

Appendix E
Confirmation Soil Sampling Analytical
Laboratory Reports

Data Validation Summary

Prepared by: Gretchen Heavner

Date: December 6, 2021

Project No.: Cantera-TOC

Sample Event(s): 2021 Confirmation Sampling

Sample Delivery Group(s): FBI107284, FBI107439, FBI107470, FBI107474, FBI107499, FBI107507, FBI107529, FBI107530, FBI108011, FBI108025, FBI108107, FBI108108, FBI108129, FBI108153, FBI108177, FBI108202, FBI108241, FBI108279, FBI108430, FBI109204, FBI109205, FBI109218, FBI110063, FBI110112, FBI110129, FBI110205, FBI111149, FBI111170, FBI111201

Sample Media: Soil

A Compliance Screening (Stages 1 & 2A) data quality review was performed on total petroleum hydrocarbons (TPHs), volatile organic compounds (VOCs), and metals resulting from laboratory analysis. The analytical data were validated in accordance with the National Functional Guidelines for Inorganic Superfund Methods Data Review (USEPA 2020a) and/or National Functional Guidelines for Organic Superfund Methods Data Review (USEPA 2020b).

A total of 81 soil samples were submitted in 29 sample delivery groups, FBI107284, FBI107439, FBI107470, FBI107474, FBI107499, FBI107507, FBI107529, FBI107530, FBI108011, FBI108025, FBI108107, FBI108108, FBI108129, FBI108153, FBI108177, FBI108202, FBI108241, FBI108279, FBI108430, FBI109204, FBI109205, FBI109218, FBI110063, FBI110112, FBI110129, FBI110205, FBI111149, FBI111170 and FBI111201, to Friedman & Bruya, Inc. for chemical analysis. The analytical holding times were met for all sample delivery groups and the method blanks had no detections. The matrix spike/matrix spike duplicate (MS/MSD) and laboratory control sample/laboratory control sample duplicate (LCS/LCSD) recoveries and sample/sample duplicate, MS/MSD, and LCS/LCSD relative percent differences all met U.S. Environmental Protection Agency (USEPA) requirements.

USEPA METHOD 8021B

The benzene result in sample CAA6A-SS-02 was flagged "j" by the laboratory to indicate the analyte concentration is reported below the lowest calibration standard. The value reported is an estimate. The sample was non-detect so this will be retained as a "UJ" qualifier.

NWTPH-DX

In sample delivery groups FBI108129, FBI108153, FBI108241, FBI108279, FBI109204, FBI111149, and FBI108202 the laboratory flagged the detected diesel range result from samples CAA6B-BASE-01 and CAA3-SS-04 and the motor oil range results from samples CAA1A-BASE-01, CAA1A-SS-05, CAA1B-SS-02, CAA1B-SS-06, CAA1B-SS-08, CAA1B-SS-04, and CAA1B-SS-05 "x" to indicate the sample chromatographic pattern does not resemble the fuel standard used for quantitation. A review of the chromatograms concurs with this assessment. The laboratory note shall be preserved in the database and in data tables as a chromatogram footnote with no additional qualifiers being added to the results.

In sample delivery groups FBI108129, FBI108153, and FBI110063 the laboratory flagged the surrogate recoveries for samples CAA1A-BASE-01, CAA1A-SS-05, CAA1B-SS-02, and CAA2B-Base-04 "ip" to indicate recovery fell outside of control limits (high) due to sample matrix effects. This laboratory qualifier will be retained as a final qualifier "J" for database entry and data table reporting to indicate the results should be considered an estimate.

In sample delivery group FBI108202 the laboratory flagged the MS and MSD recoveries and relative percent difference (RPD) for sample 108202-01 "b" to indicate the analyte was spiked at a level that was less than 5 times that present in the sample. Matrix spike recoveries may not be meaningful. Additionally, the method is in control based on the LCS. It is with professional judgement that no additional qualifiers will be added to the results based on the MS/MSD information alone.

NWTPH-GX

In sample delivery groups FBI108153, FBI108279, FBI110129, and FBI108202 the laboratory flagged the surrogate recoveries for samples CAA1B-SS-02, CAA1A-BASE-02, CAA1B-SS-08, CAA2B-Base-02 and CAA1B-SS-04 "ip" to indicate recovery fell outside of control limits (high) due to sample matrix effects. This laboratory qualifier will be retained as a final qualifier "J" for database entry and data table reporting to indicate the results should be considered an estimate.

In sample delivery group FBI108153, the laboratory flagged the duplicate results for sample CAA1B-SS-03 "a" to indicate the analyte was detected at a level less than 5 times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis. Additionally, the difference between the two results is less than the reporting limit and the method is in control based on the LCS. It is with professional judgement that the laboratory note shall be preserved in the database and in data tables as a laboratory qualifier, with no additional qualifiers being added to the results.

In sample delivery group FBI108279, the laboratory flagged the duplicate results for batch sample 108249-01 "a" to indicate the analyte was detected at a level less than 5 times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis. Because the sample is from another project and the method is in control based on the LCS, it is with

professional judgment that the laboratory note shall be preserved in the database and in data tables as a laboratory qualifier, with no additional qualifiers being added to the results.

No qualifiers were added to the analytical results based on the data quality review. Data are determined to be of acceptable quality for use as reported by the laboratory, with some laboratory qualifiers being updated to conform to the final qualifiers used for data table reporting and database storage.

REFERENCES

- U.S. Environmental Protection Agency (USEPA). 2020a. *National Functional Guidelines for Inorganic Superfund Methods Data Review*. Prepared by the Office of Superfund Remediation and Technology Innovation. EPA-542-R-20-006/OLEM 9240.1-66. November.
- _____. 2020b. *National Functional Guidelines for Organic Superfund Methods Data Review*. Prepared by the Office of Superfund Remediation and Technology Innovation. EPA-540-R-20-005/OLEM 9240.0-51. November.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

July 22, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on July 19, 2021 from the TOC Seattle Terminal 1, F&BI 107284 project. There are 11 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures

c: Jamie Stevens, K.im Hempel, Lynn Grochala, Kristin Anderson, Reid Casscadden
CTC0722R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 19, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 107284 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
107284 -01	CAA7-BASE-19
107284 -02	CAA7-BASE-17
107284 -03	CAA7-BASE-16
107284 -04	CAA7-BASE-15
107284 -05	CAA7-BASE-18
107284 -06	CAA7-BASE-14
107284 -07	CAA7-BASE-13

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-BASE-19	Client:	Crete Consulting
Date Received:	07/19/21	Project:	TOC Seattle Terminal 1, F&BI 107284
Date Extracted:	07/20/21	Lab ID:	107284-01
Date Analyzed:	07/20/21	Data File:	107284-01.041
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	6.98
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-BASE-17	Client:	Crete Consulting
Date Received:	07/19/21	Project:	TOC Seattle Terminal 1, F&BI 107284
Date Extracted:	07/20/21	Lab ID:	107284-02
Date Analyzed:	07/20/21	Data File:	107284-02.044
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	5.66
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-BASE-16	Client:	Crete Consulting
Date Received:	07/19/21	Project:	TOC Seattle Terminal 1, F&BI 107284
Date Extracted:	07/20/21	Lab ID:	107284-03
Date Analyzed:	07/20/21	Data File:	107284-03.045
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	3.06
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-BASE-15	Client:	Crete Consulting
Date Received:	07/19/21	Project:	TOC Seattle Terminal 1, F&BI 107284
Date Extracted:	07/20/21	Lab ID:	107284-04
Date Analyzed:	07/20/21	Data File:	107284-04.046
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	3.79
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-BASE-18	Client:	Crete Consulting
Date Received:	07/19/21	Project:	TOC Seattle Terminal 1, F&BI 107284
Date Extracted:	07/20/21	Lab ID:	107284-05
Date Analyzed:	07/20/21	Data File:	107284-05.047
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	6.85
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-BASE-14	Client:	Crete Consulting
Date Received:	07/19/21	Project:	TOC Seattle Terminal 1, F&BI 107284
Date Extracted:	07/20/21	Lab ID:	107284-06
Date Analyzed:	07/20/21	Data File:	107284-06.048
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	6.71
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA7-BASE-13	Client:	Crete Consulting
Date Received:	07/19/21	Project:	TOC Seattle Terminal 1, F&BI 107284
Date Extracted:	07/20/21	Lab ID:	107284-07
Date Analyzed:	07/20/21	Data File:	107284-07.049
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	6.24
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	TOC Seattle Terminal 1, F&BI 107284
Date Extracted:	07/20/21	Lab ID:	I1-441 mb
Date Analyzed:	07/20/21	Data File:	I1-441 mb.037
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<1
---------	----

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/22/21

Date Received: 07/19/21

Project: TOC Seattle Terminal 1, F&BI 107284

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 6020B**

Laboratory Code: 107284-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	5.99	92	94	75-125	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	96	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

107284

SAMPLE CHAIN OF CUSTODY

ME 07/19/21

ATQ

Report To R. Jones, J. Stevens, K. Hempel

Company Top Seattle Terminal I

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones
PROJECT NAME Top Seattle Terminal I

PO # _____

REMARKS

INVOICE TO

Page # _____ of _____
TURNAROUND TIME
 Standard Turnaround
 RUSH 24-Hour
Rush charges authorized by: _____
SAMPLE DISPOSAL
 Dispose after 30 days
 Archive Samples
 Other _____

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes		
						TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM			
CAA7-BASE-19	01	7.19.2021	1100	Soil	1								X	Arsenic	
CAA7-BASE-17	02		1110		1								X		
CAA7-BASE-16	03		1115		1								X		
CAA7-BASE-15	04		1120		1								X		
CAA7-BASE-18	05		1130		1								X		
CAA7-BASE-14	06		1145		1								X		
CAA7-BASE-13	07		1155		1								X		
															Samples received at <u>4</u> °C

SIGNATURE

PRINT NAME

COMPANY

DATE

TIME

Relinquished by: R. Jones

Rusty Jones

CEFE Consulting

7.19.21

1322

Received by: M. Hempel

M. Hempel

PHPS

V

V

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

Received by:

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

July 28, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on July 27, 2021 from the TOC Seattle Terminal 1, F&BI 107439 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1 Group
CTC0728R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 27, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 107439 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
107439 -01	CAA6A-SS-02
107439 -02	CAA6A-SS-03
107439 -03	CAA6A-SS-04

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/28/21
Date Received: 07/27/21
Project: TOC Seattle Terminal 1, F&BI 107439
Date Extracted: 07/27/21
Date Analyzed: 07/28/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING METHOD 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Gasoline</u> <u>Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-132)
CAA6A-SS-02 107439-01 1/5	<0.02 j	130	81
CAA6A-SS-03 107439-02	<0.02	<5	88
CAA6A-SS-04 107439-03	<0.02	<5	84
Method Blank 01-1659 MB	<0.02	<5	95

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/28/21
Date Received: 07/27/21
Project: TOC Seattle Terminal 1, F&BI 107439
Date Extracted: 07/27/21
Date Analyzed: 07/27/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA6A-SS-02 107439-01	510	380	91
CAA6A-SS-03 107439-02	<50	<250	99
CAA6A-SS-04 107439-03	<50	<250	91
Method Blank 01-1743 MB	<50	<250	97

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/28/21

Date Received: 07/27/21

Project: TOC Seattle Terminal 1, F&BI 107439

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 107425-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	89	69-120
Gasoline	mg/kg (ppm)	20	95	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/28/21

Date Received: 07/27/21

Project: TOC Seattle Terminal 1, F&BI 107439

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 107439-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	440	94	91	64-133	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	94	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

1071439

Report To R. Jones, J. Stevens, K. Hempel

Company TEC

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLE CHAIN OF CUSTODY ME 07/27/21

BOI/MSI

Page # 1 of 1

SAMPLERS (signature) Rusty Jones

R. Jones

PROJECT NAME

TEC Seattle Terminal 1

PO #

REMARKS

INVOICE TO

Project specific RLS? Yes / No

ANALYSES REQUESTED

TURNAROUND TIME
 Standard turnaround
 RUSH 24 Hour
Rush charges authorized by: _____

SAMPLE DISPOSAL
 Archive samples
 Other _____
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082			
CA16A-SS-02	01A-F	7.27.21	1340	soil	5	X	X	X							Benzene only
CA16A-SS-03	02-1		1350		5	X	X	X							
CA16A-SS-04	03-1		1406		5	X	X	X							

0 - 10 received samples

SIGNATURE

PRINT NAME

COMPANY

DATE

TIME

Relinquished by: Rusty Jones

Rusty Jones

CREC Consulting

7.27.21

1450

Received by: W

Khoi Hoang

FBF

7.27.21

1450

Seattle, WA 98119-2029

Ph. (206) 285-8282

Received by: _____

Samples received at 4 o'clock

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

July 30, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on July 28, 2021 from the TOC Seattle Terminal 1, F&BI 107470 project. There are 7 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC0730R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 28, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 107470 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
107470 -01	CAA6A-SS-05
107470 -02	CAA6A-SS-01
107470 -03	CAA6A-SS-09

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/30/21
Date Received: 07/28/21
Project: TOC Seattle Terminal 1, F&BI 107470
Date Extracted: 07/29/21
Date Analyzed: 07/29/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 58-139)
CAA6A-SS-09 107470-03	<5	86
Method Blank 01-1661 MB2	<5	85

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/30/21
Date Received: 07/28/21
Project: TOC Seattle Terminal 1, F&BI 107470
Date Extracted: 07/29/21
Date Analyzed: 07/29/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING METHOD 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Gasoline</u> <u>Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-132)
CAA6A-SS-05 107470-01	<0.02	<5	79
CAA6A-SS-01 107470-02	<0.02	<5	82
Method Blank 01-1661 MB2	<0.02	<5	78

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/30/21
Date Received: 07/28/21
Project: TOC Seattle Terminal 1, F&BI 107470
Date Extracted: 07/29/21
Date Analyzed: 07/29/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA6A-SS-05 107470-01	<50	<250	95
CAA6A-SS-01 107470-02	<50	<250	99
Method Blank 01-1752 MB	<50	<250	96

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/30/21

Date Received: 07/28/21

Project: TOC Seattle Terminal 1, F&BI 107470

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 107437-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	90	69-120
Gasoline	mg/kg (ppm)	20	85	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 07/30/21

Date Received: 07/28/21

Project: TOC Seattle Terminal 1, F&BI 107470

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 107470-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	98	107	64-133	9

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	98	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

107470

SAMPLE CHAIN OF CUSTODY

ME 7/28/21

601 VS-05

Report To R. Jones, J. Stevens, K. Hempel

Company TOC Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones

PROJECT NAME Rusty Jones

REMARKS TOC Seattle Terminal 1

PO # _____

INVOICE TO _____

Project specific RIs? - Yes / No

Page # _____ of _____

TURNAROUND TIME

Standard turnaround
 RUSH 24-Hour
Rush charges authorized by: _____

SAMPLE DISPOSAL

Archive samples
 Other _____
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes	
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082		
CAAGX-SS-05	01A-E	7.28.21	1530	Soil	5	X	X	X						Benzene only
CAAGX-SS-01	02 /	↓	1600	↓	5	X	X	X						↓
CAAGX-SS-09	03	↓	1610	↓	5	*X	*X	*X						* cancel by + Benette
														on-03 per E5
														7/28/21 ME

Friedman & Bruya, Inc.

3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
<u>R. Jones</u>	<u>Rusty Jones</u>	<u>Crete Consulting</u>	<u>7.28.21</u>	<u>1635</u>
<u>[Signature]</u>	<u>BRISAT TADDE</u>	<u>FR 1</u>	<u>7/28/21</u>	<u>1635</u>
Received by: _____				
Relinquished by: _____				
Received by: _____				

Samples received at 4 p.c

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 2, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on July 29, 2021 from the TOC Seattle Terminal 1, F&BI 107474 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1 Group
CTC0802R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 29, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 107474 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
107474 -01	CAA6A-BASE-01
107474 -02	CAA6A-BASE-02
107474 -03	CAA6A-BASE-03

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/02/21
Date Received: 07/29/21
Project: TOC Seattle Terminal 1, F&BI 107474
Date Extracted: 07/29/21
Date Analyzed: 07/29/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Gasoline</u> <u>Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
CAA6A-BASE-01 107474-01	<0.02	40	101
CAA6A-BASE-02 107474-02	0.038	<5	101
CAA6A-BASE-03 107474-03	0.077	<5	101
Method Blank 01-1663 MB	<0.02	<5	103

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/02/21
Date Received: 07/29/21
Project: TOC Seattle Terminal 1, F&BI 107474
Date Extracted: 07/29/21
Date Analyzed: 07/29/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA6A-BASE-01 107474-01	98	<250	102
CAA6A-BASE-02 107474-02	<50	<250	109
CAA6A-BASE-03 107474-03	<50	<250	103
Method Blank 01-1753 MB	<50	<250	100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/02/21

Date Received: 07/29/21

Project: TOC Seattle Terminal 1, F&BI 107474

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE
AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 107474-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Gasoline	mg/kg (ppm)	40	41	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	92	69-120
Gasoline	mg/kg (ppm)	20	90	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/02/21

Date Received: 07/29/21

Project: TOC Seattle Terminal 1, F&BI 107474

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 107473-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	83	117	115	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	84	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

107474

SAMPLE CHAIN OF CUSTODY

ME 07-27-21

Page # 1 of 1 US1

Report To R. Jones, J. Stevens, K. Kempel

Company Tox Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones

PROJECT NAME Kushy Jones

PO #

Tox Seattle Terminal 1

REMARKS

INVOICE TO

Project specific RIs? - Yes / No

TURNOVER/TIME Bo1

Standard turnaround
 RUSH 24-Hour
 Rush charges authorized by:

SAMPLE DISPOSAL
 Archive samples
 Other

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes					
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082						
CALGA-BASE-01	D1A-E	7.29.2021	0905	SOIL	5	X	X	X									Rentals only	
CALGA-BASE-02	02		0910		5	X	X	X										
CALGA-BASE-03 CALGA-BASE-03	03		0915		5	X	X	X										

Samples received at 4 00

Friedman & Bruya, Inc.

3012 1 6th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
<u>R. Jones</u>	<u>Rusty Jones</u>	<u>CECE Consulting</u>	<u>7/29/21</u>	<u>1015</u>
<u>[Signature]</u>	<u>Khan Phan</u>	<u>FB T</u>	<u>7/29/21</u>	<u>1015</u>
Received by:				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 2, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on July 29, 2021 from the TOC Seattle Terminal 1, F&BI 107499 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1 Group
CTC0802R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 29, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 107499 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID

107499 -01

Crete Consulting

CAA6A-SS-06

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/02/21
Date Received: 07/29/21
Project: TOC Seattle Terminal 1, F&BI 107499
Date Extracted: 07/30/21
Date Analyzed: 07/30/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING METHOD 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Gasoline</u> <u>Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-132)
CAA6A-SS-06 107499-01	<0.02	<5	79
Method Blank 01-1665 MB	<0.02	<5	81

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/02/21
Date Received: 07/29/21
Project: TOC Seattle Terminal 1, F&BI 107499
Date Extracted: 07/30/21
Date Analyzed: 07/30/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA6A-SS-06 107499-01	<50	<250	109
Method Blank 01-1756 MB	<50	<250	100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/02/21

Date Received: 07/29/21

Project: TOC Seattle Terminal 1, F&BI 107499

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE
AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 107499-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	91	66-121
Gasoline	mg/kg (ppm)	20	105	61-153

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/02/21

Date Received: 07/29/21

Project: TOC Seattle Terminal 1, F&BI 107499

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 107499-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	120	118	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	115	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

107499

SAMPLE CHAIN OF CUSTODY

ME 7/29/21

B01 VS-D2

Page # 1 of 1

Report To R. Jones, J. Stevens, K. Hempel

Company Tec Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) <u>Justy Jones</u>	PROJECT NAME <u>Tec Seattle Terminal 1</u>
PRINT NAME <u>R. Jones</u>	PO # _____
REMARKS	INVOICE TO
Project specific RIs? - Yes / No	

<input type="checkbox"/> Standard turnaround <input checked="" type="checkbox"/> RUSH <u>24 Hr</u> Rush charges authorized by: _____	TURNOURND TIME _____ of _____
<input type="checkbox"/> Archive samples <input type="checkbox"/> Other _____	SAMPLE DISPOSAL _____
Default: Dispose after 30 days	

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082			
CAAAK-SS-06	61A-G	7.29.21	1505	SOIL	5	X	X	X							Benzene only

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
<u>R. Jones</u>	<u>Justy Jones</u>	<u>Justy Jones</u>	<u>Justy Jones</u>	<u>CRE Consulting</u>	<u>CRE Consulting</u>	<u>7/29/21</u>	<u>1530</u>
<u>[Signature]</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>[Signature]</u>	<u>[Signature]</u>
Received by:		Received by:		Received by:			

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

December 2, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the amended results from the testing of material submitted on July 30, 2021 from the TOC Seattle Terminal 1, F&BI 107507 project. The NWTPH-Gx sample and duplicate results were updated to reflect the reanalysis for inhomogeneity.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures

c: Time Oil Terminal 1
CTC0803R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 3, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on July 30, 2021 from the TOC Seattle Terminal 1, F&BI 107507 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0803R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 30, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 107507 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID

107507 -01

Crete Consulting

CAA6A-Base-04

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21
Date Received: 07/30/21
Project: TOC Seattle Terminal 1, F&BI 107507
Date Extracted: 07/30/21
Date Analyzed: 07/30/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**
Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Gasoline</u> <u>Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> Limit 50-150)
CAA6A-Base-04 107507-01	<0.02	<5	94
Method Blank 01-1663 MB2	<0.02	<5	102

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21
Date Received: 07/30/21
Project: TOC Seattle Terminal 1, F&BI 107507
Date Extracted: 07/30/21
Date Analyzed: 07/30/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA6A-Base-04 107507-01	<50	<250	95
Method Blank 01-1757 MB	<50	<250	97

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21

Date Received: 07/30/21

Project: TOC Seattle Terminal 1, F&BI 107507

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 107474-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Gasoline	mg/kg (ppm)	40	41	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	92	69-120
Gasoline	mg/kg (ppm)	20	90	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21

Date Received: 07/30/21

Project: TOC Seattle Terminal 1, F&BI 107507

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 107500-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	106	104	64-133	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	102	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 3, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on July 30, 2021 from the TOC Seattle Terminal 1, F&BI 107529 project. There are 5 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0803R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 30, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 107529 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
107529 -01	CAA6A-Base-01-8
107529 -02	CAA6A-Base-02A-8
107529 -03	CAA6A-Base-03-8

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21
Date Received: 07/30/21
Project: TOC Seattle Terminal 1, F&BI 107529
Date Extracted: 08/02/21
Date Analyzed: 08/02/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
CAA6A-Base-01-8 107529-01	<5	83
Method Blank 01-1666 MB	<5	69

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21
Date Received: 07/30/21
Project: TOC Seattle Terminal 1, F&BI 107529
Date Extracted: 08/02/21
Date Analyzed: 08/02/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE
USING METHOD 8021B**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
CAA6A-Base-02A-8 107529-02	<0.02	102
CAA6A-Base-03-8 107529-03	<0.02	101
Method Blank 01-1666 MB	<0.02	87

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21

Date Received: 07/30/21

Project: TOC Seattle Terminal 1, F&BI 107529

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE
AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx**

Laboratory Code: 107523-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	85	69-120
Gasoline	mg/kg (ppm)	20	110	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

ME 07/30/21

Page # 151/1 of 1 BA1

107529

SAMPLERS (signature)
Rusty Jones

R. Jones

PO #

[Redacted]

TURNAROUND TIME
Standard turnaround
X RUSH 24H,
Rush charges authorized by:

Report to R. Jones, J. Stevens, K. Hempel

Company TEL Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

REMARKS

TEL Seattle Terminal 1

INVOICE TO

Project specific RIS? - Yes / No

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED						Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270		PCBs EPA 8082	
CAA6A-BASE-01-8	01A-E	7.30.21	1445	soil	5		X							
CAA6A-BASE-02A-8	02A		1505		5		X							Beneath only
CAA6A-BASE-03-8	03		1525		5	X								

SAMPLE DISPOSAL
 Archive samples
 Other
 Default: Dispose after 30 days

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: <u>R. Jones</u>	<u>Rusty Jones</u>	<u>CRETE Consulting</u>	<u>7.30.21</u>	<u>1624</u>
Received by: <u>Joe Mohammed</u>	<u>JOE MOHAMMED</u>	<u>FB&T</u>	<u>7/30/21</u>	<u>1624</u>
Relinquished by:		<u>Samples received at</u>		
Received by:		<u>4</u>		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 3, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on July 30, 2021 from the TOC Seattle Terminal 1, F&BI 107530 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0803R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on July 30, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 107530 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
107530 -01	CAA6A-SS-07
107530 -02	CAA6A-SS-08
107530 -03	CAA6A-Base-01-4
107530 -04	CAA6A-Base-02A-5
107530 -05	CAA6A-Base-03-4

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21
Date Received: 07/30/21
Project: TOC Seattle Terminal 1, F&BI 107530
Date Extracted: 08/02/21
Date Analyzed: 08/02/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 58-139)
CAA6A-Base-01-4 107530-03	<5	84
Method Blank 01-1666 MB	<5	69

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21
Date Received: 07/30/21
Project: TOC Seattle Terminal 1, F&BI 107530
Date Extracted: 08/02/21
Date Analyzed: 08/02/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE
USING METHOD 8021B**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-132)
CAA6A-Base-02A-5 107530-04	0.044	80
CAA6A-Base-03-4 107530-05	<0.02	82
Method Blank 01-1666 MB	<0.02	87

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21
Date Received: 07/30/21
Project: TOC Seattle Terminal 1, F&BI 107530
Date Extracted: 08/02/21
Date Analyzed: 08/02/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING METHOD 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Gasoline</u> <u>Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-132)
CAA6A-SS-07 107530-01	<0.02	<5	81
CAA6A-SS-08 107530-02	<0.02	<5	78
Method Blank 01-1666 MB	<0.02	<5	87

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21
Date Received: 07/30/21
Project: TOC Seattle Terminal 1, F&BI 107530
Date Extracted: 08/02/21
Date Analyzed: 08/02/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA6A-SS-07 107530-01	<50	<250	97
CAA6A-SS-08 107530-02	<50	<250	93
Method Blank 01-1761 MB	<50	<250	93

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21

Date Received: 07/30/21

Project: TOC Seattle Terminal 1, F&BI 107530

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE
AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 107523-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	85	69-120
Gasoline	mg/kg (ppm)	20	110	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/03/21

Date Received: 07/30/21

Project: TOC Seattle Terminal 1, F&BI 107530

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 107537-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	83	83	64-133	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	92	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

107530

SAMPLE CHAIN OF CUSTODY

ME 07/30/21

Page # 1 of 1

Report To R. Jones, J. Stevens, K. Hempel

Company Top Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones

PROJECT NAME Top Seattle Terminal 1

PO # _____

REMARKS

INVOICE TO

Project specific PLS? - Yes / No

ANALYSES REQUESTED

TURNAROUND TIME _____

Standard turnaround RUSH 24 Hr

Rush charges authorized by: _____

SAMPLE DISPOSAL

Archive samples

Other _____

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082			
CAA61-SS-07	02A	7.30.21	1325	Soil	5	X	X	X							Reanalyze only
CAA61-SS-08	02		1355		5	X	X	X							
CAA61-BASE-01-4	03		1435		5		X								
CAA61-BASE-02A-5	04		1455		5			X							Reanalyze only
CAA61-BASE-03-4	05		1515		5			X							

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Reinquished by: <u>R. Jones</u>		<u>Rusty Jones</u>		<u>REFE Consulting</u>		7.30.21	1024
Received by: <u>JOE MOHAMMED</u>		<u>JOE MOHAMMED</u>		<u>ESBT</u>		7.30.21	1624
Reinquished by: _____							
Received by: _____							

Samples received at 4 °C

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 4, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 2, 2021 from the TOC Seattle Terminal 1, F&BI 108011 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0804R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 2, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108011 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
108011 -01	CAA5-SS-02
108011 -02	CAA5-SS-03

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/04/21

Date Received: 08/02/21

Project: TOC Seattle Terminal 1, F&BI 108011

Date Extracted: 08/03/21

Date Analyzed: 08/03/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA5-SS-02 108011-01	<50	<250	95
CAA5-SS-03 108011-02	<50	<250	91
Method Blank 01-1766 MB	<50	<250	98

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA5-SS-02	Client:	Crete Consulting
Date Received:	08/02/21	Project:	TOC Seattle Terminal 1, F&BI 108011
Date Extracted:	08/03/21	Lab ID:	108011-01 x5
Date Analyzed:	08/03/21	Data File:	108011-01 x5.073
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	5.63
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA5-SS-03	Client:	Crete Consulting
Date Received:	08/02/21	Project:	TOC Seattle Terminal 1, F&BI 108011
Date Extracted:	08/03/21	Lab ID:	108011-02 x5
Date Analyzed:	08/03/21	Data File:	108011-02 x5.070
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	6.36
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	TOC Seattle Terminal 1, F&BI 108011
Date Extracted:	08/03/21	Lab ID:	I1-470 mb
Date Analyzed:	08/03/21	Data File:	I1-470 mb.040
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<1
---------	----

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/04/21

Date Received: 08/02/21

Project: TOC Seattle Terminal 1, F&BI 108011

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108011-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	84	88	64-133	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	82	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/04/21

Date Received: 08/02/21

Project: TOC Seattle Terminal 1, F&BI 108011

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 6020B**

Laboratory Code: 108010-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	82	77	75-125	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	91	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 5, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 3, 2021 from the TOC Seattle Terminal 1, F&BI 108025 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0805R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 3, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108025 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
108025 -01	CAA5-SS-04
108025 -02	CAA5-SS-01

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/05/21
Date Received: 08/03/21
Project: TOC Seattle Terminal 1, F&BI 108025
Date Extracted: 08/03/21
Date Analyzed: 08/03/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 56-165)
CAA5-SS-04 108025-01	<50	<250	79
CAA5-SS-01 108025-02	3,200	2,000	84
Method Blank 01-1792 MB	<50	<250	91

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA5-SS-04	Client:	Crete Consulting
Date Received:	08/03/21	Project:	TOC Seattle Terminal 1, F&BI 108025
Date Extracted:	08/04/21	Lab ID:	108025-01
Date Analyzed:	08/04/21	Data File:	108025-01.052
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	4.08
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	CAA5-SS-01	Client:	Crete Consulting
Date Received:	08/03/21	Project:	TOC Seattle Terminal 1, F&BI 108025
Date Extracted:	08/04/21	Lab ID:	108025-02
Date Analyzed:	08/04/21	Data File:	108025-02.053
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	5.26
---------	------

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Total Metals By EPA Method 6020B

Client ID:	Method Blank	Client:	Crete Consulting
Date Received:	NA	Project:	TOC Seattle Terminal 1, F&BI 108025
Date Extracted:	08/04/21	Lab ID:	I1-470 mb2
Date Analyzed:	08/04/21	Data File:	I1-470 mb2.051
Matrix:	Soil	Instrument:	ICPMS2
Units:	mg/kg (ppm) Dry Weight	Operator:	SP

Analyte:	Concentration mg/kg (ppm)
----------	------------------------------

Arsenic	<1
---------	----

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/05/21

Date Received: 08/03/21

Project: TOC Seattle Terminal 1, F&BI 108025

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108025-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	83	84	63-146	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	82	79-144

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/05/21

Date Received: 08/03/21

Project: TOC Seattle Terminal 1, F&BI 108025

**QUALITY ASSURANCE RESULTS
FOR THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL METALS USING EPA METHOD 6020B**

Laboratory Code: 108010-01 x5 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Arsenic	mg/kg (ppm)	10	<5	85	90	75-125	6

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Arsenic	mg/kg (ppm)	10	83	80-120

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

108025

SAMPLE CHAIN OF CUSTODY

ME 08/03/21

Page # 1 of 1 BT

Report To: R. Jones, J. Stevens, K. Hempel

Company: Top Seattle Terminal 1

Address: _____

City, State, ZIP: _____

Phone: _____ Email: _____

SAMPLERS (signature) <u>R. Jones</u>	PROJECT NAME <u>Top Seattle Terminal 1</u>	PO #
Project specific RI's? Yes / No	REMARKS	INVOICE TO

TURNAROUND TIME Standard turnaround <u>RUSH 24-Hour</u> Rush charges authorized by: _____
SAMPLE DISPOSAL <input type="checkbox"/> Standard samples <input type="checkbox"/> Archive samples <input type="checkbox"/> Other _____ Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED										Notes							
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Arsenic (6010/6820)										
9985 CAA5-SS-01	01	8.3.2021	1010	SOIL	1	X																	
985 CAA5-SS-01	02	↓	1020	SOIL	1	X																	

Samples received at 4 °C

Relinquished by: <u>R. Jones</u>	SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Received by: <u>M. Jones</u>		<u>Rusty Jones</u>	<u>CRETE Consulting</u>	<u>8.3.2021</u>	<u>1120</u>
Relinquished by:		<u>Alan Phan</u>	<u>FE BT</u>	<u>8/3/21</u>	<u>1120</u>
Received by:					

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 10, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 6, 2021 from the TOC Seattle Terminal 1, F&BI 108107 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0810R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 6, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108107 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
108107 -01	CAA1A-TP3-7
108107 -02	CAA1A-TP3-9
108107 -03	CAA1A-TP4-8
108107 -04	CAA1A-TP4-12.2
108107 -05	CAA1A-TP4-13.9

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/10/21
Date Received: 08/06/21
Project: TOC Seattle Terminal 1, F&BI 108107
Date Extracted: 08/06/21
Date Analyzed: 08/06/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 58-139)
CAA1A-TP3-7 108107-01	<5	85
CAA1A-TP3-9 108107-02	<5	81
CAA1A-TP4-8 108107-03	35	87
CAA1A-TP4-12.2 108107-04	<5	82
CAA1A-TP4-13.9 108107-05	<5	83
Method Blank 01-1768 MB	<5	96

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/10/21
Date Received: 08/06/21
Project: TOC Seattle Terminal 1, F&BI 108107
Date Extracted: 08/06/21
Date Analyzed: 08/06/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA1A-TP3-7 108107-01	<50	<250	95
CAA1A-TP3-9 108107-02	<50	<250	95
CAA1A-TP4-8 108107-03	280	<250	95
CAA1A-TP4-12.2 108107-04	<50	<250	95
CAA1A-TP4-13.9 108107-05	<50	<250	94
Method Blank 01-1818 MB	<50	<250	99

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/10/21

Date Received: 08/06/21

Project: TOC Seattle Terminal 1, F&BI 108107

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Gasoline	mg/kg (ppm)	20	85	85	71-131	0

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/10/21

Date Received: 08/06/21

Project: TOC Seattle Terminal 1, F&BI 108107

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108107-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	98	100	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	98	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

108107

SAMPLE CHAIN OF CUSTODY

ME 8/6/21 col/w/s

Report To R. Jones, J. Stevens, K. Hempel

Company Top Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) Rusty Jones

PROJECT NAME Top Seattle Terminal 1

REMARKS _____

INVOICE TO _____

Project specific PIs? - Yes / No

Page # 1 of 1

TURNAROUND TIME

- Standard turnaround
- RUSH 8/9 Morahan
- Rush charges authorized by: _____

SAMPLE DISPOSAL

- Archive samples
- Other _____
- Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Notes
CAHA-TP3-7	-01A-E	8.6.2021	1505	Soil	5	X	X						
CAHA-TP3-9	-02A-E		1510		5	X	X						
CAHA-TP4-8	03A-E		1500		5	X	X						
CAHA-TP4-12.2	04A-E		1515		5	X	X						
CAHA-TP4-13.9	05A-E		1520		5	X	X						

Samples received at 4 00

SIGNATURE

Relinquished by:

Received by: R. Jones

PRINT NAME

Rusty Jones

COMPANY

Cate Consulting

DATE

8.6.21

TIME

1552

Relinquished by:

Received by: WH

PRINT NAME

Khoi Hoang

COMPANY

FBI

DATE

8.6.21

TIME

1552

Relinquished by:

Received by:

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 10, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 6, 2021 from the TOC Seattle Terminal 1, F&BI 108108 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0810R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 6, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108108 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
108108 -01	CAA1A-SS-04
108108 -02	CAA1A-SS-03

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/10/21
Date Received: 08/06/21
Project: TOC Seattle Terminal 1, F&BI 108108
Date Extracted: 08/06/21
Date Analyzed: 08/06/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 58-139)
CAA1A-SS-04 108108-01	<5	82
CAA1A-SS-03 108108-02	<5	80
Method Blank 01-1768 MB	<5	96

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/10/21
Date Received: 08/06/21
Project: TOC Seattle Terminal 1, F&BI 108108
Date Extracted: 08/06/21
Date Analyzed: 08/06/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA1A-SS-04 108108-01	<50	<250	94
CAA1A-SS-03 108108-02	<50	<250	96
Method Blank 01-1818 MB	<50	<250	99

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/10/21

Date Received: 08/06/21

Project: TOC Seattle Terminal 1, F&BI 108108

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Gasoline	mg/kg (ppm)	20	85	85	71-131	0

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/10/21

Date Received: 08/06/21

Project: TOC Seattle Terminal 1, F&BI 108108

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108107-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	98	100	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	98	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

108108

SAMPLE CHAIN OF CUSTODY

ME 6/6/21 CO/V53

Report To R. Jones, J. Stevens, K. Hempel

Company TOC Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones PO # _____
 PROJECT NAME Kusy Jones
TOC Seattle Terminal 1
 REMARKS _____
 INVOICE TO _____
 Project specific PLS? - Yes / No _____

Page # 1 of 1
 TURNAROUND TIME
 Standard turnaround
 RUSH 8/9 Morning
 Rush charges authorized by: _____
 SAMPLE DISPOSAL
 Archive samples
 Other _____
 Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082			
QAIA-SS-04	01A-E	8.6.21	1145	SOIL	5	X	X								
QAIA-SS-03	02A-E	↓	1155	↓	5	X	X								

Samples received at 4 °C

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>R. Jones</u>		<u>Kusy Jones</u>		<u>Crete Consulting</u>		<u>8.6.21</u>	<u>1552</u>
Received by: <u>[Signature]</u>		<u>Khai Hoang</u>		<u>FB E</u>		<u>8.6.21</u>	<u>1552</u>
Relinquished by:							
Received by:							

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 11, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 9, 2021 from the TOC Seattle Terminal 1, F&BI 108129 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0811R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 9, 2020 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108129 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
108129 -01	CAA1A-BASE-01
108129 -02	CAA1A-BASE-03
108129 -03	CAA1A-SS-05

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/21
Date Received: 08/09/21
Project: TOC Seattle Terminal 1, F&BI 108129
Date Extracted: 08/09/21
Date Analyzed: 08/10/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
CAA1A-BASE-01 108129-01 1/50	4,400	ip
CAA1A-BASE-03 108129-02	<5	101
CAA1A-SS-05 108129-03 1/10	2,700	135
Method Blank 01-1770 MB	<5	89

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/21
Date Received: 08/09/21
Project: TOC Seattle Terminal 1, F&BI 108129
Date Extracted: 08/09/21
Date Analyzed: 08/09/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA1A-BASE-01 108129-01	31,000	3,500 x	ip
CAA1A-BASE-03 108129-02	<50	<250	92
CAA1A-SS-05 108129-03	38,000	14,000 x	ip
Method Blank 01-1826 MB	<50	<250	94

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/21

Date Received: 08/09/21

Project: TOC Seattle Terminal 1, F&BI 108129

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: 108111-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	120	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/11/21

Date Received: 08/09/21

Project: TOC Seattle Terminal 1, F&BI 108129

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108113-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	94	97	73-135	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	96	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 12, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 10, 2021 from the TOC Seattle Terminal 1, F&BI 108153 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0812R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 10, 2020 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108153 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
108153 -01	CAA1B-SS-03
108153 -02	CAA1B-BASE-01
108153 -03	CAA1B-SS-02
108153 -04	CAA1B-SS-01
108153 -05	CAA1A-SS-02
108153 -06	CAA1A-BASE-02

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/12/21
Date Received: 08/10/21
Project: TOC Seattle Terminal 1, F&BI 108153
Date Extracted: 08/11/21
Date Analyzed: 08/11/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
CAA1B-SS-03 108153-01	9.7	97
CAA1B-BASE-01 108153-02	13	100
CAA1B-SS-02 108153-03 1/20	2,600	ip
CAA1B-SS-01 108153-04	8.0	100
CAA1A-SS-02 108153-05 1/5	330	114
CAA1A-BASE-02 108153-06 1/10	1,100	ip
Method Blank 01-1773 MB	<5	81

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/12/21
Date Received: 08/10/21
Project: TOC Seattle Terminal 1, F&BI 108153
Date Extracted: 08/11/21
Date Analyzed: 08/11/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA1B-SS-03 108153-01	<50	<250	96
CAA1B-BASE-01 108153-02	<50	<250	83
CAA1B-SS-02 108153-03	30,000	1,400 x	ip
CAA1B-SS-01 108153-04	<50	<250	96
CAA1A-SS-02 108153-05	3,000	<250	94
CAA1A-BASE-02 108153-06	560	<250	96
Method Blank 01-1831 MB2	<50	<250	93

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/12/21

Date Received: 08/10/21

Project: TOC Seattle Terminal 1, F&BI 108153

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 108153-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	9.7	13	29 a

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	120	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/12/21

Date Received: 08/10/21

Project: TOC Seattle Terminal 1, F&BI 108153

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108137-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	520	91	96	73-135	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	96	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

108153

SAMPLE CHAIN OF CUSTODY ME 8/10/21

VS11002

Page # 1 of 1

Report To R. Jones, J. Stevens, K. Hempel

Company TEC Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones

PROJECT NAME Rusty Jones

PO # _____

REMARKS TEC Seattle Terminal 1

INVOICE TO _____

Project specific RIS? - Yes / No

TURNAROUND TIME

Standard turnaround

RUSH 24-Hour

Rush charges authorized by: _____

SAMPLE DISPOSAL

Archive samples

Other _____

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes	
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082		
CA1B-SS-03	G1A-E	8.10.2021	1225	SOIL	5	X	X							
CA1B-BASE-01	09		1235		5	X	X							
CA1B-SS-02	03		1245		5	X	X							
CA1B-SS-01	04		1250		5	X	X							
CA1A-SS-02	05		1500		5	X	X							
CA1A-BASE-02	06		1450		5	X	X							

Samples received at 4:00

MP

Friedman & Bruya, Inc.

3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
<u>R. Jones</u>	<u>Rusty Jones</u>	<u>Crete Consulting</u>	<u>8.10.21</u>	<u>15:21</u>
<u>WV</u>	<u>Khori Horvath</u>	<u>EBF</u>	<u>8.10.21</u>	<u>15:21</u>
Received by:				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 13, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 11, 2021 from the TOC Seattle Terminal 1, F&BI 108177 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0813R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 11, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108177 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
108177 -01	CAA1A-SS-06
108177 -02	CAA1A-SS-01

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/13/21
Date Received: 08/11/21
Project: TOC Seattle Terminal 1, F&BI 108177
Date Extracted: 08/12/21
Date Analyzed: 08/12/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
CAA1A-SS-06 108177-01	<5	77
CAA1A-SS-01 108177-02	120	118
Method Blank 01-1775 MB	<5	88

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/13/21
Date Received: 08/11/21
Project: TOC Seattle Terminal 1, F&BI 108177
Date Extracted: 08/12/21
Date Analyzed: 08/12/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA1A-SS-06 108177-01	<50	<250	89
CAA1A-SS-01 108177-02	330	<250	92
Method Blank 01-1872 MB2	<50	<250	86

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/13/21

Date Received: 08/11/21

Project: TOC Seattle Terminal 1, F&BI 108177

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: 108177-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	110	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/13/21

Date Received: 08/11/21

Project: TOC Seattle Terminal 1, F&BI 108177

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108164-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	100	98	64-133	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	100	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

108177

SAMPLE CHAIN OF CUSTODY

68-11-21

Page # 1 of 1

01/05/1

Report To R. Jones, J. Stevens, K. Hampe

Company Top Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) <u>Rusty Jones</u>	PROJECT NAME <u>Top Seattle Terminal 1</u>	PO #
REMARKS	INVOICE TO	
Project specific PLS? - Yes / No		

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes	
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082		
CAKX-SS-06	01A-E	8.11.2021	1415	SOIL	5	X	X							
CAKX-SS-01	0X L	8.11.2021	1420	SOIL	5	X	X							

Samples received at 400

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by:	<u>R. Jones</u>	<u>Rusty Jones</u>		<u>CRETE Consulting</u>		<u>8.11.2021</u>	<u>1554</u>
Received by:	<u>[Signature]</u>	<u>VINVA</u>		<u>FB</u>		<u>8/11/21</u>	<u>1554</u>
Relinquished by:							
Received by:							

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 16, 2021

Jamie Stevens, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Ms Stevens:

Included are the results from the testing of material submitted on August 12, 2021 from the TOC Seattle Terminal 1, F&BI 108202 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0816R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 12, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108202 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
108202 -01	CAA1B-SS-04
108202 -02	CAA1B-SS-05

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/16/21
Date Received: 08/12/21
Project: TOC Seattle Terminal 1, F&BI 108202
Date Extracted: 08/12/21
Date Analyzed: 08/13/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
CAA1B-SS-04 108202-01 1/50	6,900	ip
CAA1B-SS-05 108202-02 1/100	3,500	113
Method Blank 01-1775 MB	<5	88

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/16/21
Date Received: 08/12/21
Project: TOC Seattle Terminal 1, F&BI 108202
Date Extracted: 08/13/21
Date Analyzed: 08/13/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA1B-SS-04 108202-01	9,800	500 x	98
CAA1B-SS-05 108202-02	13,000	890 x	144
Method Blank 01-1877 MB	<50	<250	94

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/16/21

Date Received: 08/12/21

Project: TOC Seattle Terminal 1, F&BI 108202

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 108177-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	110	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/16/21

Date Received: 08/12/21

Project: TOC Seattle Terminal 1, F&BI 108202

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108202-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	8,200	132 b	79 b	73-135	50 b

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	96	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

168202

SAMPLE CHAIN OF CUSTODY ME 8/12/21

VS-D1 201 Page # 1 of 1

Report To: J. Stevens, R. Jones, K. Hempel

Company: TOC Seattle Terminal 1

Address: _____

City, State, ZIP: _____

Phone: _____ Email: _____

SAMPLERS (signature) R. Jones
PROJECT NAME Ruskys Jones
PO #

REMARKS TOC Seattle Terminal 1

INVOICE TO
Project specific RIs? - Yes / No

TURNAROUND TIME
Standard turnaround
RUSH 24-Hours
Rush charges authorized by:

SAMPLE DISPOSAL
 Archive samples
 Other
Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes						
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082							
CAA1B-SS-04	01A9E	8/12/21	1340	SOIL	5	X	X												
CAA1B-SS-05	02 ↓	↓	1355	↓	5	X	X												

Samples received at 4 °C

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: R. Jones		Ruskys Jones		CRETE Consulting		8/12/21	15:05
Received by: Will Radford		Will Radford		F&B I		8/12/21	15:05
Relinquished by:							
Received by:							

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 18, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 16, 2021 from the TOC Seattle Terminal 1, F&BI 108241 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: Time Oil Terminal 1
CTC0818R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 16, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108241 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
108241 -01	CAA1B-SS-06
108241 -02	CAA1B-SS-07

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/18/21
Date Received: 08/16/21
Project: TOC Seattle Terminal 1, F&BI 108241
Date Extracted: 08/16/21
Date Analyzed: 08/17/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 58-139)
CAA1B-SS-06 108241-01 1/100	5,200	105
Method Blank 01-1779 MB	<5	82

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/18/21
Date Received: 08/16/21
Project: TOC Seattle Terminal 1, F&BI 108241
Date Extracted: 08/17/21
Date Analyzed: 08/17/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA1B-SS-06 108241-01	8,100	350 x	92
Method Blank 01-1887 MB2	<50	<250	89

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/18/21

Date Received: 08/16/21

Project: TOC Seattle Terminal 1, F&BI 108241

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: 108221-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	105	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/18/21

Date Received: 08/16/21

Project: TOC Seattle Terminal 1, F&BI 108241

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108228-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	102	103	73-135	1

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	100	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

108241

SAMPLE CHAIN OF CUSTODY

ME 8/16/21

V5-D4 1 of 1

Report To R. Jones, J. Stevens, K. Hempel

Company TOC Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones

Rusty Jones

PROJECT NAME TOC Seattle Terminal 1

PO # _____

REMARKS

INVOICE TO

Project specific RLS? - Yes / No

TURNAROUND TIME

Standard turnaround _____

RUSH 24 Hour

Rush charges authorized by: _____

SAMPLE DISPOSAL

Archive samples

Other _____

Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	Notes
CA113-95-06	QA-E	8.16.2021	1115	soil	5	X	X						Hold
CA113-95-07	QA-E		1125										

Samples received at 4 °C

SIGNATURE

PRINT NAME

COMPANY

DATE

TIME

Relinquished by: R. Jones

Rusty Jones

CEETE Consulting

8.16.21

1152

Received by: [Signature]

Michael Calk

TIBm

8/16/21

1152

Seattle, WA 98119-2029

3012 16th Avenue West

Friedman & Bruja, Inc.

Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 23, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 18, 2021 from the TOC Seattle Terminal 1, F&BI 108279 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC0823R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 18, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108279 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
108279 -01	CAA1B-SS-08
108279 -02	CAA1B-SS-09

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/23/21
Date Received: 08/18/21
Project: TOC Seattle Terminal 1, F&BI 108279
Date Extracted: 08/18/21
Date Analyzed: 08/18/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 58-139)
CAA1B-SS-08 108279-01 1/20	4,500	ip
Method Blank 01-1781 MB	<5	91

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/23/21
Date Received: 08/18/21
Project: TOC Seattle Terminal 1, F&BI 108279
Date Extracted: 08/18/21
Date Analyzed: 08/18/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA1B-SS-08 108279-01	8,900	320 x	90
Method Blank 01-1892 MB	<50	<250	87

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/23/21

Date Received: 08/18/21

Project: TOC Seattle Terminal 1, F&BI 108279

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 108249-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	99	14	150 a

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	110	61-153

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/23/21

Date Received: 08/18/21

Project: TOC Seattle Terminal 1, F&BI 108279

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108272-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	5,100	105	100	64-133	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	96	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

ME 8/18/21

DS1 VS-D4

108279

Report To R. Jones, J. Stevens, K. Hempel

Company Tec Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones

PROJECT NAME Rusty Jones

Tec Seattle Terminal 1

PO # _____

REMARKS

INVOICE TO

Project specific RIs? - Yes / No

ANALYSES REQUESTED

TURNAROUND TIME
 Standard turnaround
 RUSH 544E BY
Rush charges authorized by: _____

SAMPLE DISPOSAL
 Archive samples
 Other _____
Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED								Notes				
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082						
CALB-SS-08	01 AAE	8.18.21	1100	Soil	5	X	Y											
CALB-SS-09	02 J		1110		5													Head

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by:	<u>R. Jones</u>	<u>Rusty Jones</u>		<u>CRETE CONSULTING</u>		<u>8.18.21</u>	<u>11:27</u>
Received by:	<u>Will Raddford</u>	<u>Will Raddford</u>		<u>FI B I</u>		<u>8.18.21</u>	<u>11:27</u>
Relinquished by:							
Received by:							

Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

August 30, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on August 26, 2021 from the TOC Seattle Terminal 1, F&BI 108430 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
NAACTC0830R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on August 26, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 108430 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID

108430 -01

Crete Consulting

CAA1B-BASE-02

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/30/21
Date Received: 08/26/21
Project: TOC Seattle Terminal 1, F&BI 108430
Date Extracted: 08/27/21
Date Analyzed: 08/27/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 58-139)
CAA1B-BASE-02 108430-01 1/5	57	99
Method Blank 01-1913 MB	<5	93

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/30/21
Date Received: 08/26/21
Project: TOC Seattle Terminal 1, F&BI 108430
Date Extracted: 08/27/21
Date Analyzed: 08/27/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA1B-BASE-02 108430-01	<50	<250	94
Method Blank 01-2033 MB	<50	<250	95

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/30/21

Date Received: 08/26/21

Project: TOC Seattle Terminal 1, F&BI 108430

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Gasoline	mg/kg (ppm)	20	130	120	61-153	8

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 08/30/21

Date Received: 08/26/21

Project: TOC Seattle Terminal 1, F&BI 108430

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 108430-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	107	109	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	106	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

108430

SAMPLE CHAIN OF CUSTODY

ME 08/26/21

Page # 1 of 1

Report To R. Jones / J. Stevens / K. Hempel

Company Top Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone 206 713 4372 Email _____

SAMPLERS (signature) <u>[Signature]</u>		PROJECT NAME <u>Top Seattle Terminal 1</u>	PO #
REMARKS		INVOICE TO	
Project specific RIs? - Yes / No			

TURNAROUND TIME	<input type="checkbox"/> Standard turnaround <input checked="" type="checkbox"/> RUSH <u>Ken</u> Rush charges authorized by:
SAMPLE DISPOSAL	<input type="checkbox"/> Archive samples <input type="checkbox"/> Other Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes						
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082							
CLAB-25410 02	OIA.E	8/26/2021	1500	Soil		X	X												
<u>per RST</u>																			
<u>0/17/21ME</u>																			

Samples received at 4 °C

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
<u>[Signature]</u>	<u>[Name]</u>	<u>CRETE CONSULTING</u>	<u>8/24/21</u>	<u>1500</u>
Relinquished by:				
Received by:	<u>[Signature]</u>	<u>[Name]</u>	<u>8/26/21</u>	<u>1500</u>
Relinquished by:				
Received by:				

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 15, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on September 13, 2021 from the TOC Seattle Terminal 1, F&BI 109204 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC0915R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 13, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 109204 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
109204 -01	CAA6B-SS-02
109204 -02	CAA6B-BASE-01

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/15/21
Date Received: 09/13/21
Project: TOC Seattle Terminal 1, F&BI 109204
Date Extracted: 09/13/21
Date Analyzed: 09/13/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Gasoline Surrogate</u> <u>Range (% Recovery)</u> (Limit 50-132)	
CAA6B-SS-02 109204-01	<0.02	<5	77
CAA6B-BASE-01 109204-02	<0.02	91	85
Method Blank 01-1936 MB	<0.02	<5	76

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/15/21
Date Received: 09/13/21
Project: TOC Seattle Terminal 1, F&BI 109204
Date Extracted: 09/13/21
Date Analyzed: 09/13/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA6B-SS-02 109204-01	<50	<250	94
CAA6B-BASE-01 109204-02	290 x	<250	95
Method Blank 01-2095 MB	<50	<250	102

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/15/21

Date Received: 09/13/21

Project: TOC Seattle Terminal 1, F&BI 109204

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING EPA METHOD 8021B AND NWTPH-Gx**

Laboratory Code: 109204-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	74	66-121
Gasoline	mg/kg (ppm)	20	90	61-153

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/15/21

Date Received: 09/13/21

Project: TOC Seattle Terminal 1, F&BI 109204

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 109184-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	122	120	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	130	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

109204

SAMPLE CHAIN OF CUSTODY

ME 09-13-2021 US1/401

Page # 1 of 1

Report To R. Jones, J. Stevens, K. Hempel

Company Top Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones

PROJECT NAME Rushy Jones

Top Seattle Terminal 1

PO #

REMARKS

INVOICE TO

Project specific RIs? - Yes / No

ANALYSES REQUESTED

TURNAROUND TIME

Standard turnaround

RUSH SAME DAY

Rush charges authorized by: _____

SAMPLE DISPOSAL

Archive samples

Other _____

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED								Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082				
CA16B-SS-02	01A-E	9.13.21	1000	soil	5	X	X	X								Benzene only
CA16B-BASE-01	02	✓	1015	↓	5	X	X	X								Benzene only

Samples received at 4 00

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
<u>R. Jones</u>	<u>Rushy Jones</u>	<u>CREATE CONSULTING</u>	<u>9.13.21</u>	<u>1120</u>
<u>nm/vj</u>	<u>Dkran</u>	<u>FEBI</u>	<u>9-13-21</u>	<u>1120</u>

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 16, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on September 13, 2021 from the TOC Seattle Terminal 1, F&BI 109205 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC0916R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 13, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 109205 project. Samples were logged in under the laboratory ID's listed below.

Laboratory ID

109205 -01

Crete Consulting

CAA6B-SS-01

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/16/21
Date Received: 09/13/21
Project: TOC Seattle Terminal 1, F&BI 109205
Date Extracted: 09/13/21
Date Analyzed: 09/14/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE AND TPH AS GASOLINE
USING METHODS 8021B AND NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Benzene</u>	<u>Gasoline</u> <u>Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
CAA6B-SS-01 109205-01	<0.02	<5	94
Method Blank 01-1935 MB	<0.02	<5	87

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/16/21
Date Received: 09/13/21
Project: TOC Seattle Terminal 1, F&BI 109205
Date Extracted: 09/13/21
Date Analyzed: 09/13/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA6B-SS-01 109205-01	<50	<250	96
Method Blank 01-2095 MB	<50	<250	102

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/16/21

Date Received: 09/13/21

Project: TOC Seattle Terminal 1, F&BI 109205

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR BENZENE
AND TPH AS GASOLINE
USING METHOD 8021B AND NWTPH-G_x**

Laboratory Code: 109160-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Benzene	mg/kg (ppm)	<0.02	<0.02	nm
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Benzene	mg/kg (ppm)	0.5	99	69-120
Gasoline	mg/kg (ppm)	20	95	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/16/21

Date Received: 09/13/21

Project: TOC Seattle Terminal 1, F&BI 109205

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 109184-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	122	120	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	130	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

109 205

SAMPLE CHAIN OF CUSTODY

ME 09-13-21

US / 921

SAMPLERS (signature)

Page # 1 of 1

Report To R. Jones, J. Stevens, K. Hempel

PROJECT NAME

PO #

Company Tel Seattle Terminal 1

Tel Seattle Terminal 1

TURNAROUND TIME
 Standard turnaround
 RUSH 2-day
Rush charges authorized by: _____

Address _____

REMARKS

SAMPLE DISPOSAL
 Archive samples
 Other _____

City, State, ZIP _____

Project specific PIs? - Yes / No

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082			
CALOB-SS-01	01A-E	9.13.21	1030	SOIL	5	X	X	X							Benzene only

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>R. Jones</u>	<u>Rusty Jones</u>					9.13.21	1126
Received by: <u>M. Stevens</u>	<u>Megan Pham</u>					9-13-21	1126
Relinquished by:							
Received by:							

Friedman & Bruya, Inc.

3012 16th Avenue West

Seattle, WA 98119-2029

Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 15, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on September 13, 2021 from the TOC Seattle Terminal 1, F&BI 109218 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC0915R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 13, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 109218 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
109218 -01	CAA6B-BASE-02
109218 -02	CAA6B-BASE-03
109218 -03	CAA6B-BASE-04

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/15/21
Date Received: 09/13/21
Project: TOC Seattle Terminal 1, F&BI 109218
Date Extracted: 09/12/21
Date Analyzed: 09/12/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 58-139)
CAA6B-BASE-02 109218-01	24	102
Method Blank 01-1936 MB	<5	90

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/15/21

Date Received: 09/13/21

Project: TOC Seattle Terminal 1, F&BI 109218

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 109204-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	90	61-153

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

1092218

SAMPLE CHAIN OF CUSTODY

ME 09-13-21

151

Report To R. Jones, J. Stevens, K. Hempel

Company TEC Seattle Terminal I

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) Rusty Jones

PROJECT NAME TEC Seattle Terminal I

PO # _____

REMARKS _____

INVOICE TO _____

Protect specific RIAs? - Yes / No _____

TURNAROUND TIME CI

Standard turnaround

RUSH First AM per RT 9/13/21

Rush charges authorized by: me

SAMPLE DISPOSAL

Archive samples

Other _____

Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes										
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082											
CAKGB-BASE-02	01A-E	9.13.21		Soil	5		X																
CAKGB-BASE-03	02	↓		↓	5																HOLD		
CAKGB-BASE-04	03	↓		↓	5																	HOLD	

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: <u>R. Jones</u>	<u>Rusty Jones</u>	<u>CRETE CONSULTING</u>	<u>9.13.21</u>	<u>1607</u>
Received by: <u>[Signature]</u>	<u>Liz Webber - Bruya</u>	<u>FiB</u>	<u>9/13/21</u>	<u>1607</u>
Relinquished by: _____	_____	_____	_____	_____
Received by: _____	_____	_____	_____	_____

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

September 17, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on September 13, 2021 from the TOC Seattle Terminal 1, F&BI 109219 project. There are 4 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC0917R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on September 13, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 109219 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
109219 -01	Northeast
109219 -02	South

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/17/21
Date Received: 09/13/21
Project: TOC Seattle Terminal 1, F&BI 109219
Date Extracted: 09/15/21
Date Analyzed: 09/15/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
Northeast 109219-01	<50	<250	97
South 109219-02	<50	<250	102
Method Blank 01-2108 MB	<50	<250	98

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 09/17/21

Date Received: 09/13/21

Project: TOC Seattle Terminal 1, F&BI 109219

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-Dx**

Laboratory Code: 109219-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	118	124	73-135	5

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	118	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

109219

SAMPLE CHAIN OF CUSTODY

04-13-21

A01

Page # 1 of 1

Report To R. Jones, J. Stevens, K. Hempel

Company TOP Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones
PROJECT NAME Rusty Jones

PO # _____

REMARKS TOP Seattle Terminal 1

INVOICE TO _____

Project specific RIs? - Yes / No

TURNAROUND TIME
 Standard turnaround
 RUSH
Rush charges authorized by: _____

SAMPLE DISPOSAL
 Archive samples
 Other _____
Default: Dispose after 30 days

ANALYSES REQUESTED

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes					
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082						
Northwest	01	09.13.21	0740	soil	1	X												
South	02	↓	0745	soil	1	X												

Samples received at 4 °C

Friedman & Bruya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>R. Jones</u>		<u>Rusty Jones</u>		<u>CRTE CONSULTING</u>		<u>9.13.21</u>	<u>1607</u>
Received by: <u>Liz Webber</u>		<u>Liz Webber-Bruya</u>		<u>F&B</u>		<u>9/13/21</u>	<u>1607</u>
Relinquished by: _____							
Received by: _____							

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 7, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on October 4, 2021 from the TOC Seattle Terminal 1, F&BI 110063 project. There are 8 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC1007R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on October 4, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 110063 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
110063 -01	CAA2B-Base-04
110063 -02	CAA2B-Base-04-0.5
110063 -03	CAA2B-Base-04-1

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/07/21

Date Received: 10/04/21

Project: TOC Seattle Terminal 1, F&BI 110063

Date Extracted: 10/05/21 and 10/06/21

Date Analyzed: 10/05/21 and 10/06/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 58-139)
CAA2B-Base-04 110063-01 1/10	2,100	ip
CAA2B-Base-04-0.5 110063-02 1/10	410	108
Method Blank 01-1971 MB	<5	98
Method Blank 01-1975 MB	<5	87

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/07/21

Date Received: 10/04/21

Project: TOC Seattle Terminal 1, F&BI 110063

Date Extracted: 10/05/21 and 10/06/21

Date Analyzed: 10/05/21 and 10/06/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA2B-Base-04 110063-01	11,000	<250	ip
CAA2B-Base-04-0.5 110063-02	3,400	<250	98
Method Blank 01-2272 MB	<50	<250	89
Method Blank 01-2285 MB	<50	<250	96

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/07/21

Date Received: 10/04/21

Project: TOC Seattle Terminal 1, F&BI 110063

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 110053-02 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	100	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/07/21

Date Received: 10/04/21

Project: TOC Seattle Terminal 1, F&BI 110063

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 110058-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	56	95	97	64-133	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	88	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/07/21

Date Received: 10/04/21

Project: TOC Seattle Terminal 1, F&BI 110063

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-Gx**

Laboratory Code: 110080-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	95	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/07/21

Date Received: 10/04/21

Project: TOC Seattle Terminal 1, F&BI 110063

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 110063-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	9,400	97	89	73-135	9

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	100	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

110063

SAMPLE CHAIN OF CUSTODY

ME 10/4/21

Page # 011 of 1 vs 1

Report To R. Jones, J. Stevens, K. Heppel

Company TEL Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) <u>Rusty Jones</u>	PROJECT NAME <u>TEL Seattle Terminal 1</u>	PO # _____
REMARKS	INVOICE TO	

TURNAROUND TIME

Standard Turnaround

RUSH 24 Hour

Rush charges authorized by: _____

SAMPLE DISPOSAL

Dispose after 30 days

Archive Samples

Other _____

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes	
						TPH-HCID	TPH-Diesel	TPH-Gasoline	BTEX by 8021B	VOCs by 8260C	SVOCs by 8270D	PAHs 8270D SIM		
CAAZB-BA5E-04	01 A-E	10/4/2021	1355	SOIL	5	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>							Hold
CAAZB-BA5E-04-0.5	02 1		1400		5	X	X							HOLD RT
CAAZB-BA5E-04-1	03 1		1410		5									HOLD

Samples received at 400

24 H-TAT per 05 10/12/21 Notes MLE

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: <u>R. Jones</u>	<u>Rusty Jones</u>	<u>CRETE Consulting</u>	<u>10/4/2021</u>	<u>1501</u>
Received by: <u>[Signature]</u>	<u>Phan Phan</u>	<u>FEBI</u>	<u>10/4/21</u>	<u>1501</u>
Relinquished by: _____				
Received by: _____				

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 11, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on October 6, 2021 from the TOC Seattle Terminal 1, F&BI 110112 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC1011R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on October 6, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 110112 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
110112 -01	CAA2B-BASE-03
110112 -02	CAA2B-BASE-03-0.5
110112 -03	CAA2B-BASE-03-1

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/11/21
Date Received: 10/06/21
Project: TOC Seattle Terminal 1, F&BI 110112
Date Extracted: 10/06/21
Date Analyzed: 10/07/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
CAA2B-BASE-03 110112-01	48	93
Method Blank 01-1973 MB	<5	97

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/11/21
Date Received: 10/06/21
Project: TOC Seattle Terminal 1, F&BI 110112
Date Extracted: 10/06/21
Date Analyzed: 10/06/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 56-165)
CAA2B-BASE-03 110112-01	120	<250	84
Method Blank 01-2284 MB	<50	<250	87

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/11/21

Date Received: 10/06/21

Project: TOC Seattle Terminal 1, F&BI 110112

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Gasoline	mg/kg (ppm)	20	100	95	60-120	5

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/11/21

Date Received: 10/06/21

Project: TOC Seattle Terminal 1, F&BI 110112

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 110082-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	90	92	63-146	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	88	79-144

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

110112

SAMPLE CHAIN OF CUSTODY ME 10/06/21

COI 1 VS 1

Report To: R. Jones, J. Stevens, K. Hempel
 Company: Tec Seattle Terminal 1
 Address: _____
 City, State, ZIP: _____
 Phone: _____ Email: _____

SAMPLERS (signature) R. Jones
 PROJECT NAME: Rusty Jones
 PROJECT NAME: Tec Seattle Terminal 1
 PO #: _____
 REMARKS: _____
 INVOICE TO: _____
 Project specific RI's? - Yes / No

Page # _____ of _____
 TURNAROUND TIME
 Standard turnaround
 RUSH 24-Hour
 Rush charges authorized by: _____
 SAMPLE DISPOSAL
 Archive samples
 Other _____
 Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes				
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082					
CAZB-BASE-03	01A-E	10.6.21	0945	Soil	5	X	X										
CAZB-BASE-03-0.5	02	↓	0855	↓	5												HELD
CAZB-BASE-03-1	03	↓	0905	↓	5												HELD

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: <u>R. Jones</u>	<u>Rusty Jones</u>	<u>CECE Consulting</u>	<u>10/6/21</u>	<u>1003</u>
Received by: <u>M. Jones</u>	<u>M. Jones</u>	<u>FEBI</u>	<u>10/6/21</u>	<u>1003</u>
Relinquished by: _____	_____	_____	_____	_____
Received by: _____	_____	_____	_____	_____

Samples received at 4 o'clock

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 11, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on October 6, 2021 from the TOC Seattle Terminal 1, F&BI 110129 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC1011R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on October 6, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 110129 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
110129 -01	CAA2B-Base-02
110129 -02	CAA2B-Base-02-0.5
110129 -03	CAA2B-Base-02-0.7

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/11/21
Date Received: 10/06/21
Project: TOC Seattle Terminal 1, F&BI 110129
Date Extracted: 10/07/21
Date Analyzed: 10/07/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 50-150)
CAA2B-Base-02 110129-01 1/5	570	ip
Method Blank 01-2289 MB2	<5	101

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/11/21
Date Received: 10/06/21
Project: TOC Seattle Terminal 1, F&BI 110129
Date Extracted: 10/07/21
Date Analyzed: 10/07/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA2B-Base-02 110129-01	1,700	<250	98
Method Blank 01-2288 MB2	<50	<250	97

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/11/21

Date Received: 10/06/21

Project: TOC Seattle Terminal 1, F&BI 110129

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: 110119-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	110	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/11/21

Date Received: 10/06/21

Project: TOC Seattle Terminal 1, F&BI 110129

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 110042-46 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	64	91	99	64-133	8

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	90	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

10-06-24

110129

Page # 1 of 1

Report To R. Towns, J. Stevens, K. Hempel

Company Top Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) <u>Rusty Jones</u>	R. Towns
PROJECT NAME <u>Top Seattle Terminal 1</u>	PO #
REMARKS	INVOICE TO
Project specific RI's? - Yes / No	

<input type="checkbox"/> Standard turnaround <input checked="" type="checkbox"/> RUSH Results by <u>10/17/24</u> Rush charges authorized by: _____	SAMPLE DISPOSAL <input type="checkbox"/> Archive samples <input type="checkbox"/> Other _____ Default: Dispose after 30 days
--	---

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED								Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082				
CAAZB-BASE-02	D1A-R	10.6.2021	1535	SOL	5	X	X									
CAAZB-RASE-02-0.5	081	↓	1545	↓	5											Held
CAAZB-BASE-02-0.7	083	↓	1555	↓	5											Held

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
Relinquished by: <u>R. Towns</u>		<u>Rusty Jones</u>		<u>CEETE Consulting</u>		<u>10.6.21</u>	<u>1623</u>
Received by: <u>[Signature]</u>		<u>Beric Johnson</u>		<u>T-B</u>		<u>10/6/21</u>	<u>1621</u>
Relinquished by:							
Received by:							

Friedman & Bruya, Inc.
 3012 1st Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

Samples received at 4 00

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

October 14, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on October 11, 2021 from the TOC Seattle Terminal 1, F&BI 110205 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC1014R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on October 11, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 110205 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
110205 -01	CAA2B-BASE-01
110205 -02	CAA2B-BASE-01-0.5

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/14/21
Date Received: 10/11/21
Project: TOC Seattle Terminal 1, F&BI 110205
Date Extracted: 10/12/21
Date Analyzed: 10/12/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 58-139)
CAA2B-BASE-01 110205-01	54	118
Method Blank 01-2297 MB	<5	101

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/14/21
Date Received: 10/11/21
Project: TOC Seattle Terminal 1, F&BI 110205
Date Extracted: 10/11/21
Date Analyzed: 10/11/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 48-168)
CAA2B-BASE-01 110205-01	250	<250	105
Method Blank 01-2346 MB	<50	<250	93

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/14/21

Date Received: 10/11/21

Project: TOC Seattle Terminal 1, F&BI 110205

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: 110202-01 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	95	61-153

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 10/14/21

Date Received: 10/11/21

Project: TOC Seattle Terminal 1, F&BI 110205

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 110180-05 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	102	104	73-135	2

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	102	74-139

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

SAMPLE CHAIN OF CUSTODY

W 10-11-21

VS1

Page # 1 of 1

110205
Report To R. Jones / Rusty Jones / K. Hempel

Company TOC Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) Rusty Jones / R. Jones
 PROJECT NAME TOC Seattle Terminal 1
 PO # _____
 REMARKS _____
 INVOICE TO _____
 Project specific RIS? - Yes / No _____

TURNAROUND TIME _____
 Standard turnaround
 RUSH Results by 10/11/21
 Rush charges authorized by: _____
 SAMPLE DISPOSAL
 Archive samples
 Other
 Default: Dispose after 30 days

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	NWTPH-HCID	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082			
CAAB-BASE-01	01	10/11/2021	1315	Soil	5	X	X								
CAAB-BASE-01-0.5	02	↓	1325	↓	5										Hold

Samples received at 5 °C

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

SIGNATURE		PRINT NAME		COMPANY		DATE	TIME
<u>Rusty Jones</u>	<u>R. Jones</u>	<u>Rusty Jones</u>	<u>R. Jones</u>	<u>AFE Consulting</u>	<u>AFE</u>	<u>10/11/21</u>	<u>1408</u>
<u>AWW</u>	<u>AWW</u>	<u>AWW</u>	<u>AWW</u>	<u>AWW</u>	<u>AWW</u>	<u>10/11/21</u>	<u>1408</u>
Received by:		Received by:		Received by:			

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

November 12, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on November 9, 2021 from the TOC Seattle Terminal 1, F&BI 111149 project. There are 10 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC1112R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 9, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 111149 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
111149 -01	CAA3-SS-04
111149 -02	CAA3-BASE-03

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/12/21
Date Received: 11/09/21
Project: TOC Seattle Terminal 1, F&BI 111149
Date Extracted: 11/10/21
Date Analyzed: 11/10/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 58-139)
CAA3-SS-04 111149-01	21	108
CAA3-BASE-03 111149-02	<5	102
Method Blank 01-2534 MB	<5	100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/12/21
Date Received: 11/09/21
Project: TOC Seattle Terminal 1, F&BI 111149
Date Extracted: 11/10/21
Date Analyzed: 11/10/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-Dx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA3-SS-04 111149-01	67 x	<250	91
CAA3-BASE-03 111149-02	<50	<250	91
Method Blank 01-2611 MB2	<50	<250	91

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	CAA3-SS-04	Client:	Crete Consulting
Date Received:	11/09/21	Project:	TOC Seattle Terminal 1, F&BI 111149
Date Extracted:	11/09/21	Lab ID:	111149-01
Date Analyzed:	11/10/21	Data File:	111011.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	101	90	109
Toluene-d8	103	89	112
4-Bromofluorobenzene	99	84	115

Compounds:	Concentration mg/kg (ppm)
Trichloroethene	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	CAA3-BASE-03	Client:	Crete Consulting
Date Received:	11/09/21	Project:	TOC Seattle Terminal 1, F&BI 111149
Date Extracted:	11/09/21	Lab ID:	111149-02
Date Analyzed:	11/10/21	Data File:	111012.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	98	90	109
Toluene-d8	106	89	112
4-Bromofluorobenzene	98	84	115

Compounds:	Concentration mg/kg (ppm)
Trichloroethene	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	TOC Seattle Terminal 1, F&BI 111149
Date Extracted:	11/09/21	Lab ID:	01-2571 mb
Date Analyzed:	11/09/21	Data File:	110919.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	93	90	109
Toluene-d8	104	89	112
4-Bromofluorobenzene	98	84	115

Compounds:	Concentration mg/kg (ppm)
Trichloroethene	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/12/21

Date Received: 11/09/21

Project: TOC Seattle Terminal 1, F&BI 111149

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: 111177-03 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	105	61-153

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/12/21

Date Received: 11/09/21

Project: TOC Seattle Terminal 1, F&BI 111149

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 111155-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	8,000	76	65	64-133	16

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	100	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/12/21

Date Received: 11/09/21

Project: TOC Seattle Terminal 1, F&BI 111149

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR VOLATILES BY EPA METHOD 8260D**

Laboratory Code: 111035-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	mg/kg (ppm)	1	<0.02	77	75	21-139	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Trichloroethene	mg/kg (ppm)	1	101	63-121

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

11149

SAMPLE CHAIN OF CUSTODY

ME 11-09-21 US1/AD1
Page # 1 of 1

Report To R. Jones / I. Stevens / K. Hempel

Company Top Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones
PROJECT NAME Fusty Jones
PO # _____
REMARKS Top Seattle Terminal 1

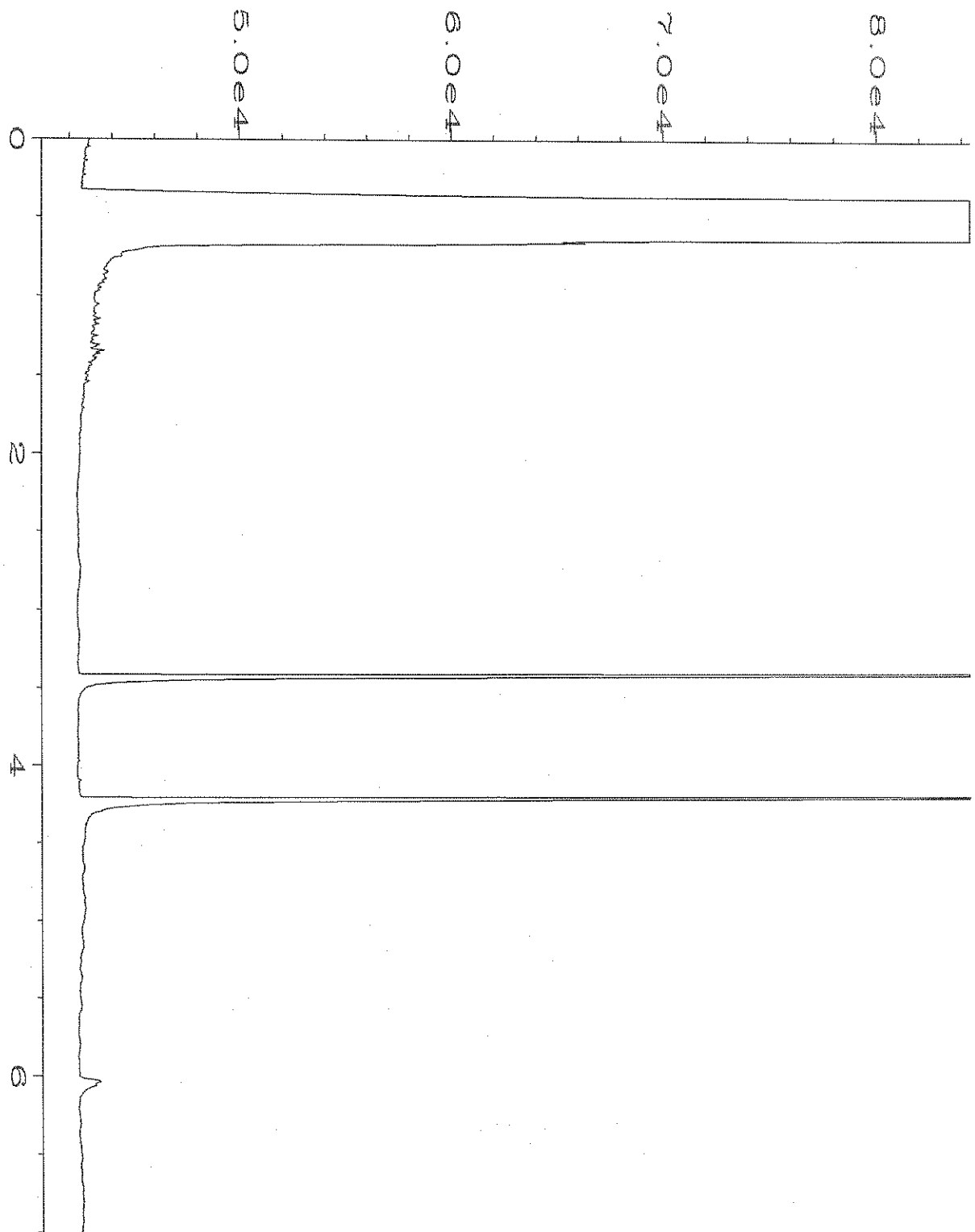
Project Specific RIs - Yes / No _____
INVOICE TO _____

TURNAROUND TIME
 Standard Turnaround
 RUSH 24-Hour
Rush charges authorized by: _____
SAMPLE DISPOSAL
 Dispose after 30 days
 Archive Samples
 Other _____

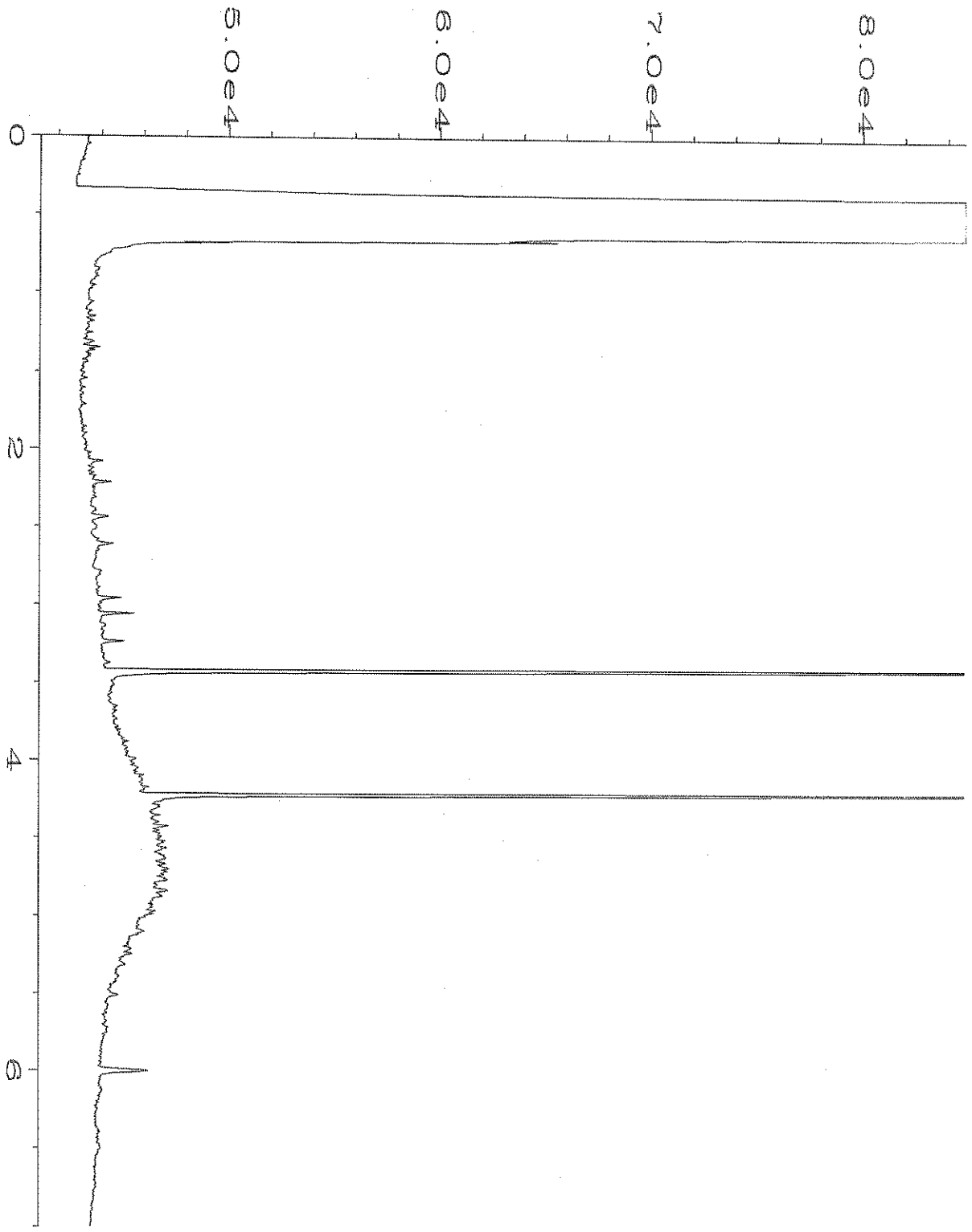
Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED										Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	TCE						
CM3-88-04	01 A-I	11/9/2021	1010	SOIL	9	X	X							X				
CM3-BASE-03	02 A-I	↓	1020	↓	9	X	X											

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Reinquired by: <u>R. Jones</u>	<u>Fusty Jones</u>	<u>ARTE CONSULTING</u>	<u>11-9-21</u>	<u>1113</u>
Received by: <u>mhan phan</u>	<u>Mhan Phan</u>	<u>FBI</u>	<u>11-4-21</u>	<u>1113</u>
Reinquired by: _____	_____	_____	_____	_____
Received by: _____	_____	_____	_____	_____

Friedman & Bryya, Inc.
3012 16th Avenue West
Seattle, WA 98119-2029
Ph. (206) 285-8282



Data File Name	: C:\HPCHEM\6\DATA\11-10-21\010F0301.D	Page Number	: 1
Operator	: TL	Vial Number	: 10
Instrument	: GC6	Injection Number	: 1
Sample Name	: 111149-02	Sequence Line	: 3
Run Time Bar Code:		Instrument Method:	DX.MTH
Acquired on	: 10 Nov 21 09:32 AM	Analysis Method	: DEFAULT.MTH
Report Created on:	10 Nov 21 10:45 AM		



Data File Name	: C:\HPCHEM\6\DATA\11-10-21\009F0301.D	Page Number	: 1
Operator	: TL	Vial Number	: 9
Instrument	: GC6	Injection Number	: 1
Sample Name	: 111149-01	Sequence Line	: 3
Run Time Bar Code:		Instrument Method:	DX.MTH
Acquired on	: 10 Nov 21 09:21 AM	Analysis Method	: DEFAULT.MTH
Report Created on:	10 Nov 21 10:45 AM		

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

November 16, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on November 10, 2021 from the TOC Seattle Terminal 1, F&BI 111201 project. There are 6 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC1116R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 10, 2020 by Friedman & Bruya, Inc. from the Crete Consulting TOC Seattle Terminal 1, F&BI 111201 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
111201 -01	CAA3-DUP-01
111201 -02	CAA3-SS-01
111201 -03	CAA3-BASE-01
111201 -04	CAA3-DUP-02
111201 -05	CAA3-SS-02
111201 -06	CAA3-BASE-02

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/16/21
Date Received: 11/10/21
Project: TOC Seattle Terminal 1, F&BI 111201
Date Extracted: 11/11/21
Date Analyzed: 11/11/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 58-139)
CAA3-DUP-01 111201-01	<5	100
CAA3-SS-01 111201-02	9.8	104
CAA3-BASE-01 111201-03	66	111
CAA3-DUP-02 111201-04	38	104
CAA3-SS-02 111201-05 1/5	220	107
CAA3-BASE-02 111201-06 1/5	130	103
Method Blank 01-2536 MB	<5	100

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/16/21
Date Received: 11/10/21
Project: TOC Seattle Terminal 1, F&BI 111201
Date Extracted: 11/11/21
Date Analyzed: 11/11/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis
Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA3-DUP-01 111201-01	<50	<250	95
CAA3-SS-01 111201-02	<50	<250	93
CAA3-BASE-01 111201-03	170	<250	96
CAA3-DUP-02 111201-04	160	<250	92
CAA3-SS-02 111201-05	92	<250	93
CAA3-BASE-02 111201-06	370	<250	92
Method Blank 01-2619 MB	<50	<250	94

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/16/21

Date Received: 11/10/21

Project: TOC Seattle Terminal 1, F&BI 111201

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Percent Recovery LCSD	Acceptance Criteria	RPD (Limit 20)
Gasoline	mg/kg (ppm)	20	105	105	61-153	0

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/16/21

Date Received: 11/10/21

Project: TOC Seattle Terminal 1, F&BI 111201

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 111201-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	<50	90	90	64-133	0

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	90	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

111901
 SAMPLE CHAIN OF CUSTODY ME 11/10/21 A03/VS2

Report To R. Jones / J. Stevens / K. Hempel

Company Tec Seattle Terminal 1

Address _____

City, State, ZIP _____

Phone _____ Email _____

SAMPLERS (signature) R. Jones
 PROJECT NAME Tec Seattle Terminal 1
 PO # _____
 REMARKS _____
 INVOICE TO _____
 Protect Specific RIs - Yes / No _____

Page # 1 of 1
 TURNAROUND TIME _____
 Standard Turnaround
 RUSH 24-Hour
 Rush charges authorized by: _____
 SAMPLE DISPOSAL
 Dispose after 30 days
 Archive Samples
 Other _____

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes		
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082				
CAA3-DUP-01	01A-E	11.10.2021	1000	Soil	5	X	X								
CAA3-SS-01	02		1100		5	X	X								
CAA3-BASE-01	03		1115		5	X	X								
CAA3-DUP-02	04		1200		5	X	X								
CAA3-SS-02	05		1400		5	X	X								
CAA3-BASE-02	06		1430		5	X	X								
Samples received at <u>14</u> °C															

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

SIGNATURE	PRINT NAME	COMPANY	DATE	TIME
Relinquished by: <u>R. Jones</u>	<u>Rusty Jones</u>	<u>CRETE Consulting</u>	<u>11.10.21</u>	<u>1458</u>
Received by: <u>[Signature]</u>	<u>Ava W. [Signature]</u>	<u>FRB</u>	<u>11/10</u>	<u>1458</u>
Relinquished by: _____	_____	_____	_____	_____
Received by: _____	_____	_____	_____	_____

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

James E. Bruya, Ph.D.
Yelena Aravkina, M.S.
Michael Erdahl, B.S.
Arina Podnozova, B.S.
Eric Young, B.S.

3012 16th Avenue West
Seattle, WA 98119-2029
(206) 285-8282
fbi@isomedia.com
www.friedmanandbruya.com

November 12, 2021

Rusty Jones, Project Manager
Crete Consulting
16300 Christensen Road, Suite 214
Tukwila, WA 98188

Dear Mr Jones:

Included are the results from the testing of material submitted on November 9, 2021 from the TOCST 1, F&BI 111170 project. There are 9 pages included in this report. Any samples that may remain are currently scheduled for disposal in 30 days, or as directed by the Chain of Custody document. If you would like us to return your samples or arrange for long term storage at our offices, please contact us as soon as possible.

We appreciate this opportunity to be of service to you and hope you will call if you should have any questions.

Sincerely,

FRIEDMAN & BRUYA, INC.



Michael Erdahl
Project Manager

Enclosures
c: TOC Seattle Terminal 1
CTC1112R.DOC

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

CASE NARRATIVE

This case narrative encompasses samples received on November 9, 2021 by Friedman & Bruya, Inc. from the Crete Consulting TOCST 1, F&BI 111170 project. Samples were logged in under the laboratory ID's listed below.

<u>Laboratory ID</u>	<u>Crete Consulting</u>
111170 -01	CAA3-SS-03

All quality control requirements were acceptable.

