2	
11:30	30	21.0	20.1	
12:00	60	17.5	20.0	
12:30	90	15.0	19.9	
13:00	120	14.0	19.8	
15:00	240	12.5	19.5	
17:00	360	11.5	19.4	
11:00	1440	9.0	19.0	

Note:

1 cm foam = 5 hydrometer units.

Adjust Hydrometer Reading entered into Excel spreadsheet by adding 5 hydrometer units per cm of foam.

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve No.	Tare	Oven Dry + Tare
+20	1.312	1.373
+40	1.319	2.890
+60	1.318	6.922
+100	1.308	4.547
+140	1.305	2.317
+200	1.311	2.673
+230	1.312	2.103
-230 (pan)	1.328	3.227

Apex Laboratories, LLC

Particle Size Analysis of Soil by ASTM D 422

Sample ID:	A9I0297-02		Client Sample ID:	T4-PDI2019-SC47-190522-03-05		Batch Number:	9091242
Data Entered by:	ID	Date:	09/30/19	Data Reviewed by:	JW	Date:	10/02/19
Sample Description:	Clayey Silty SAND			Max Particle Size:	Gravel		
Particle Shape:	N/A			Hardness	N/A		

Whole Sample	Tare	Air Dry + Tare	Air Dry	Moisture	Dry Wt.
	17.575	757.731	740.16	5.24	703.3

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Wt. Retained	% Retained	% Passing
4	4.75	1.313	2.868	1.56	1.56	0.2	99.8
10	2.00	1.319	2.393	1.07	2.63	0.2	99.6
Pan		17.588	754.591	737.00	739.63	99.3	

Hygroscopic Moisture Correction

	Hygroscopic Correction Factor	Oven Sample	Pan No.	Tare	Air Dry + Tare	Oven Dry + Tare	Moisture
	0.9502		I297-02	1.303	25.842	24.620	5.24

Hydrometer Analysis

Start Date/Time	9/26/2019	11:22	Dispersing Agent	$NaPO_3$
Air Dry Sample Wt. for Hydrometer Test (g)	55.245		G_s Correction Factor (α)	1.000
Percent Passing No.10 Sieve	99.6		Specific Gravity (G_s)	2.65
Dry Weight of Soil Tested (g)	52.49		Corrected Dry Weight of Soil Tested (g) (W)	52.69

Elapsed Time (min)	Hydrometer Reading	Temperature (°C)	Corrected Hydrometer Reading [R]	% Finer of Hydrometer Sample	L	K	Particle Diameter (mm)	Percent Passing
1	29.5	20	24.71	46.9	11.2	0.01365	0.046	46.71
2	27.5	20	22.71	43.1	11.5	0.01365	0.033	42.93
4	26	20.1	21.23	40.3	11.9	0.01365	0.024	40.14
8	22.5	20.3	17.78	33.7	12.4	0.01365	0.017	33.62
15	20.5	20.3	15.78	30.0	12.7	0.01365	0.013	29.84
30	17.5	20.2	12.76	24.2	13.2	0.01365	0.009	24.12
60	15	20.1	10.23	19.4	13.7	0.01365	0.007	19.35
90	13	19.8	8.16	15.5	14	0.01365	0.005	15.42
120	12	19.6	7.11	13.5	14.2	0.01365	0.005	13.43
240	10.5	19.6	5.61	10.6	14.3	0.01365	0.003	10.60
360	9.5	19.4	4.55	8.6	14.5	0.01382	0.003	8.61
1440	7.5	19.1	2.48	4.7	14.8	0.01382	0.001	4.69

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve Number	Opening (mm)	Tare	Dry + Tare	Weight Retained	Cumulative Retained	% Retained	% Passing
20	0.850	1.318	1.787	0.47	8.89	0.9	98.7
40	0.425	1.317	7.806	6.49	95.45	12.3	86.4
60	0.250	1.310	14.370	13.06	269.68	24.8	61.6
100	0.150	1.313	6.171	4.86	334.49	9.2	52.4
140	0.105	1.335	2.378	1.04	348.40	2.0	50.4
200	0.075	1.324	2.371	1.05	362.37	2.0	48.4
230	0.063	1.320	1.831	0.51	369.19	1.0	47.5
			Sum	27.48	230 Minus	25.02	

Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Sample ID: T4-PDI2019-SC47-190522-03-05 (A9I0297-02)

Grain Size Analysis Summary from Sieving and Hydrometer Testing	Particle Size (mm)	Percent Finer	Total Percent of Sample
Gravel			*0.37*
Retained on No. 4 sieve	4.75	99.78	0.22
Gravel, passing No. 4 sieve and retained on No. 10 sieve	2.00	99.63	0.15
Sand			*52.15*
Coarse sand, passing No.10 sieve and retained on No. 20 sieve	0.8500	98.74	0.89
Medium sand, passing No.20 sieve and retained on No. 40 sieve	0.4250	86.42	12.32
Medium sand, passing No.40 sieve and retained on No. 60 sieve	0.2500	61.63	24.79
Medium sand, passing No. 60 sieve and retained on No.100 sieve	0.1500	52.41	9.22
Fine sand, passing No. 100 sieve and retained on No.140 sieve	0.1060	50.44	1.98
Fine sand passing No. 140 sieve and retained on No. 200 sieve	0.0750	48.45	1.99
Fine sand, passing No. 200 sieve and retained on No. 230 sieve	0.0630	47.48	0.97
Silt and Clay (Measurements in the Clay fraction are noted)			*47.48*
Hydrometer Test	0.0457	46.71	0.76
Hydrometer Test	0.0327	42.93	3.78
Hydrometer Test	0.0235	40.14	2.79
Hydrometer Test	0.0170	33.62	6.52
Hydrometer Test	0.0126	29.84	3.78
Hydrometer Test	0.0091	24.12	5.72
Hydrometer Test	0.0065	19.35	4.77
Hydrometer Test	0.0054	15.42	3.92
Hydrometer Test Clay	0.0047	13.43	1.99
Hydrometer Test Clay	0.0033	10.6	2.84
Hydrometer Test Clay	0.0028	8.61	1.99
Hydrometer Test Clay	0.0014	4.69	3.92

Grain Size Summary	Percent of Total Sample
Gravel	0.4
Sand	52.1
Coarse sand	0.9
Medium sand	46.3
Fine sand	4.9
Silt	32.1
Clay	15.4

Case Narrative for Sample ID: T4-PDI2019-SC47-190522-03-05 (A9I0297-02)

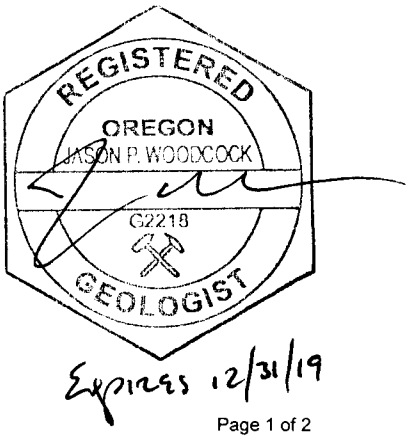
This data is not to be used for engineering purposes.

No difficulty dispersing the fraction passing the No. 10 sieve.

Dispersion device used: Commercial drink mixer operating at least 10,000 rpm for one minute.