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/12/21
Date Received: 11/09/21
Project: TOCST 1, F&BI 111170
Date Extracted: 11/09/21
Date Analyzed: 11/10/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS GASOLINE
USING METHOD NWTPH-Gx**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Gasoline Range</u>	Surrogate (% Recovery) (Limit 58-139)
CAA3-SS-03 111170-01 1/10	270	107
Method Blank 01-2531 MB	<5	112

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/12/21
Date Received: 11/09/21
Project: TOCST 1, F&BI 111170
Date Extracted: 11/10/21
Date Analyzed: 11/10/21

**RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL AND MOTOR OIL
USING METHOD NWTPH-D_x**

Results Reported on a Dry Weight Basis

Results Reported as mg/kg (ppm)

<u>Sample ID</u> Laboratory ID	<u>Diesel Range</u> (C ₁₀ -C ₂₅)	<u>Motor Oil Range</u> (C ₂₅ -C ₃₆)	<u>Surrogate</u> <u>(% Recovery)</u> (Limit 53-144)
CAA3-SS-03 111170-01	<50	<250	94
Method Blank 01-2611 MB2	<50	<250	91

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	CAA3-SS-03	Client:	Crete Consulting
Date Received:	11/09/21	Project:	TOCST 1, F&BI 111170
Date Extracted:	11/09/21	Lab ID:	111170-01
Date Analyzed:	11/10/21	Data File:	111019.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	104	90	109
Toluene-d8	108	89	112
4-Bromofluorobenzene	100	84	115

Compounds:	Concentration mg/kg (ppm)
Trichloroethene	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Analysis For Volatile Compounds By EPA Method 8260D

Client Sample ID:	Method Blank	Client:	Crete Consulting
Date Received:	Not Applicable	Project:	TOCST 1, F&BI 111170
Date Extracted:	11/09/21	Lab ID:	01-2571 mb
Date Analyzed:	11/09/21	Data File:	110919.D
Matrix:	Soil	Instrument:	GCMS4
Units:	mg/kg (ppm) Dry Weight	Operator:	WE

Surrogates:	% Recovery:	Lower Limit:	Upper Limit:
1,2-Dichloroethane-d4	93	90	109
Toluene-d8	104	89	112
4-Bromofluorobenzene	98	84	115

Compounds:	Concentration mg/kg (ppm)
Trichloroethene	<0.02

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/12/21

Date Received: 11/09/21

Project: TOCST 1, F&BI 111170

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR TPH AS GASOLINE
USING METHOD NWTPH-G_x**

Laboratory Code: 111051-11 (Duplicate)

Analyte	Reporting Units	Sample Result (Wet Wt)	Duplicate Result (Wet Wt)	RPD (Limit 20)
Gasoline	mg/kg (ppm)	<5	<5	nm

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Gasoline	mg/kg (ppm)	20	85	71-131

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/12/21

Date Received: 11/09/21

Project: TOCST 1, F&BI 111170

**QUALITY ASSURANCE RESULTS FROM THE ANALYSIS OF SOIL SAMPLES
FOR TOTAL PETROLEUM HYDROCARBONS AS
DIESEL EXTENDED USING METHOD NWTPH-D_x**

Laboratory Code: 111155-01 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet Wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Diesel Extended	mg/kg (ppm)	5,000	8,000	76	65	64-133	16

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Diesel Extended	mg/kg (ppm)	5,000	100	58-147

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Date of Report: 11/12/21

Date Received: 11/09/21

Project: TOCST 1, F&BI 111170

**QUALITY ASSURANCE RESULTS FOR THE ANALYSIS OF SOIL SAMPLES
FOR VOLATILES BY EPA METHOD 8260D**

Laboratory Code: 111035-02 (Matrix Spike)

Analyte	Reporting Units	Spike Level	Sample Result (Wet wt)	Percent Recovery MS	Percent Recovery MSD	Acceptance Criteria	RPD (Limit 20)
Trichloroethene	mg/kg (ppm)	1	<0.02	77	75	21-139	3

Laboratory Code: Laboratory Control Sample

Analyte	Reporting Units	Spike Level	Percent Recovery LCS	Acceptance Criteria
Trichloroethene	mg/kg (ppm)	1	101	63-121

FRIEDMAN & BRUYA, INC.

ENVIRONMENTAL CHEMISTS

Data Qualifiers & Definitions

a - The analyte was detected at a level less than five times the reporting limit. The RPD results may not provide reliable information on the variability of the analysis.

b - The analyte was spiked at a level that was less than five times that present in the sample. Matrix spike recoveries may not be meaningful.

ca - The calibration results for the analyte were outside of acceptance criteria. The value reported is an estimate.

c - The presence of the analyte may be due to carryover from previous sample injections.

cf - The sample was centrifuged prior to analysis.

d - The sample was diluted. Detection limits were raised and surrogate recoveries may not be meaningful.

dv - Insufficient sample volume was available to achieve normal reporting limits.

f - The sample was laboratory filtered prior to analysis.

fb - The analyte was detected in the method blank.

fc - The analyte is a common laboratory and field contaminant.

hr - The sample and duplicate were reextracted and reanalyzed. RPD results were still outside of control limits. Variability is attributed to sample inhomogeneity.

hs - Headspace was present in the container used for analysis.

ht - The analysis was performed outside the method or client-specified holding time requirement.

ip - Recovery fell outside of control limits due to sample matrix effects.

j - The analyte concentration is reported below the lowest calibration standard. The value reported is an estimate.

J - The internal standard associated with the analyte is out of control limits. The reported concentration is an estimate.

jl - The laboratory control sample(s) percent recovery and/or RPD were out of control limits. The reported concentration should be considered an estimate.

js - The surrogate associated with the analyte is out of control limits. The reported concentration should be considered an estimate.

lc - The presence of the analyte is likely due to laboratory contamination.

L - The reported concentration was generated from a library search.

nm - The analyte was not detected in one or more of the duplicate analyses. Therefore, calculation of the RPD is not applicable.

pc - The sample was received with incorrect preservation or in a container not approved by the method. The value reported should be considered an estimate.

ve - The analyte response exceeded the valid instrument calibration range. The value reported is an estimate.

vo - The value reported fell outside the control limits established for this analyte.

x - The sample chromatographic pattern does not resemble the fuel standard used for quantitation.

11117D

SAMPLE CHAIN OF CUSTODY

11-09-21

401/VS1

Report To R. Jones / J. Stevens / K. Hempel
 Company Tol Seattle Terminal 1
 Address _____
 City, State, ZIP _____
 Phone _____ Email _____

SAMPLERS (signature) <u>R. Jones</u> PROJECT NAME <u>Rusty Jones</u> PO # _____		INVOICE TO _____
REMARKS <u>TEST 1</u> Project Specific RIs - Yes / No		

Page # 1 of 1

TURNAROUND TIME
 Standard Turnaround
 RUSH 24-Hour
 Rush charges authorized by: _____

SAMPLE DISPOSAL
 Dispose after 30 days
 Archive Samples
 Other _____

Sample ID	Lab ID	Date Sampled	Time Sampled	Sample Type	# of Jars	ANALYSES REQUESTED							Notes							
						NWTPH-Dx	NWTPH-Gx	BTEX EPA 8021	VOCs EPA 8260	PAHs EPA 8270	PCBs EPA 8082	TCE								
CA43-SS-03	01A-E	11.9.2021	1340	Soil	5	X	X													

Samples received at 4 oc

SIGNATURE		PRINT NAME		COMPANY		DATE		TIME	
Relinquished by: <u>R. Jones</u>		Rusty Jones		CRETE Consulting		11.9.2021		1423	
Received by: <u>[Signature]</u>		[Signature]		FORS		11/9/21		1423	
Relinquished by:									
Received by:									

Friedman & Bruya, Inc.
 3012 16th Avenue West
 Seattle, WA 98119-2029
 Ph. (206) 285-8282

Appendix F

Import Laboratory Report

SUBMITTAL REVIEW COMMENT FORM

Submittal Title:	Bedding Sand	Submittal Identification Number	0A.1
Project Title: Project Number:	Time Oil Company - Seattle	Reviewer(s):	CRETE- Reid Carscadden (RC)/Jamie Stevens(JCS)
Cantera Project Manager:	Kim Hempel		
Dated Submitted:	10/07/2021	Final Review Date:	10/07/2021

Submittal Item No.	Reviewer Name	Review Date	Reviewer Comment with <u>Contract</u> Document Reference	Receipt Acknowledged	Accepted	Accepted as Noted	Revise and Resubmit	Substitution Requests Only	Not Accepted
				0	1	2	3	4	
A.1	JCS	10/7/21	Bedding Sand		X				

CalPortland - Aggregate Submittal



Date: July 21,2021

Product Number: 8725

Product Description: Building Sand

Specification Number: ASTM C33, Fine Aggregate

Source: Manke Pit

Location: Shelton, WA

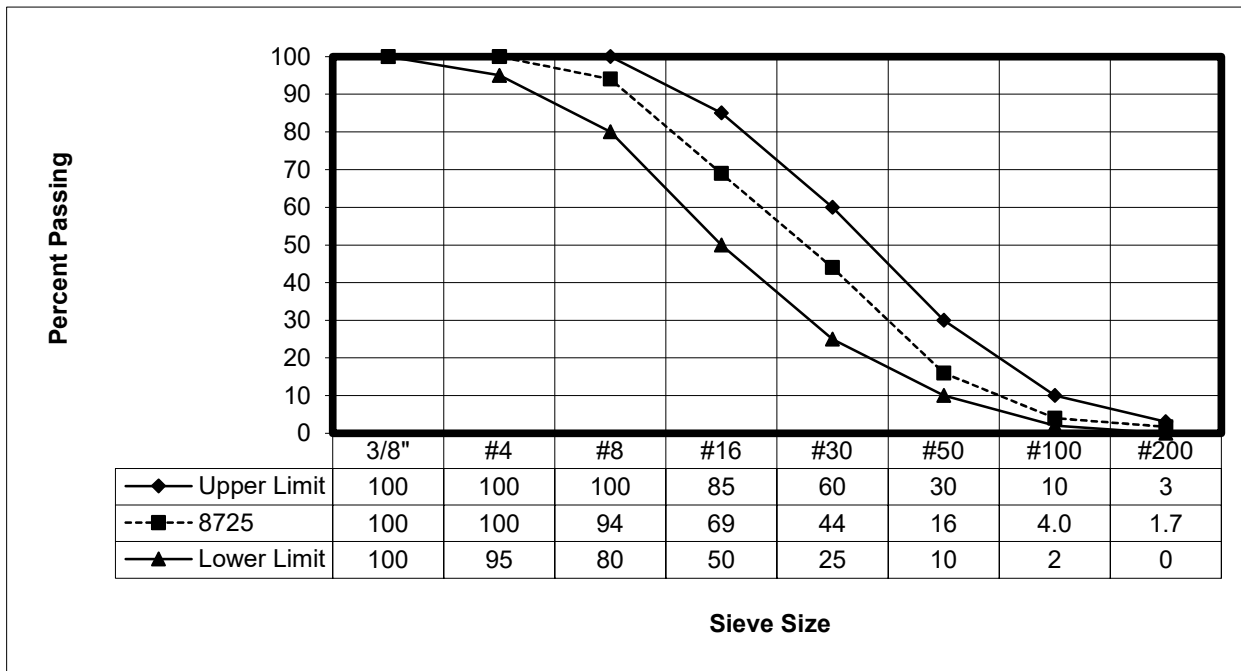
WSDOT Pit Number: x-125

Specification:

3/8"	100%passing	% Fracture	-
#4	95-100%	Sand Equivalent	-
#8	80-100	L.A. Wear	-
#16	50-85	Degradation:	-
#30	25-60	Dust Ratio	-
#50	10-30	F.M.	2.3 to 3.1
#100	2-10		
#200	0-3		

Specific Gravity:	2.718
Absorption:	1.2%
L.A. Abrasion:	11.0%
Degradation:	62

% Fracture:	0%
Sand Equivalent:	0.00
Dust Ratio:	0
F.M.	2.72





To Whom it May Concern,

Sample IDs “Grab 01”, “DP Agg 72021”, and “DP Grab 02” (collected September 2nd, July 29th, and August 18th, 2021), are composite samples collected from active mine faces. As such, the samples are representative of all mined materials from their respective sources.

Thank you,

A handwritten signature in black ink that reads 'Annie Ayre'.

Annie Ayre
Environmental Manager
CalPortland

SPECTRA Laboratories

...Where experience matters

2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

08/13/2021

Cal Portland - Pioneer Aggregates
 4301 Pioneer Avenue
 DuPont, WA 98327
 Attn: Jim Tweedy or Louie Bayless

P.O.#: 4501095667
 Project: DP Agg
 Client ID: DP Agg 72021
 Sample Matrix: Soil
 Date Sampled: 07/29/2021
 Date Received: 07/29/2021
 Spectra Project: 2021070720
 Spectra Number: 1
 Rush

Analyte	Result	Units	Method	Analyte	Result	Units	Method
Benzo(a)Anthracene--SIM	<0.005	mg/Kg	8270E SIM	1,2-Dichlorobenzene	<0.017	mg/Kg	SW846 8270E
Benzo(a)Pyrene--SIM	<0.005	mg/Kg	8270E SIM	1,3-Dichlorobenzene	<0.017	mg/Kg	SW846 8270E
Benzo(b)Fluoranthene--SIM	0.0056	mg/Kg	8270E SIM	1,4-Dichlorobenzene	<0.017	mg/Kg	SW846 8270E
Benzo(k)Fluoranthene--SIM	0.0059	mg/Kg	8270E SIM	2,3,4,6-Tetrachlorophenol	<0.017	mg/Kg	SW846 8270E
Chrysene--SIM	<0.005	mg/Kg	8270E SIM	2,3,5,6-Tetrachlorophenol	<0.017	mg/Kg	SW846 8270E
Dibenz(a,h)Anthracene--SIM	<0.005	mg/Kg	8270E SIM	2,4,5-Trichlorophenol	<0.017	mg/Kg	SW846 8270E
Indeno(1,2,3-cd)Pyrene--SIM	<0.005	mg/Kg	8270E SIM	2,4,6-Trichlorophenol	<0.017	mg/Kg	SW846 8270E
Diesel	<5.00	mg/Kg	NWTPH-Dx	2,4-Dichlorophenol	<0.017	mg/Kg	SW846 8270E
Oil	<10.00	mg/Kg	NWTPH-Dx	2,4-Dimethylphenol	<0.017	mg/Kg	SW846 8270E
Total Arsenic	< 2.5	mg/Kg	SW846 6010D	2,4-Dinitrophenol	<0.017	mg/Kg	SW846 8270E
Total Barium	24.2	mg/Kg	SW846 6010D	2,4-Dinitrotoluene	<0.017	mg/Kg	SW846 8270E
Total Cadmium	< 0.3	mg/Kg	SW846 6010D	2,6-Dinitrotoluene	<0.017	mg/Kg	SW846 8270E
Total Chromium	15.0	mg/Kg	SW846 6010D	2-Chloronaphthalene	<0.017	mg/Kg	SW846 8270E
Total Copper	6.8	mg/Kg	SW846 6010D	2-Chlorophenol	<0.017	mg/Kg	SW846 8270E
Total Lead	< 2.5	mg/Kg	SW846 6010D	2-Methylnaphthalene	<0.007	mg/Kg	SW846 8270E
Total Selenium	< 2.5	mg/Kg	SW846 6010D	2-Methylphenol	<0.017	mg/Kg	SW846 8270E
Total Silver	< 0.7	mg/Kg	SW846 6010D	2-Nitroaniline	<0.017	mg/Kg	SW846 8270E
Total Zinc	30.9	mg/Kg	SW846 6010D	2-Nitrophenol	<0.017	mg/Kg	SW846 8270E
Total Silver	0.0347*	mg/Kg	SW846 6020B	3,3-Dichlorobenzidine	<0.033	mg/Kg	SW846 8270E
Total Mercury	< 0.025	mg/Kg	SW846 7471B	3-Nitroaniline	<0.033	mg/Kg	SW846 8270E
1,2,4-Trichlorobenzene	<0.017	mg/Kg	SW846 8270E	4,6-Dinitro-2-Methylphenol	<0.017	mg/Kg	SW846 8270E

*Analyzed by Fremont Analytical. See complete report attached.

PARTIAL RESULTS
 Final report will follow as soon as complete.

Surrogate	Recovery	Method
Nitrobenzene-d5--SIM	86	8270E SIM
p-Terphenyl-d14--SIM	124	8270E SIM
Decachlorobiphenyl		SW846 8082A
p-Terphenyl	74	NWTPH-Dx
Nitrobenzene-d5	49	SW846 8270E
2-Fluorobiphenyl	55	SW846 8270E
p-Terphenyl-d14	91	SW846 8270E

Surrogate	Recovery	Method
2-Fluorophenol	54	SW846 8270E
Phenol-d6	56	SW846 8270E
2,4,6-Tribromophenol	50	SW846 8270E

SPECTRA LABORATORIES


 Marie Holt, Customer Support & Proj. Manager

08/13/2021

Cal Portland - Pioneer Aggregates
 4301 Pioneer Avenue
 DuPont, WA 98327
 Attn: Jim Tweedy or Louie Bayless

P.O.#: 4501095667
 Project: DP Agg
 Client ID: DP Agg 72021
 Sample Matrix: Soil
 Date Sampled: 07/29/2021
 Date Received: 07/29/2021
 Spectra Project: 2021070720
 Spectra Number: 1

Rush

Analyte	Result	Units	Method	Analyte	Result	Units	Method
4-Bromophenyl-phenylether	<0.017	mg/Kg	SW846 8270E	Bis(2-Chloroethyl)Ether	<0.017	mg/Kg	SW846 8270E
4-Chloro-3-Methylphenol	<0.017	mg/Kg	SW846 8270E	Butylbenzylphthalate	<0.017	mg/Kg	SW846 8270E
4-Chloroaniline	<0.033	mg/Kg	SW846 8270E	Carbazole	<0.017	mg/Kg	SW846 8270E
4-Chlorophenyl-phenylether	<0.017	mg/Kg	SW846 8270E	Chrysene	<0.017	mg/Kg	SW846 8270E
4-Methylphenol	<0.017	mg/Kg	SW846 8270E	Di-n-Butylphthalate	<0.017	mg/Kg	SW846 8270E
4-Nitroaniline	<0.033	mg/Kg	SW846 8270E	Di-n-Octyl Phthalate	<0.017	mg/Kg	SW846 8270E
4-Nitrophenol	<0.017	mg/Kg	SW846 8270E	Dibenz(a,h)Anthracene	<0.017	mg/Kg	SW846 8270E
Acenaphthene	<0.007	mg/Kg	SW846 8270E	Dibenzofuran	<0.017	mg/Kg	SW846 8270E
Acenaphthylene	<0.007	mg/Kg	SW846 8270E	Dibenzothiophene	<0.017	mg/Kg	SW846 8270E
Aniline	<0.033	mg/Kg	SW846 8270E	Diethylphthalate	<0.017	mg/Kg	SW846 8270E
Anthracene	<0.007	mg/Kg	SW846 8270E	Dimethyl Phthalate	<0.017	mg/Kg	SW846 8270E
Azobenzene	<0.017	mg/Kg	SW846 8270E	Fluoranthene	<0.007	mg/Kg	SW846 8270E
Benidine	<0.033	mg/Kg	SW846 8270E	Fluorene	<0.007	mg/Kg	SW846 8270E
Benzo(a)Anthracene	<0.017	mg/Kg	SW846 8270E	Hexachlorobenzene	<0.017	mg/Kg	SW846 8270E
Benzo(a)Pyrene	<0.017	mg/Kg	SW846 8270E	Hexachlorobutadiene	<0.017	mg/Kg	SW846 8270E
Benzo(b)Fluoranthene	<0.017	mg/Kg	SW846 8270E	Hexachlorocyclopentadiene	<0.017	mg/Kg	SW846 8270E
Benzo(ghi)Perylene	<0.017	mg/Kg	SW846 8270E	Hexachloroethane	<0.017	mg/Kg	SW846 8270E
Benzo(k)Fluoranthene	<0.017	mg/Kg	SW846 8270E	Indeno(1,2,3-cd)Pyrene	<0.017	mg/Kg	SW846 8270E
Benzoic Acid	<0.033	mg/Kg	SW846 8270E	Isophorone	<0.017	mg/Kg	SW846 8270E
Benzyl Alcohol	<0.017	mg/Kg	SW846 8270E	N-Nitroso-Di-n-Propylamine	<0.017	mg/Kg	SW846 8270E
Biphenyl	<0.017	mg/Kg	SW846 8270E	N-Nitrosodiphenylamine	<0.017	mg/Kg	SW846 8270E


*Analyzed by Fremont Analytical. See complete report attached.

PARTIAL RESULTS
 Final report will follow as soon as complete.

Surrogate	Recovery	Method
Nitrobenzene-d5--SIM	86	8270E SIM
p-Terphenyl-d14--SIM	124	8270E SIM
Decachlorobiphenyl		SW846 8082A
p-Terphenyl	74	NWTPH-Dx
Nitrobenzene-d5	49	SW846 8270E
2-Fluorobiphenyl	55	SW846 8270E
p-Terphenyl-d14	91	SW846 8270E

Surrogate	Recovery	Method
2-Fluorophenol	54	SW846 8270E
Phenol-d6	56	SW846 8270E
2,4,6-Tribromophenol	50	SW846 8270E

SPECTRA LABORATORIES


 Marie Holt, Customer Support & Proj. Manager

08/13/2021

Cal Portland - Pioneer Aggregates
 4301 Pioneer Avenue
 DuPont, WA 98327
 Attn: Jim Tweedy or Louie Bayless

P.O.#: 4501095667
 Project: DP Agg
 Client ID: DP Agg 72021
 Sample Matrix: Soil
 Date Sampled: 07/29/2021
 Date Received: 07/29/2021
 Spectra Project: 2021070720
 Spectra Number: 1

Rush

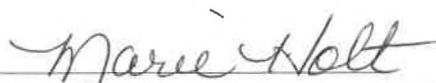
Analyte	Result	Units	Method	Analyte	Result	Units	Method
N-nitrosodimethylamine	<0.017	mg/Kg	SW846 8270E				
Naphthalene	<0.007	mg/Kg	SW846 8270E				
Nitrobenzene	<0.017	mg/Kg	SW846 8270E				
Pentachlorophenol	<0.017	mg/Kg	SW846 8270E				
Phenanthrene	<0.007	mg/Kg	SW846 8270E				
Phenol	<0.017	mg/Kg	SW846 8270E				
Pyrene	<0.007	mg/Kg	SW846 8270E				
Pyridine	<0.017	mg/Kg	SW846 8270E				
bis(2-Chloroethoxy)Methane	<0.017	mg/Kg	SW846 8270E				
bis(2-Ethylhexyl)Phthalate	<0.017	mg/Kg	SW846 8270E				
bis(2-chloroisopropyl)Ether	<0.017	mg/Kg	SW846 8270E				

*Analyzed by Fremont Analytical. See complete report attached.

PARTIAL RESULTS
 Final report will follow as soon as complete.

Surrogate	Recovery	Method	Surrogate	Recovery	Method
Nitrobenzene-d5--SIM	86	8270E SIM	2-Fluorophenol	54	SW846 8270E
p-Terphenyl-d14--SIM	124	8270E SIM	Phenol-d6	56	SW846 8270E
Decachlorobiphenyl		SW846 8082A	2,4,6-Tribromophenol	50	SW846 8270E
p-Terphenyl	74	NWTPH-Dx			
Nitrobenzene-d5	49	SW846 8270E			
2-Fluorobiphenyl	55	SW846 8270E			
p-Terphenyl-d14	91	SW846 8270E			

SPECTRA LABORATORIES


 Marie Holt, Customer Support & Proj. Manager



3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Spectra Laboratories
Marie Holt
2221 Ross Way
Tacoma, WA 98421

RE: 2021070720
Work Order Number: 2108132

August 12, 2021

Attention Marie Holt:

Fremont Analytical, Inc. received 1 sample(s) on 8/10/2021 for the analyses presented in the following report.

Sample Moisture (Percent Moisture)
Total Metals by EPA Method 6020B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

A handwritten signature in black ink, appearing to read "Brianna Barnes".

Brianna Barnes
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Original

www.fremontanalytical.com



CLIENT: Spectra Laboratories
Project: 2021070720
Work Order: 2108132

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2108132-001	070720-1	07/29/2021 12:00 AM	08/10/2021 9:10 AM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

CLIENT: Spectra Laboratories**Project:** 2021070720

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.



Qualifiers:

- * - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit
- R - High relative percent difference observed

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate



Analytical Report

Work Order: 2108132
 Date Reported: 8/12/2021

Client: Spectra Laboratories

Collection Date: 7/29/2021

Project: 2021070720

Lab ID: 2108132-001

Matrix: Soil

Client Sample ID: 070720-1

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
<u>Total Metals by EPA Method 6020B</u>				Batch ID: 33294		Analyst: TN	
Silver	0.0347	0.119	0.0336	J	mg/Kg-dry	1	08/10/21 18:09:22
<u>Sample Moisture (Percent Moisture)</u>				Batch ID: R69167		Analyst: ALB	
Percent Moisture	2.46	0.500	0.100		wt%	1	08/11/21 11:34:33

Work Order: 2108132
CLIENT: Spectra Laboratories
Project: 2021070720

QC SUMMARY REPORT
Total Metals by EPA Method 6020B

Sample ID: MB-33294	SampType: MBLK	Units: mg/Kg	Prep Date: 8/10/2021	RunNo: 69151							
Client ID: MBLKS	Batch ID: 33294		Analysis Date: 8/10/2021	SeqNo: 1400121							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Silver	ND	0.118									
--------	----	-------	--	--	--	--	--	--	--	--	--

Sample ID: LCS-33294	SampType: LCS	Units: mg/Kg	Prep Date: 8/10/2021	RunNo: 69151							
Client ID: LCSS	Batch ID: 33294		Analysis Date: 8/10/2021	SeqNo: 1400122							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Silver	1.95	0.120	2.000	0	97.4	80	120				
--------	------	-------	-------	---	------	----	-----	--	--	--	--

Sample ID: 2108124-001AMS	SampType: MS	Units: mg/Kg	Prep Date: 8/10/2021	RunNo: 69151							
Client ID: BATCH	Batch ID: 33294		Analysis Date: 8/10/2021	SeqNo: 1400125							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Silver	1.98	0.119	1.984	0.04678	97.3	75	125				
--------	------	-------	-------	---------	------	----	-----	--	--	--	--

Sample ID: 2108124-001AMSD	SampType: MSD	Units: mg/Kg	Prep Date: 8/10/2021	RunNo: 69151							
Client ID: BATCH	Batch ID: 33294		Analysis Date: 8/10/2021	SeqNo: 1400126							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Silver	1.93	0.121	2.016	0.04678	93.3	75	125	1.978	2.60	20	
--------	------	-------	-------	---------	------	----	-----	-------	------	----	--



Client Name: SPECTR	Work Order Number: 2108132
Logged by: Clare Griggs	Date Received: 8/10/2021 9:10:00 AM

Chain of Custody

1. Is Chain of Custody complete? Yes No Not Present
2. How was the sample delivered? UPS

Log In

3. Coolers are present? Yes No NA
4. Shipping container/cooler in good condition? Yes No
5. Custody Seals present on shipping container/cooler? (Refer to comments for Custody Seals not intact) Yes No Not Present
6. Was an attempt made to cool the samples? Yes No NA
7. Were all items received at a temperature of >2°C to 6°C * Yes No NA
8. Sample(s) in proper container(s)? Yes No
9. Sufficient sample volume for indicated test(s)? Yes No
10. Are samples properly preserved? Yes No
11. Was preservative added to bottles? Yes No NA
12. Is there headspace in the VOA vials? Yes No NA
13. Did all samples containers arrive in good condition(unbroken)? Yes No
14. Does paperwork match bottle labels? Yes No
15. Are matrices correctly identified on Chain of Custody? Yes No
16. Is it clear what analyses were requested? Yes No
17. Were all holding times able to be met? Yes No

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes No NA

Person Notified:	<input type="text"/>	Date:	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

19. Additional remarks:

Item Information

Item #	Temp °C
Sample	6.0

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SPECTRA Laboratories

2221 Ross Way, Tacoma, WA 98421
 (253) 272-4850 Fax (253) 572-9838
 www.spectra-lab.com info@spectra-lab.com

SPECIAL INSTRUCTIONS/COMMENTS
 Total Silver by 6020
 Report to MDL -Req. 0.10mg/kg

Return Samples Y N x Page 1 of 1

CHAIN of CUSTODY
 2108132
 2-Day TAT please

Page 8 of 8

STANDARD **RUSH**

CLIENT Spectra Laboratories ADDRESS 2221 Ross Way Tacoma WA 98421 ADDRESS CHANGE

PROJECT 2021070720
 CONTACT Marie H
 SUBBED TO Fremont Analytical
 PHONE 253-272-4850 FAX. 253-572-9838
 e-MAIL marieh@spectra-lab.com Prefer FAX or e-MAIL
 PURCHASE ORDER #

NUMBER OF CONTAINERS	HYDROCARBONS		ORGANICS				METALS			OTHER										
	NWTPH-HClO BTEX	BTEX NWTPH-G	NWTPH-G	NWTPH-D ⁺	1964 SGT HEM (TPH)	1964 HPM (TOG)	8260 CHLOR SOLVENTS	8270/825 SEMI VOA	8270 PAH/PNA	8082/608 PCB	TOTAL METALS RCRA 8	TOTAL METALS (SPECIFY)	TCLP METALS RCRA 8	TCLP METALS (SPECIFY)	PH 504/5045	TX TOX 3076	TURBIDITY	FLASH POINT	BOD	SOLIDS (SPECIFY)

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	MATRIX	NUMBER OF CONTAINERS	NWTPH-HClO BTEX	BTEX NWTPH-G	NWTPH-G	NWTPH-D ⁺	1964 SGT HEM (TPH)	1964 HPM (TOG)	8260 CHLOR SOLVENTS	8270/825 SEMI VOA	8270 PAH/PNA	8082/608 PCB	TOTAL METALS RCRA 8	TOTAL METALS (SPECIFY)	TCLP METALS RCRA 8	TCLP METALS (SPECIFY)	PH 504/5045	TX TOX 3076	TURBIDITY	FLASH POINT	BOD	SOLIDS (SPECIFY)	TOX FPA 5080A
070720-1	07/29/21		soil	1												X									

LAB USE ONLY		SIGNATURE	PRINTED NAME	COMPANY	DATE	TIME
US Mail <input type="checkbox"/> UPS <input type="checkbox"/> Fed Ex <input type="checkbox"/> Courier <input type="checkbox"/> Client <input type="checkbox"/>	RELINQUISHED BY	<i>Jen Draven</i>	Jen Draven	Spectra	08/09/21	3:00 PM
	RECEIVED BY	<i>Justine Mantz</i>	Justine Mantz	FAI	8/10/21	9:10
Cooler <input type="checkbox"/> Box <input type="checkbox"/> Envelope <input type="checkbox"/> None <input type="checkbox"/>	RELINQUISHED BY					
Tracking # _____	RECEIVED BY					
Custody Seals <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/> Intact <input type="checkbox"/> Y <input type="checkbox"/> N <input type="checkbox"/>	Payment Terms: Net 30 days Past due accounts subject to 1 1/2 % per month interest Customer agrees to pay all costs of collection including reasonable attorney's fees and all other costs of collection regardless of whether suit is filed in Pierce Co. WA venue. Spectra Analytical Inc.					
Cooler Temp _____ Sample Temp _____						

SPECTRA Laboratories

2221 Ross Way, Tacoma, WA 98421
 (253) 272-4850 Fax (253) 572-9838
 www.spectra-lab.com info@spectra-lab.com

SPECIAL INSTRUCTIONS/COMMENTS:

CHAIN OF CUSTODY

SPECTRA PROJECT #

2021070720

Return Samples: Y N

Page 1 of 1

STANDARD

RUSH

CLIENT: CalPortland

ADDRESS:

ADDRESS CHANGE

PROJECT: DP Agg
 CONTACT: Annie Ayre
 SAMPLED BY: Justin Lake
 PHONE: 206-704 3026 FAX:
 e-MAIL: ayre@calportland.com Prefer FAX pr e-MAIL
 PURCHASE ORDER #

NUMBER OF CONTAINERS	HYDROCARBONS								ORGANICS				METALS			OTHER								
	NWTPH-HCID	BTEX	BTEX/NWTPH-G	NWTPH-G	NWTPH-Dx	1664 SGT-HEM (TPH)	1664 HEM (FOG)	8260/624 VOA	8260 CHLOR SOLVENTS	8270-625 SEMI VOA	8270 PAH/PNA	8082/808 PCB	TOTAL METALS RCRA 8 + Copper	TOTAL METALS (SPECIFY)	TCLP METALS RCRA 8	TCLP METALS (SPECIFY)	PH 9040/9045	TX/TOX/EOX	TURBIDITY	FLASH POINT	BOD	SOLIDS (SPECIFY)		
4					X					X	X	X											X	PAH EPA 8270 SIM

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	MATRIX
1 DP Agg # 7-29-21	7-29	1:00 pm	SD11
2			
3			
4			
5			
6			
7			
8			
9			
10			

LAB USE ONLY	SIGNATURE	PRINTED NAME	COMPANY	DATE	TIME
	Annie Ayre	Annie Ayre	CalPortland	7/29	1:51 pm
T: 266 C	[Signature]	Nick Miller	Spectra	7/29	1:51

Payment Terms: Net 30 days. Past due accounts subject to 1 1/2% per month interest. Customer agrees to pay all costs of collection including reasonable attorney's fees and all other costs of collection regardless of whether suit is filed in Pierce Co., WA venue. Spectra Laboratories, LLC



Ayre

Anne Ayre
5975 E Marginal Ways
Seattle, WA 98134

RE: DP Agg

Work Order Number: 2108236

August 18, 2021

Attention Anne Ayre:

Fremont Analytical, Inc. received 1 sample(s) on 8/17/2021 for the analyses presented in the following report.

Polychlorinated Biphenyls (PCB) by EPA 8082

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

CLIENT: Ayre
Project: DP Agg
Work Order: 2108236

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2108236-001	DP Grab 02	08/17/2021 11:15 AM	08/17/2021 12:56 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

CLIENT: Ayre
Project: DP Agg

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Prep Comments for METHOD (PREP-PCB-S), SAMPLE (2108236-001A) required Acid Cleanup Procedure (Using Method No 3665A).

Prep Comments for METHOD (PREP-PCB-S), SAMPLE (2108236-001A) required Florisil Cleanup Procedure (Using Method No 3620C).

Rev 1: Report has been revised to clarify that no PCBs were detected at or above the level of the MDL (i.e. <0.004 mg/kg).

Qualifiers:

- * - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit
- R - High relative percent difference observed

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate



Client: Ayre

Collection Date: 8/17/2021 11:15:00 AM

Project: DP Agg

Lab ID: 2108236-001

Matrix: Solid

Client Sample ID: DP Grab 02

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
----------	--------	----	-----	------	-------	----	---------------

Polychlorinated Biphenyls (PCB) by EPA 8082

Batch ID: 33386

Analyst: SB

Aroclor 1016	ND	0.0198	0.00319		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1221	ND	0.0198	0.00319		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1232	ND	0.0198	0.00319		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1242	ND	0.0198	0.00319		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1248	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1254	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1260	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1262	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1268	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Total PCBs	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Surr: Decachlorobiphenyl	97.4	20.6 - 142			%Rec	1	08/17/21 16:52:48
Surr: Tetrachloro-m-xylene	104	22 - 157			%Rec	1	08/17/21 16:52:48

NOTES:

ND - Sample is non-detect evaluated to the method detection limit (MDL). Any detections between the MDL and the RL would be presented as a number qualified with a J.

Work Order: 2108236
 CLIENT: Ayre
 Project: DP Agg

QC SUMMARY REPORT
Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID: MB-33386	SampType: MBLK	Units: mg/Kg	Prep Date: 8/17/2021	RunNo: 69321							
Client ID: MBLKS	Batch ID: 33386		Analysis Date: 8/17/2021	SeqNo: 1404598							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.0500									
Aroclor 1221	ND	0.0500									
Aroclor 1232	ND	0.0500									
Aroclor 1242	ND	0.0500									
Aroclor 1248	ND	0.0500									
Aroclor 1254	ND	0.0500									
Aroclor 1260	ND	0.0500									
Aroclor 1262	ND	0.0500									
Aroclor 1268	ND	0.0500									
Total PCBs	ND	0.0500									
Surr: Decachlorobiphenyl	238		200.0		119	20.6	142				
Surr: Tetrachloro-m-xylene	214		200.0		107	22	157				

Sample ID: LCS1-33386	SampType: LCS	Units: mg/Kg	Prep Date: 8/17/2021	RunNo: 69321							
Client ID: LCSS	Batch ID: 33386		Analysis Date: 8/17/2021	SeqNo: 1404599							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.918	0.0500	1.000	0	91.8	52.2	136				
Aroclor 1260	0.865	0.0500	1.000	0	86.5	50.5	150				
Surr: Decachlorobiphenyl	216		200.0		108	20.6	142				
Surr: Tetrachloro-m-xylene	218		200.0		109	22	157				

Sample ID: 2108236-001AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 8/17/2021	RunNo: 69321							
Client ID: DP Grab 02	Batch ID: 33386		Analysis Date: 8/17/2021	SeqNo: 1404601							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.393	0.0196	0.3912	0	100	38.6	146				
Aroclor 1260	0.367	0.0196	0.3912	0	93.8	24.6	161				
Surr: Decachlorobiphenyl	81.4		78.25		104	20.6	142				

Work Order: 2108236

CLIENT: Ayre

Project: DP Agg

QC SUMMARY REPORT

Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID: 2108236-001AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 8/17/2021	RunNo: 69321							
Client ID: DP Grab 02	Batch ID: 33386	Analysis Date: 8/17/2021	SeqNo: 1404601								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Surr: Tetrachloro-m-xylene 82.7 78.25 106 22 157

Sample ID: 2108236-001AMSD	SampType: MSD	Units: mg/Kg-dry	Prep Date: 8/17/2021	RunNo: 69321							
Client ID: DP Grab 02	Batch ID: 33386	Analysis Date: 8/17/2021	SeqNo: 1404602								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1016 0.374 0.0195 0.3897 0 96.1 38.6 146 0.3931 4.87 30

Aroclor 1260 0.366 0.0195 0.3897 0 93.8 24.6 161 0.3671 0.407 30

 Surr: Decachlorobiphenyl 83.1 77.94 107 20.6 142 0

 Surr: Tetrachloro-m-xylene 82.6 77.94 106 22 157 0

Sample ID: LCS2-33386	SampType: LCS	Units: mg/Kg	Prep Date: 8/17/2021	RunNo: 69321							
Client ID: LCSS	Batch ID: 33386	Analysis Date: 8/18/2021	SeqNo: 1404605								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1254 1.31 0.0500 1.000 0 131 48.1 147

 Surr: Decachlorobiphenyl 238 200.0 119 20.6 142

 Surr: Tetrachloro-m-xylene 248 200.0 124 22 157

Client Name: CALPO	Work Order Number: 2108236
Logged by: Gabrielle Coeuille	Date Received: 8/17/2021 12:56:53 PM

Chain of Custody

1. Is Chain of Custody complete? Yes No Not Present
2. How was the sample delivered? Client

Log In

3. Coolers are present? Yes No NA
No cooler present
4. Shipping container/cooler in good condition? Yes No
5. Custody Seals present on shipping container/cooler?
 (Refer to comments for Custody Seals not intact) Yes No Not Present
6. Was an attempt made to cool the samples? Yes No NA
Unknown prior to receipt
7. Were all items received at a temperature of >2°C to 6°C * Yes No NA
8. Sample(s) in proper container(s)? Yes No
9. Sufficient sample volume for indicated test(s)? Yes No
10. Are samples properly preserved? Yes No
11. Was preservative added to bottles? Yes No NA
12. Is there headspace in the VOA vials? Yes No NA
13. Did all samples containers arrive in good condition(unbroken)? Yes No
14. Does paperwork match bottle labels? Yes No
15. Are matrices correctly identified on Chain of Custody? Yes No
16. Is it clear what analyses were requested? Yes No
17. Were all holding times able to be met? Yes No

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes No NA

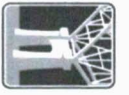
Person Notified:	<input type="text" value="Anne Avre"/>	Date:	<input type="text" value="8/17/2021"/>
By Whom:	<input type="text" value="Clare Griqas"/>	Via:	<input type="checkbox"/> eMail <input checked="" type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text" value="Confirming report to email & project limits."/>		
Client Instructions:	<input type="text"/>		

19. Additional remarks:

Item Information

Item #	Temp °C
Sample 1	23.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Client: Call Portland
Address: 5735 E Marginal Way S
City, State, Zip: Seattle, WA ~~98134~~ 98134
Telephone: 206-Fly 30240
Fax:

Date: 9/17/2021 **Page:** _____ **of:** _____
Project Name: DR Agg
Project No.:
Collected by: Ayre
Location:
Report To (PM):
PM Email:

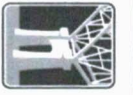
Laboratory Project No (Internal): 2108236
Special Remarks:
 Sample Disposal: Return to client Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)	Comments	Turn-around Time:	
																			Standard
DR Grab 02	8/17/21	11:50am	solid	1														see attached spec phase reporting limit 4 ppts/kg	<input type="checkbox"/> Standard <input type="checkbox"/> Next Day <input type="checkbox"/> Same Day (specify)

Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water
Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Tl V Zn
Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature) *[Signature]* **Print Name** Anne Ayre **Date/Time** 8/17/21 12:50pm **Received (Signature)** *[Signature]* **Print Name** Oliver Khan **Date/Time** 8/17/21 1256



Fremont

ANALYTICAL

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 8/17/2021 Page: 1 of: 1

Project Name: DR Agg

Project No:

Collected by: Ayre

Location:

Report To (PM): Anne Ayre

PM Email: aayre@calportland.com

Laboratory Project No (Internal): 2108236

Special Remarks:

Update per AA 8/17/21 - gac

Sample Disposal: Return to client Disposal by lab (after 30 days)

Client: CalPortland

Address: 5735 E Marginal Way S

City, State, Zip: Seattle, WA 98134

Telephone: 206-704-3020

Fax:

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	Analysis Parameters																Comments
					VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)					
<u>DR Grab 02</u>	<u>8/17/21</u>	<u>11:50am</u>	<u>solid</u>	<u>1</u>																<u>see attached spec phase reporting limit 4ppb/g</u>	

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Tl V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Turn-around Time:
 Standard Next Day
 3 Day Same Day
 2 Day _____ (specify)

Relinquished (Signature) Anne Ayre Print Name Anne Ayre Date/Time 8/17/21 12:50pm

Relinquished (Signature) Oliver Khan Print Name Oliver Khan Date/Time 8/17/21 1256



Ayre
Anne Ayre
5975 E Marginal Ways
Seattle, WA 98134

RE: MM Grab 2021
Work Order Number: 2109045

September 17, 2021

Attention Anne Ayre:

Fremont Analytical, Inc. received 1 sample(s) on 9/2/2021 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Mercury by EPA Method 7471B
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Polychlorinated Biphenyls (PCB) by EPA 8082
Sample Moisture (Percent Moisture)
Semivolatile Organic Compounds by EPA Method 8270
Total Metals by EPA Method 6020B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Original



Date: 09/17/2021

CLIENT: Ayre
Project: MM Grab 2021
Work Order: 2109045

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2109045-001	G01	09/02/2021 10:00 AM	09/02/2021 1:16 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

CLIENT: Ayre
Project: MM Grab 2021

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

- * - Associated LCS is outside of control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Method Detection Limit
- R - High relative percent difference observed

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate



Client: Ayre
Project: MM Grab 2021
Lab ID: 2109045-001
Client Sample ID: G01

Collection Date: 9/2/2021 10:00:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
----------	--------	----	-----	------	-------	----	---------------

Polychlorinated Biphenyls (PCB) by EPA 8082

Batch ID: 33689 Analyst: SB

Aroclor 1016	ND	0.0166	0.00267		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1221	ND	0.0166	0.00267		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1232	ND	0.0166	0.00267		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1242	ND	0.0166	0.00267		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1248	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1254	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1260	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1262	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1268	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Total PCBs	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Surr: Decachlorobiphenyl	82.5	20.6 - 142			%Rec	1	09/14/21 11:45:50
Surr: Tetrachloro-m-xylene	89.4	22 - 157			%Rec	1	09/14/21 11:45:50

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 33649 Analyst: IH

Diesel (Fuel Oil)	ND	16.9	3.81		mg/Kg-dry	1	09/09/21 16:46:24
Heavy Oil	ND	33.8	7.36		mg/Kg-dry	1	09/09/21 16:46:24
Total Petroleum Hydrocarbons	ND	50.6	11.2		mg/Kg-dry	1	09/09/21 16:46:24
Surr: 2-Fluorobiphenyl	86.3	50 - 150			%Rec	1	09/09/21 16:46:24
Surr: o-Terphenyl	90.8	50 - 150			%Rec	1	09/09/21 16:46:24

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 33603 Analyst: SB

Benz(a)anthracene	ND	19.0	2.39		µg/Kg-dry	1	09/03/21 18:57:43
Chrysene	ND	38.0	6.88		µg/Kg-dry	1	09/03/21 18:57:43
Benzo(b)fluoranthene	ND	19.0	2.05		µg/Kg-dry	1	09/03/21 18:57:43
Benzo(k)fluoranthene	ND	19.0	2.57		µg/Kg-dry	1	09/03/21 18:57:43
Benzo(a)pyrene	ND	19.0	2.14		µg/Kg-dry	1	09/03/21 18:57:43
Indeno(1,2,3-cd)pyrene	ND	38.0	6.78		µg/Kg-dry	1	09/03/21 18:57:43
Dibenz(a,h)anthracene	ND	38.0	8.30		µg/Kg-dry	1	09/03/21 18:57:43
Surr: 2-Fluorobiphenyl	79.4	27.9 - 129			%Rec	1	09/03/21 18:57:43
Surr: Terphenyl-d14 (surr)	85.8	39.1 - 145	0		%Rec	1	09/03/21 18:57:43



Client: Ayre

Collection Date: 9/2/2021 10:00:00 AM

Project: MM Grab 2021

Lab ID: 2109045-001

Matrix: Soil

Client Sample ID: G01

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Semivolatile Organic Compounds by EPA Method 8270			Batch ID: 33602		Analyst: SB		
Phenol	ND	69.9	19.5		µg/Kg-dry	1	09/07/21 18:18:54
Bis(2-chloroethyl) ether	ND	93.2	32.4		µg/Kg-dry	1	09/07/21 18:18:54
2-Chlorophenol	ND	46.6	14.0		µg/Kg-dry	1	09/07/21 18:18:54
1,3-Dichlorobenzene	ND	46.6	15.3		µg/Kg-dry	1	09/07/21 18:18:54
1,4-Dichlorobenzene	ND	37.3	12.0		µg/Kg-dry	1	09/07/21 18:18:54
1,2-Dichlorobenzene	ND	37.3	12.3		µg/Kg-dry	1	09/07/21 18:18:54
Benzyl alcohol	ND	65.2	14.2		µg/Kg-dry	1	09/07/21 18:18:54
2-Methylphenol (o-cresol)	ND	55.9	23.9		µg/Kg-dry	1	09/07/21 18:18:54
Hexachloroethane	ND	69.9	19.0		µg/Kg-dry	1	09/07/21 18:18:54
N-Nitrosodi-n-propylamine	ND	93.2	44.2		µg/Kg-dry	1	09/07/21 18:18:54
3&4-Methylphenol (m, p-cresol)	ND	46.6	13.4		µg/Kg-dry	1	09/07/21 18:18:54
Nitrobenzene	ND	69.9	18.4		µg/Kg-dry	1	09/07/21 18:18:54
Isophorone	ND	37.3	12.2		µg/Kg-dry	1	09/07/21 18:18:54
2-Nitrophenol	ND	93.2	26.9		µg/Kg-dry	1	09/07/21 18:18:54
2,4-Dimethylphenol	ND	37.3	5.46		µg/Kg-dry	1	09/07/21 18:18:54
Bis(2-chloroethoxy)methane	ND	69.9	21.7		µg/Kg-dry	1	09/07/21 18:18:54
2,4-Dichlorophenol	ND	93.2	4.11		µg/Kg-dry	1	09/07/21 18:18:54
1,2,4-Trichlorobenzene	ND	37.3	11.5		µg/Kg-dry	1	09/07/21 18:18:54
Naphthalene	ND	46.6	14.1		µg/Kg-dry	1	09/07/21 18:18:54
4-Chloroaniline	ND	69.9	21.2		µg/Kg-dry	1	09/07/21 18:18:54
Hexachlorobutadiene	ND	37.3	8.54		µg/Kg-dry	1	09/07/21 18:18:54
4-Chloro-3-methylphenol	ND	93.2	34.3		µg/Kg-dry	1	09/07/21 18:18:54
2-Methylnaphthalene	ND	37.3	6.85		µg/Kg-dry	1	09/07/21 18:18:54
1-Methylnaphthalene	ND	37.3	11.0		µg/Kg-dry	1	09/07/21 18:18:54
Hexachlorocyclopentadiene	ND	93.2	20.7	Q	µg/Kg-dry	1	09/07/21 18:18:54
2,4,6-Trichlorophenol	ND	69.9	20.4		µg/Kg-dry	1	09/07/21 18:18:54
2,4,5-Trichlorophenol	ND	69.9	23.8		µg/Kg-dry	1	09/07/21 18:18:54
2-Chloronaphthalene	ND	37.3	6.62		µg/Kg-dry	1	09/07/21 18:18:54
2-Nitroaniline	ND	93.2	39.3		µg/Kg-dry	1	09/07/21 18:18:54
Acenaphthene	ND	37.3	6.51		µg/Kg-dry	1	09/07/21 18:18:54
Dimethylphthalate	ND	55.9	9.64		µg/Kg-dry	1	09/07/21 18:18:54



Client: Ayre

Collection Date: 9/2/2021 10:00:00 AM

Project: MM Grab 2021

Lab ID: 2109045-001

Matrix: Soil

Client Sample ID: G01

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
----------	--------	----	-----	------	-------	----	---------------

Semivolatile Organic Compounds by EPA Method 8270

Batch ID: 33602

Analyst: SB

2,6-Dinitrotoluene	ND	46.6	16.0		µg/Kg-dry	1	09/07/21 18:18:54
Acenaphthylene	ND	37.3	5.84		µg/Kg-dry	1	09/07/21 18:18:54
2,4-Dinitrophenol	ND	46.6	16.0	Q	µg/Kg-dry	1	09/07/21 18:18:54
Dibenzofuran	ND	37.3	5.57		µg/Kg-dry	1	09/07/21 18:18:54
2,4-Dinitrotoluene	ND	93.2	30.8		µg/Kg-dry	1	09/07/21 18:18:54
4-Nitrophenol	ND	466	13.5		µg/Kg-dry	1	09/07/21 18:18:54
Fluorene	ND	37.3	4.66		µg/Kg-dry	1	09/07/21 18:18:54
4-Chlorophenyl phenyl ether	ND	37.3	7.56		µg/Kg-dry	1	09/07/21 18:18:54
Diethylphthalate	34.5	69.9	21.1	J	µg/Kg-dry	1	09/07/21 18:18:54
4,6-Dinitro-2-methylphenol	ND	186	21.4		µg/Kg-dry	1	09/07/21 18:18:54
4-Bromophenyl phenyl ether	ND	69.9	25.2		µg/Kg-dry	1	09/07/21 18:18:54
Hexachlorobenzene	ND	46.6	14.4		µg/Kg-dry	1	09/07/21 18:18:54
Pentachlorophenol	ND	93.2	10.9		µg/Kg-dry	1	09/07/21 18:18:54
Phenanthrene	ND	37.3	8.08		µg/Kg-dry	1	09/07/21 18:18:54
Anthracene	ND	37.3	5.17		µg/Kg-dry	1	09/07/21 18:18:54
Carbazole	ND	37.3	13.0		µg/Kg-dry	1	09/07/21 18:18:54
Di-n-butylphthalate	ND	37.3	10.1		µg/Kg-dry	1	09/07/21 18:18:54
Fluoranthene	10.9	37.3	8.22	J	µg/Kg-dry	1	09/07/21 18:18:54
Pyrene	25.0	37.3	9.23	J	µg/Kg-dry	1	09/07/21 18:18:54
Butyl Benzylphthalate	ND	46.6	13.7		µg/Kg-dry	1	09/07/21 18:18:54
bis(2-Ethylhexyl)adipate	ND	93.2	18.5		µg/Kg-dry	1	09/07/21 18:18:54
Benz(a)anthracene	ND	37.3	11.2		µg/Kg-dry	1	09/07/21 18:18:54
Chrysene	ND	46.6	20.4		µg/Kg-dry	1	09/07/21 18:18:54
bis (2-Ethylhexyl) phthalate	ND	37.3	10.5		µg/Kg-dry	1	09/07/21 18:18:54
Di-n-octyl phthalate	ND	69.9	24.3		µg/Kg-dry	1	09/07/21 18:18:54
Benzo(b)fluoranthene	ND	37.3	9.86		µg/Kg-dry	1	09/07/21 18:18:54
Benzo(k)fluoranthene	ND	37.3	9.34		µg/Kg-dry	1	09/07/21 18:18:54
Benzo(a)pyrene	ND	37.3	13.5		µg/Kg-dry	1	09/07/21 18:18:54
Indeno(1,2,3-cd)pyrene	ND	69.9	24.3		µg/Kg-dry	1	09/07/21 18:18:54
Dibenz(a,h)anthracene	ND	93.2	36.3		µg/Kg-dry	1	09/07/21 18:18:54
Benzo(g,h,i)perylene	ND	69.9	27.0		µg/Kg-dry	1	09/07/21 18:18:54



Client: Ayre
Project: MM Grab 2021
Lab ID: 2109045-001
Client Sample ID: G01

Collection Date: 9/2/2021 10:00:00 AM

Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
----------	--------	----	-----	------	-------	----	---------------

Semivolatile Organic Compounds by EPA Method 8270

Batch ID: 33602 Analyst: SB

Surr: 2,4,6-Tribromophenol	111	18.4 - 156	0	%Rec	1	09/07/21 18:18:54
Surr: 2-Fluorobiphenyl	99.1	17.6 - 135	0	%Rec	1	09/07/21 18:18:54
Surr: Nitrobenzene-d5	80.5	8.6 - 139	0	%Rec	1	09/07/21 18:18:54
Surr: Phenol-d6	83.8	17.2 - 136	0	%Rec	1	09/07/21 18:18:54
Surr: p-Terphenyl	115	35.1 - 146	0	%Rec	1	09/07/21 18:18:54

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet acceptance criteria

Mercury by EPA Method 7471B

Batch ID: 33632 Analyst: CH

Mercury	ND	0.256	0.00517	mg/Kg-dry	1	09/09/21 12:15:06
---------	----	-------	---------	-----------	---	-------------------

Total Metals by EPA Method 6020B

Batch ID: 33614 Analyst: EH

Arsenic	0.643	0.0922	0.0309	mg/Kg-dry	1	09/09/21 17:41:09
Cadmium	0.0557	0.154	0.00254	J mg/Kg-dry	1	09/08/21 19:55:03
Chromium	26.2	0.307	0.100	mg/Kg-dry	1	09/08/21 19:55:03
Copper	35.0	0.769	0.144	mg/Kg-dry	1	09/08/21 19:55:03
Lead	0.946	0.154	0.0320	mg/Kg-dry	1	09/08/21 19:55:03
Silver	0.0486	0.115	0.0325	J mg/Kg-dry	1	09/08/21 19:55:03
Zinc	36.1	1.35	0.469	mg/Kg-dry	1	09/08/21 19:55:03

Sample Moisture (Percent Moisture)

Batch ID: R69699 Analyst: cb

Percent Moisture	2.19	0.500	0.100	wt%	1	09/03/21 11:44:10
------------------	------	-------	-------	-----	---	-------------------

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Total Metals by EPA Method 6020B

Sample ID: MB-33614	SampType: MBLK	Units: mg/Kg	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: MBLKS	Batch ID: 33614	Analysis Date: 9/7/2021	SeqNo: 1414499								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.0902									
Cadmium	ND	0.150									
Chromium	ND	0.301									
Copper	ND	0.752									
Lead	ND	0.150									
Silver	ND	0.113									
Zinc	ND	1.32									

Sample ID: LCS-33614	SampType: LCS	Units: mg/Kg	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: LCSS	Batch ID: 33614	Analysis Date: 9/7/2021	SeqNo: 1414500								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	1.88	0.160	2.000	0	93.8	80	120				
Chromium	41.7	0.320	40.00	0	104	80	120				
Copper	40.1	0.800	40.00	0	100	80	120				
Lead	20.8	0.160	20.00	0	104	80	120				
Silver	2.02	0.120	2.000	0	101	80	120				

Sample ID: 2108296-011AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: BATCH	Batch ID: 33614	Analysis Date: 9/7/2021	SeqNo: 1414503								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	45.1	0.101	42.00	1.362	104	75	125				
Cadmium	2.06	0.168	2.100	0.04000	96.4	75	125				
Chromium	64.4	0.336	42.00	17.92	111	75	125				
Copper	49.6	0.840	42.00	7.491	100	75	125				
Lead	21.3	0.168	21.00	1.160	96.1	75	125				
Silver	1.95	0.126	2.100	0	93.0	75	125				
Zinc	67.5	1.47	42.00	22.77	106	75	125				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Total Metals by EPA Method 6020B

Sample ID: 2108296-011AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: BATCH	Batch ID: 33614	Analysis Date: 9/7/2021	SeqNo: 1414503								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 2108296-011AMS	SampType: MSD	Units: mg/Kg-dry	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: BATCH	Batch ID: 33614	Analysis Date: 9/7/2021	SeqNo: 1414504								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic	46.0	0.103	42.96	1.362	104	75	125	45.14	1.82	20	
Cadmium	1.99	0.172	2.148	0.04000	90.8	75	125	2.064	3.61	20	
Chromium	61.6	0.344	42.96	17.92	102	75	125	64.43	4.48	20	
Copper	46.9	0.859	42.96	7.491	91.7	75	125	49.65	5.75	20	
Lead	20.9	0.172	21.48	1.160	91.7	75	125	21.35	2.32	20	
Silver	1.89	0.129	2.148	0	88.0	75	125	1.953	3.23	20	
Zinc	67.3	1.50	42.96	22.77	104	75	125	67.48	0.299	20	

Sample ID: LCS-33614	SampType: LCS	Units: mg/Kg	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: LCSS	Batch ID: 33614	Analysis Date: 9/8/2021	SeqNo: 1414611								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic	40.6	0.0960	40.00	0	101	80	120				
Zinc	41.0	1.40	40.00	0	103	80	120				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Mercury by EPA Method 7471B

Sample ID: MB-33632	SampType: MBLK	Units: mg/Kg	Prep Date: 9/8/2021	RunNo: 69807							
Client ID: MBLKS	Batch ID: 33632	Analysis Date: 9/9/2021	SeqNo: 1415415								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury ND 0.250

Sample ID: LCS-33632	SampType: LCS	Units: mg/Kg	Prep Date: 9/8/2021	RunNo: 69807							
Client ID: LCSS	Batch ID: 33632	Analysis Date: 9/9/2021	SeqNo: 1415416								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.446 0.250 0.5000 0 89.2 80 120

Sample ID: 2108296-001ADUP	SampType: DUP	Units: mg/Kg-dry	Prep Date: 9/8/2021	RunNo: 69807							
Client ID: BATCH	Batch ID: 33632	Analysis Date: 9/9/2021	SeqNo: 1415418								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.0140 0.248 0.01277 9.26 20 J

Sample ID: 2108296-001AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 9/8/2021	RunNo: 69807							
Client ID: BATCH	Batch ID: 33632	Analysis Date: 9/9/2021	SeqNo: 1415419								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.546 0.268 0.5367 0.01277 99.4 70 130

Sample ID: 2108296-001AMSD	SampType: MSD	Units: mg/Kg-dry	Prep Date: 9/8/2021	RunNo: 69807							
Client ID: BATCH	Batch ID: 33632	Analysis Date: 9/9/2021	SeqNo: 1415420								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.545 0.258 0.5161 0.01277 103 70 130 0.5464 0.257 20

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID: MB-33649	SampType: MBLK	Units: mg/Kg				Prep Date: 9/9/2021	RunNo: 69859				
Client ID: MBLKS	Batch ID: 33649					Analysis Date: 9/9/2021	SeqNo: 1416438				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	16.7									
Heavy Oil	ND	33.3									
Total Petroleum Hydrocarbons	ND	50.0									
Surr: 2-Fluorobiphenyl	3.00		3.333		90.0	50	150				
Surr: o-Terphenyl	3.08		3.333		92.5	50	150				

Sample ID: LCS-33649	SampType: LCS	Units: mg/Kg				Prep Date: 9/9/2021	RunNo: 69859				
Client ID: LCSS	Batch ID: 33649					Analysis Date: 9/9/2021	SeqNo: 1416439				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	517	150	500.0	0	103	77.2	122				
Surr: 2-Fluorobiphenyl	10.2		10.00		102	50	150				
Surr: o-Terphenyl	10.3		10.00		103	50	150				

Sample ID: 2109045-001AMS	SampType: MS	Units: mg/Kg-dry				Prep Date: 9/9/2021	RunNo: 69859				
Client ID: G01	Batch ID: 33649					Analysis Date: 9/9/2021	SeqNo: 1416441				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	181	50.9	169.7	0	106	68	132				
Surr: 2-Fluorobiphenyl	3.19		3.393		94.0	50	150				
Surr: o-Terphenyl	4.06		3.393		120	50	150				

Sample ID: 2109045-001AMSD	SampType: MSD	Units: mg/Kg-dry				Prep Date: 9/9/2021	RunNo: 69859				
Client ID: G01	Batch ID: 33649					Analysis Date: 9/9/2021	SeqNo: 1416442				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	180	49.7	165.6	0	109	68	132	180.6	0.0567	30	
Surr: 2-Fluorobiphenyl	2.73		3.312		82.5	50	150		0		
Surr: o-Terphenyl	3.57		3.312		108	50	150		0		

Work Order: 2109045
CLIENT: Ayre
Project: MM Grab 2021

QC SUMMARY REPORT
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID: 2109045-001AMSD	SampType: MSD	Units: mg/Kg-dry	Prep Date: 9/9/2021	RunNo: 69859							
Client ID: G01	Batch ID: 33649	Analysis Date: 9/9/2021	SeqNo: 1416442								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: MB-33603	SampType: MBLK	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69751							
Client ID: MBLKS	Batch ID: 33603	Analysis Date: 9/3/2021	SeqNo: 1413886								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	20.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	20.0									
Benzo(k)fluoranthene	ND	20.0									
Benzo(a)pyrene	ND	20.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Surr: 2-Fluorobiphenyl	892		1,000		89.2	27.9	129				
Surr: Terphenyl-d14 (surr)	888		1,000		88.8	39.1	145				

Sample ID: LCS-33603	SampType: LCS	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69751							
Client ID: LCSS	Batch ID: 33603	Analysis Date: 9/3/2021	SeqNo: 1413887								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	1,560	20.0	2,000	0	77.9	64.4	113				
Chrysene	1,420	40.0	2,000	0	70.8	57.3	113				
Benzo(b)fluoranthene	1,470	20.0	2,000	0	73.6	58.2	115				
Benzo(k)fluoranthene	1,470	20.0	2,000	0	73.5	53.4	121				
Benzo(a)pyrene	1,560	20.0	2,000	0	78.2	64.7	125				
Indeno(1,2,3-cd)pyrene	1,430	40.0	2,000	0	71.6	61.6	113				
Dibenz(a,h)anthracene	1,490	40.0	2,000	0	74.7	62.1	116				
Surr: 2-Fluorobiphenyl	849		1,000		84.9	27.9	129				
Surr: Terphenyl-d14 (surr)	856		1,000		85.6	39.1	145				

Sample ID: 2109038-001AMS	SampType: MS	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69751							
Client ID: BATCH	Batch ID: 33603	Analysis Date: 9/3/2021	SeqNo: 1413889								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	1,190	18.9	1,895	11.45	62.2	45	110				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: 2109038-001AMS	SampType: MS	Units: µg/Kg-dry				Prep Date: 9/3/2021	RunNo: 69751				
Client ID: BATCH	Batch ID: 33603					Analysis Date: 9/3/2021	SeqNo: 1413889				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chrysene	1,090	37.9	1,895	0	57.8	42.4	106				
Benzo(b)fluoranthene	1,140	18.9	1,895	0	60.0	43.7	108				
Benzo(k)fluoranthene	1,120	18.9	1,895	0	59.0	39.5	113				
Benzo(a)pyrene	1,190	18.9	1,895	7.844	62.6	44.1	122				
Indeno(1,2,3-cd)pyrene	1,020	37.9	1,895	0	54.0	40.2	109				
Dibenz(a,h)anthracene	1,050	37.9	1,895	0	55.2	31.4	126				
Surr: 2-Fluorobiphenyl	686		947.4		72.4	27.9	129				
Surr: Terphenyl-d14 (surr)	628		947.4		66.3	39.1	145				

Sample ID: 2109038-001AMSD	SampType: MSD	Units: µg/Kg-dry				Prep Date: 9/3/2021	RunNo: 69751				
Client ID: BATCH	Batch ID: 33603					Analysis Date: 9/3/2021	SeqNo: 1413890				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	1,410	17.7	1,769	11.45	79.0	45	110	1,190	16.8	30	
Chrysene	1,320	35.4	1,769	0	74.8	42.4	106	1,095	18.9	30	
Benzo(b)fluoranthene	1,330	17.7	1,769	0	75.0	43.7	108	1,136	15.5	30	
Benzo(k)fluoranthene	1,410	17.7	1,769	0	79.6	39.5	113	1,119	22.8	30	
Benzo(a)pyrene	1,450	17.7	1,769	7.844	81.4	44.1	122	1,194	19.2	30	
Indeno(1,2,3-cd)pyrene	1,300	35.4	1,769	0	73.6	40.2	109	1,022	24.0	30	
Dibenz(a,h)anthracene	1,350	35.4	1,769	0	76.5	31.4	126	1,046	25.5	30	
Surr: 2-Fluorobiphenyl	747		884.4		84.5	27.9	129		0		
Surr: Terphenyl-d14 (surr)	742		884.4		83.9	39.1	145		0		

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID: MB-33689	SampType: MBLK	Units: mg/Kg			Prep Date: 9/14/2021	RunNo: 69900					
Client ID: MBLKS	Batch ID: 33689				Analysis Date: 9/14/2021	SeqNo: 1417273					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.0167									
Aroclor 1221	ND	0.0167									
Aroclor 1232	ND	0.0167									
Aroclor 1242	ND	0.0167									
Aroclor 1248	ND	0.0167									
Aroclor 1254	ND	0.0167									
Aroclor 1260	ND	0.0167									
Aroclor 1262	ND	0.0167									
Aroclor 1268	ND	0.0167									
Total PCBs	ND	0.0167									
Surr: Decachlorobiphenyl	45.9		66.98		68.6	20.6	142				
Surr: Tetrachloro-m-xylene	49.9		66.98		74.6	22	157				

Sample ID: LCS1-33689	SampType: LCS	Units: mg/Kg			Prep Date: 9/14/2021	RunNo: 69900					
Client ID: LCSS	Batch ID: 33689				Analysis Date: 9/14/2021	SeqNo: 1417274					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1254	0.948	0.0500	1.000	0	94.8	48.1	147				
Surr: Decachlorobiphenyl	196		200.0		97.8	20.6	142				
Surr: Tetrachloro-m-xylene	222		200.0		111	22	157				

Sample ID: LCS2-33689	SampType: LCS	Units: mg/Kg			Prep Date: 9/14/2021	RunNo: 69900					
Client ID: LCSS	Batch ID: 33689				Analysis Date: 9/14/2021	SeqNo: 1417275					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.850	0.0500	1.000	0	85.0	52.2	136				
Aroclor 1260	0.926	0.0500	1.000	0	92.6	50.5	150				
Surr: Decachlorobiphenyl	179		200.0		89.4	20.6	142				
Surr: Tetrachloro-m-xylene	213		200.0		106	22	157				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID: LCS2-33689	SampType: LCS	Units: mg/Kg	Prep Date: 9/14/2021	RunNo: 69900							
Client ID: LCSS	Batch ID: 33689	Analysis Date: 9/14/2021	SeqNo: 1417275								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 2109045-001AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 9/14/2021	RunNo: 69900							
Client ID: G01	Batch ID: 33689	Analysis Date: 9/14/2021	SeqNo: 1417277								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1254	0.320	0.0170	0.3393	0	94.4	50	150				
Surr: Decachlorobiphenyl	62.8		67.86		92.5	20.6	142				
Surr: Tetrachloro-m-xylene	57.8		67.86		85.2	22	157				

Sample ID: 2109045-001AMSD	SampType: MSD	Units: mg/Kg-dry	Prep Date: 9/14/2021	RunNo: 69900							
Client ID: G01	Batch ID: 33689	Analysis Date: 9/14/2021	SeqNo: 1417278								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1254	0.318	0.0170	0.3391	0	93.7	50	150	0.3203	0.841		
Surr: Decachlorobiphenyl	58.7		67.82		86.5	20.6	142		0		
Surr: Tetrachloro-m-xylene	47.8		67.82		70.5	22	157		0		

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: MB-33602	SampType: MBLK	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: MBLKS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1413991							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Phenol	ND	75.0									
Bis(2-chloroethyl) ether	ND	100									
2-Chlorophenol	ND	50.0									
1,3-Dichlorobenzene	ND	50.0									
1,4-Dichlorobenzene	ND	40.0									
1,2-Dichlorobenzene	ND	40.0									
Benzyl alcohol	ND	70.0									
2-Methylphenol (o-cresol)	ND	60.0									
Hexachloroethane	ND	75.0									
N-Nitrosodi-n-propylamine	ND	100									
3&4-Methylphenol (m, p-cresol)	ND	50.0									
Nitrobenzene	ND	75.0									
Isophorone	ND	40.0									
2-Nitrophenol	ND	100									
2,4-Dimethylphenol	ND	40.0									
Bis(2-chloroethoxy)methane	ND	75.0									
2,4-Dichlorophenol	ND	100									
1,2,4-Trichlorobenzene	ND	40.0									
Naphthalene	ND	50.0									
4-Chloroaniline	ND	75.0									
Hexachlorobutadiene	ND	40.0									
4-Chloro-3-methylphenol	ND	100									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Hexachlorocyclopentadiene	ND	100									
2,4,6-Trichlorophenol	ND	75.0									
2,4,5-Trichlorophenol	ND	75.0									
2-Chloronaphthalene	ND	40.0									
2-Nitroaniline	ND	100									
Acenaphthene	ND	40.0									

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: MB-33602	SampType: MBLK	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: MBLKS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1413991							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Dimethylphthalate	ND	60.0									
2,6-Dinitrotoluene	ND	50.0									
Acenaphthylene	ND	40.0									
2,4-Dinitrophenol	ND	50.0									
Dibenzofuran	ND	40.0									
2,4-Dinitrotoluene	ND	100									
4-Nitrophenol	ND	500									
Fluorene	ND	40.0									
4-Chlorophenyl phenyl ether	ND	40.0									
Diethylphthalate	ND	75.0									
4,6-Dinitro-2-methylphenol	ND	200									
4-Bromophenyl phenyl ether	ND	75.0									
Hexachlorobenzene	ND	50.0									
Pentachlorophenol	ND	100									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Carbazole	ND	40.0									
Di-n-butylphthalate	12.4	40.0									J
Fluoranthene	ND	40.0									
Pyrene	33.3	40.0									J
Butyl Benzylphthalate	ND	50.0									
bis(2-Ethylhexyl)adipate	ND	100									
Benz(a)anthracene	ND	40.0									
Chrysene	ND	50.0									
bis (2-Ethylhexyl) phthalate	ND	40.0									
Di-n-octyl phthalate	ND	75.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	75.0									

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: MB-33602	SampType: MBLK	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: MBLKS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1413991							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Dibenz(a,h)anthracene	ND	100									
Benzo(g,h,i)perylene	ND	75.0									
Surr: 2,4,6-Tribromophenol	1,900		2,000		94.8	18.4	156				
Surr: 2-Fluorobiphenyl	1,120		1,000		112	17.6	135				
Surr: Nitrobenzene-d5	871		1,000		87.1	8.6	139				
Surr: Phenol-d6	1,860		2,000		93.0	17.2	136				
Surr: p-Terphenyl	1,200		1,000		120	35.1	146				

Sample ID: LCS-33602	SampType: LCS	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: LCSS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1413992							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Phenol	1,850	75.0	2,000	0	92.7	53.3	121				
Bis(2-chloroethyl) ether	1,710	100	2,000	0	85.4	55.4	126				
2-Chlorophenol	2,070	50.0	2,000	0	104	60.2	118				
1,3-Dichlorobenzene	1,980	50.0	2,000	0	99.0	54.9	115				
1,4-Dichlorobenzene	1,910	40.0	2,000	0	95.6	50.2	118				
1,2-Dichlorobenzene	2,040	40.0	2,000	0	102	50.9	120				
Benzyl alcohol	2,050	70.0	2,000	0	102	5	159				
2-Methylphenol (o-cresol)	2,080	60.0	2,000	0	104	57.3	121				
Hexachloroethane	1,740	75.0	2,000	0	86.9	47.9	125				
N-Nitrosodi-n-propylamine	1,870	100	2,000	0	93.4	57.3	124				
3&4-Methylphenol (m, p-cresol)	2,000	50.0	2,000	0	99.8	56.6	128				
Nitrobenzene	1,720	75.0	2,000	0	85.9	59.4	122				
Isophorone	1,970	40.0	2,000	0	98.6	58.5	116				
2-Nitrophenol	2,200	100	2,000	0	110	57	128				
2,4-Dimethylphenol	2,020	40.0	2,000	0	101	57.2	119				
Bis(2-chloroethoxy)methane	1,900	75.0	2,000	0	94.8	59.9	117				
2,4-Dichlorophenol	2,230	100	2,000	0	112	60.3	115				
1,2,4-Trichlorobenzene	2,150	40.0	2,000	0	108	60.1	117				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: LCS-33602	SampType: LCS	Units: µg/Kg				Prep Date: 9/3/2021	RunNo: 69749				
Client ID: LCSS	Batch ID: 33602					Analysis Date: 9/7/2021	SeqNo: 1413992				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	2,020	50.0	2,000	0	101	58.9	117				
4-Chloroaniline	1,960	75.0	2,000	0	98.2	60	108				
Hexachlorobutadiene	2,040	40.0	2,000	0	102	60	117				
4-Chloro-3-methylphenol	2,170	100	2,000	0	108	54.2	125				
2-Methylnaphthalene	2,030	40.0	2,000	0	102	60.3	121				
1-Methylnaphthalene	2,130	40.0	2,000	0	106	60.4	119				
Hexachlorocyclopentadiene	1,770	100	2,000	0	88.7	45.5	151				
2,4,6-Trichlorophenol	2,470	75.0	2,000	0	123	62.2	125				
2,4,5-Trichlorophenol	2,420	75.0	2,000	0	121	60.3	119				S
2-Chloronaphthalene	2,100	40.0	2,000	0	105	61.7	118				
2-Nitroaniline	1,890	100	2,000	0	94.5	60.6	124				
Acenaphthene	2,010	40.0	2,000	0	100	58.2	116				
Dimethylphthalate	2,160	60.0	2,000	0	108	57.9	136				
2,6-Dinitrotoluene	2,290	50.0	2,000	0	115	62.5	126				
Acenaphthylene	2,160	40.0	2,000	0	108	60.8	112				
2,4-Dinitrophenol	2,450	50.0	4,000	0	61.3	5	117				
Dibenzofuran	2,070	40.0	2,000	0	103	60.8	117				
2,4-Dinitrotoluene	2,200	100	2,000	0	110	62.4	127				
4-Nitrophenol	2,220	500	2,000	0	111	35.3	123				
Fluorene	2,150	40.0	2,000	0	107	60.6	117				
4-Chlorophenyl phenyl ether	2,210	40.0	2,000	0	110	59.7	121				
Diethylphthalate	2,190	75.0	2,000	0	109	60.7	120				
4,6-Dinitro-2-methylphenol	1,960	200	2,000	0	98.0	19.6	140				
4-Bromophenyl phenyl ether	2,230	75.0	2,000	0	112	58.7	123				
Hexachlorobenzene	2,150	50.0	2,000	0	108	60.1	124				
Pentachlorophenol	2,570	100	2,000	0	129	28.5	131				
Phenanthrene	2,100	40.0	2,000	0	105	57.6	119				
Anthracene	2,190	40.0	2,000	0	110	60.2	117				
Carbazole	2,240	40.0	2,000	0	112	59.9	120				
Di-n-butylphthalate	2,320	40.0	2,000	0	116	60	125				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: LCS-33602	SampType: LCS	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: LCSS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1413992							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoranthene	2,350	40.0	2,000	0	118	60.6	120				
Pyrene	2,330	40.0	2,000	0	116	61.1	117				
Butyl Benzylphthalate	2,690	50.0	2,000	0	135	56	137				
bis(2-Ethylhexyl)adipate	2,710	100	2,000	0	136	54.7	138				
Chrysene	2,100	50.0	2,000	0	105	62.1	119				
bis (2-Ethylhexyl) phthalate	2,590	40.0	2,000	0	129	55	141				
Di-n-octyl phthalate	2,970	75.0	2,000	0	149	49.7	150				
Benzo(b)fluoranthene	2,170	40.0	2,000	0	109	62.6	126				
Benzo(k)fluoranthene	2,100	40.0	2,000	0	105	62.3	123				
Benzo(a)pyrene	2,550	40.0	2,000	0	128	68.6	133				
Benzo(g,h,i)perylene	2,430	75.0	2,000	0	122	51.7	124				
Surr: 2,4,6-Tribromophenol	2,570		2,000		128	18.4	156				
Surr: 2-Fluorobiphenyl	1,040		1,000		104	17.6	135				
Surr: Nitrobenzene-d5	814		1,000		81.4	8.6	139				
Surr: Phenol-d6	1,840		2,000		91.9	17.2	136				
Surr: p-Terphenyl	1,130		1,000		113	35.1	146				

NOTES:

S - Outlying spike recovery observed (high bias). Detections will be qualified with a *.

Sample ID: LCS-33602	SampType: LCS	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: LCSS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1414002							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	2,080	40.0	2,000	0	104	55.2	119				
Surr: 2,4,6-Tribromophenol	2,630		2,000		132	18.4	156				
Surr: 2-Fluorobiphenyl	1,060		1,000		106	17.6	135				
Surr: Nitrobenzene-d5	900		1,000		90.0	8.6	139				
Surr: Phenol-d6	1,890		2,000		94.4	17.2	136				
Surr: p-Terphenyl	1,200		1,000		120	35.1	146				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: LCS-33602	SampType: LCS	Units: µg/Kg				Prep Date: 9/3/2021	RunNo: 69749				
Client ID: LCSS	Batch ID: 33602					Analysis Date: 9/7/2021	SeqNo: 1414449				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	2,130	75.0	2,000	0	107	57.1	121				
Dibenz(a,h)anthracene	2,400	100	2,000	0	120	53.1	126				
Surr: 2,4,6-Tribromophenol	2,450		2,000		123	18.4	156				
Surr: 2-Fluorobiphenyl	1,010		1,000		101	17.6	135				
Surr: Nitrobenzene-d5	919		1,000		91.9	8.6	139				
Surr: Phenol-d6	2,000		2,000		100	17.2	136				
Surr: p-Terphenyl	1,110		1,000		111	35.1	146				

Sample ID: 2109049-021AMS	SampType: MS	Units: µg/Kg-dry				Prep Date: 9/3/2021	RunNo: 69749				
Client ID: BATCH	Batch ID: 33602					Analysis Date: 9/7/2021	SeqNo: 1414450				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phenol	1,690	84.6	2,255	0	74.9	42.6	107				
Bis(2-chloroethyl) ether	1,540	113	2,255	0	68.4	25.3	125				
2-Chlorophenol	1,820	56.4	2,255	0	80.8	22.9	117				
1,3-Dichlorobenzene	1,780	56.4	2,255	0	79.1	11	118				
1,4-Dichlorobenzene	1,730	45.1	2,255	0	76.7	12.4	118				
1,2-Dichlorobenzene	1,640	45.1	2,255	0	72.6	14.9	118				
Benzyl alcohol	1,880	78.9	2,255	0	83.2	5	126				
2-Methylphenol (o-cresol)	1,670	67.7	2,255	0	74.1	40	114				
Hexachloroethane	1,530	84.6	2,255	0	67.7	12.1	124				
N-Nitrosodi-n-propylamine	1,600	113	2,255	0	70.9	33.3	120				
3&4-Methylphenol (m, p-cresol)	1,830	56.4	2,255	0	81.3	39.4	120				
Nitrobenzene	1,610	84.6	2,255	0	71.2	37.5	115				
Isophorone	1,730	45.1	2,255	0	76.9	44.8	109				
2-Nitrophenol	1,750	113	2,255	0	77.8	44.5	116				
2,4-Dimethylphenol	1,670	45.1	2,255	0	73.9	39.5	107				
Bis(2-chloroethoxy)methane	1,530	84.6	2,255	0	67.8	41.4	110				
2,4-Dichlorophenol	1,900	113	2,255	0	84.2	44.2	105				
1,2,4-Trichlorobenzene	1,800	45.1	2,255	0	79.8	34	111				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: 2109049-021AMS	SampType: MS	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: BATCH	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1414450							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Naphthalene	1,840	56.4	2,255	0	81.5	43	108				
4-Chloroaniline	1,660	84.6	2,255	0	73.8	19.5	98.4				
Hexachlorobutadiene	1,990	45.1	2,255	0	88.2	30.2	114				
4-Chloro-3-methylphenol	1,890	113	2,255	0	83.7	47.3	114				
2-Methylnaphthalene	1,750	45.1	2,255	0	77.5	49.6	107				
1-Methylnaphthalene	1,910	45.1	2,255	0	84.6	49.8	105				
Hexachlorocyclopentadiene	1,270	113	2,255	0	56.2	5	142				
2,4,6-Trichlorophenol	2,240	84.6	2,255	0	99.4	44.2	117				
2,4,5-Trichlorophenol	2,230	84.6	2,255	0	98.8	43.8	109				
2-Chloronaphthalene	1,860	45.1	2,255	0	82.5	41.6	108				
2-Nitroaniline	1,690	113	2,255	0	75.0	51.4	118				
Acenaphthene	1,810	45.1	2,255	0	80.1	41.3	106				
Dimethylphthalate	1,940	67.7	2,255	0	86.0	46.3	113				
2,6-Dinitrotoluene	1,990	56.4	2,255	0	88.3	49.5	115				
Acenaphthylene	1,950	45.1	2,255	0	86.3	43.5	101				
2,4-Dinitrophenol	2,720	56.4	4,510	0	60.3	5	133				
Dibenzofuran	1,860	45.1	2,255	7.508	82.1	43.4	107				
2,4-Dinitrotoluene	1,940	113	2,255	0	86.1	50.2	115				
4-Nitrophenol	2,310	564	2,255	0	102	30.7	119				
Fluorene	1,850	45.1	2,255	0	81.9	42.4	109				
4-Chlorophenyl phenyl ether	1,950	45.1	2,255	0	86.4	46	110				
Diethylphthalate	1,830	84.6	2,255	0	81.1	47	112				
4,6-Dinitro-2-methylphenol	1,910	226	2,255	0	84.7	5	157				
4-Bromophenyl phenyl ether	1,920	84.6	2,255	0	85.2	46	111				
Hexachlorobenzene	1,980	56.4	2,255	0	87.6	45.6	110				
Pentachlorophenol	2,180	113	2,255	0	96.9	10.4	151				
Phenanthrene	1,940	45.1	2,255	88.29	82.2	33.3	117				
Anthracene	1,950	45.1	2,255	19.41	85.5	35.9	114				
Carbazole	1,990	45.1	2,255	0	88.2	38.6	117				
Di-n-butylphthalate	2,090	45.1	2,255	0	92.8	44.5	123				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: 2109049-021AMS	SampType: MS	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: BATCH	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1414450							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Fluoranthene	2,210	45.1	2,255	139.5	91.8	29.9	125				
Pyrene	2,250	45.1	2,255	206.3	90.6	31.8	120				
Butyl Benzylphthalate	2,320	56.4	2,255	0	103	48.1	133				
bis(2-Ethylhexyl)adipate	2,550	113	2,255	0	113	52.1	134				
Benz(a)anthracene	2,160	45.1	2,255	84.24	91.9	29.6	121				
Chrysene	1,880	56.4	2,255	85.91	79.7	27.8	120				
bis (2-Ethylhexyl) phthalate	2,360	45.1	2,255	0	105	35.2	146				
Di-n-octyl phthalate	2,800	84.6	2,255	0	124	58.2	143				
Benzo(b)fluoranthene	2,140	45.1	2,255	90.21	90.7	24.3	130				
Benzo(k)fluoranthene	2,100	45.1	2,255	74.13	89.9	6.58	150				
Benzo(a)pyrene	2,500	45.1	2,255	136.8	105	21.7	148				
Indeno(1,2,3-cd)pyrene	2,030	84.6	2,255	96.36	85.6	28.7	126				
Dibenz(a,h)anthracene	2,260	113	2,255	51.02	98.1	31.8	129				
Benzo(g,h,i)perylene	2,020	84.6	2,255	110.3	84.8	4.72	138				
Surr: 2,4,6-Tribromophenol	2,260		2,255		100	18.4	156				
Surr: 2-Fluorobiphenyl	991		1,128		87.9	17.6	135				
Surr: Nitrobenzene-d5	794		1,128		70.4	8.6	139				
Surr: Phenol-d6	1,800		2,255		80.0	17.2	136				
Surr: p-Terphenyl	994		1,128		88.2	35.1	146				

Sample ID: 2109049-021AMSD	SampType: MSD	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: BATCH	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1414531							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Phenol	1,790	83.9	2,239	0	79.9	42.6	107	1,689	5.70	50	
Bis(2-chloroethyl) ether	1,630	112	2,239	0	72.6	25.3	125	1,542	5.28	50	
2-Chlorophenol	1,980	56.0	2,239	0	88.5	22.9	117	1,823	8.30	50	
1,3-Dichlorobenzene	1,880	56.0	2,239	0	84.1	11	118	1,784	5.34	50	
1,4-Dichlorobenzene	1,890	44.8	2,239	0	84.3	12.4	118	1,729	8.71	50	
1,2-Dichlorobenzene	1,920	44.8	2,239	0	85.8	14.9	118	1,638	15.9	50	

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: 2109049-021AMSD	SampType: MSD	Units: µg/Kg-dry				Prep Date: 9/3/2021			RunNo: 69749		
Client ID: BATCH	Batch ID: 33602					Analysis Date: 9/7/2021			SeqNo: 1414531		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzyl alcohol	2,170	78.3	2,239	0	97.2	5	126	1,876	14.8	50	
2-Methylphenol (o-cresol)	2,000	67.2	2,239	0	89.1	40	114	1,670	17.7	50	
Hexachloroethane	1,640	83.9	2,239	0	73.4	12.1	124	1,527	7.31	50	
N-Nitrosodi-n-propylamine	1,700	112	2,239	0	75.8	33.3	120	1,599	5.97	50	
3&4-Methylphenol (m, p-cresol)	1,900	56.0	2,239	0	84.9	39.4	120	1,834	3.56	50	
Nitrobenzene	1,630	83.9	2,239	0	72.7	37.5	115	1,605	1.39	50	
Isophorone	1,920	44.8	2,239	0	85.9	44.8	109	1,734	10.3	50	
2-Nitrophenol	2,130	112	2,239	0	95.2	44.5	116	1,754	19.4	50	
2,4-Dimethylphenol	2,020	44.8	2,239	0	90.3	39.5	107	1,667	19.2	50	
Bis(2-chloroethoxy)methane	1,800	83.9	2,239	0	80.6	41.4	110	1,528	16.5	50	
2,4-Dichlorophenol	2,150	112	2,239	0	96.1	44.2	105	1,899	12.4	50	
1,2,4-Trichlorobenzene	1,930	44.8	2,239	0	86.2	34	111	1,800	6.97	50	
Naphthalene	1,950	56.0	2,239	0	87.0	43	108	1,837	5.82	50	
4-Chloroaniline	1,760	83.9	2,239	0	78.5	19.5	98.4	1,665	5.42	50	
Hexachlorobutadiene	2,060	44.8	2,239	0	91.9	30.2	114	1,989	3.38	50	
4-Chloro-3-methylphenol	2,130	112	2,239	0	95.2	47.3	114	1,889	12.1	50	
2-Methylnaphthalene	1,910	44.8	2,239	0	85.3	49.6	107	1,747	8.87	50	
1-Methylnaphthalene	2,000	44.8	2,239	0	89.4	49.8	105	1,908	4.77	50	
Hexachlorocyclopentadiene	1,420	112	2,239	0	63.3	5	142	1,267	11.3	50	
2,4,6-Trichlorophenol	2,360	83.9	2,239	0	105	44.2	117	2,241	5.05	50	
2,4,5-Trichlorophenol	2,410	83.9	2,239	0	108	43.8	109	2,228	7.86	50	
2-Chloronaphthalene	2,130	44.8	2,239	0	95.1	41.6	108	1,861	13.4	50	
2-Nitroaniline	2,040	112	2,239	0	91.4	51.4	118	1,692	18.9	50	
Acenaphthene	1,990	44.8	2,239	0	89.1	41.3	106	1,806	9.92	50	
Dimethylphthalate	2,130	67.2	2,239	0	95.1	46.3	113	1,938	9.36	50	
2,6-Dinitrotoluene	2,130	56.0	2,239	0	95.0	49.5	115	1,990	6.65	50	
Acenaphthylene	2,090	44.8	2,239	0	93.4	43.5	101	1,946	7.16	50	
2,4-Dinitrophenol	2,830	56.0	4,477	0	63.1	5	133	2,721	3.77	50	
Dibenzofuran	2,030	44.8	2,239	7.508	90.2	43.4	107	1,860	8.63	50	
2,4-Dinitrotoluene	2,020	112	2,239	0	90.4	50.2	115	1,943	4.06	50	

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: 2109049-021AMSD	SampType: MSD	Units: µg/Kg-dry				Prep Date: 9/3/2021			RunNo: 69749		
Client ID: BATCH	Batch ID: 33602					Analysis Date: 9/7/2021			SeqNo: 1414531		
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Nitrophenol	2,420	560	2,239	0	108	30.7	119	2,305	5.01	50	
Fluorene	2,090	44.8	2,239	0	93.1	42.4	109	1,846	12.1	50	
4-Chlorophenyl phenyl ether	2,060	44.8	2,239	0	91.8	46	110	1,949	5.31	50	
Diethylphthalate	2,110	83.9	2,239	0	94.4	47	112	1,830	14.4	50	
4,6-Dinitro-2-methylphenol	1,970	224	2,239	0	88.1	5	157	1,909	3.23	50	
4-Bromophenyl phenyl ether	2,040	83.9	2,239	0	91.3	46	111	1,921	6.20	50	
Hexachlorobenzene	2,180	56.0	2,239	0	97.5	45.6	110	1,976	9.94	50	
Pentachlorophenol	2,320	112	2,239	0	104	10.4	151	2,184	5.94	50	
Phenanthrene	2,050	44.8	2,239	88.29	87.9	33.3	117	1,943	5.59	50	
Anthracene	2,010	44.8	2,239	19.41	89.1	35.9	114	1,947	3.34	50	
Carbazole	2,060	44.8	2,239	0	92.0	38.6	117	1,989	3.46	50	
Di-n-butylphthalate	2,250	44.8	2,239	0	100	44.5	123	2,093	7.11	50	
Fluoranthene	2,170	44.8	2,239	139.5	90.6	29.9	125	2,210	1.89	50	
Pyrene	2,260	44.8	2,239	206.3	91.9	31.8	120	2,250	0.584	50	
Butyl Benzylphthalate	2,370	56.0	2,239	0	106	48.1	133	2,323	2.11	50	
bis(2-Ethylhexyl)adipate	2,620	112	2,239	0	117	52.1	134	2,552	2.56	50	
Benz(a)anthracene	2,290	44.8	2,239	84.24	98.4	29.6	121	2,158	5.79	50	
Chrysene	2,080	56.0	2,239	85.91	89.1	27.8	120	1,882	9.95	50	
bis (2-Ethylhexyl) phthalate	2,590	44.8	2,239	0	116	35.2	146	2,362	9.17	50	
Di-n-octyl phthalate	2,810	83.9	2,239	0	126	58.2	143	2,800	0.343	50	
Benzo(b)fluoranthene	2,310	44.8	2,239	90.21	99.0	24.3	130	2,136	7.68	50	
Benzo(k)fluoranthene	2,210	44.8	2,239	74.13	95.4	6.58	150	2,101	5.06	50	
Benzo(a)pyrene	2,540	44.8	2,239	136.8	107	21.7	148	2,497	1.55	50	
Indeno(1,2,3-cd)pyrene	2,360	83.9	2,239	96.36	101	28.7	126	2,026	15.2	50	
Dibenz(a,h)anthracene	2,610	112	2,239	51.02	115	31.8	129	2,263	14.4	50	
Benzo(g,h,i)perylene	2,200	83.9	2,239	110.3	93.2	4.72	138	2,023	8.27	50	
Surr: 2,4,6-Tribromophenol	2,220		2,239		99.1	18.4	156		0		
Surr: 2-Fluorobiphenyl	1,030		1,119		91.9	17.6	135		0		
Surr: Nitrobenzene-d5	825		1,119		73.7	8.6	139		0		
Surr: Phenol-d6	1,820		2,239		81.5	17.2	136		0		

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: 2109049-021AMSD	SampType: MSD	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: BATCH	Batch ID: 33602	Analysis Date: 9/7/2021	SeqNo: 1414531								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: p-Terphenyl	1,030		1,119		92.1	35.1	146		0		

Client Name: **CALPO**

 Work Order Number: **2109045**

 Logged by: **Gabrielle Coeuille**

 Date Received: **9/2/2021 1:16:00 PM**

Chain of Custody

1. Is Chain of Custody complete? Yes No Not Present
2. How was the sample delivered? Client

Log In

3. Coolers are present? Yes No NA
4. Shipping container/cooler in good condition? Yes No
5. Custody Seals present on shipping container/cooler?
(Refer to comments for Custody Seals not intact) Yes No Not Present
6. Was an attempt made to cool the samples? Yes No NA
7. Were all items received at a temperature of >2°C to 6°C * Unknown prior to receipt Yes No NA
8. Sample(s) in proper container(s)? Yes No
9. Sufficient sample volume for indicated test(s)? Yes No
10. Are samples properly preserved? Yes No
11. Was preservative added to bottles? Yes No NA
12. Is there headspace in the VOA vials? Yes No NA
13. Did all samples containers arrive in good condition(unbroken)? Yes No
14. Does paperwork match bottle labels? Yes No
15. Are matrices correctly identified on Chain of Custody? Yes No
16. Is it clear what analyses were requested? Yes No
17. Were all holding times able to be met? Yes No

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes No NA

Person Notified:	<input type="text" value="Anne Avre"/>	Date:	<input type="text" value="9/2/2021"/>
By Whom:	<input type="text" value="Gabrielle Coeuille"/>	Via:	<input checked="" type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text" value="Do redundant compounds need to be reported VIA both SIM and 8270?"/>		
Client Instructions:	<input type="text" value="Yes. Report redundant compounds."/>		

19. Additional remarks:

Item Information

Item #	Temp °C
Sample 1	23.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 9/21/21 Page: of:
Project Name: Mbl Grab 2021
Laboratory Project No (Internal): 2109043
Special Remarks:

Client: Annie Ayre
Address: 5975 Emerald Way S
City, State, Zip: Seattle, WA 98134
Telephone: 206-620-4169
Fax:

Project No:
Collected by: Ayre
Location: SULTON, WA
Report To (PM): Annie Ayre
PM Email: ayre@copartland.com

Sample Disposal: Return to client Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HClD)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
9 01	9/21	10:00 AM	soil	3													Please see attached spec - all parameters need analyzed - reporting limits are low so please report to RPL if necessary possible

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water
 **Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Ti V Zn
 ***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Turn-around Time:
 Standard Next Day
 3 Day Same Day
 2 Day _____ (specify)

Relinquished (Signature) *Annie Ayre* Print Name Annie Ayre Date/Time 9/21/21 1:09 pm
 Relinquished (Signature) *Justin Mark* Print Name Justin Mark Date/Time 9/21/21 1:09 pm

SUBMITTAL REVIEW COMMENT FORM

Submittal Title:	Gravel Borrow – Second submittal	Submittal Identification Number	0A.2
Project Title: Project Number:	Time Oil Company - Seattle	Reviewer(s):	CRETE- Reid Carscadden (RC)/Jamie Stevens(JCS)
Cantera Project Manager:	Kim Hempel		
Dated Submitted:	10/07/2021	Final Review Date:	10/07/2021

Submittal Item No.	Reviewer Name	Review Date	Reviewer Comment with <u>Contract</u> Document Reference	Receipt Acknowledged	Accepted	Accepted as Noted	Revise and Resubmit	(Substitution Requests Only) Not Accepted
				0	1	2	3	4
A.1	JCS	10/7/21	Gravel borrow – second approval for material from CalPortland Seattle Yard. Pervious approval was for CalPortland Kenmore Yard. Gravel borrow can be received from either the Seattle or Kenmore CalPortland yards.		X			



Ayre
Anne Ayre
5975 E Marginal Ways
Seattle, WA 98134

RE: MM Grab 2021
Work Order Number: 2109045

September 17, 2021

Attention Anne Ayre:

Fremont Analytical, Inc. received 1 sample(s) on 9/2/2021 for the analyses presented in the following report.