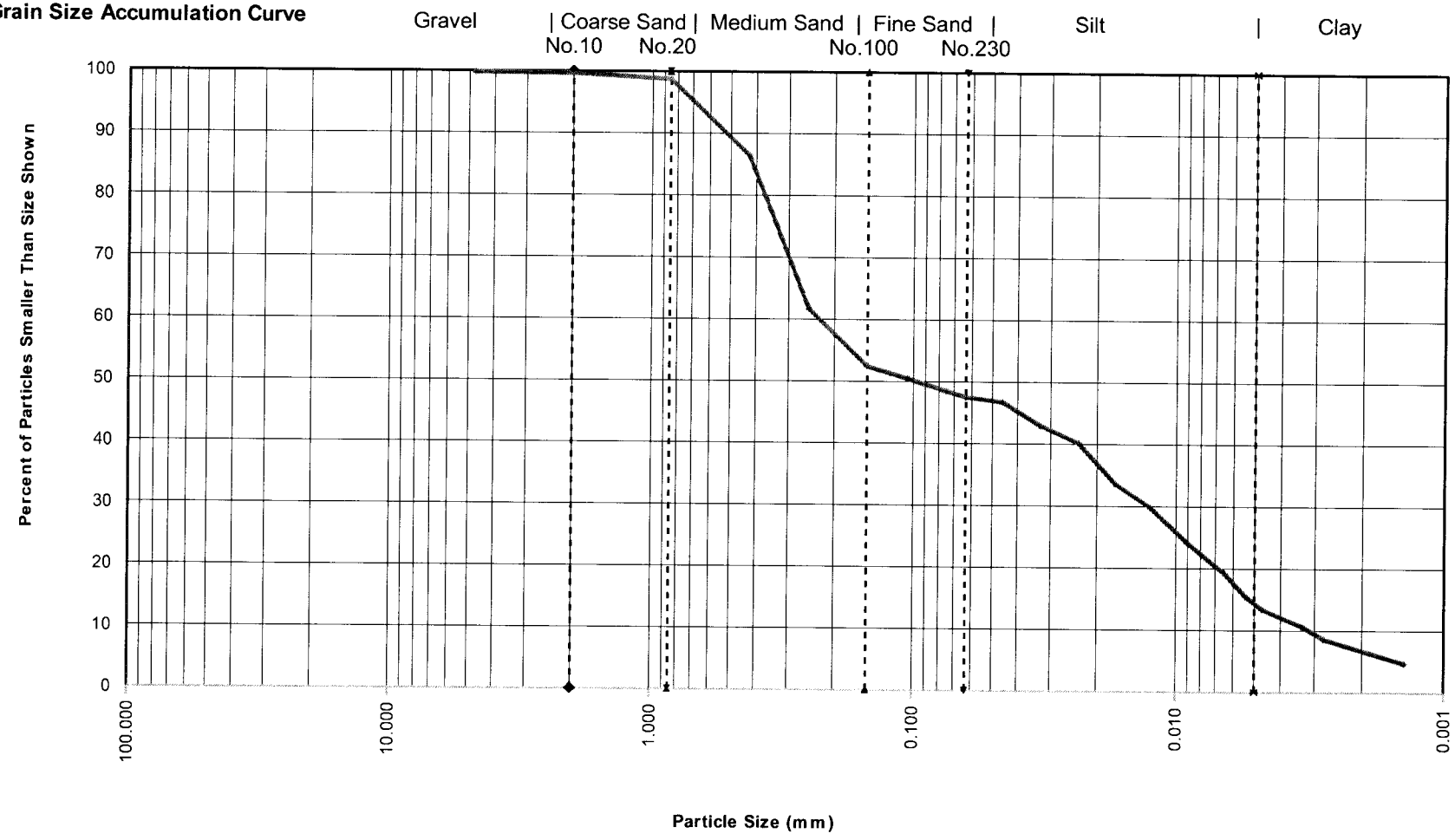
The assumed specific gravity used in the calculations was 2.65.

+4 and +10 fractions consist almost entirely of organic and possible anthropogenic material.



Apex Laboratories, LLC
Particle Size Analysis of Soil by ASTM D 422 Modified

Grain Size Accumulation Curve



Sample ID:	T4-PDI2019-SC47-190522-03-05 (A9I0297-02)			
Specific Gravity	MAXIMUM PARTICLE SIZE	GRAVEL & SAND		SOIL DESCRIPTION
		PARTICLE SHAPE	HARDNESS	
2.65	Gravel	N/A	N/A	Clayey Silty SAND

Hydrometer S/N (drop down):

229773

m	b
-0.2529	9.85

Sample ID: A9I0297-02

Whole Sample

									Total
Tare Values	5.828	5.925	5.822						17.575
Air Dry + Tare	300.271	292.459	165.001						757.731

Sieve Number 4 Enter the weight of soil after wash and oven-dry at 50.