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.
Mercury by EPA Method 7471B
Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)
Polychlorinated Biphenyls (PCB) by EPA 8082
Sample Moisture (Percent Moisture)
Semivolatile Organic Compounds by EPA Method 8270
Total Metals by EPA Method 6020B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Original



Date: 09/17/2021

CLIENT: Ayre
Project: MM Grab 2021
Work Order: 2109045

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2109045-001	G01	09/02/2021 10:00 AM	09/02/2021 1:16 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

Original

CLIENT: Ayre
Project: MM Grab 2021

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Qualifiers:

- * - Associated LCS is outside of control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Method Detection Limit
- R - High relative percent difference observed

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate



Client: Ayre
Project: MM Grab 2021
Lab ID: 2109045-001
Client Sample ID: G01

Collection Date: 9/2/2021 10:00:00 AM
Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
----------	--------	----	-----	------	-------	----	---------------

Polychlorinated Biphenyls (PCB) by EPA 8082

Batch ID: 33689 Analyst: SB

Aroclor 1016	ND	0.0166	0.00267		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1221	ND	0.0166	0.00267		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1232	ND	0.0166	0.00267		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1242	ND	0.0166	0.00267		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1248	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1254	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1260	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1262	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Aroclor 1268	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Total PCBs	ND	0.0166	0.00330		mg/Kg-dry	1	09/14/21 11:45:50
Surr: Decachlorobiphenyl	82.5	20.6 - 142			%Rec	1	09/14/21 11:45:50
Surr: Tetrachloro-m-xylene	89.4	22 - 157			%Rec	1	09/14/21 11:45:50

Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Batch ID: 33649 Analyst: IH

Diesel (Fuel Oil)	ND	16.9	3.81		mg/Kg-dry	1	09/09/21 16:46:24
Heavy Oil	ND	33.8	7.36		mg/Kg-dry	1	09/09/21 16:46:24
Total Petroleum Hydrocarbons	ND	50.6	11.2		mg/Kg-dry	1	09/09/21 16:46:24
Surr: 2-Fluorobiphenyl	86.3	50 - 150			%Rec	1	09/09/21 16:46:24
Surr: o-Terphenyl	90.8	50 - 150			%Rec	1	09/09/21 16:46:24

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Batch ID: 33603 Analyst: SB

Benz(a)anthracene	ND	19.0	2.39		µg/Kg-dry	1	09/03/21 18:57:43
Chrysene	ND	38.0	6.88		µg/Kg-dry	1	09/03/21 18:57:43
Benzo(b)fluoranthene	ND	19.0	2.05		µg/Kg-dry	1	09/03/21 18:57:43
Benzo(k)fluoranthene	ND	19.0	2.57		µg/Kg-dry	1	09/03/21 18:57:43
Benzo(a)pyrene	ND	19.0	2.14		µg/Kg-dry	1	09/03/21 18:57:43
Indeno(1,2,3-cd)pyrene	ND	38.0	6.78		µg/Kg-dry	1	09/03/21 18:57:43
Dibenz(a,h)anthracene	ND	38.0	8.30		µg/Kg-dry	1	09/03/21 18:57:43
Surr: 2-Fluorobiphenyl	79.4	27.9 - 129			%Rec	1	09/03/21 18:57:43
Surr: Terphenyl-d14 (surr)	85.8	39.1 - 145	0		%Rec	1	09/03/21 18:57:43



Client: Ayre
Project: MM Grab 2021
Lab ID: 2109045-001
Client Sample ID: G01

Collection Date: 9/2/2021 10:00:00 AM

Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
Semivolatile Organic Compounds by EPA Method 8270				Batch ID: 33602		Analyst: SB	
Phenol	ND	69.9	19.5		µg/Kg-dry	1	09/07/21 18:18:54
Bis(2-chloroethyl) ether	ND	93.2	32.4		µg/Kg-dry	1	09/07/21 18:18:54
2-Chlorophenol	ND	46.6	14.0		µg/Kg-dry	1	09/07/21 18:18:54
1,3-Dichlorobenzene	ND	46.6	15.3		µg/Kg-dry	1	09/07/21 18:18:54
1,4-Dichlorobenzene	ND	37.3	12.0		µg/Kg-dry	1	09/07/21 18:18:54
1,2-Dichlorobenzene	ND	37.3	12.3		µg/Kg-dry	1	09/07/21 18:18:54
Benzyl alcohol	ND	65.2	14.2		µg/Kg-dry	1	09/07/21 18:18:54
2-Methylphenol (o-cresol)	ND	55.9	23.9		µg/Kg-dry	1	09/07/21 18:18:54
Hexachloroethane	ND	69.9	19.0		µg/Kg-dry	1	09/07/21 18:18:54
N-Nitrosodi-n-propylamine	ND	93.2	44.2		µg/Kg-dry	1	09/07/21 18:18:54
3&4-Methylphenol (m, p-cresol)	ND	46.6	13.4		µg/Kg-dry	1	09/07/21 18:18:54
Nitrobenzene	ND	69.9	18.4		µg/Kg-dry	1	09/07/21 18:18:54
Isophorone	ND	37.3	12.2		µg/Kg-dry	1	09/07/21 18:18:54
2-Nitrophenol	ND	93.2	26.9		µg/Kg-dry	1	09/07/21 18:18:54
2,4-Dimethylphenol	ND	37.3	5.46		µg/Kg-dry	1	09/07/21 18:18:54
Bis(2-chloroethoxy)methane	ND	69.9	21.7		µg/Kg-dry	1	09/07/21 18:18:54
2,4-Dichlorophenol	ND	93.2	4.11		µg/Kg-dry	1	09/07/21 18:18:54
1,2,4-Trichlorobenzene	ND	37.3	11.5		µg/Kg-dry	1	09/07/21 18:18:54
Naphthalene	ND	46.6	14.1		µg/Kg-dry	1	09/07/21 18:18:54
4-Chloroaniline	ND	69.9	21.2		µg/Kg-dry	1	09/07/21 18:18:54
Hexachlorobutadiene	ND	37.3	8.54		µg/Kg-dry	1	09/07/21 18:18:54
4-Chloro-3-methylphenol	ND	93.2	34.3		µg/Kg-dry	1	09/07/21 18:18:54
2-Methylnaphthalene	ND	37.3	6.85		µg/Kg-dry	1	09/07/21 18:18:54
1-Methylnaphthalene	ND	37.3	11.0		µg/Kg-dry	1	09/07/21 18:18:54
Hexachlorocyclopentadiene	ND	93.2	20.7	Q	µg/Kg-dry	1	09/07/21 18:18:54
2,4,6-Trichlorophenol	ND	69.9	20.4		µg/Kg-dry	1	09/07/21 18:18:54
2,4,5-Trichlorophenol	ND	69.9	23.8		µg/Kg-dry	1	09/07/21 18:18:54
2-Chloronaphthalene	ND	37.3	6.62		µg/Kg-dry	1	09/07/21 18:18:54
2-Nitroaniline	ND	93.2	39.3		µg/Kg-dry	1	09/07/21 18:18:54
Acenaphthene	ND	37.3	6.51		µg/Kg-dry	1	09/07/21 18:18:54
Dimethylphthalate	ND	55.9	9.64		µg/Kg-dry	1	09/07/21 18:18:54



Client: Ayre

Collection Date: 9/2/2021 10:00:00 AM

Project: MM Grab 2021

Lab ID: 2109045-001

Matrix: Soil

Client Sample ID: G01

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
----------	--------	----	-----	------	-------	----	---------------

Semivolatile Organic Compounds by EPA Method 8270

Batch ID: 33602

Analyst: SB

2,6-Dinitrotoluene	ND	46.6	16.0		µg/Kg-dry	1	09/07/21 18:18:54
Acenaphthylene	ND	37.3	5.84		µg/Kg-dry	1	09/07/21 18:18:54
2,4-Dinitrophenol	ND	46.6	16.0	Q	µg/Kg-dry	1	09/07/21 18:18:54
Dibenzofuran	ND	37.3	5.57		µg/Kg-dry	1	09/07/21 18:18:54
2,4-Dinitrotoluene	ND	93.2	30.8		µg/Kg-dry	1	09/07/21 18:18:54
4-Nitrophenol	ND	466	13.5		µg/Kg-dry	1	09/07/21 18:18:54
Fluorene	ND	37.3	4.66		µg/Kg-dry	1	09/07/21 18:18:54
4-Chlorophenyl phenyl ether	ND	37.3	7.56		µg/Kg-dry	1	09/07/21 18:18:54
Diethylphthalate	34.5	69.9	21.1	J	µg/Kg-dry	1	09/07/21 18:18:54
4,6-Dinitro-2-methylphenol	ND	186	21.4		µg/Kg-dry	1	09/07/21 18:18:54
4-Bromophenyl phenyl ether	ND	69.9	25.2		µg/Kg-dry	1	09/07/21 18:18:54
Hexachlorobenzene	ND	46.6	14.4		µg/Kg-dry	1	09/07/21 18:18:54
Pentachlorophenol	ND	93.2	10.9		µg/Kg-dry	1	09/07/21 18:18:54
Phenanthrene	ND	37.3	8.08		µg/Kg-dry	1	09/07/21 18:18:54
Anthracene	ND	37.3	5.17		µg/Kg-dry	1	09/07/21 18:18:54
Carbazole	ND	37.3	13.0		µg/Kg-dry	1	09/07/21 18:18:54
Di-n-butylphthalate	ND	37.3	10.1		µg/Kg-dry	1	09/07/21 18:18:54
Fluoranthene	10.9	37.3	8.22	J	µg/Kg-dry	1	09/07/21 18:18:54
Pyrene	25.0	37.3	9.23	J	µg/Kg-dry	1	09/07/21 18:18:54
Butyl Benzylphthalate	ND	46.6	13.7		µg/Kg-dry	1	09/07/21 18:18:54
bis(2-Ethylhexyl)adipate	ND	93.2	18.5		µg/Kg-dry	1	09/07/21 18:18:54
Benz(a)anthracene	ND	37.3	11.2		µg/Kg-dry	1	09/07/21 18:18:54
Chrysene	ND	46.6	20.4		µg/Kg-dry	1	09/07/21 18:18:54
bis (2-Ethylhexyl) phthalate	ND	37.3	10.5		µg/Kg-dry	1	09/07/21 18:18:54
Di-n-octyl phthalate	ND	69.9	24.3		µg/Kg-dry	1	09/07/21 18:18:54
Benzo(b)fluoranthene	ND	37.3	9.86		µg/Kg-dry	1	09/07/21 18:18:54
Benzo(k)fluoranthene	ND	37.3	9.34		µg/Kg-dry	1	09/07/21 18:18:54
Benzo(a)pyrene	ND	37.3	13.5		µg/Kg-dry	1	09/07/21 18:18:54
Indeno(1,2,3-cd)pyrene	ND	69.9	24.3		µg/Kg-dry	1	09/07/21 18:18:54
Dibenz(a,h)anthracene	ND	93.2	36.3		µg/Kg-dry	1	09/07/21 18:18:54
Benzo(g,h,i)perylene	ND	69.9	27.0		µg/Kg-dry	1	09/07/21 18:18:54



Client: Ayre
Project: MM Grab 2021
Lab ID: 2109045-001
Client Sample ID: G01

Collection Date: 9/2/2021 10:00:00 AM

Matrix: Soil

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
----------	--------	----	-----	------	-------	----	---------------

Semivolatile Organic Compounds by EPA Method 8270

Batch ID: 33602 Analyst: SB

Surr: 2,4,6-Tribromophenol	111	18.4 - 156	0	%Rec	1	09/07/21 18:18:54
Surr: 2-Fluorobiphenyl	99.1	17.6 - 135	0	%Rec	1	09/07/21 18:18:54
Surr: Nitrobenzene-d5	80.5	8.6 - 139	0	%Rec	1	09/07/21 18:18:54
Surr: Phenol-d6	83.8	17.2 - 136	0	%Rec	1	09/07/21 18:18:54
Surr: p-Terphenyl	115	35.1 - 146	0	%Rec	1	09/07/21 18:18:54

NOTES:

Q - Indicates an analyte with a continuing calibration that does not meet acceptance criteria

Mercury by EPA Method 7471B

Batch ID: 33632 Analyst: CH

Mercury	ND	0.256	0.00517	mg/Kg-dry	1	09/09/21 12:15:06
---------	----	-------	---------	-----------	---	-------------------

Total Metals by EPA Method 6020B

Batch ID: 33614 Analyst: EH

Arsenic	0.643	0.0922	0.0309	mg/Kg-dry	1	09/09/21 17:41:09
Cadmium	0.0557	0.154	0.00254	J mg/Kg-dry	1	09/08/21 19:55:03
Chromium	26.2	0.307	0.100	mg/Kg-dry	1	09/08/21 19:55:03
Copper	35.0	0.769	0.144	mg/Kg-dry	1	09/08/21 19:55:03
Lead	0.946	0.154	0.0320	mg/Kg-dry	1	09/08/21 19:55:03
Silver	0.0486	0.115	0.0325	J mg/Kg-dry	1	09/08/21 19:55:03
Zinc	36.1	1.35	0.469	mg/Kg-dry	1	09/08/21 19:55:03

Sample Moisture (Percent Moisture)

Batch ID: R69699 Analyst: cb

Percent Moisture	2.19	0.500	0.100	wt%	1	09/03/21 11:44:10
------------------	------	-------	-------	-----	---	-------------------

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Total Metals by EPA Method 6020B

Sample ID: MB-33614	SampType: MBLK	Units: mg/Kg	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: MBLKS	Batch ID: 33614		Analysis Date: 9/7/2021	SeqNo: 1414499							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	ND	0.0902									
Cadmium	ND	0.150									
Chromium	ND	0.301									
Copper	ND	0.752									
Lead	ND	0.150									
Silver	ND	0.113									
Zinc	ND	1.32									

Sample ID: LCS-33614	SampType: LCS	Units: mg/Kg	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: LCSS	Batch ID: 33614		Analysis Date: 9/7/2021	SeqNo: 1414500							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Cadmium	1.88	0.160	2.000	0	93.8	80	120				
Chromium	41.7	0.320	40.00	0	104	80	120				
Copper	40.1	0.800	40.00	0	100	80	120				
Lead	20.8	0.160	20.00	0	104	80	120				
Silver	2.02	0.120	2.000	0	101	80	120				

Sample ID: 2108296-011AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: BATCH	Batch ID: 33614		Analysis Date: 9/7/2021	SeqNo: 1414503							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Arsenic	45.1	0.101	42.00	1.362	104	75	125				
Cadmium	2.06	0.168	2.100	0.04000	96.4	75	125				
Chromium	64.4	0.336	42.00	17.92	111	75	125				
Copper	49.6	0.840	42.00	7.491	100	75	125				
Lead	21.3	0.168	21.00	1.160	96.1	75	125				
Silver	1.95	0.126	2.100	0	93.0	75	125				
Zinc	67.5	1.47	42.00	22.77	106	75	125				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Total Metals by EPA Method 6020B

Sample ID: 2108296-011AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: BATCH	Batch ID: 33614	Analysis Date: 9/7/2021	SeqNo: 1414503								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 2108296-011AMS	SampType: MSD	Units: mg/Kg-dry	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: BATCH	Batch ID: 33614	Analysis Date: 9/7/2021	SeqNo: 1414504								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic	46.0	0.103	42.96	1.362	104	75	125	45.14	1.82	20	
Cadmium	1.99	0.172	2.148	0.04000	90.8	75	125	2.064	3.61	20	
Chromium	61.6	0.344	42.96	17.92	102	75	125	64.43	4.48	20	
Copper	46.9	0.859	42.96	7.491	91.7	75	125	49.65	5.75	20	
Lead	20.9	0.172	21.48	1.160	91.7	75	125	21.35	2.32	20	
Silver	1.89	0.129	2.148	0	88.0	75	125	1.953	3.23	20	
Zinc	67.3	1.50	42.96	22.77	104	75	125	67.48	0.299	20	

Sample ID: LCS-33614	SampType: LCS	Units: mg/Kg	Prep Date: 9/7/2021	RunNo: 69768							
Client ID: LCSS	Batch ID: 33614	Analysis Date: 9/8/2021	SeqNo: 1414611								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Arsenic	40.6	0.0960	40.00	0	101	80	120				
Zinc	41.0	1.40	40.00	0	103	80	120				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Mercury by EPA Method 7471B

Sample ID: MB-33632	SampType: MBLK	Units: mg/Kg	Prep Date: 9/8/2021	RunNo: 69807							
Client ID: MBLKS	Batch ID: 33632	Analysis Date: 9/9/2021	SeqNo: 1415415								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury ND 0.250

Sample ID: LCS-33632	SampType: LCS	Units: mg/Kg	Prep Date: 9/8/2021	RunNo: 69807							
Client ID: LCSS	Batch ID: 33632	Analysis Date: 9/9/2021	SeqNo: 1415416								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.446 0.250 0.5000 0 89.2 80 120

Sample ID: 2108296-001ADUP	SampType: DUP	Units: mg/Kg-dry	Prep Date: 9/8/2021	RunNo: 69807							
Client ID: BATCH	Batch ID: 33632	Analysis Date: 9/9/2021	SeqNo: 1415418								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.0140 0.248 0.01277 9.26 20 J

Sample ID: 2108296-001AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 9/8/2021	RunNo: 69807							
Client ID: BATCH	Batch ID: 33632	Analysis Date: 9/9/2021	SeqNo: 1415419								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.546 0.268 0.5367 0.01277 99.4 70 130

Sample ID: 2108296-001AMSD	SampType: MSD	Units: mg/Kg-dry	Prep Date: 9/8/2021	RunNo: 69807							
Client ID: BATCH	Batch ID: 33632	Analysis Date: 9/9/2021	SeqNo: 1415420								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Mercury 0.545 0.258 0.5161 0.01277 103 70 130 0.5464 0.257 20

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID: MB-33649	SampType: MBLK	Units: mg/Kg				Prep Date: 9/9/2021	RunNo: 69859				
Client ID: MBLKS	Batch ID: 33649					Analysis Date: 9/9/2021	SeqNo: 1416438				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Diesel (Fuel Oil)	ND	16.7									
Heavy Oil	ND	33.3									
Total Petroleum Hydrocarbons	ND	50.0									
Surr: 2-Fluorobiphenyl	3.00		3.333		90.0	50	150				
Surr: o-Terphenyl	3.08		3.333		92.5	50	150				

Sample ID: LCS-33649	SampType: LCS	Units: mg/Kg				Prep Date: 9/9/2021	RunNo: 69859				
Client ID: LCSS	Batch ID: 33649					Analysis Date: 9/9/2021	SeqNo: 1416439				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	517	150	500.0	0	103	77.2	122				
Surr: 2-Fluorobiphenyl	10.2		10.00		102	50	150				
Surr: o-Terphenyl	10.3		10.00		103	50	150				

Sample ID: 2109045-001AMS	SampType: MS	Units: mg/Kg-dry				Prep Date: 9/9/2021	RunNo: 69859				
Client ID: G01	Batch ID: 33649					Analysis Date: 9/9/2021	SeqNo: 1416441				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	181	50.9	169.7	0	106	68	132				
Surr: 2-Fluorobiphenyl	3.19		3.393		94.0	50	150				
Surr: o-Terphenyl	4.06		3.393		120	50	150				

Sample ID: 2109045-001AMSD	SampType: MSD	Units: mg/Kg-dry				Prep Date: 9/9/2021	RunNo: 69859				
Client ID: G01	Batch ID: 33649					Analysis Date: 9/9/2021	SeqNo: 1416442				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Total Petroleum Hydrocarbons	180	49.7	165.6	0	109	68	132	180.6	0.0567	30	
Surr: 2-Fluorobiphenyl	2.73		3.312		82.5	50	150		0		
Surr: o-Terphenyl	3.57		3.312		108	50	150		0		

Work Order: 2109045
CLIENT: Ayre
Project: MM Grab 2021

QC SUMMARY REPORT
Diesel and Heavy Oil by NWTPH-Dx/Dx Ext.

Sample ID: 2109045-001AMSD	SampType: MSD	Units: mg/Kg-dry	Prep Date: 9/9/2021	RunNo: 69859							
Client ID: G01	Batch ID: 33649		Analysis Date: 9/9/2021	SeqNo: 1416442							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: MB-33603	SampType: MBLK	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69751							
Client ID: MBLKS	Batch ID: 33603	Analysis Date: 9/3/2021	SeqNo: 1413886								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	ND	20.0									
Chrysene	ND	40.0									
Benzo(b)fluoranthene	ND	20.0									
Benzo(k)fluoranthene	ND	20.0									
Benzo(a)pyrene	ND	20.0									
Indeno(1,2,3-cd)pyrene	ND	40.0									
Dibenz(a,h)anthracene	ND	40.0									
Surr: 2-Fluorobiphenyl	892		1,000		89.2	27.9	129				
Surr: Terphenyl-d14 (surr)	888		1,000		88.8	39.1	145				

Sample ID: LCS-33603	SampType: LCS	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69751							
Client ID: LCSS	Batch ID: 33603	Analysis Date: 9/3/2021	SeqNo: 1413887								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	1,560	20.0	2,000	0	77.9	64.4	113				
Chrysene	1,420	40.0	2,000	0	70.8	57.3	113				
Benzo(b)fluoranthene	1,470	20.0	2,000	0	73.6	58.2	115				
Benzo(k)fluoranthene	1,470	20.0	2,000	0	73.5	53.4	121				
Benzo(a)pyrene	1,560	20.0	2,000	0	78.2	64.7	125				
Indeno(1,2,3-cd)pyrene	1,430	40.0	2,000	0	71.6	61.6	113				
Dibenz(a,h)anthracene	1,490	40.0	2,000	0	74.7	62.1	116				
Surr: 2-Fluorobiphenyl	849		1,000		84.9	27.9	129				
Surr: Terphenyl-d14 (surr)	856		1,000		85.6	39.1	145				

Sample ID: 2109038-001AMS	SampType: MS	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69751							
Client ID: BATCH	Batch ID: 33603	Analysis Date: 9/3/2021	SeqNo: 1413889								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	1,190	18.9	1,895	11.45	62.2	45	110				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT

Polyaromatic Hydrocarbons by EPA Method 8270 (SIM)

Sample ID: 2109038-001AMS	SampType: MS	Units: µg/Kg-dry				Prep Date: 9/3/2021	RunNo: 69751				
Client ID: BATCH	Batch ID: 33603					Analysis Date: 9/3/2021	SeqNo: 1413889				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Chrysene	1,090	37.9	1,895	0	57.8	42.4	106				
Benzo(b)fluoranthene	1,140	18.9	1,895	0	60.0	43.7	108				
Benzo(k)fluoranthene	1,120	18.9	1,895	0	59.0	39.5	113				
Benzo(a)pyrene	1,190	18.9	1,895	7.844	62.6	44.1	122				
Indeno(1,2,3-cd)pyrene	1,020	37.9	1,895	0	54.0	40.2	109				
Dibenz(a,h)anthracene	1,050	37.9	1,895	0	55.2	31.4	126				
Surr: 2-Fluorobiphenyl	686		947.4		72.4	27.9	129				
Surr: Terphenyl-d14 (surr)	628		947.4		66.3	39.1	145				

Sample ID: 2109038-001AMSD	SampType: MSD	Units: µg/Kg-dry				Prep Date: 9/3/2021	RunNo: 69751				
Client ID: BATCH	Batch ID: 33603					Analysis Date: 9/3/2021	SeqNo: 1413890				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	1,410	17.7	1,769	11.45	79.0	45	110	1,190	16.8	30	
Chrysene	1,320	35.4	1,769	0	74.8	42.4	106	1,095	18.9	30	
Benzo(b)fluoranthene	1,330	17.7	1,769	0	75.0	43.7	108	1,136	15.5	30	
Benzo(k)fluoranthene	1,410	17.7	1,769	0	79.6	39.5	113	1,119	22.8	30	
Benzo(a)pyrene	1,450	17.7	1,769	7.844	81.4	44.1	122	1,194	19.2	30	
Indeno(1,2,3-cd)pyrene	1,300	35.4	1,769	0	73.6	40.2	109	1,022	24.0	30	
Dibenz(a,h)anthracene	1,350	35.4	1,769	0	76.5	31.4	126	1,046	25.5	30	
Surr: 2-Fluorobiphenyl	747		884.4		84.5	27.9	129		0		
Surr: Terphenyl-d14 (surr)	742		884.4		83.9	39.1	145		0		

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID: MB-33689	SampType: MBLK	Units: mg/Kg			Prep Date: 9/14/2021	RunNo: 69900					
Client ID: MBLKS	Batch ID: 33689				Analysis Date: 9/14/2021	SeqNo: 1417273					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.0167									
Aroclor 1221	ND	0.0167									
Aroclor 1232	ND	0.0167									
Aroclor 1242	ND	0.0167									
Aroclor 1248	ND	0.0167									
Aroclor 1254	ND	0.0167									
Aroclor 1260	ND	0.0167									
Aroclor 1262	ND	0.0167									
Aroclor 1268	ND	0.0167									
Total PCBs	ND	0.0167									
Surr: Decachlorobiphenyl	45.9		66.98		68.6	20.6	142				
Surr: Tetrachloro-m-xylene	49.9		66.98		74.6	22	157				

Sample ID: LCS1-33689	SampType: LCS	Units: mg/Kg			Prep Date: 9/14/2021	RunNo: 69900					
Client ID: LCSS	Batch ID: 33689				Analysis Date: 9/14/2021	SeqNo: 1417274					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1254	0.948	0.0500	1.000	0	94.8	48.1	147				
Surr: Decachlorobiphenyl	196		200.0		97.8	20.6	142				
Surr: Tetrachloro-m-xylene	222		200.0		111	22	157				

Sample ID: LCS2-33689	SampType: LCS	Units: mg/Kg			Prep Date: 9/14/2021	RunNo: 69900					
Client ID: LCSS	Batch ID: 33689				Analysis Date: 9/14/2021	SeqNo: 1417275					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.850	0.0500	1.000	0	85.0	52.2	136				
Aroclor 1260	0.926	0.0500	1.000	0	92.6	50.5	150				
Surr: Decachlorobiphenyl	179		200.0		89.4	20.6	142				
Surr: Tetrachloro-m-xylene	213		200.0		106	22	157				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID: LCS2-33689	SampType: LCS	Units: mg/Kg	Prep Date: 9/14/2021	RunNo: 69900							
Client ID: LCSS	Batch ID: 33689	Analysis Date: 9/14/2021	SeqNo: 1417275								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Sample ID: 2109045-001AMS	SampType: MS	Units: mg/Kg-dry	Prep Date: 9/14/2021	RunNo: 69900							
Client ID: G01	Batch ID: 33689	Analysis Date: 9/14/2021	SeqNo: 1417277								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1254	0.320	0.0170	0.3393	0	94.4	50	150				
Surr: Decachlorobiphenyl	62.8		67.86		92.5	20.6	142				
Surr: Tetrachloro-m-xylene	57.8		67.86		85.2	22	157				

Sample ID: 2109045-001AMSD	SampType: MSD	Units: mg/Kg-dry	Prep Date: 9/14/2021	RunNo: 69900							
Client ID: G01	Batch ID: 33689	Analysis Date: 9/14/2021	SeqNo: 1417278								
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1254	0.318	0.0170	0.3391	0	93.7	50	150	0.3203	0.841		
Surr: Decachlorobiphenyl	58.7		67.82		86.5	20.6	142		0		
Surr: Tetrachloro-m-xylene	47.8		67.82		70.5	22	157		0		

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: MB-33602	SampType: MBLK	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: MBLKS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1413991							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Phenol	ND	75.0									
Bis(2-chloroethyl) ether	ND	100									
2-Chlorophenol	ND	50.0									
1,3-Dichlorobenzene	ND	50.0									
1,4-Dichlorobenzene	ND	40.0									
1,2-Dichlorobenzene	ND	40.0									
Benzyl alcohol	ND	70.0									
2-Methylphenol (o-cresol)	ND	60.0									
Hexachloroethane	ND	75.0									
N-Nitrosodi-n-propylamine	ND	100									
3&4-Methylphenol (m, p-cresol)	ND	50.0									
Nitrobenzene	ND	75.0									
Isophorone	ND	40.0									
2-Nitrophenol	ND	100									
2,4-Dimethylphenol	ND	40.0									
Bis(2-chloroethoxy)methane	ND	75.0									
2,4-Dichlorophenol	ND	100									
1,2,4-Trichlorobenzene	ND	40.0									
Naphthalene	ND	50.0									
4-Chloroaniline	ND	75.0									
Hexachlorobutadiene	ND	40.0									
4-Chloro-3-methylphenol	ND	100									
2-Methylnaphthalene	ND	40.0									
1-Methylnaphthalene	ND	40.0									
Hexachlorocyclopentadiene	ND	100									
2,4,6-Trichlorophenol	ND	75.0									
2,4,5-Trichlorophenol	ND	75.0									
2-Chloronaphthalene	ND	40.0									
2-Nitroaniline	ND	100									
Acenaphthene	ND	40.0									

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: MB-33602	SampType: MBLK	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: MBLKS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1413991							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Dimethylphthalate	ND	60.0									
2,6-Dinitrotoluene	ND	50.0									
Acenaphthylene	ND	40.0									
2,4-Dinitrophenol	ND	50.0									
Dibenzofuran	ND	40.0									
2,4-Dinitrotoluene	ND	100									
4-Nitrophenol	ND	500									
Fluorene	ND	40.0									
4-Chlorophenyl phenyl ether	ND	40.0									
Diethylphthalate	ND	75.0									
4,6-Dinitro-2-methylphenol	ND	200									
4-Bromophenyl phenyl ether	ND	75.0									
Hexachlorobenzene	ND	50.0									
Pentachlorophenol	ND	100									
Phenanthrene	ND	40.0									
Anthracene	ND	40.0									
Carbazole	ND	40.0									
Di-n-butylphthalate	12.4	40.0									J
Fluoranthene	ND	40.0									
Pyrene	33.3	40.0									J
Butyl Benzylphthalate	ND	50.0									
bis(2-Ethylhexyl)adipate	ND	100									
Benz(a)anthracene	ND	40.0									
Chrysene	ND	50.0									
bis (2-Ethylhexyl) phthalate	ND	40.0									
Di-n-octyl phthalate	ND	75.0									
Benzo(b)fluoranthene	ND	40.0									
Benzo(k)fluoranthene	ND	40.0									
Benzo(a)pyrene	ND	40.0									
Indeno(1,2,3-cd)pyrene	ND	75.0									

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: MB-33602	SampType: MBLK	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: MBLKS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1413991							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Dibenz(a,h)anthracene	ND	100									
Benzo(g,h,i)perylene	ND	75.0									
Surr: 2,4,6-Tribromophenol	1,900		2,000		94.8	18.4	156				
Surr: 2-Fluorobiphenyl	1,120		1,000		112	17.6	135				
Surr: Nitrobenzene-d5	871		1,000		87.1	8.6	139				
Surr: Phenol-d6	1,860		2,000		93.0	17.2	136				
Surr: p-Terphenyl	1,200		1,000		120	35.1	146				

Sample ID: LCS-33602	SampType: LCS	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: LCSS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1413992							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Phenol	1,850	75.0	2,000	0	92.7	53.3	121				
Bis(2-chloroethyl) ether	1,710	100	2,000	0	85.4	55.4	126				
2-Chlorophenol	2,070	50.0	2,000	0	104	60.2	118				
1,3-Dichlorobenzene	1,980	50.0	2,000	0	99.0	54.9	115				
1,4-Dichlorobenzene	1,910	40.0	2,000	0	95.6	50.2	118				
1,2-Dichlorobenzene	2,040	40.0	2,000	0	102	50.9	120				
Benzyl alcohol	2,050	70.0	2,000	0	102	5	159				
2-Methylphenol (o-cresol)	2,080	60.0	2,000	0	104	57.3	121				
Hexachloroethane	1,740	75.0	2,000	0	86.9	47.9	125				
N-Nitrosodi-n-propylamine	1,870	100	2,000	0	93.4	57.3	124				
3&4-Methylphenol (m, p-cresol)	2,000	50.0	2,000	0	99.8	56.6	128				
Nitrobenzene	1,720	75.0	2,000	0	85.9	59.4	122				
Isophorone	1,970	40.0	2,000	0	98.6	58.5	116				
2-Nitrophenol	2,200	100	2,000	0	110	57	128				
2,4-Dimethylphenol	2,020	40.0	2,000	0	101	57.2	119				
Bis(2-chloroethoxy)methane	1,900	75.0	2,000	0	94.8	59.9	117				
2,4-Dichlorophenol	2,230	100	2,000	0	112	60.3	115				
1,2,4-Trichlorobenzene	2,150	40.0	2,000	0	108	60.1	117				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: LCS-33602	SampType: LCS	Units: µg/Kg				Prep Date: 9/3/2021	RunNo: 69749				
Client ID: LCSS	Batch ID: 33602					Analysis Date: 9/7/2021	SeqNo: 1413992				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Naphthalene	2,020	50.0	2,000	0	101	58.9	117				
4-Chloroaniline	1,960	75.0	2,000	0	98.2	60	108				
Hexachlorobutadiene	2,040	40.0	2,000	0	102	60	117				
4-Chloro-3-methylphenol	2,170	100	2,000	0	108	54.2	125				
2-Methylnaphthalene	2,030	40.0	2,000	0	102	60.3	121				
1-Methylnaphthalene	2,130	40.0	2,000	0	106	60.4	119				
Hexachlorocyclopentadiene	1,770	100	2,000	0	88.7	45.5	151				
2,4,6-Trichlorophenol	2,470	75.0	2,000	0	123	62.2	125				
2,4,5-Trichlorophenol	2,420	75.0	2,000	0	121	60.3	119				S
2-Chloronaphthalene	2,100	40.0	2,000	0	105	61.7	118				
2-Nitroaniline	1,890	100	2,000	0	94.5	60.6	124				
Acenaphthene	2,010	40.0	2,000	0	100	58.2	116				
Dimethylphthalate	2,160	60.0	2,000	0	108	57.9	136				
2,6-Dinitrotoluene	2,290	50.0	2,000	0	115	62.5	126				
Acenaphthylene	2,160	40.0	2,000	0	108	60.8	112				
2,4-Dinitrophenol	2,450	50.0	4,000	0	61.3	5	117				
Dibenzofuran	2,070	40.0	2,000	0	103	60.8	117				
2,4-Dinitrotoluene	2,200	100	2,000	0	110	62.4	127				
4-Nitrophenol	2,220	500	2,000	0	111	35.3	123				
Fluorene	2,150	40.0	2,000	0	107	60.6	117				
4-Chlorophenyl phenyl ether	2,210	40.0	2,000	0	110	59.7	121				
Diethylphthalate	2,190	75.0	2,000	0	109	60.7	120				
4,6-Dinitro-2-methylphenol	1,960	200	2,000	0	98.0	19.6	140				
4-Bromophenyl phenyl ether	2,230	75.0	2,000	0	112	58.7	123				
Hexachlorobenzene	2,150	50.0	2,000	0	108	60.1	124				
Pentachlorophenol	2,570	100	2,000	0	129	28.5	131				
Phenanthrene	2,100	40.0	2,000	0	105	57.6	119				
Anthracene	2,190	40.0	2,000	0	110	60.2	117				
Carbazole	2,240	40.0	2,000	0	112	59.9	120				
Di-n-butylphthalate	2,320	40.0	2,000	0	116	60	125				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: LCS-33602	SampType: LCS	Units: µg/Kg				Prep Date: 9/3/2021	RunNo: 69749				
Client ID: LCSS	Batch ID: 33602					Analysis Date: 9/7/2021	SeqNo: 1413992				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Fluoranthene	2,350	40.0	2,000	0	118	60.6	120				
Pyrene	2,330	40.0	2,000	0	116	61.1	117				
Butyl Benzylphthalate	2,690	50.0	2,000	0	135	56	137				
bis(2-Ethylhexyl)adipate	2,710	100	2,000	0	136	54.7	138				
Chrysene	2,100	50.0	2,000	0	105	62.1	119				
bis (2-Ethylhexyl) phthalate	2,590	40.0	2,000	0	129	55	141				
Di-n-octyl phthalate	2,970	75.0	2,000	0	149	49.7	150				
Benzo(b)fluoranthene	2,170	40.0	2,000	0	109	62.6	126				
Benzo(k)fluoranthene	2,100	40.0	2,000	0	105	62.3	123				
Benzo(a)pyrene	2,550	40.0	2,000	0	128	68.6	133				
Benzo(g,h,i)perylene	2,430	75.0	2,000	0	122	51.7	124				
Surr: 2,4,6-Tribromophenol	2,570		2,000		128	18.4	156				
Surr: 2-Fluorobiphenyl	1,040		1,000		104	17.6	135				
Surr: Nitrobenzene-d5	814		1,000		81.4	8.6	139				
Surr: Phenol-d6	1,840		2,000		91.9	17.2	136				
Surr: p-Terphenyl	1,130		1,000		113	35.1	146				

NOTES:

S - Outlying spike recovery observed (high bias). Detections will be qualified with a *.

Sample ID: LCS-33602	SampType: LCS	Units: µg/Kg				Prep Date: 9/3/2021	RunNo: 69749				
Client ID: LCSS	Batch ID: 33602					Analysis Date: 9/7/2021	SeqNo: 1414002				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benz(a)anthracene	2,080	40.0	2,000	0	104	55.2	119				
Surr: 2,4,6-Tribromophenol	2,630		2,000		132	18.4	156				
Surr: 2-Fluorobiphenyl	1,060		1,000		106	17.6	135				
Surr: Nitrobenzene-d5	900		1,000		90.0	8.6	139				
Surr: Phenol-d6	1,890		2,000		94.4	17.2	136				
Surr: p-Terphenyl	1,200		1,000		120	35.1	146				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: LCS-33602	SampType: LCS	Units: µg/Kg	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: LCSS	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1414449							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Indeno(1,2,3-cd)pyrene	2,130	75.0	2,000	0	107	57.1	121				
Dibenz(a,h)anthracene	2,400	100	2,000	0	120	53.1	126				
Surr: 2,4,6-Tribromophenol	2,450		2,000		123	18.4	156				
Surr: 2-Fluorobiphenyl	1,010		1,000		101	17.6	135				
Surr: Nitrobenzene-d5	919		1,000		91.9	8.6	139				
Surr: Phenol-d6	2,000		2,000		100	17.2	136				
Surr: p-Terphenyl	1,110		1,000		111	35.1	146				

Sample ID: 2109049-021AMS	SampType: MS	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: BATCH	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1414450							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Phenol	1,690	84.6	2,255	0	74.9	42.6	107				
Bis(2-chloroethyl) ether	1,540	113	2,255	0	68.4	25.3	125				
2-Chlorophenol	1,820	56.4	2,255	0	80.8	22.9	117				
1,3-Dichlorobenzene	1,780	56.4	2,255	0	79.1	11	118				
1,4-Dichlorobenzene	1,730	45.1	2,255	0	76.7	12.4	118				
1,2-Dichlorobenzene	1,640	45.1	2,255	0	72.6	14.9	118				
Benzyl alcohol	1,880	78.9	2,255	0	83.2	5	126				
2-Methylphenol (o-cresol)	1,670	67.7	2,255	0	74.1	40	114				
Hexachloroethane	1,530	84.6	2,255	0	67.7	12.1	124				
N-Nitrosodi-n-propylamine	1,600	113	2,255	0	70.9	33.3	120				
3&4-Methylphenol (m, p-cresol)	1,830	56.4	2,255	0	81.3	39.4	120				
Nitrobenzene	1,610	84.6	2,255	0	71.2	37.5	115				
Isophorone	1,730	45.1	2,255	0	76.9	44.8	109				
2-Nitrophenol	1,750	113	2,255	0	77.8	44.5	116				
2,4-Dimethylphenol	1,670	45.1	2,255	0	73.9	39.5	107				
Bis(2-chloroethoxy)methane	1,530	84.6	2,255	0	67.8	41.4	110				
2,4-Dichlorophenol	1,900	113	2,255	0	84.2	44.2	105				
1,2,4-Trichlorobenzene	1,800	45.1	2,255	0	79.8	34	111				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: 2109049-021AMS	SampType: MS	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: BATCH	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1414450							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Naphthalene	1,840	56.4	2,255	0	81.5	43	108				
4-Chloroaniline	1,660	84.6	2,255	0	73.8	19.5	98.4				
Hexachlorobutadiene	1,990	45.1	2,255	0	88.2	30.2	114				
4-Chloro-3-methylphenol	1,890	113	2,255	0	83.7	47.3	114				
2-Methylnaphthalene	1,750	45.1	2,255	0	77.5	49.6	107				
1-Methylnaphthalene	1,910	45.1	2,255	0	84.6	49.8	105				
Hexachlorocyclopentadiene	1,270	113	2,255	0	56.2	5	142				
2,4,6-Trichlorophenol	2,240	84.6	2,255	0	99.4	44.2	117				
2,4,5-Trichlorophenol	2,230	84.6	2,255	0	98.8	43.8	109				
2-Chloronaphthalene	1,860	45.1	2,255	0	82.5	41.6	108				
2-Nitroaniline	1,690	113	2,255	0	75.0	51.4	118				
Acenaphthene	1,810	45.1	2,255	0	80.1	41.3	106				
Dimethylphthalate	1,940	67.7	2,255	0	86.0	46.3	113				
2,6-Dinitrotoluene	1,990	56.4	2,255	0	88.3	49.5	115				
Acenaphthylene	1,950	45.1	2,255	0	86.3	43.5	101				
2,4-Dinitrophenol	2,720	56.4	4,510	0	60.3	5	133				
Dibenzofuran	1,860	45.1	2,255	7.508	82.1	43.4	107				
2,4-Dinitrotoluene	1,940	113	2,255	0	86.1	50.2	115				
4-Nitrophenol	2,310	564	2,255	0	102	30.7	119				
Fluorene	1,850	45.1	2,255	0	81.9	42.4	109				
4-Chlorophenyl phenyl ether	1,950	45.1	2,255	0	86.4	46	110				
Diethylphthalate	1,830	84.6	2,255	0	81.1	47	112				
4,6-Dinitro-2-methylphenol	1,910	226	2,255	0	84.7	5	157				
4-Bromophenyl phenyl ether	1,920	84.6	2,255	0	85.2	46	111				
Hexachlorobenzene	1,980	56.4	2,255	0	87.6	45.6	110				
Pentachlorophenol	2,180	113	2,255	0	96.9	10.4	151				
Phenanthrene	1,940	45.1	2,255	88.29	82.2	33.3	117				
Anthracene	1,950	45.1	2,255	19.41	85.5	35.9	114				
Carbazole	1,990	45.1	2,255	0	88.2	38.6	117				
Di-n-butylphthalate	2,090	45.1	2,255	0	92.8	44.5	123				

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: 2109049-021AMS	SampType: MS	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: BATCH	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1414450							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Fluoranthene	2,210	45.1	2,255	139.5	91.8	29.9	125				
Pyrene	2,250	45.1	2,255	206.3	90.6	31.8	120				
Butyl Benzylphthalate	2,320	56.4	2,255	0	103	48.1	133				
bis(2-Ethylhexyl)adipate	2,550	113	2,255	0	113	52.1	134				
Benz(a)anthracene	2,160	45.1	2,255	84.24	91.9	29.6	121				
Chrysene	1,880	56.4	2,255	85.91	79.7	27.8	120				
bis (2-Ethylhexyl) phthalate	2,360	45.1	2,255	0	105	35.2	146				
Di-n-octyl phthalate	2,800	84.6	2,255	0	124	58.2	143				
Benzo(b)fluoranthene	2,140	45.1	2,255	90.21	90.7	24.3	130				
Benzo(k)fluoranthene	2,100	45.1	2,255	74.13	89.9	6.58	150				
Benzo(a)pyrene	2,500	45.1	2,255	136.8	105	21.7	148				
Indeno(1,2,3-cd)pyrene	2,030	84.6	2,255	96.36	85.6	28.7	126				
Dibenz(a,h)anthracene	2,260	113	2,255	51.02	98.1	31.8	129				
Benzo(g,h,i)perylene	2,020	84.6	2,255	110.3	84.8	4.72	138				
Surr: 2,4,6-Tribromophenol	2,260		2,255		100	18.4	156				
Surr: 2-Fluorobiphenyl	991		1,128		87.9	17.6	135				
Surr: Nitrobenzene-d5	794		1,128		70.4	8.6	139				
Surr: Phenol-d6	1,800		2,255		80.0	17.2	136				
Surr: p-Terphenyl	994		1,128		88.2	35.1	146				

Sample ID: 2109049-021AMSD	SampType: MSD	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: BATCH	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1414531							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Phenol	1,790	83.9	2,239	0	79.9	42.6	107	1,689	5.70	50	
Bis(2-chloroethyl) ether	1,630	112	2,239	0	72.6	25.3	125	1,542	5.28	50	
2-Chlorophenol	1,980	56.0	2,239	0	88.5	22.9	117	1,823	8.30	50	
1,3-Dichlorobenzene	1,880	56.0	2,239	0	84.1	11	118	1,784	5.34	50	
1,4-Dichlorobenzene	1,890	44.8	2,239	0	84.3	12.4	118	1,729	8.71	50	
1,2-Dichlorobenzene	1,920	44.8	2,239	0	85.8	14.9	118	1,638	15.9	50	

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: 2109049-021AMSD	SampType: MSD	Units: µg/Kg-dry				Prep Date: 9/3/2021	RunNo: 69749				
Client ID: BATCH	Batch ID: 33602					Analysis Date: 9/7/2021	SeqNo: 1414531				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Benzyl alcohol	2,170	78.3	2,239	0	97.2	5	126	1,876	14.8	50	
2-Methylphenol (o-cresol)	2,000	67.2	2,239	0	89.1	40	114	1,670	17.7	50	
Hexachloroethane	1,640	83.9	2,239	0	73.4	12.1	124	1,527	7.31	50	
N-Nitrosodi-n-propylamine	1,700	112	2,239	0	75.8	33.3	120	1,599	5.97	50	
3&4-Methylphenol (m, p-cresol)	1,900	56.0	2,239	0	84.9	39.4	120	1,834	3.56	50	
Nitrobenzene	1,630	83.9	2,239	0	72.7	37.5	115	1,605	1.39	50	
Isophorone	1,920	44.8	2,239	0	85.9	44.8	109	1,734	10.3	50	
2-Nitrophenol	2,130	112	2,239	0	95.2	44.5	116	1,754	19.4	50	
2,4-Dimethylphenol	2,020	44.8	2,239	0	90.3	39.5	107	1,667	19.2	50	
Bis(2-chloroethoxy)methane	1,800	83.9	2,239	0	80.6	41.4	110	1,528	16.5	50	
2,4-Dichlorophenol	2,150	112	2,239	0	96.1	44.2	105	1,899	12.4	50	
1,2,4-Trichlorobenzene	1,930	44.8	2,239	0	86.2	34	111	1,800	6.97	50	
Naphthalene	1,950	56.0	2,239	0	87.0	43	108	1,837	5.82	50	
4-Chloroaniline	1,760	83.9	2,239	0	78.5	19.5	98.4	1,665	5.42	50	
Hexachlorobutadiene	2,060	44.8	2,239	0	91.9	30.2	114	1,989	3.38	50	
4-Chloro-3-methylphenol	2,130	112	2,239	0	95.2	47.3	114	1,889	12.1	50	
2-Methylnaphthalene	1,910	44.8	2,239	0	85.3	49.6	107	1,747	8.87	50	
1-Methylnaphthalene	2,000	44.8	2,239	0	89.4	49.8	105	1,908	4.77	50	
Hexachlorocyclopentadiene	1,420	112	2,239	0	63.3	5	142	1,267	11.3	50	
2,4,6-Trichlorophenol	2,360	83.9	2,239	0	105	44.2	117	2,241	5.05	50	
2,4,5-Trichlorophenol	2,410	83.9	2,239	0	108	43.8	109	2,228	7.86	50	
2-Chloronaphthalene	2,130	44.8	2,239	0	95.1	41.6	108	1,861	13.4	50	
2-Nitroaniline	2,040	112	2,239	0	91.4	51.4	118	1,692	18.9	50	
Acenaphthene	1,990	44.8	2,239	0	89.1	41.3	106	1,806	9.92	50	
Dimethylphthalate	2,130	67.2	2,239	0	95.1	46.3	113	1,938	9.36	50	
2,6-Dinitrotoluene	2,130	56.0	2,239	0	95.0	49.5	115	1,990	6.65	50	
Acenaphthylene	2,090	44.8	2,239	0	93.4	43.5	101	1,946	7.16	50	
2,4-Dinitrophenol	2,830	56.0	4,477	0	63.1	5	133	2,721	3.77	50	
Dibenzofuran	2,030	44.8	2,239	7.508	90.2	43.4	107	1,860	8.63	50	
2,4-Dinitrotoluene	2,020	112	2,239	0	90.4	50.2	115	1,943	4.06	50	

Work Order: 2109045
 CLIENT: Ayre
 Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: 2109049-021AMSD	SampType: MSD	Units: µg/Kg-dry				Prep Date: 9/3/2021	RunNo: 69749				
Client ID: BATCH	Batch ID: 33602					Analysis Date: 9/7/2021	SeqNo: 1414531				
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
4-Nitrophenol	2,420	560	2,239	0	108	30.7	119	2,305	5.01	50	
Fluorene	2,090	44.8	2,239	0	93.1	42.4	109	1,846	12.1	50	
4-Chlorophenyl phenyl ether	2,060	44.8	2,239	0	91.8	46	110	1,949	5.31	50	
Diethylphthalate	2,110	83.9	2,239	0	94.4	47	112	1,830	14.4	50	
4,6-Dinitro-2-methylphenol	1,970	224	2,239	0	88.1	5	157	1,909	3.23	50	
4-Bromophenyl phenyl ether	2,040	83.9	2,239	0	91.3	46	111	1,921	6.20	50	
Hexachlorobenzene	2,180	56.0	2,239	0	97.5	45.6	110	1,976	9.94	50	
Pentachlorophenol	2,320	112	2,239	0	104	10.4	151	2,184	5.94	50	
Phenanthrene	2,050	44.8	2,239	88.29	87.9	33.3	117	1,943	5.59	50	
Anthracene	2,010	44.8	2,239	19.41	89.1	35.9	114	1,947	3.34	50	
Carbazole	2,060	44.8	2,239	0	92.0	38.6	117	1,989	3.46	50	
Di-n-butylphthalate	2,250	44.8	2,239	0	100	44.5	123	2,093	7.11	50	
Fluoranthene	2,170	44.8	2,239	139.5	90.6	29.9	125	2,210	1.89	50	
Pyrene	2,260	44.8	2,239	206.3	91.9	31.8	120	2,250	0.584	50	
Butyl Benzylphthalate	2,370	56.0	2,239	0	106	48.1	133	2,323	2.11	50	
bis(2-Ethylhexyl)adipate	2,620	112	2,239	0	117	52.1	134	2,552	2.56	50	
Benz(a)anthracene	2,290	44.8	2,239	84.24	98.4	29.6	121	2,158	5.79	50	
Chrysene	2,080	56.0	2,239	85.91	89.1	27.8	120	1,882	9.95	50	
bis (2-Ethylhexyl) phthalate	2,590	44.8	2,239	0	116	35.2	146	2,362	9.17	50	
Di-n-octyl phthalate	2,810	83.9	2,239	0	126	58.2	143	2,800	0.343	50	
Benzo(b)fluoranthene	2,310	44.8	2,239	90.21	99.0	24.3	130	2,136	7.68	50	
Benzo(k)fluoranthene	2,210	44.8	2,239	74.13	95.4	6.58	150	2,101	5.06	50	
Benzo(a)pyrene	2,540	44.8	2,239	136.8	107	21.7	148	2,497	1.55	50	
Indeno(1,2,3-cd)pyrene	2,360	83.9	2,239	96.36	101	28.7	126	2,026	15.2	50	
Dibenz(a,h)anthracene	2,610	112	2,239	51.02	115	31.8	129	2,263	14.4	50	
Benzo(g,h,i)perylene	2,200	83.9	2,239	110.3	93.2	4.72	138	2,023	8.27	50	
Surr: 2,4,6-Tribromophenol	2,220		2,239		99.1	18.4	156		0		
Surr: 2-Fluorobiphenyl	1,030		1,119		91.9	17.6	135		0		
Surr: Nitrobenzene-d5	825		1,119		73.7	8.6	139		0		
Surr: Phenol-d6	1,820		2,239		81.5	17.2	136		0		

Work Order: 2109045
CLIENT: Ayre
Project: MM Grab 2021

QC SUMMARY REPORT
Semivolatile Organic Compounds by EPA Method 8270

Sample ID: 2109049-021AMSD	SampType: MSD	Units: µg/Kg-dry	Prep Date: 9/3/2021	RunNo: 69749							
Client ID: BATCH	Batch ID: 33602		Analysis Date: 9/7/2021	SeqNo: 1414531							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Surr: p-Terphenyl	1,030		1,119		92.1	35.1	146			0	

Client Name: CALPO	Work Order Number: 2109045
Logged by: Gabrielle Coeuille	Date Received: 9/2/2021 1:16:00 PM

Chain of Custody

1. Is Chain of Custody complete? Yes No Not Present
2. How was the sample delivered? Client

Log In

3. Coolers are present? Yes No NA
4. Shipping container/cooler in good condition? Yes No
5. Custody Seals present on shipping container/cooler?
(Refer to comments for Custody Seals not intact) Yes No Not Present
6. Was an attempt made to cool the samples? Yes No NA
7. Were all items received at a temperature of >2°C to 6°C * Unknown prior to receipt Yes No NA
8. Sample(s) in proper container(s)? Yes No
9. Sufficient sample volume for indicated test(s)? Yes No
10. Are samples properly preserved? Yes No
11. Was preservative added to bottles? Yes No NA
12. Is there headspace in the VOA vials? Yes No NA
13. Did all samples containers arrive in good condition(unbroken)? Yes No
14. Does paperwork match bottle labels? Yes No
15. Are matrices correctly identified on Chain of Custody? Yes No
16. Is it clear what analyses were requested? Yes No
17. Were all holding times able to be met? Yes No

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes No NA

Person Notified:	<input type="text" value="Anne Avre"/>	Date:	<input type="text" value="9/2/2021"/>
By Whom:	<input type="text" value="Gabrielle Coeuille"/>	Via:	<input checked="" type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text" value="Do redundant compounds need to be reported VIA both SIM and 8270?"/>		
Client Instructions:	<input type="text" value="Yes. Report redundant compounds."/>		

19. Additional remarks:

Item Information

Item #	Temp °C
Sample 1	23.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



Fremont Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 9/21/21 Page: _____ of: _____
Project Name: MM Grab 2021
Laboratory Project No (Internal): 2109043

Client: Annie Ayre
5975 Emerald Way S

Address: Seattle, WA 98134
City, State, Zip: 206-620-4169
Telephone: _____
Fax: _____

Project No: _____
Collected by: Ayre
Location: Sutton, WA
Report To (PM): Annie Ayre
PM Email: ayre@copeland.com

Special Remarks: _____
Sample Disposal: Return to client Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HClD)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) / Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
1 <u>G 01</u>	<u>9/21</u>	<u>10:00 AM</u>	<u>Soil</u>	<u>3</u>													<u>Please see attached spec - all parameters need analyzed - reporting limits are low so please report to RPL if necessary possible</u>
2																	
3																	
4																	
5																	
6																	
7																	
8																	
9																	
10																	

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water
 **Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Ti V Zn
 ***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide Iodide Nitrate-Nitrite O-Phosphate Fluoride

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature) _____ Print Name omirayre Date/Time 9/21/21 1:09 pm
 Relinquished (Signature) _____ Print Name Justin Marts Date/Time 9/21/21 13:16

CalPortland - Aggregate Submittal



Date: **September 17, 2021**

Product Number: **8128**

Product Description: **Gravel Borrow**

Specification Number: **WSDOT, 9-03.14(1)**

Source: **Johns Prairie Pit**

Location: **Shelton, WA**

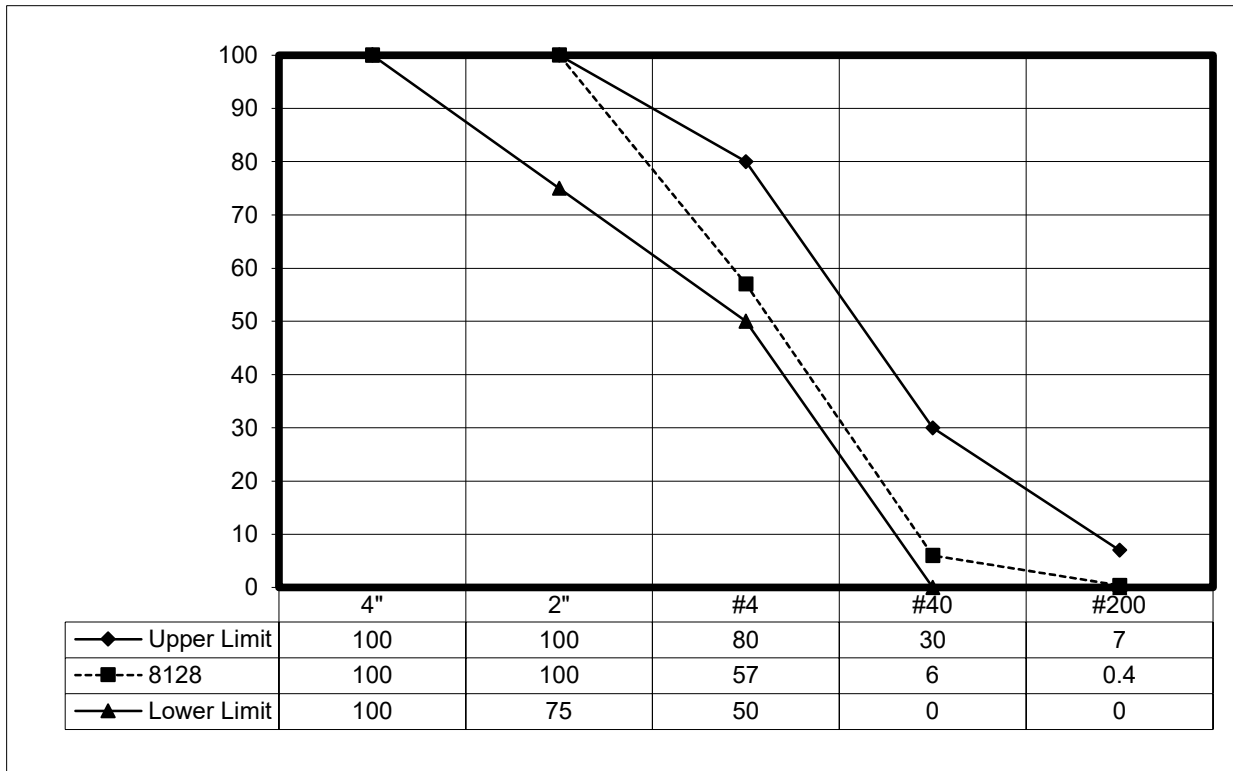
WSDOT Pit Number: **X-125**

Specification:

4"square	100%passing	% Fracture	-
2"square	75-100	Sand Equivalent	50min
U.S. No. 4	50-80	L.A. Wear	-
U.S. No.40	30max.	Degradation:	-
U.S. No. 200	7.0max	Dust Ratio	-

Specific Gravity:	2.754
Absorption:	1.34
L.A. Abrasion:	14.0%
Degradation:	75

% Fracture:	0%
Sand Equivalent:	56
Dust Ratio:	0





To Whom it May Concern,

Sample ID "Grab 01" collected September 2nd, 2021 was taken from the same area at the Manke Family Resources Shelton Mine as material that will supply the project. Please reach out to me with any additional questions at 206-764-3026.

Thank you,

A handwritten signature in black ink that reads 'Annie Ayre'.

Annie Ayre
Environmental Manager
CalPortland

SUBMITTAL REVIEW COMMENT FORM

Submittal Title:	Gravel Borrow Sieve and Chemistry	Submittal Identification Number	
Project Title: Project Number:	Time Oil Company - Seattle	Reviewer(s):	CRETE- Reid Carscadden (RC) /Jamie Stevens(JCS)
Cantera Project Manager:	Kim Hempel		
Dated Submitted:	07/20/2021	Final Review Date:	8/23/2021

Submittal Item No.	Reviewer Name	Review Date	Reviewer Comment with <u>Contract</u> Document Reference	Receipt Acknowledged	Accepted	Accepted as Noted	Revise and Resubmit	(Substitution Requests Only) Not Accepted
				0	1	2	3	4
	RC	8/23/21	Gravel Borrow Sieve and chemistry product data		X			

CalPortland - Aggregate Submittal



Date: July 27, 2021

Product Number: 8128

Product Description: Gravel Borrow

Specification Number: WSDOT, 9-03.14(1)

Source: Pioneer Aggregates

Location: DuPont, WA

WSDOT Pit Number: B-335

Specification:

4"square	100%passing	% Fracture	-
2"square	75-100	Sand Equivalent	50min.
U.S. No. 4	50-80	L.A. Wear	-
U.S. No. 40	30max.	Degradation:	-
U.S. No. 200	7.0max	Dust Ratio	-

Specific Gravity: 2.701

% Fracture: 0%

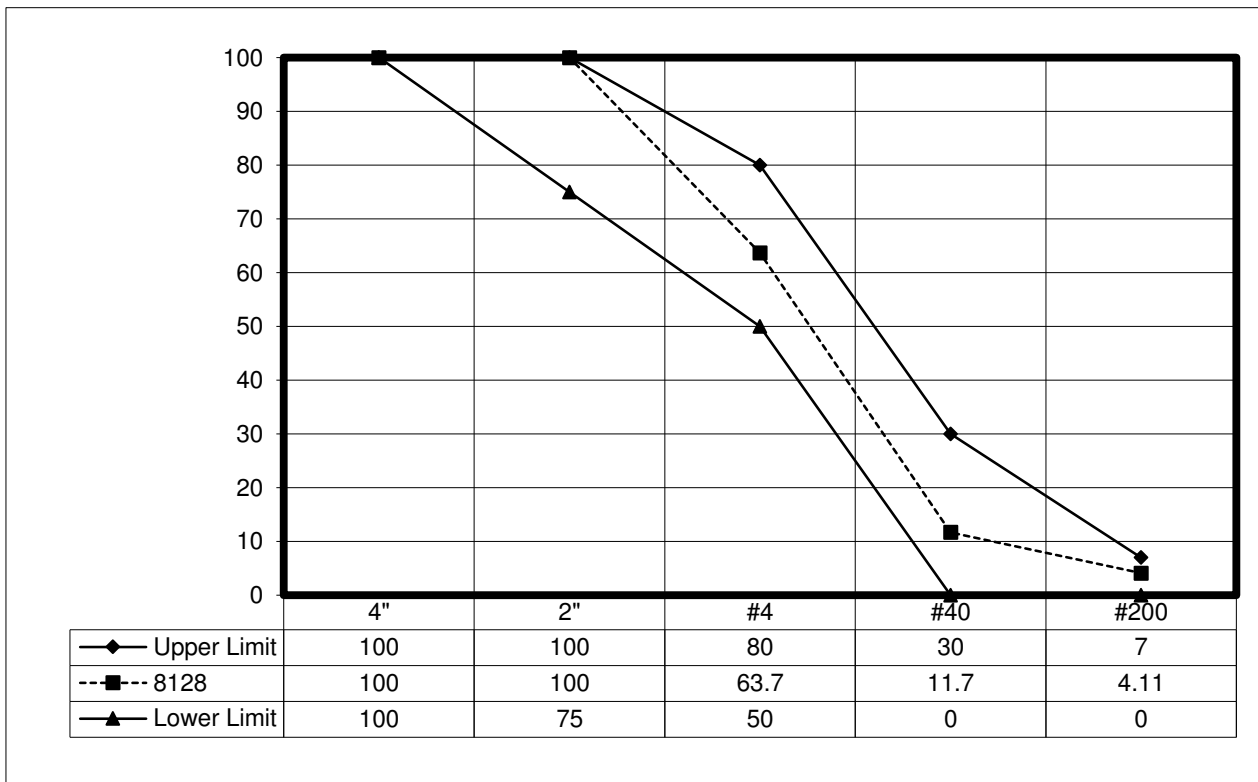
Absorption: 1.34

Sand Equivalent: 56

L.A. Abrasion: 14.0%

Dust Ratio: 0

Degradation: 63



SPECTRA Laboratories

...Where experience matters

2221 Ross Way • Tacoma, WA 98421 • (253) 272-4850 • Fax (253) 572-9838 • www.spectra-lab.com

08/13/2021

Cal Portland - Pioneer Aggregates
 4301 Pioneer Avenue
 DuPont, WA 98327
 Attn: Jim Tweedy or Louie Bayless

P.O.#: 4501095667
 Project: DP Agg
 Client ID: DP Agg 72021
 Sample Matrix: Soil
 Date Sampled: 07/29/2021
 Date Received: 07/29/2021
 Spectra Project: 2021070720
 Spectra Number: 1
 Rush

Analyte	Result	Units	Method	Analyte	Result	Units	Method
Benzo(a)Anthracene--SIM	<0.005	mg/Kg	8270E SIM	1,2-Dichlorobenzene	<0.017	mg/Kg	SW846 8270E
Benzo(a)Pyrene--SIM	<0.005	mg/Kg	8270E SIM	1,3-Dichlorobenzene	<0.017	mg/Kg	SW846 8270E
Benzo(b)Fluoranthene--SIM	0.0056	mg/Kg	8270E SIM	1,4-Dichlorobenzene	<0.017	mg/Kg	SW846 8270E
Benzo(k)Fluoranthene--SIM	0.0059	mg/Kg	8270E SIM	2,3,4,6-Tetrachlorophenol	<0.017	mg/Kg	SW846 8270E
Chrysene--SIM	<0.005	mg/Kg	8270E SIM	2,3,5,6-Tetrachlorophenol	<0.017	mg/Kg	SW846 8270E
Dibenz(a,h)Anthracene--SIM	<0.005	mg/Kg	8270E SIM	2,4,5-Trichlorophenol	<0.017	mg/Kg	SW846 8270E
Indeno(1,2,3-cd)Pyrene--SIM	<0.005	mg/Kg	8270E SIM	2,4,6-Trichlorophenol	<0.017	mg/Kg	SW846 8270E
Diesel	<5.00	mg/Kg	NWTPH-Dx	2,4-Dichlorophenol	<0.017	mg/Kg	SW846 8270E
Oil	<10.00	mg/Kg	NWTPH-Dx	2,4-Dimethylphenol	<0.017	mg/Kg	SW846 8270E
Total Arsenic	< 2.5	mg/Kg	SW846 6010D	2,4-Dinitrophenol	<0.017	mg/Kg	SW846 8270E
Total Barium	24.2	mg/Kg	SW846 6010D	2,4-Dinitrotoluene	<0.017	mg/Kg	SW846 8270E
Total Cadmium	< 0.3	mg/Kg	SW846 6010D	2,6-Dinitrotoluene	<0.017	mg/Kg	SW846 8270E
Total Chromium	15.0	mg/Kg	SW846 6010D	2-Chloronaphthalene	<0.017	mg/Kg	SW846 8270E
Total Copper	6.8	mg/Kg	SW846 6010D	2-Chlorophenol	<0.017	mg/Kg	SW846 8270E
Total Lead	< 2.5	mg/Kg	SW846 6010D	2-Methylnaphthalene	<0.007	mg/Kg	SW846 8270E
Total Selenium	< 2.5	mg/Kg	SW846 6010D	2-Methylphenol	<0.017	mg/Kg	SW846 8270E
Total Silver	< 0.7	mg/Kg	SW846 6010D	2-Nitroaniline	<0.017	mg/Kg	SW846 8270E
Total Zinc	30.9	mg/Kg	SW846 6010D	2-Nitrophenol	<0.017	mg/Kg	SW846 8270E
Total Silver	0.0347*	mg/Kg	SW846 6020B	3,3-Dichlorobenzidine	<0.033	mg/Kg	SW846 8270E
Total Mercury	< 0.025	mg/Kg	SW846 7471B	3-Nitroaniline	<0.033	mg/Kg	SW846 8270E
1,2,4-Trichlorobenzene	<0.017	mg/Kg	SW846 8270E	4,6-Dinitro-2-Methylphenol	<0.017	mg/Kg	SW846 8270E

*Analyzed by Fremont Analytical. See complete report attached.

PARTIAL RESULTS
 Final report will follow as soon as complete.

Surrogate	Recovery	Method
Nitrobenzene-d5--SIM	86	8270E SIM
p-Terphenyl-d14--SIM	124	8270E SIM
Decachlorobiphenyl		SW846 8082A
p-Terphenyl	74	NWTPH-Dx
Nitrobenzene-d5	49	SW846 8270E
2-Fluorobiphenyl	55	SW846 8270E
p-Terphenyl-d14	91	SW846 8270E

Surrogate	Recovery	Method
2-Fluorophenol	54	SW846 8270E
Phenol-d6	56	SW846 8270E
2,4,6-Tribromophenol	50	SW846 8270E

SPECTRA LABORATORIES


 Marie Holt, Customer Support & Proj. Manager

08/13/2021

Cal Portland - Pioneer Aggregates
 4301 Pioneer Avenue
 DuPont, WA 98327
 Attn: Jim Tweedy or Louie Bayless

P.O.#: 4501095667
 Project: DP Agg
 Client ID: DP Agg 72021
 Sample Matrix: Soil
 Date Sampled: 07/29/2021
 Date Received: 07/29/2021
 Spectra Project: 2021070720
 Spectra Number: 1

Rush

Analyte	Result	Units	Method	Analyte	Result	Units	Method
4-Bromophenyl-phenylether	<0.017	mg/Kg	SW846 8270E	Bis(2-Chloroethyl)Ether	<0.017	mg/Kg	SW846 8270E
4-Chloro-3-Methylphenol	<0.017	mg/Kg	SW846 8270E	Butylbenzylphthalate	<0.017	mg/Kg	SW846 8270E
4-Chloroaniline	<0.033	mg/Kg	SW846 8270E	Carbazole	<0.017	mg/Kg	SW846 8270E
4-Chlorophenyl-phenylether	<0.017	mg/Kg	SW846 8270E	Chrysene	<0.017	mg/Kg	SW846 8270E
4-Methylphenol	<0.017	mg/Kg	SW846 8270E	Di-n-Butylphthalate	<0.017	mg/Kg	SW846 8270E
4-Nitroaniline	<0.033	mg/Kg	SW846 8270E	Di-n-Octyl Phthalate	<0.017	mg/Kg	SW846 8270E
4-Nitrophenol	<0.017	mg/Kg	SW846 8270E	Dibenz(a,h)Anthracene	<0.017	mg/Kg	SW846 8270E
Acenaphthene	<0.007	mg/Kg	SW846 8270E	Dibenzofuran	<0.017	mg/Kg	SW846 8270E
Acenaphthylene	<0.007	mg/Kg	SW846 8270E	Dibenzothiophene	<0.017	mg/Kg	SW846 8270E
Aniline	<0.033	mg/Kg	SW846 8270E	Diethylphthalate	<0.017	mg/Kg	SW846 8270E
Anthracene	<0.007	mg/Kg	SW846 8270E	Dimethyl Phthalate	<0.017	mg/Kg	SW846 8270E
Azobenzene	<0.017	mg/Kg	SW846 8270E	Fluoranthene	<0.007	mg/Kg	SW846 8270E
Benidine	<0.033	mg/Kg	SW846 8270E	Fluorene	<0.007	mg/Kg	SW846 8270E
Benzo(a)Anthracene	<0.017	mg/Kg	SW846 8270E	Hexachlorobenzene	<0.017	mg/Kg	SW846 8270E
Benzo(a)Pyrene	<0.017	mg/Kg	SW846 8270E	Hexachlorobutadiene	<0.017	mg/Kg	SW846 8270E
Benzo(b)Fluoranthene	<0.017	mg/Kg	SW846 8270E	Hexachlorocyclopentadiene	<0.017	mg/Kg	SW846 8270E
Benzo(ghi)Perylene	<0.017	mg/Kg	SW846 8270E	Hexachloroethane	<0.017	mg/Kg	SW846 8270E
Benzo(k)Fluoranthene	<0.017	mg/Kg	SW846 8270E	Indeno(1,2,3-cd)Pyrene	<0.017	mg/Kg	SW846 8270E
Benzoic Acid	<0.033	mg/Kg	SW846 8270E	Isophorone	<0.017	mg/Kg	SW846 8270E
Benzyl Alcohol	<0.017	mg/Kg	SW846 8270E	N-Nitroso-Di-n-Propylamine	<0.017	mg/Kg	SW846 8270E
Biphenyl	<0.017	mg/Kg	SW846 8270E	N-Nitrosodiphenylamine	<0.017	mg/Kg	SW846 8270E


*Analyzed by Fremont Analytical. See complete report attached.

PARTIAL RESULTS
 Final report will follow as soon as complete.

Surrogate	Recovery	Method
Nitrobenzene-d5--SIM	86	8270E SIM
p-Terphenyl-d14--SIM	124	8270E SIM
Decachlorobiphenyl		SW846 8082A
p-Terphenyl	74	NWTPH-Dx
Nitrobenzene-d5	49	SW846 8270E
2-Fluorobiphenyl	55	SW846 8270E
p-Terphenyl-d14	91	SW846 8270E

Surrogate	Recovery	Method
2-Fluorophenol	54	SW846 8270E
Phenol-d6	56	SW846 8270E
2,4,6-Tribromophenol	50	SW846 8270E

SPECTRA LABORATORIES


 Marie Holt, Customer Support & Proj. Manager

08/13/2021

Cal Portland - Pioneer Aggregates
 4301 Pioneer Avenue
 DuPont, WA 98327
 Attn: Jim Tweedy or Louie Bayless

P.O.#: 4501095667
 Project: DP Agg
 Client ID: DP Agg 72021
 Sample Matrix: Soil
 Date Sampled: 07/29/2021
 Date Received: 07/29/2021
 Spectra Project: 2021070720
 Spectra Number: 1

Rush

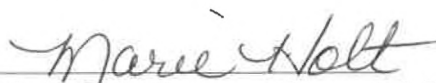
Analyte	Result	Units	Method	Analyte	Result	Units	Method
N-nitrosodimethylamine	<0.017	mg/Kg	SW846 8270E				
Naphthalene	<0.007	mg/Kg	SW846 8270E				
Nitrobenzene	<0.017	mg/Kg	SW846 8270E				
Pentachlorophenol	<0.017	mg/Kg	SW846 8270E				
Phenanthrene	<0.007	mg/Kg	SW846 8270E				
Phenol	<0.017	mg/Kg	SW846 8270E				
Pyrene	<0.007	mg/Kg	SW846 8270E				
Pyridine	<0.017	mg/Kg	SW846 8270E				
bis(2-Chloroethoxy)Methane	<0.017	mg/Kg	SW846 8270E				
bis(2-Ethylhexyl)Phthalate	<0.017	mg/Kg	SW846 8270E				
bis(2-chloroisopropyl)Ether	<0.017	mg/Kg	SW846 8270E				

*Analyzed by Fremont Analytical. See complete report attached.

PARTIAL RESULTS
 Final report will follow as soon as complete.

Surrogate	Recovery	Method	Surrogate	Recovery	Method
Nitrobenzene-d5--SIM	86	8270E SIM	2-Fluorophenol	54	SW846 8270E
p-Terphenyl-d14--SIM	124	8270E SIM	Phenol-d6	56	SW846 8270E
Decachlorobiphenyl		SW846 8082A	2,4,6-Tribromophenol	50	SW846 8270E
p-Terphenyl	74	NWTPH-Dx			
Nitrobenzene-d5	49	SW846 8270E			
2-Fluorobiphenyl	55	SW846 8270E			
p-Terphenyl-d14	91	SW846 8270E			

SPECTRA LABORATORIES


 Marie Holt, Customer Support & Proj. Manager



3600 Fremont Ave. N.
Seattle, WA 98103
T: (206) 352-3790
F: (206) 352-7178
info@fremontanalytical.com

Spectra Laboratories
Marie Holt
2221 Ross Way
Tacoma, WA 98421

RE: 2021070720
Work Order Number: 2108132

August 12, 2021

Attention Marie Holt:

Fremont Analytical, Inc. received 1 sample(s) on 8/10/2021 for the analyses presented in the following report.

Sample Moisture (Percent Moisture)
Total Metals by EPA Method 6020B

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

A handwritten signature in black ink, appearing to read "Brianna Barnes".

Brianna Barnes
Project Manager

DoD-ELAP Accreditation #79636 by PJLA, ISO/IEC 17025:2017 and QSM 5.3 for Environmental Testing
ORELAP Certification: WA 100009 (NELAP Recognized) for Environmental Testing
Washington State Department of Ecology Accredited for Environmental Testing, Lab ID C910

Original

www.fremontanalytical.com



CLIENT: Spectra Laboratories
Project: 2021070720
Work Order: 2108132

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2108132-001	070720-1	07/29/2021 12:00 AM	08/10/2021 9:10 AM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

CLIENT: Spectra Laboratories

Project: 2021070720

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.



Qualifiers:

- * - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit
- R - High relative percent difference observed

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate



Analytical Report

Work Order: 2108132
 Date Reported: 8/12/2021

Client: Spectra Laboratories

Collection Date: 7/29/2021

Project: 2021070720

Lab ID: 2108132-001

Matrix: Soil

Client Sample ID: 070720-1

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
<u>Total Metals by EPA Method 6020B</u>				Batch ID: 33294		Analyst: TN	
Silver	0.0347	0.119	0.0336	J	mg/Kg-dry	1	08/10/21 18:09:22
<u>Sample Moisture (Percent Moisture)</u>				Batch ID: R69167		Analyst: ALB	
Percent Moisture	2.46	0.500	0.100		wt%	1	08/11/21 11:34:33

Work Order: 2108132
CLIENT: Spectra Laboratories
Project: 2021070720

QC SUMMARY REPORT
Total Metals by EPA Method 6020B

Sample ID: MB-33294	SampType: MBLK	Units: mg/Kg	Prep Date: 8/10/2021	RunNo: 69151							
Client ID: MBLKS	Batch ID: 33294		Analysis Date: 8/10/2021	SeqNo: 1400121							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Silver	ND	0.118									
--------	----	-------	--	--	--	--	--	--	--	--	--

Sample ID: LCS-33294	SampType: LCS	Units: mg/Kg	Prep Date: 8/10/2021	RunNo: 69151							
Client ID: LCSS	Batch ID: 33294		Analysis Date: 8/10/2021	SeqNo: 1400122							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Silver	1.95	0.120	2.000	0	97.4	80	120				
--------	------	-------	-------	---	------	----	-----	--	--	--	--

Sample ID: 2108124-001AMS	SampType: MS	Units: mg/Kg	Prep Date: 8/10/2021	RunNo: 69151							
Client ID: BATCH	Batch ID: 33294		Analysis Date: 8/10/2021	SeqNo: 1400125							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Silver	1.98	0.119	1.984	0.04678	97.3	75	125				
--------	------	-------	-------	---------	------	----	-----	--	--	--	--

Sample ID: 2108124-001AMSD	SampType: MSD	Units: mg/Kg	Prep Date: 8/10/2021	RunNo: 69151							
Client ID: BATCH	Batch ID: 33294		Analysis Date: 8/10/2021	SeqNo: 1400126							
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Silver	1.93	0.121	2.016	0.04678	93.3	75	125	1.978	2.60	20	
--------	------	-------	-------	---------	------	----	-----	-------	------	----	--



Client Name: SPECTR	Work Order Number: 2108132
Logged by: Clare Griggs	Date Received: 8/10/2021 9:10:00 AM

Chain of Custody

1. Is Chain of Custody complete? Yes No Not Present
2. How was the sample delivered? UPS

Log In

3. Coolers are present? Yes No NA
4. Shipping container/cooler in good condition? Yes No
5. Custody Seals present on shipping container/cooler?
(Refer to comments for Custody Seals not intact) Yes No Not Present
6. Was an attempt made to cool the samples? Yes No NA
7. Were all items received at a temperature of >2°C to 6°C * Yes No NA
8. Sample(s) in proper container(s)? Yes No
9. Sufficient sample volume for indicated test(s)? Yes No
10. Are samples properly preserved? Yes No
11. Was preservative added to bottles? Yes No NA
12. Is there headspace in the VOA vials? Yes No NA
13. Did all samples containers arrive in good condition(unbroken)? Yes No
14. Does paperwork match bottle labels? Yes No
15. Are matrices correctly identified on Chain of Custody? Yes No
16. Is it clear what analyses were requested? Yes No
17. Were all holding times able to be met? Yes No

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes No NA

Person Notified:	<input type="text"/>	Date:	<input type="text"/>
By Whom:	<input type="text"/>	Via:	<input type="checkbox"/> eMail <input type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text"/>		
Client Instructions:	<input type="text"/>		

19. Additional remarks:

Item Information

Item #	Temp °C
Sample	6.0

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C

SPECTRA Laboratories

2221 Ross Way, Tacoma, WA 98421
 (253) 272-4850 Fax (253) 572-9838
 www.spectra-lab.com info@spectra-lab.com

SPECIAL INSTRUCTIONS/COMMENTS

Total Silver by 6020
 Report to MDL -Req. 0.10mg/kg

CHAIN of CUSTODY

2108132
 2-Day TAT please

Return Samples Y N x Page 1 of 1

STANDARD

RUSH

CLIENT **Spectra Laboratories** ADDRESS **2221 Ross Way Tacoma WA 98421** ADDRESS CHANGE

PROJECT	2021070720
CONTACT	Marie H
SUBBED TO	Fremont Analytical
PHONE	253-272-4850 FAX. 253-572-9838
e-MAIL	marieh@spectra-lab.com <input type="checkbox"/> Prefer FAX <input type="checkbox"/> or e-MAIL <input type="checkbox"/>
PURCHASE ORDER #	

NUMBER OF CONTAINERS	HYDROCARBONS								ORGANICS				METALS			OTHER					
	NWTPH-HClO	BTEX	BTEX NWTPH-G	NWTPH-G	NWTPH-D ⁺	1964 SGT HEM (TPH)	1964 HPM (TOG)	8260 CHLOR SOLVENTS	8270/826 SEMI VOA	8270 PAH/PNA	8082/608 PCB	TOTAL METALS RCRA 8	TOTAL METALS (SPECIFY)	TCLP METALS RCRA 8	TCLP METALS (SPECIFY)	PH 5.0-9.0/4.5	TX TOX 3076	TURBIDITY	FLASH POINT	BOD	SOLIDS (SPECIFY)

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	MATRIX	NUMBER OF CONTAINERS	NWTPH-HClO	BTEX	BTEX NWTPH-G	NWTPH-G	NWTPH-D ⁺	1964 SGT HEM (TPH)	1964 HPM (TOG)	8260 CHLOR SOLVENTS	8270/826 SEMI VOA	8270 PAH/PNA	8082/608 PCB	TOTAL METALS RCRA 8	TOTAL METALS (SPECIFY)	TCLP METALS RCRA 8	TCLP METALS (SPECIFY)	PH 5.0-9.0/4.5	TX TOX 3076	TURBIDITY	FLASH POINT	BOD	SOLIDS (SPECIFY)	TOX EPA 809/8A		
070720-1	07/29/21		soil	1													X											

LAB USE ONLY				SIGNATURE	PRINTED NAME	COMPANY	DATE	TIME
US Mail <input type="checkbox"/>	UPS <input type="checkbox"/>	Fed Ex <input type="checkbox"/>	Courier <input type="checkbox"/>	Client <input type="checkbox"/>	RELINQUISHED BY <i>Jen Draven</i>	Jen Draven	Spectra	08/09/21 3:00 PM
Cooler <input type="checkbox"/> Box <input type="checkbox"/> Envelope <input type="checkbox"/> None <input type="checkbox"/>				RECEIVED BY <i>Justine Mantz</i>	Justine Mantz	FAI	8/10/21 9:10	
Tracking # _____				RELINQUISHED BY				
Custody Seals: <input type="checkbox"/> N Intact <input type="checkbox"/> Y <input type="checkbox"/> N				RECEIVED BY				
Cooler Temp: _____ Sample Temp: _____				Payment Terms: Net 30 days Past due accounts subject to 1 1/2 % per month interest Customer agrees to pay all costs of collection including reasonable attorney's fees and all other costs of collection regardless of whether suit is filed in Pierce Co. WA venue. Spectra Analytical Inc.				

SPECTRA Laboratories

2221 Ross Way, Tacoma, WA 98421
 (253) 272-4850 Fax (253) 572-9838
 www.spectra-lab.com info@spectra-lab.com

SPECIAL INSTRUCTIONS/COMMENTS:

CHAIN OF CUSTODY

SPECTRA PROJECT #

2021070720

Return Samples: Y N

Page 1 of 1

STANDARD

RUSH

CLIENT: CalPortland

ADDRESS:

ADDRESS CHANGE

PROJECT: DP Agg
 CONTACT: Annie Ayre
 SAMPLED BY: Justin Lake
 PHONE: 206-704 3026 FAX:
 e-MAIL: ayre@calportland.com Prefer FAX or e-MAIL
 PURCHASE ORDER #

NUMBER OF CONTAINERS	HYDROCARBONS								ORGANICS				METALS			OTHER								
	NWTPH-HCID	BTEX	BTEX/NWTPH-G	NWTPH-G	NWTPH-Dx	1664 SGT-HEM (TPH)	1664 HEM (FOG)	8260/624 VOA	8260 CHLOR SOLVENTS	8270-625 SEMI VOA	8270 PAH/PNA	8082/808 PCB	TOTAL METALS RCRA 8 + Copper	TOTAL METALS (SPECIFY)	TCLP METALS RCRA 8	TCLP METALS (SPECIFY)	PH 9040/9045	TX/TXO/XEOX	TURBIDITY	FLASH POINT	BOD	SOLIDS (SPECIFY)		
4					X					X	X	X											X	PAH EPA 8270 SIM

SAMPLE ID	DATE SAMPLED	TIME SAMPLED	MATRIX
1 DP Agg # 7071	7-29	1:00 pm	SD11
2			
3			
4			
5			
6			
7			
8			
9			
10			

LAB USE ONLY	SIGNATURE	PRINTED NAME	COMPANY	DATE	TIME
RELINQUISHED BY	Annie Ayre	Annie Ayre	CalPortland	7/29	1:51 pm
RECEIVED BY	[Signature]	Nick Miller	Spectra	7/29	1:51
RELINQUISHED BY					
RECEIVED BY					

Payment Terms: Net 30 days. Past due accounts subject to 1 1/2% per month interest. Customer agrees to pay all costs of collection including reasonable attorney's fees and all other costs of collection regardless of whether suit is filed in Pierce Co., WA venue. Spectra Laboratories, LLC



Ayre

Anne Ayre
5975 E Marginal Ways
Seattle, WA 98134

RE: DP Agg

Work Order Number: 2108236

August 18, 2021

Attention Anne Ayre:

Fremont Analytical, Inc. received 1 sample(s) on 8/17/2021 for the analyses presented in the following report.