									Total
Tare Values	1.313								1.313
Dry + Tare	2.868								2.868

Sieve Number 10

									Total
Tare Values	1.319								1.319
Dry + Tare	2.393								2.393

Pan

									Total
Tare Values	5.831	5.929	5.828						17.588
Dry + Tare	300.712	292.365	161.514						754.591

Ensure that Total % Retained is ~ 100%. 99.67

APEX
Grain Size Analysis

Analyst	JM
Batch number	9091242
Sample ID	A91O297-02
Start Date/ Time	09/23/19 18:15

Air Drying

Tare	Air Dry Sample + Tare	Tare	Air Dry Sample + Tare
5.828	300.271		
5.925	292.459		
5.822	165.001		

Post 10 mesh sieving

+4 Fraction

Tare	+4 fraction (air dry) + tare	+4 fraction (oven dry) + tare
1.313	2.969	2.868

+10 Fraction

Tare	+10 fraction (air dry) + tare	+10 fraction (oven dry) + tare
1.319	2.489	2.393

-10 Fraction (Pan)

Tare	Pan fraction (air dry) + tare	Tare	Pan fraction (air dry) + tare
5.831	300.712		
5.929	292.365		
5.828	161.514		

Date/Time/Temp

IN	09/25/19 1200
AMEOOIV	111.6
OUT	09/30/19 12:40 112.0

Hygroscopic Moisture Correction

Pan No.	Tare	-10 fraction (air dry) + tare	-10 fraction (oven dry) + tare
E29702	1.303	25.842	24.620

APEX
Grain Size Analysis

A9I0297-02

Notes

~~RR~~

T4-PDI209-SC47-A052203-05

+4 & +10 fractions consist almost entirely of organic & possible anthropogenic material

Maximum Particle Size: Gravel

Hardness and Shape: N/A

Soil/Sediment Classification:

Clayey Silty SAND

10/2/19

APEX
Grain Size Analysis

Hydrometer Analysis

Analyst	JD		
Batch Number	~~A9J0297-02~~ AH 9-30-19		9091242
Sample ID	A9J0297-02		
Start Date/Time	09/26/19 11:22		
Air Dry Sample for Hydrometer Test			55.245
Hydrometer	229773	Dispersant	A19I223

Time/Date: 09/25/19 @1130

11:22	Time (min.)	Hydrometer Reading	Temperature (°C)	Amount of Foam
	0.5			
11:23	1	29.5	20.0	
11:24	2	27.5	20.0	
11:26	4	26.0	20.1	
11:30	8	22.5	20.3	
11:37	15	20.5	20.3	
11:52	30	17.5	20.2	
12:22	60	15.0	20.1	
12:52	90	13.0	19.8	
13:22	120	12.0	19.6	
15:22	240	10.5	19.6	
17:22	360	9.5	19.4	
11:22	1440	7.5	19.1	

Note:

1 cm foam = 5 hydrometer units.

Adjust Hydrometer Reading entered into Excel spreadsheet by adding 5 hydrometer units per cm of foam.

Sieve Analysis of Portion Finer Than No. 10 Sieve

Sieve No.	Tare	Oven Dry + Tare
~~+18~~	1.318	1.787
~~+35~~	1.317	7.506
+60	1.310	14.370
+100	1.313	6.171
+140	1.335	2.378
+200	1.324	2.371
+230	1.320	1.831
~~+270~~	1.319	2.341
~~270 (pan)~~		

+20
+40
AH 09-30-19
-230
NA

Balance Checksheets

Wet Chem April 2019
Grain Size April 2019

Balance Challenge Log

Wet Chem Balance 1
Ohaus Adventurer Pro
ID# 8C30461093

Weight ID	weight (g) <0.5000g >/=0.5000g	acceptance range (g) ± 0.5mg ± 0.1%	
1000015949	0.005g	0.0045	0.0055
66067	0.100g	0.0995	0.1005
66067	100g	99.9000	100.1000

If other than as listed above, the weight and tracking ID of the mass used to challenge the balance must be recorded.