Polychlorinated Biphenyls (PCB) by EPA 8082

This report consists of the following:

- Case Narrative
- Analytical Results
- Applicable Quality Control Summary Reports
- Chain of Custody

All analyses were performed consistent with the Quality Assurance program of Fremont Analytical, Inc. Please contact the laboratory if you should have any questions about the results.

Thank you for using Fremont Analytical.

Sincerely,

Brianna Barnes
Project Manager



Date: 08/19/2021

CLIENT: Ayre
Project: DP Agg
Work Order: 2108236

Work Order Sample Summary

Lab Sample ID	Client Sample ID	Date/Time Collected	Date/Time Received
2108236-001	DP Grab 02	08/17/2021 11:15 AM	08/17/2021 12:56 PM

Note: If no "Time Collected" is supplied, a default of 12:00AM is assigned

CLIENT: Ayre
Project: DP Agg

I. SAMPLE RECEIPT:

Samples receipt information is recorded on the attached Sample Receipt Checklist.

II. GENERAL REPORTING COMMENTS:

Results are reported on a wet weight basis unless dry-weight correction is denoted in the units field on the analytical report ("mg/kg-dry" or "ug/kg-dry").

Matrix Spike (MS) and MS Duplicate (MSD) samples are tested from an analytical batch of "like" matrix to check for possible matrix effect. The MS and MSD will provide site specific matrix data only for those samples which are spiked by the laboratory. The sample chosen for spike purposes may or may not have been a sample submitted in this sample delivery group. The validity of the analytical procedures for which data is reported in this analytical report is determined by the Laboratory Control Sample (LCS) and the Method Blank (MB). The LCS and the MB are processed with the samples and the MS/MSD to ensure method criteria are achieved throughout the entire analytical process.

III. ANALYSES AND EXCEPTIONS:

Exceptions associated with this report will be footnoted in the analytical results page(s) or the quality control summary page(s) and/or noted below.

Prep Comments for METHOD (PREP-PCB-S), SAMPLE (2108236-001A) required Acid Cleanup Procedure (Using Method No 3665A).

Prep Comments for METHOD (PREP-PCB-S), SAMPLE (2108236-001A) required Florisil Cleanup Procedure (Using Method No 3620C).

Rev 1: Report has been revised to clarify that no PCBs were detected at or above the level of the MDL (i.e. <0.004 mg/kg).

Qualifiers:

- * - Flagged value is not within established control limits
- B - Analyte detected in the associated Method Blank
- D - Dilution was required
- E - Value above quantitation range
- H - Holding times for preparation or analysis exceeded
- I - Analyte with an internal standard that does not meet established acceptance criteria
- J - Analyte detected below Reporting Limit
- N - Tentatively Identified Compound (TIC)
- Q - Analyte with an initial or continuing calibration that does not meet established acceptance criteria
- S - Spike recovery outside accepted recovery limits
- ND - Not detected at the Reporting Limit
- R - High relative percent difference observed

Acronyms:

- %Rec - Percent Recovery
- CCB - Continued Calibration Blank
- CCV - Continued Calibration Verification
- DF - Dilution Factor
- DUP - Sample Duplicate
- HEM - Hexane Extractable Material
- ICV - Initial Calibration Verification
- LCS/LCSD - Laboratory Control Sample / Laboratory Control Sample Duplicate
- MCL - Maximum Contaminant Level
- MB or MBLANK - Method Blank
- MDL - Method Detection Limit
- MS/MSD - Matrix Spike / Matrix Spike Duplicate
- PDS - Post Digestion Spike
- Ref Val - Reference Value
- REP - Sample Replicate
- RL - Reporting Limit
- RPD - Relative Percent Difference
- SD - Serial Dilution
- SGT - Silica Gel Treatment
- SPK - Spike
- Surr - Surrogate



Client: Ayre

Collection Date: 8/17/2021 11:15:00 AM

Project: DP Agg

Lab ID: 2108236-001

Matrix: Solid

Client Sample ID: DP Grab 02

Analyses	Result	RL	MDL	Qual	Units	DF	Date Analyzed
----------	--------	----	-----	------	-------	----	---------------

Polychlorinated Biphenyls (PCB) by EPA 8082

Batch ID: 33386

Analyst: SB

Aroclor 1016	ND	0.0198	0.00319		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1221	ND	0.0198	0.00319		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1232	ND	0.0198	0.00319		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1242	ND	0.0198	0.00319		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1248	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1254	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1260	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1262	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Aroclor 1268	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Total PCBs	ND	0.0198	0.00394		mg/Kg-dry	1	08/17/21 16:52:48
Surr: Decachlorobiphenyl	97.4	20.6 - 142			%Rec	1	08/17/21 16:52:48
Surr: Tetrachloro-m-xylene	104	22 - 157			%Rec	1	08/17/21 16:52:48

NOTES:

ND - Sample is non-detect evaluated to the method detection limit (MDL). Any detections between the MDL and the RL would be presented as a number qualified with a J.

Work Order: 2108236
 CLIENT: Ayre
 Project: DP Agg

QC SUMMARY REPORT
Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID: MB-33386	SampType: MBLK	Units: mg/Kg			Prep Date: 8/17/2021	RunNo: 69321					
Client ID: MBLKS	Batch ID: 33386				Analysis Date: 8/17/2021	SeqNo: 1404598					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	ND	0.0500									
Aroclor 1221	ND	0.0500									
Aroclor 1232	ND	0.0500									
Aroclor 1242	ND	0.0500									
Aroclor 1248	ND	0.0500									
Aroclor 1254	ND	0.0500									
Aroclor 1260	ND	0.0500									
Aroclor 1262	ND	0.0500									
Aroclor 1268	ND	0.0500									
Total PCBs	ND	0.0500									
Surr: Decachlorobiphenyl	238		200.0		119	20.6	142				
Surr: Tetrachloro-m-xylene	214		200.0		107	22	157				

Sample ID: LCS1-33386	SampType: LCS	Units: mg/Kg			Prep Date: 8/17/2021	RunNo: 69321					
Client ID: LCSS	Batch ID: 33386				Analysis Date: 8/17/2021	SeqNo: 1404599					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.918	0.0500	1.000	0	91.8	52.2	136				
Aroclor 1260	0.865	0.0500	1.000	0	86.5	50.5	150				
Surr: Decachlorobiphenyl	216		200.0		108	20.6	142				
Surr: Tetrachloro-m-xylene	218		200.0		109	22	157				

Sample ID: 2108236-001AMS	SampType: MS	Units: mg/Kg-dry			Prep Date: 8/17/2021	RunNo: 69321					
Client ID: DP Grab 02	Batch ID: 33386				Analysis Date: 8/17/2021	SeqNo: 1404601					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual
Aroclor 1016	0.393	0.0196	0.3912	0	100	38.6	146				
Aroclor 1260	0.367	0.0196	0.3912	0	93.8	24.6	161				
Surr: Decachlorobiphenyl	81.4		78.25		104	20.6	142				

Work Order: 2108236

CLIENT: Ayre

Project: DP Agg

QC SUMMARY REPORT

Polychlorinated Biphenyls (PCB) by EPA 8082

Sample ID: 2108236-001AMS	SampType: MS	Units: mg/Kg-dry			Prep Date: 8/17/2021	RunNo: 69321					
Client ID: DP Grab 02	Batch ID: 33386				Analysis Date: 8/17/2021	SeqNo: 1404601					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Surr: Tetrachloro-m-xylene 82.7 78.25 106 22 157

Sample ID: 2108236-001AMSD	SampType: MSD	Units: mg/Kg-dry			Prep Date: 8/17/2021	RunNo: 69321					
Client ID: DP Grab 02	Batch ID: 33386				Analysis Date: 8/17/2021	SeqNo: 1404602					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1016 0.374 0.0195 0.3897 0 96.1 38.6 146 0.3931 4.87 30

Aroclor 1260 0.366 0.0195 0.3897 0 93.8 24.6 161 0.3671 0.407 30

 Surr: Decachlorobiphenyl 83.1 77.94 107 20.6 142 0

 Surr: Tetrachloro-m-xylene 82.6 77.94 106 22 157 0

Sample ID: LCS2-33386	SampType: LCS	Units: mg/Kg			Prep Date: 8/17/2021	RunNo: 69321					
Client ID: LCSS	Batch ID: 33386				Analysis Date: 8/18/2021	SeqNo: 1404605					
Analyte	Result	RL	SPK value	SPK Ref Val	%REC	LowLimit	HighLimit	RPD Ref Val	%RPD	RPDLimit	Qual

Aroclor 1254 1.31 0.0500 1.000 0 131 48.1 147

 Surr: Decachlorobiphenyl 238 200.0 119 20.6 142

 Surr: Tetrachloro-m-xylene 248 200.0 124 22 157

Client Name: CALPO	Work Order Number: 2108236
Logged by: Gabrielle Coeuille	Date Received: 8/17/2021 12:56:53 PM

Chain of Custody

1. Is Chain of Custody complete? Yes No Not Present
2. How was the sample delivered? Client

Log In

3. Coolers are present? Yes No NA
No cooler present
4. Shipping container/cooler in good condition? Yes No
5. Custody Seals present on shipping container/cooler?
 (Refer to comments for Custody Seals not intact) Yes No Not Present
6. Was an attempt made to cool the samples? Yes No NA
Unknown prior to receipt
7. Were all items received at a temperature of >2°C to 6°C * Yes No NA
8. Sample(s) in proper container(s)? Yes No
9. Sufficient sample volume for indicated test(s)? Yes No
10. Are samples properly preserved? Yes No
11. Was preservative added to bottles? Yes No NA
12. Is there headspace in the VOA vials? Yes No NA
13. Did all samples containers arrive in good condition(unbroken)? Yes No
14. Does paperwork match bottle labels? Yes No
15. Are matrices correctly identified on Chain of Custody? Yes No
16. Is it clear what analyses were requested? Yes No
17. Were all holding times able to be met? Yes No

Special Handling (if applicable)

18. Was client notified of all discrepancies with this order? Yes No NA

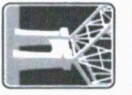
Person Notified:	<input type="text" value="Anne Avre"/>	Date:	<input type="text" value="8/17/2021"/>
By Whom:	<input type="text" value="Clare Griqas"/>	Via:	<input type="checkbox"/> eMail <input checked="" type="checkbox"/> Phone <input type="checkbox"/> Fax <input type="checkbox"/> In Person
Regarding:	<input type="text" value="Confirming report to email & project limits."/>		
Client Instructions:	<input type="text"/>		

19. Additional remarks:

Item Information

Item #	Temp °C
Sample 1	23.9

* Note: DoD/ELAP and TNI require items to be received at 4°C +/- 2°C



Fremont
Analytical

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 9/17/2021

Page: of

Laboratory Project No (Internal): 2108236

Project Name: DR Agg

Project No:

Collected by: Ayre

Location:

Report To (PM):

Special Remarks:

Telephone: 206-Fly 30210

Fax:

PM Email:

Client: Call Portland

Address: 5735 E Marginal Way S

City, State, Zip: Seattle, WA 98134

Telephone: 206-Fly 30210

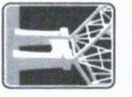
Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
DR Grab 02	8/17/21	11:15 AM	Soil	1													see attached spec phase reporting limit 4 ppt/kg

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water
 **Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Ti Tl V Zn
 ***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Turn-around Time:
 Standard Next Day
 3 Day Same Day
 2 Day (specify)

Relinquished (Signature) *Anne Ayre* Print Name Anne Ayre Date/Time 8/17/21 12:56 PM
 Relinquished (Signature) *Oliver Khan* Print Name Oliver Khan Date/Time 8/17/21 12:56 PM



Fremont
ANALYTICAL

3600 Fremont Ave N.
Seattle, WA 98103
Tel: 206-352-3790
Fax: 206-352-7178

Chain of Custody Record & Laboratory Services Agreement

Date: 8/17/2021 Page: of:

Project Name: DR Agg

Project No:

Collected by: Ayre

Location:

Report To (PM): Anne Ayre

PM Email: aayre@calportland.com

Laboratory Project No (Internal): 2108236

Special Remarks:

Update per AA 8/17/21 - gac

Sample Disposal: Return to client Disposal by lab (after 30 days)

Sample Name	Sample Date	Sample Time	Sample Type (Matrix)*	# of Cont.	VOCs (EPA 8260 / 624)	BTEX	Gasoline Range Organics (GX)	Hydrocarbon Identification (HCID)	Diesel/Heavy Oil Range Organics (DX)	SVOCs (EPA 8270 / 625)	PAHs (EPA 8270 - SIM)	PCBs (EPA 8082 / 608)	Metals** (EPA 6020 / 200.8)	Total (T) Dissolved (D)	Anions (IC)***	EDB (8011)	Comments
DR Grab 02	8/17/21	11:50am	solid	1													see attached spec phase reporting limit 4 parts/kg

*Matrix: A = Air, AQ = Aqueous, B = Bulk, O = Other, P = Product, S = Soil, SD = Sediment, SL = Solid, W = Water, DW = Drinking Water, GW = Ground Water, SW = Storm Water, WW = Waste Water

**Metals (Circle): MTCA-5 RCRA-8 Priority Pollutants TAL Individual: Ag Al As B Ba Be Ca Cd Co Cr Cu Fe Hg K Mg Mn Mo Na Ni Pb Sb Se Sr Sn Tl Ti V Zn

***Anions (Circle): Nitrate Nitrite Chloride Sulfate Bromide O-Phosphate Fluoride Nitrate-Nitrite

I represent that I am authorized to enter into this Agreement with Fremont Analytical on behalf of the Client named above, that I have verified Client's agreement to each of the terms on the front and backside of this Agreement.

Relinquished (Signature) *Anne Ayre* Print Name Anne Ayre Date/Time 8/17/21 12:56pm Received (Signature) *Oliver Khan* Print Name Oliver Khan Date/Time 8/17/21 12:56



To Whom it May Concern,

Sample IDs “DP Agg 72021” and “DP Grab 02” collected July 29th and August 18th of 2021 respectively, were both taken from the same area of the Steilacoom Deposit at CalPortland’s Pioneer Aggregates Mine. Both samples are representative of the material that will supply the project. Please reach out to me with any additional questions at 206-764-3026.

Thank you,

A handwritten signature in black ink that reads 'Annie Ayre'.

Annie Ayre
Environmental Manager
CalPortland

SUBMITTAL REVIEW COMMENT FORM

Submittal Title:	Crushed Surfacing Base Course – City of Seattle Type 2	Submittal Identification Number	
Project Title: Project Number:	Time Oil Company - Seattle	Reviewer(s):	CRETE- Reid Carscadden (RC) /Jamie Stevens(JCS)
Cantera Project Manager:	Kim Hempel		
Dated Submitted:	07/20/2021	Final Review Date:	7/21/2021

Submittal Item No.	Reviewer Name	Review Date	Reviewer Comment with <u>Contract</u> Document Reference	Receipt Acknowledged	Accepted	Accepted as Noted	Revise and Resubmit	(Substitution Requests Only)	Not Accepted																																											
				0	1	2	3	4																																												
	RC	7/20/21	<p>Ballast Rock</p> <p>CalPortland- Aggregate Submittal</p> <p>Date: February 10, 2021</p> <p>Product Number: 8545</p> <p>Product Description: Crushed Surfacing Base Course</p> <p>Specification Number: City Of Seattle- Type 2</p> <p>Source: Lafarge Canada Location: Texada Island, BC</p> <p>WSDOT Pit Number: QS-CA-8</p> <p>Specification:</p> <table border="1" style="font-size: small;"> <tr><td>1 1/4" SQUARE</td><td>100%PASSING</td><td>% Fracture</td><td>NA</td></tr> <tr><td>1" SQUARE</td><td>80-100%</td><td>Sand Equivalent</td><td>NA</td></tr> <tr><td>5/8" SQUARE</td><td>50-80</td><td>L.A. Wear</td><td>NA</td></tr> <tr><td>U.S.No. 4</td><td>25-45</td><td>Degradation:</td><td>NA</td></tr> <tr><td>U.S.No.40</td><td>3-18</td><td></td><td></td></tr> <tr><td>U.S.No.200</td><td>0-7.5</td><td></td><td></td></tr> </table> <p>Specific Gravity: 2.76 %Fracture: 100%</p> <p>Absorption: 0 Sand Equivalent: 54</p> <p>L.A. Abrasion: 17.1% Dust Ratio: ok</p> <p>Degradation: 65</p> <p>Ballast Spec</p> <table border="1" style="font-size: x-small; margin-top: 10px;"> <tr><th>Sieve Size</th><th>Percent Passing</th></tr> <tr><td>2 1/2"</td><td>99-100</td></tr> <tr><td>2"</td><td>65-100</td></tr> <tr><td>1"</td><td>50-85</td></tr> <tr><td>No. 4</td><td>26-44</td></tr> <tr><td>No. 40</td><td>16 max.</td></tr> <tr><td>No. 200</td><td>9.0 max.</td></tr> <tr><td>Dust Ratio:</td><td>1/2 max.</td></tr> <tr><td>Sand Equivalent</td><td>35 min.</td></tr> </table>	1 1/4" SQUARE	100%PASSING	% Fracture	NA	1" SQUARE	80-100%	Sand Equivalent	NA	5/8" SQUARE	50-80	L.A. Wear	NA	U.S.No. 4	25-45	Degradation:	NA	U.S.No.40	3-18			U.S.No.200	0-7.5			Sieve Size	Percent Passing	2 1/2"	99-100	2"	65-100	1"	50-85	No. 4	26-44	No. 40	16 max.	No. 200	9.0 max.	Dust Ratio:	1/2 max.	Sand Equivalent	35 min.		X					
1 1/4" SQUARE	100%PASSING	% Fracture	NA																																																	
1" SQUARE	80-100%	Sand Equivalent	NA																																																	
5/8" SQUARE	50-80	L.A. Wear	NA																																																	
U.S.No. 4	25-45	Degradation:	NA																																																	
U.S.No.40	3-18																																																			
U.S.No.200	0-7.5																																																			
Sieve Size	Percent Passing																																																			
2 1/2"	99-100																																																			
2"	65-100																																																			
1"	50-85																																																			
No. 4	26-44																																																			
No. 40	16 max.																																																			
No. 200	9.0 max.																																																			
Dust Ratio:	1/2 max.																																																			
Sand Equivalent	35 min.																																																			

CalPortland - Aggregate Submittal



Date: February 10, 2021

Product Number: 8545

Product Description: Crushed Surfacing Base Course

Specification Number: City Of Seattle- Type 2

Source: Lafarge Canada

Location: Texada Island, BC

WSDOT Pit Number: QS-CA-8

Specification:

1 1/4" SQUARE	100% PASSING	% Fracture	NA
1" SQUARE	80-100%	Sand Equivalent	
5/8" SQUARE	50-80	L.A. Wear	NA
U.S No. 4	25-45	Degradation:	NA
U.S. No.40	3-18		
U.S. No.200	0-7.5		

Specific Gravity: 2.76

% Fracture: 100%

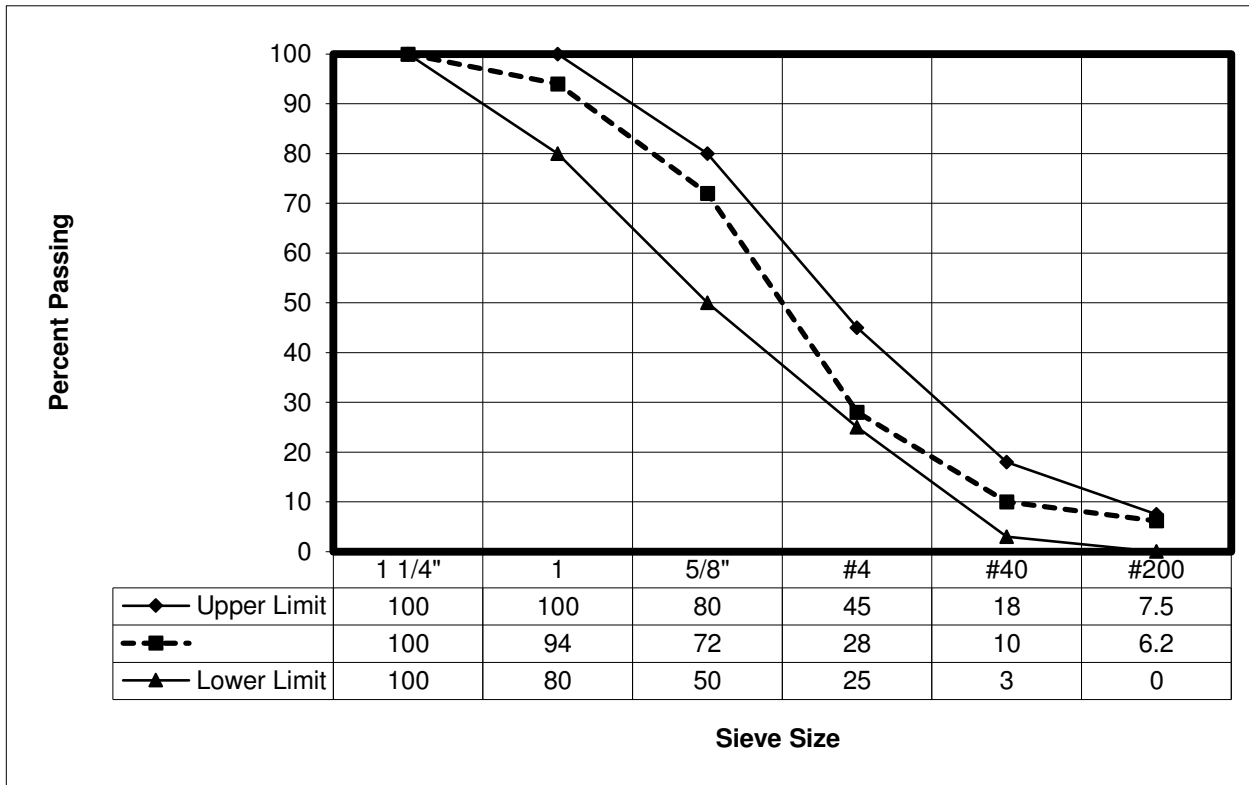
Absorption: 0

Sand Equivalent: 54

L.A. Abrasion: 17.1%

Dust Ratio: ok

Degradation: 65



Appendix G

Final Compaction Acceptance

December 30, 2021

File No. 20-361.500

Ms. Kim Hempel
TOC Seattle Terminal LLP
2753 West 31st Street
Chicago, IL 60608

**Subject: Final Letter - Geotechnical Construction Observations
Site Grading and Remediation
2737 W Commodore Way, Seattle, Washington
SDCI Permit No. 6819513-CN**

Dear Ms. Hempel:

PanGEO, Inc. has completed geotechnical construction support services for the subject project as required by the City of Seattle Department of Construction and Inspections (SDCI). This final letter summarizes our observations and was prepared to assist you in closing out your grading permit. The scope of the construction support services performed was in accordance with the geotechnical inspection items outlined in the SDCI letter dated July 6, 2021.

Our construction support services were performed between July 15th and December 21st, 2021. Observations from our site visits were documented in 22 field reports which were transmitted to the project team and the City.

OBSERVATIONS AND CONCLUSIONS

The following items were identified in the SDCI permit as requiring geotechnical inspection. Details of our observations are contained in our field reports. The following summarizes our observations:

- 1. Preconstruction Meeting** – We attended a preconstruction meeting on August 11, 2021, which was attended by the contractor and representative of the City to discuss reporting requirements of the City.
- 2. Temporary Erosion Control** – Temporary erosion control consisting of silt fencing and straw rolls along W Commodore Way was completed prior to site grading. Equipment access was through the paved area of the site. Erosion control was maintained throughout the grading activities. We did not observe off-site sediment transport during grading work.
- 3. Permanent Erosion Control** – Following the ISS treatments, excavation, backfill and compaction of excavated areas, treatment areas CAA-2, CAA-3, CAA-4, CAA-5 and part of CAA-1 were covered with a layer of clean ballast rock as permanent erosion control. The ballast was placed over geotextile filter fabric. The Swell Management Area, including part of CAA-1, was covered with geotextile filter fabric, per plan, as final erosion control.
- 4. Monitor Grading Season Restriction** – Two Dry Season Grading extensions were applied for and granted. The first extension was effective from October 18, 2021, extended through December 7, 2021. The second extension was effective from December 10, 2021, through January 31, 2022. All grading activities were completed by December 21, 2021.
- 5. Observed and Monitored Excavations** – PanGEO was on site during excavation and removal of contaminated soil and periodically during backfill placement. The various excavations remained stable throughout the grading work.
- 6. Other Geotechnical: Excavation Mixing Grid Cells** – PanGEO was on site periodically to observe the ISS mixing grid cell work. Two mixing methods were used. The first entailed in-situ mixing of soil and cement to contain and neutralize contaminated soil and thereby minimize off-site disposal of contaminated material. The second involved excavation and temporary stockpiling of soil materials, mixing at the surface, and replacement of mixed materials. No excavation remained open for any extended period, and all excavations remained stable during mixing.
- 7. Other Geotechnical: Interceptor Trench** – The Interceptor trench was located within cell CAA-4, and was constructed concurrently with the backfilling operation. No separate excavation was done.

- 8. Other Geotechnical: In Situ Stabilization/Solidification** – See note 6 above. In situ stabilization was used in cell CAA-2, near W Commodore Way, and in much of CAA-4, especially next to the temporary shoring wall along the BNSF right-of-way. All stabilized soil had an unconfined compressive strength of at least 50 psi.
- 9. Shoring Installation/Performance Monitoring** – Two temporary cantilever soldier pile shoring walls were constructed to facilitate soil removal, one adjacent to W Commodore Way in CAA-2b, and one along the BNSF right-of-way in CAA-4. PanGEO was on site continually during the construction of both walls. Following construction, the area of CAA-2b between W Commodore Way and ISS cell CAA-2a was excavated and replaced with clean backfill. Following construction of the BNSF wall in CAA-4, the area in front of the wall was excavated to allow deep, in situ mixing. After deep mixing was completed, the area in front of the wall was backfilled with the previously excavated soil, mixed with cement grout. Both walls were surveyed twice weekly for lateral movement by Axis Survey & Mapping. PanGEO reviewed all survey data. The wall along W Commodore Way exhibited less than 0.4 inches of lateral movement. Movements of the the BNSF wall were typically about 1 inch or less. No significant soil distress was observed behind the wall. As of November 19, the area below the wall was backfilled.
- 10. Soldier Pile Wall Installation** – PanGEO was on site continuously during the construction of both soldier piles walls. Both walls were built in accordance with the approved plans.
- 11. Verify Backfill and Compaction** – The area where excavation and replacement were conducted included CAA-1, CAA-2b, CAA-3 and CAA-5. CAA-5 was the first area to be backfilled, and it was backfilled with ballast rock, which required no compaction. CAA-1 was excavated and CAA-1a was backfilled with gravel borrow compacted with a smooth drum roller (see Field Report 03). CAA-1b was initially backfilled with quarry spalls, followed by gravel borrow (see Field Report 06 and 07), also compacted with a vibratory drum roller. Density testing was conducted by Mayes and the reports submitted to PanGEO for review. All compaction tests met the specified level of compaction per plan. Backfill of CAA-6b also consisted of a bottom layer of quarry spalls, followed by gravel borrow, compacted with the same equipment (see Field Reports 11 and 12). Lifts were tested periodically by Mayes Testing, and all backfill tests met the required 95% compaction. Excavation and backfill of CAA-3 occurred between November 12 and 15, 2021 (see Field Report 17). The excavation was backfilled with ballast rock and compacted with a drum roller.

In summary, to the best of our knowledge, the above-discussed geotechnical elements of the project have been accomplished in general accordance with our recommendations and the SDCI approved plans and specifications.

LIMITATIONS

The geotechnical observation services were performed in accordance with generally accepted standards of the profession in this geographic area. Except during wall construction, PanGEO was on site on an as-needed basis. Our conclusions and opinions as to whether the work essentially complies with the project requirements are based on our observations and experience. The conclusions contained herein apply only to our observations at the time of our site visits. We cannot provide advice, opinions, or conclusions relative to site work that we have not observed.

We appreciate the opportunity to be of service.

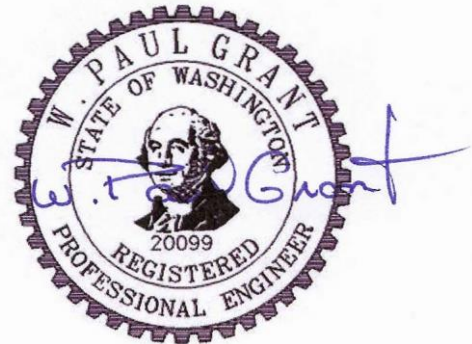
Sincerely,



STEPHEN H. EVANS

Stephen H. Evans

Stephen H Evans, L.E.G.
Senior Engineering Geologist



W. Paul Grant, P.E.
Principal Geotechnical Engineer

cc: SDCI (portal)

Kim Hempel khempel@pioneerees.com,
Jamie Stevens <jamie.stevens@creteconsulting.com>,
Rusty Jones rusty.jones@creteconsulting.com,
Kenny Martinez <kmartinez@for-gen.com>

3213 Eastlake Avenue E, Suite B Seattle, WA 98102 Tel: (206) 262-0370 Fax: (206) 262-0374	Project No. 20-361.500	Page No. 1 of 2
	Report No. 22	Date / Day of Week 12/21/21 (Tuesday)
Project Name Salmon Bay Redevelopment	Location or Address 2737 W. Commodore Way, Seattle	
Owner's Representative Kim Hempel	DPD Permit No. 6819513-CN	Weather Overcast, cool
Client TOC Seattle Terminal LLC	Contractor Forgen Construction	PanGEO Field Rep. Steve Evans

A representative from PanGEO visited the site on December 21, 2021, to observe site grading work.

Site Grading: All site grading work was completed as of December 21, 2021.

Temporary Erosion Control: Temporary erosion control was in place through December. Bare soil areas were covered with clean ballast rock or geotextile as of December 21, 2021 (see Plates 1 and 2), per plan. This constitutes permanent erosion control under this permit, and temporary erosion control is no longer required.



Plate 1: CAA-3 and 4 with permanent erosion control.



Plate 2: ISS swell management area covered with geotextile.

Signed: *Stephen A. Evans*

CC: City of Seattle
Kim Hempel khempel@pioneerees.com, Jamie Stevens <jamie.stevens@creteconsulting.com>, Rusty Jones rusty.jones@creteconsulting.com, Kenny Martinez <kmartinez@forgen.com>

Appendix H

Well Log

Recourse Protection Well Report

Notice of Intent No. _____

RE21996

Type of Work:

Construction

Decommission → Original NOI No. _____

Ecology Well ID Tag No. **BNC 553**

Site Well Name _____

Consulting Firm **Forgen**

Was a variance approved for this well/boring? Yes No

If yes, what was the variance for? _____

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported are true to my best knowledge and belief.

Driller Trainee

Name (Print Last, First Name) **Wes Kennedy**

Driller/Trainee Signature _____

License No. **3244**

Company Name **Cascade Drilling - Seattle**

If trainee box is checked, sponsor's license number: _____

Sponsor's signature _____

Type of Well:

Resource Protection Well

Injection Point

Remediation Well

Grounding Well

Geotechnical Soil Boring

Ground Source Heat Pump

Environmental Boring

Other _____

Soil Vapor Water Sampling

Property Owner **TOC Seattle Terminal 1 LLC**

Well Street Address **2805 West Commodore Way**

City **Seattle** County **King**

Tax Parcel No. **423790-0405**

Location (see instructions): WWM EWM

¼-¼ **SW** ¼ **SW** Sec **11** Twn **25N** R **3E**

Latitude (Example: 47.12345) **x**

Longitude (Example: -120.12345) **x**

Borehole Diameter **12"** inches Casing Diameter _____ inches

Static Water Level **23'** ft below top of casing

Above-ground completion w/bollards Flush Monument

Stick-up of top of well casing _____ ft above ground surface

Start Date **11/12/2021** Completed Date **11/12/2021**

Construction Design

Well Data

103-21-1380

Formation Description

	Concrete Surface Seal Depth	<u>3'</u> FT	<u>0</u> - <u>10</u> FT
	Blank Casing (dia x dep)	<u>6" x 12'</u>	Fine to medium black sands
	Material	<u>PVC</u>	
	Backfill	_____ FT	
	Type	_____	
	Seal	<u>7'</u> FT	<u>10</u> - <u>25</u> FT
	Material	<u>Bentonite Chips</u>	Light gray sands to sandy silts
	Gravel Pack	<u>17'</u> FT	
	Material	<u>2/12 Sand</u>	
	Screen (dia x dep)	<u>6" x 15'</u>	<u>25</u> - <u>30</u> FT
	Slot Size	<u>.030</u>	Sandy silts to dense sandy silts
	Material	<u>PVC</u>	
Well Depth	<u>27'</u> FT	<div style="border: 1px solid black; padding: 5px;"> Easting: 245439.007 Northing: 1255853.038 Top of Well Elevation FT NAVD88: 46.167 </div>	
Backfill	<u>1.5' 2/12 Sand</u>		
Material	<u>1.5' Bentonite Chips</u>		
Total Hole Depth	<u>30'</u> FT		

Appendix I

ISS Confirmation Sampling Analytical Laboratory Reports and Backup



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/07/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39047/2-20	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/27/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.633
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.89
Area, in ²	6.96
Volume, in ³	39.21
Mass of Sample, g	1187.9
Wet Density, pcf	115.4
Dry Density, pcf	87.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1485.6
Mass of Dry Sample and Tare, g	1203.4
Mass of Tare, g	299.2
Moisture, %	31.2

TEST DATA

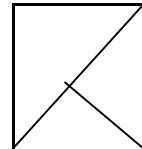
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	896
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	129
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	129

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/25/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39047/2-20	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/27/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.594
Initial Diameter, in	2.980
Height-to-Diameter Ratio	1.88
Area, in ²	6.97
Volume, in ³	39.02
Mass of Sample, g	1175.7
Wet Density, pcf	114.8
Dry Density, pcf	87.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1472.7
Mass of Dry Sample and Tare, g	1191.5
Mass of Tare, g	302.0
Moisture, %	31.6

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2742
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	393
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	393

Failure Code 3

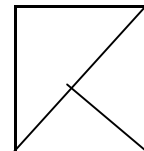
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/07/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39047/2-20	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/27/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.005 in	7.63 cm	Speed	10	Average Height of Sample	3.006 in	7.64 cm	Dry Density	87.6 pcf		
Diameter	2.969 in	7.54 cm	Board Number	9	Average Diameter of Sample	2.970 in	7.54 cm	Vol. of Voids	163.80 cm ³		
Area	6.92 in ²	44.67 cm ²	Cell Number	41	Area	6.93 in ²	44.70 cm ²	Vol. of Solids	177.46 cm ³		
Volume	340.92 cm ³	0.0120 ft ³	Flow Pump Number	2A	Volume	341.27 cm ³	0.0121 ft ³	Void Ratio	0.92		
Mass	629.4 g	1.39 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	642.7 g	1.42 lb	Saturation	99.8 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	87.7 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	724.0 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	560.5 g				
Mass of wet sample & tare	629.4 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	81.5 g					
Mass of dry sample & tare	479.0 g		Max Head	17.59 cm	% Moisture	34.1					
Mass of tare	0.0 g		Min Head	16.88 cm							
% Moisture	31.4		Maximum Gradient	2.30							
			Minimum Gradient	2.21							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/07/21	8	5	-	0.25	17.59	2.30	23.1	-	-	-
10/07/21	8	15	600	0.24	16.88	2.21	23.1	2.22E-06	0.929	2.06E-06
10/07/21	8	25	600	0.25	17.59	2.30	23.1	2.22E-06	0.929	2.06E-06
10/07/21	8	35	600	0.24	16.88	2.21	23.1	2.22E-06	0.929	2.06E-06
10/07/21	8	45	600	0.25	17.59	2.30	23.1	2.22E-06	0.929	2.06E-06
10/07/21	8	55	600	0.24	16.88	2.21	23.1	2.22E-06	0.929	2.06E-06
10/07/21	9	5	600	0.25	17.59	2.30	23.1	2.22E-06	0.929	2.06E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				2.1E-06 cm/sec	
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	571
Syringe ID #	245			Pore Pressure Meter ID #	29

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/25/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39047/2-20	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/27/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.035 in	7.71 cm	Speed	10	Average Height of Sample	3.036 in	7.71 cm	Dry Density	87.4 pcf		
Diameter	2.967 in	7.54 cm	Board Number	14	Average Diameter of Sample	2.968 in	7.54 cm	Vol. of Voids	165.74 cm ³		
Area	6.91 in ²	44.61 cm ²	Cell Number	14	Area	6.92 in ²	44.64 cm ²	Vol. of Solids	178.47 cm ³		
Volume	343.86 cm ³	0.0121 ft ³	Flow Pump Number	2a	Volume	344.21 cm ³	0.0122 ft ³	Void Ratio	0.93		
Mass	635.1 g	1.40 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	645.4 g	1.42 lb	Saturation	98.7 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	87.4 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	725.8 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	562.3 g				
Mass of wet sample & tare	635.1 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	80.5 g					
Mass of dry sample & tare	481.8 g		Max Head	205.39 cm	% Moisture	33.9					
Mass of tare	0.0 g		Min Head	203.99 cm							
% Moisture	31.8		Maximum Gradient	26.63							
			Minimum Gradient	26.45							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/25/21	7	0	-	2.91	204.69	26.54	24.7	-	-	-
10/25/21	7	10	600	2.90	203.99	26.45	24.7	1.89E-07	0.895	1.69E-07
10/25/21	7	20	600	2.92	205.39	26.63	24.7	1.89E-07	0.895	1.69E-07
10/25/21	7	30	600	2.92	205.39	26.63	24.7	1.88E-07	0.895	1.69E-07
10/25/21	7	40	600	2.90	203.99	26.45	24.7	1.89E-07	0.895	1.69E-07
10/25/21	7	50	600	2.92	205.39	26.63	24.7	1.89E-07	0.895	1.69E-07
10/25/21	8	0	600	2.91	204.69	26.54	24.7	1.89E-07	0.895	1.69E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.7E-07	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	694/459
Syringe ID #	245			Pore Pressure Meter ID #	372

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/08/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39092/2-27	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/28/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.677
Initial Diameter, in	2.980
Height-to-Diameter Ratio	1.91
Area, in ²	6.97
Volume, in ³	39.60
Mass of Sample, g	1206.6
Wet Density, pcf	116.1
Dry Density, pcf	87.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1541.2
Mass of Dry Sample and Tare, g	1245.3
Mass of Tare, g	336.9
Moisture, %	32.6

TEST DATA

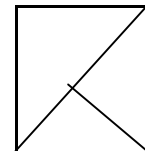
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	489
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	70
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	70

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/26/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39092/2-27	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/28/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.662
Initial Diameter, in	2.973
Height-to-Diameter Ratio	1.90
Area, in ²	6.94
Volume, in ³	39.31
Mass of Sample, g	1196.0
Wet Density, pcf	115.9
Dry Density, pcf	87.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1493.5
Mass of Dry Sample and Tare, g	1199.2
Mass of Tare, g	299.7
Moisture, %	32.7

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	3126
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	450
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	450

Failure Code 3

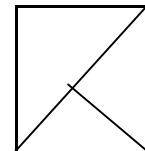
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/09/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39092/2-27	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/28/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	11	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.066 in	7.79 cm	Speed	9	Average Height of Sample	3.067 in	7.79 cm	Dry Density	88.0 pcf		
Diameter	2.954 in	7.50 cm	Board Number	7	Average Diameter of Sample	2.954 in	7.50 cm	Vol. of Voids	164.59 cm ³		
Area	6.85 in ²	44.22 cm ²	Cell Number	14	Area	6.85 in ²	44.22 cm ²	Vol. of Solids	179.86 cm ³		
Volume	344.34 cm ³	0.0122 ft ³	Flow Pump Number	4B	Volume	344.45 cm ³	0.0122 ft ³	Void Ratio	0.92		
Mass	643.1 g	1.42 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec	Mass	651.5 g	1.44 lb	Saturation	100.8 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	88.0 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	734.5 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	568.6 g				
Mass of wet sample & tare	643.1 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	82.9 g					
Mass of dry sample & tare	485.7 g		Max Head	21.81 cm	% Moisture	34.2					
Mass of tare	0.0 g		Min Head	21.10 cm							
% Moisture	32.4		Maximum Gradient	2.80							
			Minimum Gradient	2.71							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/09/21	6	20	-	0.30	21.10	2.71	23.2	-	-	-
10/09/21	6	30	600	0.31	21.81	2.80	23.2	3.68E-06	0.927	3.41E-06
10/09/21	6	40	600	0.31	21.81	2.80	23.2	3.62E-06	0.927	3.35E-06
10/09/21	6	50	600	0.30	21.10	2.71	23.2	3.68E-06	0.927	3.41E-06
10/09/21	7	0	600	0.30	21.10	2.71	23.2	3.74E-06	0.927	3.47E-06
10/09/21	7	10	600	0.31	21.81	2.80	23.2	3.68E-06	0.927	3.41E-06
10/09/21	7	20	600	0.30	21.10	2.71	23.2	3.68E-06	0.927	3.41E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.4E-06	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1046			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/26/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39092/2-27	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/28/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.032 in	7.70 cm	Speed	10	Average Height of Sample	3.031 in	7.70 cm	Dry Density	86.3 pcf		
Diameter	2.976 in	7.56 cm	Board Number	3	Average Diameter of Sample	2.977 in	7.56 cm	Vol. of Voids	168.58 cm ³		
Area	6.96 in ²	44.88 cm ²	Cell Number	55	Area	6.96 in ²	44.91 cm ²	Vol. of Solids	177.15 cm ³		
Volume	345.61 cm ³	0.0122 ft ³	Flow Pump Number	4B	Volume	345.73 cm ³	0.0122 ft ³	Void Ratio	0.95		
Mass	634.5 g	1.40 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	645.2 g	1.42 lb	Saturation	99.0 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	86.4 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	718.1 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	551.2 g				
Mass of wet sample & tare	634.5 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	72.9 g					
Mass of dry sample & tare	478.3 g		Max Head	116.76 cm	% Moisture	34.9					
Mass of tare	0.0 g		Min Head	115.36 cm							
% Moisture	32.7		Maximum Gradient	15.17							
			Minimum Gradient	14.98							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/26/21	7	5	-	1.65	116.06	15.08	24.5	-	-	-
10/26/21	7	15	600	1.66	116.76	15.17	24.5	3.30E-07	0.899	2.97E-07
10/26/21	7	25	600	1.64	115.36	14.98	24.5	3.31E-07	0.899	2.98E-07
10/26/21	7	35	600	1.64	115.36	14.98	24.5	3.33E-07	0.899	2.99E-07
10/26/21	7	45	600	1.65	116.06	15.08	24.5	3.32E-07	0.899	2.99E-07
10/26/21	7	55	600	1.66	116.76	15.17	24.5	3.30E-07	0.899	2.97E-07
10/26/21	8	5	600	1.65	116.06	15.08	24.5	3.30E-07	0.899	2.97E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.0E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	1046			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/08/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39093/CAA-4 Ex-Situ (5)	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/28/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.672
Initial Diameter, in	2.978
Height-to-Diameter Ratio	1.90
Area, in ²	6.97
Volume, in ³	39.51
Mass of Sample, g	1166.0
Wet Density, pcf	112.4
Dry Density, pcf	81.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1530.3
Mass of Dry Sample and Tare, g	1207.2
Mass of Tare, g	365.7
Moisture, %	38.4

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1952
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	280
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	280

Failure Code 3

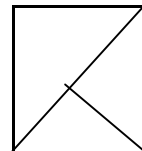
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/26/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39093/CAA-4 Ex-Situ (5)	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/28/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.722
Initial Diameter, in	2.981
Height-to-Diameter Ratio	1.92
Area, in ²	6.98
Volume, in ³	39.94
Mass of Sample, g	1176.7
Wet Density, pcf	112.2
Dry Density, pcf	81.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.87

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1471.5
Mass of Dry Sample and Tare, g	1148.2
Mass of Tare, g	299.1
Moisture, %	38.1

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	5363
Specimen Cross-sectional Area, in ²	6.98
Compressive Strength at Failure, psi	768
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	768