Month: April
Year: 2019

Alternate Weight/ID used:

		Date Range:
100g	10659	4/1 → 4/30/19
0.100g	03-J68049-19	4/1 → 4/30/19
0.005g	1000049215 JCS	3/31/19 4/1 → 4/30/19 JCS

Day/Time	Initials	Weight 1	Observed	Weight 2	Observed	Weight 3	Observed
1 0730	MRF		99.9994		0.1000		0.0051
2 0808	JKP		99.9998		0.0999		0.0050
3 0943	MRF		100.0002		0.1001		0.0050
4							
5 0743	MRF		100.0011		0.1003		0.0051
6							
7							
8 10:09	MRF		100.0009		0.10031		0.0051
9 0720	JKP		100.0011		0.1001 ME 4/8		0.0051
10 0520	JKP		100.0007		0.1000		0.0050
11 0655	JKP		100.0009		0.1000		0.0050
12 0730	JKP		100.0006		0.0995		0.0049
13							
14							
15 0711	WVD		100.0007		0.1003		0.0050
16 0655	JKP	100.0000g	100.0008	0.1000g	0.1002	.0050g	0.0049
17 0735	MRF		100.0009		0.1001		0.0050
18 0749	MRF		100.0006		0.1000		0.0051
19 0700	JKP		100.0015		0.1001		0.0050
20							
21							
22 0730	MRF		100.0009		0.1000		0.0050
23 1013	MRF		100.0013		0.1001		0.0051
24 0658	JKP		100.0015		0.1001		0.0050
25 1115	SDS		100.0006		0.0999		0.0051
26 0735	JKP		100.0004		0.0999		0.0050
27 0740	JKP		100.0004		0.1000		0.0050
28							
29 0731	MRF		100.0007		0.1000		0.0051
30 0750	JKP		99.9997		0.1002		0.0051
31							

Balance Challenge Log

Grain Size
Mettler B303
ID# 1115401761

Weight ID	weight (g)	acceptance range (g)	
	=/<1g	± 0.02g	
	>1g	± 2%	
03-J68208-34	1g	0.980	1.020
10077	10g	9.800	10.200
03-J68630-11	200g	196.000	204.000

If other than as listed above, the weight and tracking ID of the mass used to challenge the balance must be recorded.

Month: April
Year: 2019

Alternate Weight/ID used: 1g 41612 JCS 3/31/19

Date Range: 4/1 → 4/30/19 JCS 4/30/19

Day/Time	Initials	Weight 1	Observed	Weight 2	Observed	Weight 3	Observed
1							
2							
3 04/03/19 13:01	JD		1.000		10.000		199.999
4							
5							
6							
7							
8 1250	KM		199.999		10.000		1.000
9 14:40	SPJ		199.994		10.000		1.001
10 12:11	JD		199.997		10.000	MJ 4.1.19	1.000
11 11:02	MJ		199.999		~~0.999~~ 9.998		0.999
12							
13							
14							
15							
16		200.000g		10.000g		1.000g	
17 14:30	MJ		199.997		10.000		1.000
18 08:20	KM		199.996		9.999		1.000
19							
20							
21					KM 4-24-19		
22					10.00		
23 08:15	KM		199.998		~~100~~.00		~~1~~.000
24 1217	KM		199.995		10.000		1.000
25							
26 08:20	KM		199.997		9.999		0.998
27							
28							
29 9:00	MJ		199997		10.000		1.001
30 12:50	KM		199.997		10.000		1.000
31							