Failure Code 3

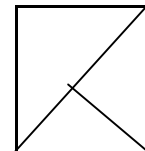
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/09/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39093/CAA-4 Ex-Situ (5)	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/28/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	11	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.036 in	7.71 cm	Speed	9	Average Height of Sample	3.038 in	7.72 cm	Dry Density	81.5 pcf		
Diameter	2.962 in	7.52 cm	Board Number	8	Average Diameter of Sample	2.963 in	7.53 cm	Vol. of Voids	177.21 cm ³		
Area	6.89 in ²	44.46 cm ²	Cell Number	33	Area	6.90 in ²	44.49 cm ²	Vol. of Solids	166.06 cm ³		
Volume	342.82 cm ³	0.0121 ft ³	Flow Pump Number	4A	Volume	343.27 cm ³	0.0121 ft ³	Void Ratio	1.07		
Mass	618.8 g	1.36 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec	Mass	624.0 g	1.38 lb	Saturation	99.1 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	81.6 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	707.9 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	532.3 g				
Mass of wet sample & tare	618.8 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	84.0 g					
Mass of dry sample & tare	448.3 g		Max Head	95.66 cm	% Moisture	39.2					
Mass of tare	0.0 g		Min Head	94.26 cm							
% Moisture	38.0		Maximum Gradient	12.40							
			Minimum Gradient	12.21							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/09/21	6	20	-	1.35	94.96	12.31	23.2	-	-	-
10/09/21	6	30	600	1.36	95.66	12.40	23.2	8.15E-07	0.927	7.56E-07
10/09/21	6	40	600	1.36	95.66	12.40	23.2	8.12E-07	0.927	7.53E-07
10/09/21	6	50	600	1.34	94.26	12.21	23.2	8.18E-07	0.927	7.58E-07
10/09/21	7	0	600	1.36	95.66	12.40	23.2	8.18E-07	0.927	7.58E-07
10/09/21	7	10	600	1.36	95.66	12.40	23.2	8.12E-07	0.927	7.53E-07
10/09/21	7	20	600	1.35	94.96	12.31	23.2	8.15E-07	0.927	7.56E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				7.6E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1047			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/26/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39093/CAA-4 Ex-Situ (5)	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/28/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.049 in	7.74 cm	Speed	10	Average Height of Sample	3.048 in	7.74 cm	Dry Density	80.8 pcf		
Diameter	2.972 in	7.55 cm	Board Number	4	Average Diameter of Sample	2.973 in	7.55 cm	Vol. of Voids	180.44 cm ³		
Area	6.94 in ²	44.76 cm ²	Cell Number	41	Area	6.94 in ²	44.79 cm ²	Vol. of Solids	166.30 cm ³		
Volume	346.61 cm ³	0.0122 ft ³	Flow Pump Number	4A	Volume	346.73 cm ³	0.0122 ft ³	Void Ratio	1.09		
Mass	620.1 g	1.37 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	628.5 g	1.39 lb	Saturation	99.5 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95							
Dry Density	80.8 pcf		Cell Pressure	95.0 psi							
Moisture Content				Back Pressure	90.0 psi						
Mass of wet sample & tare	620.1 g		Confining (Effective) Pressure	5.0 psi							
Mass of dry sample & tare	449.0 g		Max Head	202.58 cm							
Mass of tare	0.0 g		Min Head	199.77 cm							
% Moisture	38.1		Maximum Gradient	26.17							
				Minimum Gradient	25.80						
								Moisture Content			
								Mass of wet sample & tare	702.8 g		
								Mass of dry sample & tare	523.3 g		
								Mass of tare	74.3 g		
								% Moisture	40.0		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/26/21	7	5	-	2.88	202.58	26.17	24.5	-	-	-
10/26/21	7	15	600	2.84	199.77	25.80	24.5	1.92E-07	0.899	1.73E-07
10/26/21	7	25	600	2.86	201.17	25.98	24.5	1.93E-07	0.899	1.74E-07
10/26/21	7	35	600	2.86	201.17	25.98	24.5	1.92E-07	0.899	1.73E-07
10/26/21	7	45	600	2.88	202.58	26.17	24.5	1.92E-07	0.899	1.73E-07
10/26/21	7	55	600	2.86	201.17	25.98	24.5	1.92E-07	0.899	1.73E-07
10/26/21	8	5	600	2.87	201.88	26.08	24.5	1.92E-07	0.899	1.73E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.7E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	1047			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/09/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39094/4-72	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/29/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.671
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.91
Area, in ²	6.95
Volume, in ³	39.42
Mass of Sample, g	1152.0
Wet Density, pcf	111.3
Dry Density, pcf	78.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1457.8
Mass of Dry Sample and Tare, g	1130.0
Mass of Tare, g	331.9
Moisture, %	41.1

TEST DATA

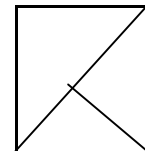
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	610
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	88
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	88

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/27/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39094/4-72	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/29/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.706
Initial Diameter, in	2.978
Height-to-Diameter Ratio	1.92
Area, in ²	6.97
Volume, in ³	39.74
Mass of Sample, g	1158.9
Wet Density, pcf	111.1
Dry Density, pcf	78.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1460.8
Mass of Dry Sample and Tare, g	1123.5
Mass of Tare, g	305.5
Moisture, %	41.2

TEST DATA

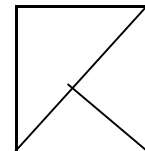
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2334
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	335
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	335

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/09/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39094/4-72	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/29/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.013 in	7.65 cm	Speed	10	Average Height of Sample	3.017 in	7.66 cm	Dry Density	78.7 pcf		
Diameter	2.965 in	7.53 cm	Board Number	5	Average Diameter of Sample	2.955 in	7.51 cm	Vol. of Voids	180.59 cm ³		
Area	6.90 in ²	44.55 cm ²	Cell Number	55	Area	6.86 in ²	44.25 cm ²	Vol. of Solids	158.47 cm ³		
Volume	340.91 cm ³	0.0120 ft ³	Flow Pump Number	4B	Volume	339.06 cm ³	0.0120 ft ³	Void Ratio	1.14		
Mass	604.4 g	1.33 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	611.0 g	1.35 lb	Saturation	101.4 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	78.3 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	693.3 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	510.2 g				
Mass of wet sample & tare	604.4 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	82.4 g					
Mass of dry sample & tare	427.8 g		Max Head	97.77 cm	% Moisture	42.8					
Mass of tare	0.0 g		Min Head	95.66 cm							
% Moisture	41.3		Maximum Gradient	12.76							
			Minimum Gradient	12.48							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/09/21	7	55	-	1.38	97.07	12.67	23.2	-	-	-
10/09/21	8	5	600	1.36	95.66	12.48	23.2	4.03E-07	0.927	3.73E-07
10/09/21	8	15	600	1.39	97.77	12.76	23.2	4.01E-07	0.927	3.72E-07
10/09/21	8	25	600	1.37	96.37	12.58	23.2	4.00E-07	0.927	3.70E-07
10/09/21	8	35	600	1.38	97.07	12.67	23.2	4.01E-07	0.927	3.72E-07
10/09/21	8	45	600	1.36	95.66	12.48	23.2	4.03E-07	0.927	3.73E-07
10/09/21	8	55	600	1.37	96.37	12.58	23.2	4.04E-07	0.927	3.74E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.7E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042
Syringe ID #	1046			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/27/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39094/4-72	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/29/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)					
Height	3.017	in	7.66	cm	Speed	12			Average Height of Sample	3.018	in	7.67	cm
Diameter	2.966	in	7.53	cm	Board Number	1			Average Diameter of Sample	2.967	in	7.54	cm
Area	6.91	in ²	44.58	cm ²	Cell Number	15			Area	6.91	in ²	44.61	cm ²
Volume	341.59	cm ³	0.0121	ft ³	Flow Pump Number	1B			Volume	341.94	cm ³	0.0121	ft ³
Mass	604.3	g	1.33	lb	Flow Pump Rate*	5.60E-05 cm ³ /sec			Mass	616.4	g	1.36	lb
Specific Gravity	2.700	(Assumed)			B - Value	0.95			Dry Density	78.1			pcf
Dry Density	78.1	pcf			Cell Pressure	95.0 psi			Vol. of Voids	183.53			cm ³
Moisture Content					Back Pressure	90.0 psi			Vol. of Solids	158.41			cm ³
Mass of wet sample & tare	604.3	g			Confining (Effective) Pressure	5.0 psi			Void Ratio	1.16			
Mass of dry sample & tare	427.7	g			Max Head	150.53 cm			Saturation	102.8			%
Mass of tare	0.0	g			Min Head	147.71 cm			Mass of wet sample & tare	699.1	g		
% Moisture	41.3				Maximum Gradient	19.64			Mass of dry sample & tare	510.4	g		
					Minimum Gradient	19.27			Mass of tare	82.7	g		
									% Moisture	44.1			

TIME FUNCTION			Δ t	READING	Head	Gradient	Temp.	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN	(sec)	DP, (psi)	(cm)		T _x (°C)	@ T _x	R _T	@ 20 °C
10/27/21	6	30	-	2.10	147.71	19.27	23.7	-	-	-
10/27/21	6	40	600	2.12	149.12	19.45	23.7	6.48E-08	0.916	5.94E-08
10/27/21	6	50	600	2.11	148.42	19.36	23.7	6.47E-08	0.916	5.93E-08
10/27/21	7	0	600	2.14	150.53	19.64	23.7	6.44E-08	0.916	5.90E-08
10/27/21	7	10	600	2.13	149.82	19.54	23.7	6.41E-08	0.916	5.87E-08
10/27/21	7	20	600	2.13	149.82	19.54	23.7	6.42E-08	0.916	5.88E-08
10/27/21	7	30	600	2.12	149.12	19.45	23.7	6.44E-08	0.916	5.90E-08

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS

Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*			5.9E-08	cm/sec	
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	942
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	64
Syringe ID #	141			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/28/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39095/CAA-4 SP	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/30/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.678
Initial Diameter, in	2.972
Height-to-Diameter Ratio	1.91
Area, in ²	6.94
Volume, in ³	39.39
Mass of Sample, g	1158.3
Wet Density, pcf	112.0
Dry Density, pcf	80.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1456.0
Mass of Dry Sample and Tare, g	1127.6
Mass of Tare, g	299.1
Moisture, %	39.6

TEST DATA

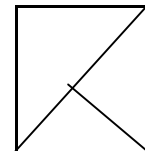
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	4004
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	577
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	577

Failure Code 3

Failure Sketch



Failure Type:

Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/28/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39095/CAA-4 SP	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/30/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.991 in	7.60 cm	Speed	12	Average Height of Sample	2.992 in	7.60 cm	Dry Density	80.7 pcf		
Diameter	2.957 in	7.51 cm	Board Number	15	Average Diameter of Sample	2.958 in	7.51 cm	Vol. of Voids	175.64 cm ³		
Area	6.87 in ²	44.31 cm ²	Cell Number	5	Area	6.87 in ²	44.34 cm ²	Vol. of Solids	161.30 cm ³		
Volume	336.60 cm ³	0.0119 ft ³	Flow Pump Number	2B	Volume	336.94 cm ³	0.0119 ft ³	Void Ratio	1.09		
Mass	606.1 g	1.34 lb	Flow Pump Rate*	5.60E-05 cm ³ /sec	Mass	611.4 g	1.35 lb	Saturation	100.1 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	80.7 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	685.0 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	509.1 g				
Mass of wet sample & tare	606.1 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	73.6 g					
Mass of dry sample & tare	435.5 g		Max Head	113.25 cm	% Moisture	40.4					
Mass of tare	0.0 g		Min Head	112.54 cm							
% Moisture	39.2		Maximum Gradient	14.90							
			Minimum Gradient	14.81							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/28/21	8	20	-	1.60	112.54	14.81	23.3	-	-	-
10/28/21	8	30	600	1.61	113.25	14.90	23.3	8.50E-08	0.925	7.86E-08
10/28/21	8	40	600	1.60	112.54	14.81	23.3	8.50E-08	0.925	7.86E-08
10/28/21	8	50	600	1.61	113.25	14.90	23.3	8.50E-08	0.925	7.86E-08
10/28/21	9	0	600	1.60	112.54	14.81	23.3	8.50E-08	0.925	7.86E-08
10/28/21	9	10	600	1.61	113.25	14.90	23.3	8.50E-08	0.925	7.86E-08
10/28/21	9	20	600	1.60	112.54	14.81	23.3	8.50E-08	0.925	7.86E-08

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				7.9E-08 cm/sec	
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	694/459
Syringe ID #	246			Pore Pressure Meter ID #	372

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/30/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39130/4-9	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	10/02/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.656
Initial Diameter, in	2.969
Height-to-Diameter Ratio	1.91
Area, in ²	6.92
Volume, in ³	39.16
Mass of Sample, g	1154.2
Wet Density, pcf	112.3
Dry Density, pcf	79.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1511.7
Mass of Dry Sample and Tare, g	1179.3
Mass of Tare, g	358.9
Moisture, %	40.5

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	913
Specimen Cross-sectional Area, in ²	6.92
Compressive Strength at Failure, psi	132
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	132

Failure Code 3

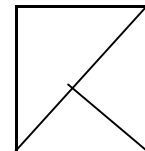
Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/01/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39131/4-73	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	10/04/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.555
Initial Diameter, in	2.941
Height-to-Diameter Ratio	1.89
Area, in ²	6.79
Volume, in ³	37.74
Mass of Sample, g	1179.6
Wet Density, pcf	119.1
Dry Density, pcf	91.1
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1438.8
Mass of Dry Sample and Tare, g	1162.9
Mass of Tare, g	261.8
Moisture, %	30.6

TEST DATA

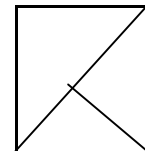
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	52
Specimen Cross-sectional Area, in ²	6.79
Compressive Strength at Failure, psi	8
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	8

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/01/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39131/4-73	Subsample ID	4
Add. Info	-	Mixing/Molding Date	10/04/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.005 in	7.63 cm	Speed	8	Average Height of Sample	3.006 in	7.64 cm	Dry Density	90.3 pcf		
Diameter	2.931 in	7.44 cm	Board Number	18	Average Diameter of Sample	2.932 in	7.45 cm	Vol. of Voids	154.29 cm ³		
Area	6.75 in ²	43.53 cm ²	Cell Number	4	Area	6.75 in ²	43.56 cm ²	Vol. of Solids	178.30 cm ³		
Volume	332.25 cm ³	0.0117 ft ³	Flow Pump Number	2A	Volume	332.59 cm ³	0.0117 ft ³	Void Ratio	0.87		
Mass	627.3 g	1.38 lb	Flow Pump Rate*	8.96E-04 cm ³ /sec	Mass	630.3 g	1.39 lb	Saturation	96.5 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95							
Dry Density	90.4 pcf		Cell Pressure	95.0 psi							
Moisture Content				Back Pressure	90.0 psi						
Mass of wet sample & tare	627.3 g		Confining (Effective) Pressure	5.0 psi							
Mass of dry sample & tare	481.4 g		Max Head	25.32 cm							
Mass of tare	0.0 g		Min Head	23.92 cm							
% Moisture	30.3		Maximum Gradient	3.32							
				Minimum Gradient	3.13						
								Moisture Content			
								Mass of wet sample & tare	710.4 g		
								Mass of dry sample & tare	561.5 g		
								Mass of tare	80.1 g		
								% Moisture	30.9		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/01/21	7	5	-	0.35	24.62	3.22	21.5	-	-	-
11/01/21	7	15	600	0.34	23.92	3.13	21.5	6.47E-06	0.965	6.24E-06
11/01/21	7	25	600	0.35	24.62	3.22	21.5	6.47E-06	0.965	6.24E-06
11/01/21	7	35	600	0.35	24.62	3.22	21.5	6.38E-06	0.965	6.15E-06 *
11/01/21	7	45	600	0.36	25.32	3.32	21.5	6.29E-06	0.965	6.07E-06 *
11/01/21	7	55	600	0.35	24.62	3.22	21.5	6.29E-06	0.965	6.07E-06 *
11/01/21	8	5	600	0.34	23.92	3.13	21.5	6.47E-06	0.965	6.24E-06 *

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				6.1E-06 cm/sec	
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	570
Syringe ID #	245			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/06/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39486/4-12	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/09/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.604
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.88
Area, in ²	6.95
Volume, in ³	38.95
Mass of Sample, g	1166.7
Wet Density, pcf	114.1
Dry Density, pcf	83.1
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1527.6
Mass of Dry Sample and Tare, g	1211.3
Mass of Tare, g	363.4
Moisture, %	37.3

TEST DATA

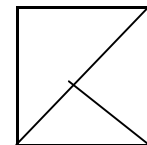
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	868
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	125
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	125

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By	EB/KP
Date	11/06/21
Checked By	<i>EB</i>

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39486/4-12	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/09/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)						
Height	3.005	in	7.63	cm	Speed	11			Average Height of Sample	3.006	in	7.64	cm	
Diameter	2.968	in	7.54	cm	Board Number	7			Average Diameter of Sample	2.968	in	7.54	cm	
Area	6.92	in ²	44.64	cm ²	Cell Number	9			Area	6.92	in ²	44.64	cm ²	
Volume	340.69	cm ³	0.0120	ft ³	Flow Pump Number	4B			Volume	340.81	cm ³	0.0120	ft ³	
Mass	622.7	g	1.37	lb	Flow Pump Rate*	1.12E-04			cm ³ /sec	Mass	627.2	g	1.38	lb
Specific Gravity	2.700 (Assumed)				B - Value	0.95			Dry Density	82.9	pcf	Vol. of Voids	173.10	cm ³
Dry Density	82.9	pcf	Cell Pressure	95.0	psi	Back Pressure	90.0	psi	Vol. of Solids	167.70	cm ³	Void Ratio	1.03	
Moisture Content				Confining (Effective) Pressure	5.0	psi	Moisture Content				Saturation	100.7	%	
Mass of wet sample & tare	622.7	g	Max Head	104.81	cm	Mass of wet sample & tare	711.2	g	Mass of dry sample & tare	536.8	g			
Mass of dry sample & tare	452.8	g	Min Head	103.40	cm	Mass of dry sample & tare	84.0	g	% Moisture	38.5				
Mass of tare	0.0	g	Maximum Gradient	13.73										
% Moisture	37.5			Minimum Gradient	13.54									

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/06/21	6	30	-	1.48	104.10	13.63	20.9	-	-	-
11/06/21	6	40	600	1.47	103.40	13.54	20.9	1.85E-07	0.979	1.81E-07
11/06/21	6	50	600	1.49	104.81	13.73	20.9	1.84E-07	0.979	1.80E-07
11/06/21	7	0	600	1.49	104.81	13.73	20.9	1.83E-07	0.979	1.79E-07
11/06/21	7	10	600	1.48	104.10	13.63	20.9	1.83E-07	0.979	1.79E-07
11/06/21	7	20	600	1.49	104.81	13.73	20.9	1.83E-07	0.979	1.79E-07
11/06/21	7	30	600	1.47	103.40	13.54	20.9	1.84E-07	0.979	1.80E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*		1.8E-07		cm/sec	
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1046			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/08/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39487/4-2	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/11/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.581
Initial Diameter, in	2.969
Height-to-Diameter Ratio	1.88
Area, in ²	6.92
Volume, in ³	38.64
Mass of Sample, g	1199.2
Wet Density, pcf	118.2
Dry Density, pcf	89.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1496.1
Mass of Dry Sample and Tare, g	1210.0
Mass of Tare, g	298.8
Moisture, %	31.4

TEST DATA

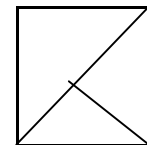
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	521
Specimen Cross-sectional Area, in ²	6.92
Compressive Strength at Failure, psi	75
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	75

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/09/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39488/4-7	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/12/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.654
Initial Diameter, in	2.972
Height-to-Diameter Ratio	1.90
Area, in ²	6.94
Volume, in ³	39.22
Mass of Sample, g	1177.5
Wet Density, pcf	114.4
Dry Density, pcf	83.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1474.4
Mass of Dry Sample and Tare, g	1158.3
Mass of Tare, g	298.3
Moisture, %	36.8

TEST DATA

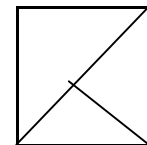
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	455
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	66
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	66

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/10/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39489/4-1	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	10/13/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD **B**

SAMPLE DATA

Initial Height, in	5.570
Initial Diameter, in	2.972
Height-to-Diameter Ratio	1.87
Area, in ²	6.94
Volume, in ³	38.64
Mass of Sample, g	1145.9
Wet Density, pcf	113.0
Dry Density, pcf	79.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1443.5
Mass of Dry Sample and Tare, g	1104.5
Mass of Tare, g	299.3
Moisture, %	42.1

TEST DATA

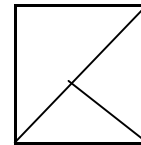
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	236
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	34
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	34

Failure Code **3**

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

[Empty box for description]

USCS (ASTM D2487: D2488)

[Empty box]

REMARKS

[Empty box for remarks]



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



Tested By

KP/IH

Date

11/24/21

Checked By

[Signature]

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39489/4-1	Subsample	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	10/13/21	Curing Age, Days	42		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.557
Initial Diameter, in	2.969
Height-to-Diameter Ratio	1.87
Area, in ²	6.92
Volume, in ³	38.47
Mass of Sample, g	1139.8
Wet Density, pcf	112.9
Dry Density, pcf	79.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1436.8
Mass of Dry Sample and Tare, g	1098.0
Mass of Tare, g	298.4
Moisture, %	42.4

TEST DATA

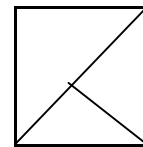
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	505
Specimen Cross-sectional Area, in ²	6.92
Compressive Strength at Failure, psi	73
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	73

Failure Code 3

Failure Sketch



Failure Type:

Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/10/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39489/4-1	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/13/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)									
Height	3.020	in	7.67	cm	Speed	8				Average Height of Sample	3.021	in	7.67	cm			
Diameter	2.962	in	7.52	cm	Board Number	2				Average Diameter of Sample	2.963	in	7.53	cm			
Area	6.89	in ²	44.46	cm ²	Cell Number	17				Area	6.90	in ²	44.49	cm ²	Dry Density	79.7	pcf
Volume	341.01	cm ³	0.0120	ft ³	Flow Pump Number	1B				Volume	341.35	cm ³	0.0121	ft ³	Vol. of Voids	179.93	cm ³
Mass	618.8	g	1.36	lb	Flow Pump Rate*	8.96E-04	cm ³ /sec			Mass	623.4	g	1.37	lb	Vol. of Solids	161.42	cm ³
Specific Gravity	2.700	(Assumed)			B - Value	0.95				Moisture Content					Void Ratio	1.11	
Dry Density	79.7	pcf			Cell Pressure	95.0	psi			Mass of wet sample & tare	714.8	g			Saturation	104.2	%
					Back Pressure	90.0	psi			Mass of dry sample & tare	527.3	g					
					Confining (Effective) Pressure	5.0	psi			Mass of tare	91.6	g					
					Max Head	26.73	cm			% Moisture	43.0						
					Min Head	26.03	cm										
					Maximum Gradient	3.48											
					Minimum Gradient	3.39											

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/10/21	6	40	-	0.38	26.73	3.48	20.3	-	-	-
11/10/21	6	50	600	0.37	26.03	3.39	20.3	5.86E-06	0.993	5.82E-06
11/10/21	7	0	600	0.38	26.73	3.48	20.3	5.86E-06	0.993	5.82E-06
11/10/21	7	10	600	0.38	26.73	3.48	20.3	5.78E-06	0.993	5.74E-06
11/10/21	7	20	600	0.37	26.03	3.39	20.3	5.86E-06	0.993	5.82E-06
11/10/21	7	30	600	0.38	26.73	3.48	20.3	5.86E-06	0.993	5.82E-06
11/10/21	7	40	600	0.37	26.03	3.39	20.3	5.86E-06	0.993	5.82E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487:2488)
	NA
REMARKS	
Bottom Half of the mold was used for testing.	

Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	942
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	64
Syringe ID #	141			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/24/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39489/4-1	Subsample ID	4
Add. Info	-	Mixing/Molding Date	10/13/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	42	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)						
Height	3.100	in	7.87	cm	Speed	10				Average Height of Sample	3.103	in	7.88	cm
Diameter	2.970	in	7.54	cm	Board Number	20				Average Diameter of Sample	2.972	in	7.55	cm
Area	6.93	in ²	44.70	cm ²	Cell Number	13				Area	6.94	in ²	44.76	cm ²
Volume	351.94	cm ³	0.0124	ft ³	Flow Pump Number	3B				Volume	352.75	cm ³	0.0125	ft ³
Mass	636.4	g	1.40	lb	Flow Pump Rate*	2.24E-04	cm ³ /sec			Mass	641.5	g	1.41	lb
Specific Gravity	2.700	(Assumed)			B - Value	0.95				Dry Density			78.9	pcf
Dry Density	79.1	pcf			Cell Pressure	95.0	psi			Vol. of Voids			187.57	cm ³
					Back Pressure	90.0	psi			Vol. of Solids			165.19	cm ³
					Confining (Effective) Pressure	5.0	psi			Void Ratio			1.14	
					Max Head	45.02	cm			Saturation			104.2	%
					Min Head	40.80	cm			Moisture Content				
					Maximum Gradient	5.71				Mass of wet sample & tare	762.0	g		
					Minimum Gradient	5.18				Mass of dry sample & tare	566.5	g		
										Mass of tare	120.5	g		
										% Moisture	43.8			

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/24/21	8	45	-	0.62	43.61	5.53	18.3	-	-	-
11/24/21	8	55	600	0.60	42.20	5.35	18.3	9.19E-07	1.043	9.59E-07
11/24/21	9	5	600	0.64	45.02	5.71	18.3	9.05E-07	1.043	9.44E-07
11/24/21	9	15	600	0.58	40.80	5.18	18.3	9.19E-07	1.043	9.59E-07
11/24/21	9	25	600	0.60	42.20	5.35	18.3	9.51E-07	1.043	9.92E-07
11/24/21	9	35	600	0.59	41.50	5.27	18.3	9.43E-07	1.043	9.83E-07
11/24/21	9	45	600	0.59	41.50	5.27	18.3	9.51E-07	1.043	9.92E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487:2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*		9.8E-07		cm/sec	
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	262
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	783
Syringe ID #	490			Pore Pressure Meter ID #	1054

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/11/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39490/4-63	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/14/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.577
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.87
Area, in ²	6.96
Volume, in ³	38.82
Mass of Sample, g	1202.1
Wet Density, pcf	118.0
Dry Density, pcf	90.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1560.9
Mass of Dry Sample and Tare, g	1280.3
Mass of Tare, g	360.1
Moisture, %	30.5

TEST DATA

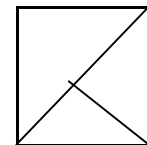
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	551
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	79
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	79

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/11/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39490/4-63	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/14/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)				
Height	3.070 in	7.80 cm		Speed	10			Average Height of Sample	3.071 in	7.80 cm		
Diameter	2.954 in	7.50 cm		Board Number	5			Average Diameter of Sample	2.955 in	7.51 cm		
Area	6.85 in ²	44.22 cm ²		Cell Number	2			Area	6.86 in ²	44.25 cm ²		
Volume	344.79 cm ³	0.0122 ft ³		Flow Pump Number	3A			Volume	345.13 cm ³	0.0122 ft ³		
Mass	658.8 g	1.45 lb		Flow Pump Rate*	2.24E-04 cm ³ /sec			Mass	669.5 g	1.48 lb		
Specific Gravity	2.700 (Assumed)			B - Value	0.95						Dry Density	91.4 pcf
Dry Density	91.5 pcf			Cell Pressure	95.0 psi						Vol. of Voids	157.82 cm ³
				Back Pressure	90.0 psi						Vol. of Solids	187.32 cm ³
				Confining (Effective) Pressure	5.0 psi						Void Ratio	0.84
				Max Head	59.79 cm						Saturation	103.8 %
				Min Head	59.09 cm							
				Maximum Gradient	7.66							
				Minimum Gradient	7.57							
Moisture Content								Moisture Content				
Mass of wet sample & tare	658.8 g							Mass of wet sample & tare	751.4 g			
Mass of dry sample & tare	505.6 g							Mass of dry sample & tare	587.7 g			
Mass of tare	0.0 g							Mass of tare	82.1 g			
% Moisture	30.3							% Moisture	32.4			

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/11/21	9	5	-	0.85	59.79	7.66	20.3	-	-	-
11/11/21	9	15	600	0.84	59.09	7.57	20.3	6.64E-07	0.993	6.60E-07
11/11/21	9	25	600	0.85	59.79	7.66	20.3	6.64E-07	0.993	6.60E-07
11/11/21	9	35	600	0.84	59.09	7.57	20.3	6.64E-07	0.993	6.60E-07
11/11/21	9	45	600	0.85	59.79	7.66	20.3	6.64E-07	0.993	6.60E-07
11/11/21	9	55	600	0.84	59.09	7.57	20.3	6.64E-07	0.993	6.60E-07
11/11/21	10	5	600	0.85	59.79	7.66	20.3	6.64E-07	0.993	6.60E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

	Reported Average Hydraulic Conductivity*		6.6E-07	cm/sec	
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	469
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042
Syringe ID #	491			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/12/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39491/4-58	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/15/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.673
Initial Diameter, in	2.980
Height-to-Diameter Ratio	1.90
Area, in ²	6.97
Volume, in ³	39.57
Mass of Sample, g	1231.5
Wet Density, pcf	118.6
Dry Density, pcf	90.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1591.1
Mass of Dry Sample and Tare, g	1302.9
Mass of Tare, g	361.5
Moisture, %	30.6

TEST DATA

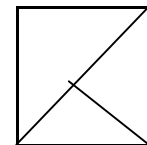
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	641
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	92
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	92

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/12/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39491/4-58	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/15/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.070 in	7.80 cm		Speed	10			Average Height of Sample	3.071 in	7.80 cm	
Diameter	2.968 in	7.54 cm		Board Number	9			Average Diameter of Sample	2.969 in	7.54 cm	
Area	6.92 in ²	44.64 cm ²		Cell Number	37			Area	6.92 in ²	44.67 cm ²	
Volume	348.06 cm ³	0.0123 ft ³		Flow Pump Number	1A			Volume	348.41 cm ³	0.0123 ft ³	
Mass	656.0 g	1.45 lb		Flow Pump Rate*	2.24E-04 cm ³ /sec			Mass	662.8 g	1.46 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	90.1 pcf		
Dry Density	90.2 pcf			Cell Pressure	95.0 psi			Vol. of Voids	161.98 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	186.43 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.87		
				Max Head	52.76 cm			Saturation	98.4 %		
				Min Head	52.05 cm						
				Maximum Gradient	6.76						
				Minimum Gradient	6.67						
Moisture Content				Moisture Content				Moisture Content			
Mass of wet sample & tare	656.0 g			Mass of wet sample & tare	729.9 g			Mass of wet sample & tare	729.9 g		
Mass of dry sample & tare	503.2 g			Mass of dry sample & tare	570.5 g			Mass of dry sample & tare	570.5 g		
Mass of tare	0.0 g			Mass of tare	67.3 g			Mass of tare	67.3 g		
% Moisture	30.4			% Moisture	31.7			% Moisture	31.7		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/12/21	6	10	-	0.75	52.76	6.76	21.0	-	-	-
11/12/21	6	20	600	0.74	52.05	6.67	21.0	7.46E-07	0.976	7.29E-07
11/12/21	6	30	600	0.75	52.76	6.76	21.0	7.46E-07	0.976	7.29E-07
11/12/21	6	40	600	0.74	52.05	6.67	21.0	7.46E-07	0.976	7.29E-07
11/12/21	6	50	600	0.75	52.76	6.76	21.0	7.46E-07	0.976	7.29E-07
11/12/21	7	0	600	0.74	52.05	6.67	21.0	7.46E-07	0.976	7.29E-07
11/12/21	7	10	600	0.75	52.76	6.76	21.0	7.46E-07	0.976	7.29E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				7.3E-07	cm/sec
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	1107
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	571
Syringe ID #	140			Pore Pressure Meter ID #	29

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/13/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39492/4-44	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/16/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.604
Initial Diameter, in	2.970
Height-to-Diameter Ratio	1.89
Area, in ²	6.93
Volume, in ³	38.82
Mass of Sample, g	1211.3
Wet Density, pcf	118.9
Dry Density, pcf	90.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1544.1
Mass of Dry Sample and Tare, g	1255.3
Mass of Tare, g	334.5
Moisture, %	31.4

TEST DATA

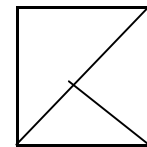
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	365
Specimen Cross-sectional Area, in ²	6.93
Compressive Strength at Failure, psi	53
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	53

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/15/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39493/4-60	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/18/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.658
Initial Diameter, in	2.970
Height-to-Diameter Ratio	1.91
Area, in ²	6.93
Volume, in ³	39.20
Mass of Sample, g	1201.4
Wet Density, pcf	116.8
Dry Density, pcf	88.1
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1502.7
Mass of Dry Sample and Tare, g	1208.3
Mass of Tare, g	303.6
Moisture, %	32.5

TEST DATA

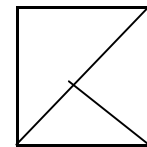
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	531
Specimen Cross-sectional Area, in ²	6.93
Compressive Strength at Failure, psi	77
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	77

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 11/15/21
Checked By *IB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39493/4-60	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/18/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.043 in	7.73 cm		Speed	10			Average Height of Sample	3.044 in	7.73 cm	
Diameter	2.967 in	7.54 cm		Board Number	3			Average Diameter of Sample	2.968 in	7.54 cm	
Area	6.91 in ²	44.61 cm ²		Cell Number	2			Area	6.92 in ²	44.64 cm ²	
Volume	344.77 cm ³	0.0122 ft ³		Flow Pump Number	1B			Volume	345.11 cm ³	0.0122 ft ³	
Mass	638.3 g	1.41 lb		Flow Pump Rate*	2.24E-04 cm ³ /sec			Mass	649.4 g	1.43 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	87.4 pcf		
Dry Density	87.5 pcf			Cell Pressure	95.0 psi			Vol. of Voids	166.10 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	179.02 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.93		
				Max Head	77.37 cm			Saturation	100.0 %		
				Min Head	76.67 cm						
				Maximum Gradient	10.01						
				Minimum Gradient	9.92						

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/15/21	7	5	-	1.10	77.37	10.01	18.6	-	-	-
11/15/21	7	15	600	1.09	76.67	9.92	18.6	5.04E-07	1.036	5.22E-07
11/15/21	7	25	600	1.10	77.37	10.01	18.6	5.04E-07	1.036	5.22E-07
11/15/21	7	35	600	1.09	76.67	9.92	18.6	5.04E-07	1.036	5.22E-07
11/15/21	7	45	600	1.09	76.67	9.92	18.6	5.06E-07	1.036	5.24E-07
11/15/21	7	55	600	1.10	77.37	10.01	18.6	5.04E-07	1.036	5.22E-07
11/15/21	8	5	600	1.10	77.37	10.01	18.6	5.01E-07	1.036	5.19E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				5.2E-07	cm/sec
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	942
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	141			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/16/21**

Checked By

Client Pr. #	200016			Lab. PR. #	21136-02-4	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39494/4-53	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/19/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.588
Initial Diameter, in	2.973
Height-to-Diameter Ratio	1.88
Area, in ²	6.94
Volume, in ³	38.79
Mass of Sample, g	1179.7
Wet Density, pcf	115.9
Dry Density, pcf	87.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1484.3
Mass of Dry Sample and Tare, g	1193.3
Mass of Tare, g	307.0
Moisture, %	32.8

TEST DATA

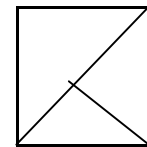
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	820
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	118
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	118

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/16/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39494/4-53	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/19/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.005 in	7.63 cm	Speed	10	Average Height of Sample	3.006 in	7.64 cm	Dry Density	88.1 pcf	Vol. of Voids	161.58 cm ³
Diameter	2.957 in	7.51 cm	Board Number	3	Average Diameter of Sample	2.958 in	7.51 cm	Vol. of Solids	176.93 cm ³	Void Ratio	0.91
Area	6.87 in ²	44.31 cm ²	Cell Number	17	Area	6.87 in ²	44.34 cm ²	Void Ratio	0.91	Saturation	102.4 %
Volume	338.17 cm ³	0.0119 ft ³	Flow Pump Number	2A	Volume	338.51 cm ³	0.0120 ft ³				
Mass	632.4 g	1.39 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	643.1 g	1.42 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95							
Dry Density	88.1 pcf		Cell Pressure	95.0 psi							
			Back Pressure	90.0 psi							
			Confining (Effective) Pressure	5.0 psi							
			Max Head	49.94 cm							
			Min Head	49.24 cm							
			Maximum Gradient	6.54							
			Minimum Gradient	6.45							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/16/21	8	5	-	0.70	49.24	6.45	19.6	-	-	-
11/16/21	8	15	600	0.71	49.94	6.54	19.6	7.78E-07	1.010	7.86E-07
11/16/21	8	25	600	0.70	49.24	6.45	19.6	7.78E-07	1.010	7.86E-07
11/16/21	8	35	600	0.71	49.94	6.54	19.6	7.78E-07	1.010	7.86E-07
11/16/21	8	45	600	0.70	49.24	6.45	19.6	7.78E-07	1.010	7.86E-07
11/16/21	8	55	600	0.71	49.94	6.54	19.6	7.78E-07	1.010	7.86E-07
11/16/21	9	5	600	0.70	49.24	6.45	19.6	7.78E-07	1.010	7.86E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS (ASTM D2487;2488)
NA	NA
REMARKS	
Bottom Half of the mold was used for testing.	

	Reported Average Hydraulic Conductivity*	7.9E-07	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036
Thermometer ID #	796/985	Oven ID #	496/758
Syringe ID #	245	Differential Pressure Meter ID #	346
		Board Pressure Meter ID #	1041
		Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/17/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39560/4-46	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/20/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.658
Initial Diameter, in	2.968
Height-to-Diameter Ratio	1.91
Area, in ²	6.92
Volume, in ³	39.15
Mass of Sample, g	1226.4
Wet Density, pcf	119.3
Dry Density, pcf	93.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1527.5
Mass of Dry Sample and Tare, g	1262.5
Mass of Tare, g	302.9
Moisture, %	27.6

TEST DATA

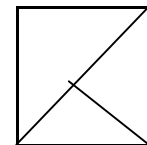
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	683
Specimen Cross-sectional Area, in ²	6.92
Compressive Strength at Failure, psi	99
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	99

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/17/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39560/4-46	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/20/21

Lab. PR. #	21136-02-5		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.010 in	7.65 cm		Speed	10			Average Height of Sample	3.011 in	7.65 cm	
Diameter	2.965 in	7.53 cm		Board Number	4			Average Diameter of Sample	2.966 in	7.53 cm	
Area	6.90 in ²	44.55 cm ²		Cell Number	41			Area	6.91 in ²	44.58 cm ²	
Volume	340.57 cm ³	0.0120 ft ³		Flow Pump Number	2B			Volume	340.91 cm ³	0.0120 ft ³	
Mass	648.1 g	1.43 lb		Flow Pump Rate*	2.24E-04 cm ³ /sec			Mass	661.7 g	1.46 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	92.9 pcf		
Dry Density	93.0 pcf			Cell Pressure	95.0 psi			Vol. of Voids	152.85 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	188.07 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.81		
				Max Head	82.30 cm			Saturation	100.7 %		
				Min Head	81.59 cm						
				Maximum Gradient	10.76						
				Minimum Gradient	10.67						
Moisture Content				Moisture Content				Moisture Content			
Mass of wet sample & tare	648.1 g			Mass of wet sample & tare	744.0 g			Mass of wet sample & tare	744.0 g		
Mass of dry sample & tare	507.4 g			Mass of dry sample & tare	590.2 g			Mass of dry sample & tare	590.2 g		
Mass of tare	0.0 g			Mass of tare	82.8 g			Mass of tare	82.8 g		
% Moisture	27.7			% Moisture	30.3			% Moisture	30.3		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/17/21	8	5	-	1.17	82.30	10.76	19.6	-	-	-
11/17/21	8	15	600	1.16	81.59	10.67	19.6	4.69E-07	1.010	4.74E-07
11/17/21	8	25	600	1.17	82.30	10.76	19.6	4.69E-07	1.010	4.74E-07
11/17/21	8	35	600	1.16	81.59	10.67	19.6	4.69E-07	1.010	4.74E-07
11/17/21	8	45	600	1.17	82.30	10.76	19.6	4.69E-07	1.010	4.74E-07
11/17/21	8	55	600	1.16	81.59	10.67	19.6	4.69E-07	1.010	4.74E-07
11/17/21	9	5	600	1.17	82.30	10.76	19.6	4.69E-07	1.010	4.74E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				4.7E-07	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	246			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/18/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-4	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39561/4-20	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/21/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.611
Initial Diameter, in	2.981
Height-to-Diameter Ratio	1.88
Area, in ²	6.98
Volume, in ³	39.16
Mass of Sample, g	1179.2
Wet Density, pcf	114.7
Dry Density, pcf	85.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1438.0
Mass of Dry Sample and Tare, g	1135.9
Mass of Tare, g	259.9
Moisture, %	34.5

TEST DATA

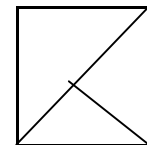
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1602
Specimen Cross-sectional Area, in ²	6.98
Compressive Strength at Failure, psi	230
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	230

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 11/18/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39561/4-20	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/21/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.065 in	7.79 cm	Speed	12	Average Height of Sample	3.066 in	7.79 cm				
Diameter	2.963 in	7.53 cm	Board Number	12	Average Diameter of Sample	2.964 in	7.53 cm				
Area	6.90 in ²	44.49 cm ²	Cell Number	13	Area	6.90 in ²	44.52 cm ²				
Volume	346.33 cm ³	0.0122 ft ³	Flow Pump Number	2A	Volume	346.67 cm ³	0.0122 ft ³				
Mass	642.5 g	1.42 lb	Flow Pump Rate*	5.60E-05 cm ³ /sec	Mass	649.5 g	1.43 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	85.9 pcf					
Dry Density	86.0 pcf		Cell Pressure	95.0 psi	Vol. of Voids	169.88 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	176.80 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.96					
			Max Head	52.76 cm	Saturation	101.3 %					
			Min Head	52.05 cm							
			Maximum Gradient	6.77							
			Minimum Gradient	6.68							

Moisture Content			
Mass of wet sample & tare	642.5 g		
Mass of dry sample & tare	477.2 g		
Mass of tare	0.0 g		
% Moisture	34.6		

Moisture Content			
Mass of wet sample & tare	731.9 g		
Mass of dry sample & tare	559.8 g		
Mass of tare	82.6 g		
% Moisture	36.1		

TIME FUNCTION			Δt (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T_x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T_x	R_T	@ 20 °C
11/18/21	9	5	-	0.74	52.05	6.68	20.0	-	-	-
11/18/21	9	15	600	0.75	52.76	6.77	20.0	1.87E-07	1.000	1.87E-07
11/18/21	9	25	600	0.74	52.05	6.68	20.0	1.87E-07	1.000	1.87E-07
11/18/21	9	35	600	0.75	52.76	6.77	20.0	1.87E-07	1.000	1.87E-07
11/18/21	9	45	600	0.74	52.05	6.68	20.0	1.87E-07	1.000	1.87E-07
11/18/21	9	55	600	0.75	52.76	6.77	20.0	1.87E-07	1.000	1.87E-07
11/18/21	10	5	600	0.74	52.05	6.68	20.0	1.87E-07	1.000	1.87E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.9E-07	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	776
Syringe ID #	245			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/19/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39562/4-22	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/22/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.674
Initial Diameter, in	2.972
Height-to-Diameter Ratio	1.91
Area, in ²	6.94
Volume, in ³	39.36
Mass of Sample, g	1202.2
Wet Density, pcf	116.4
Dry Density, pcf	87.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1408.8
Mass of Dry Sample and Tare, g	1108.6
Mass of Tare, g	208.6
Moisture, %	33.4

TEST DATA

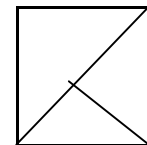
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2332
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	336
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	336

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 11/19/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39562/4-22	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/22/21

Lab. PR. #	21136-02-5		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.964 in	7.53 cm		Speed	10			Average Height of Sample	2.965 in	7.53 cm	
Diameter	2.963 in	7.53 cm		Board Number	4			Average Diameter of Sample	2.964 in	7.53 cm	
Area	6.90 in ²	44.49 cm ²		Cell Number	2			Area	6.90 in ²	44.52 cm ²	
Volume	334.91 cm ³	0.0118 ft ³		Flow Pump Number	4A			Volume	335.25 cm ³	0.0118 ft ³	
Mass	625.1 g	1.38 lb		Flow Pump Rate*	2.24E-04 cm ³ /sec			Mass	632.6 g	1.39 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	87.0 pcf		
Dry Density	87.1 pcf			Cell Pressure	95.0 psi			Vol. of Voids	162.17 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	173.08 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.94		
				Max Head	182.88 cm			Saturation	101.9 %		
				Min Head	181.48 cm						
				Maximum Gradient	24.28						
				Minimum Gradient	24.10						

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/19/21	9	50	-	2.59	182.18	24.19	22.1	-	-	-
11/19/21	10	0	600	2.60	182.88	24.28	22.1	2.08E-07	0.951	1.97E-07
11/19/21	10	10	600	2.60	182.88	24.28	22.1	2.07E-07	0.951	1.97E-07
11/19/21	10	20	600	2.59	182.18	24.19	22.1	2.08E-07	0.951	1.97E-07
11/19/21	10	30	600	2.58	181.48	24.10	22.1	2.08E-07	0.951	1.98E-07
11/19/21	10	40	600	2.59	182.18	24.19	22.1	2.08E-07	0.951	1.98E-07
11/19/21	10	50	600	2.59	182.18	24.19	22.1	2.08E-07	0.951	1.98E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA
REMARKS	
Bottom Half of the mold was used for testing.	

Reported Average Hydraulic Conductivity*		2.0E-07 cm/sec	
Flow pump ID #	1043	Balance ID #	1035/1036
Thermometer ID #	796/985	Oven ID #	496/758
Syringe ID #	1047	Differential Pressure Meter ID #	1044/1048
		Board Pressure Meter ID #	1041
		Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/20/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39563/4-24	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/23/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.628
Initial Diameter, in	2.976
Height-to-Diameter Ratio	1.89
Area, in ²	6.96
Volume, in ³	39.15
Mass of Sample, g	1177.9
Wet Density, pcf	114.6
Dry Density, pcf	86.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1473.6
Mass of Dry Sample and Tare, g	1188.2
Mass of Tare, g	298.4
Moisture, %	32.1

TEST DATA

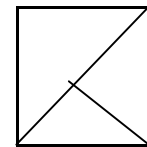
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2797
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	402
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	402

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/22/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39564/4-26	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/25/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.637
Initial Diameter, in	2.971
Height-to-Diameter Ratio	1.90
Area, in ²	6.93
Volume, in ³	39.08
Mass of Sample, g	1201.4
Wet Density, pcf	117.1
Dry Density, pcf	88.8
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1500.8
Mass of Dry Sample and Tare, g	1211.6
Mass of Tare, g	301.0
Moisture, %	31.8

TEST DATA

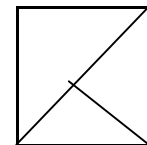
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2367
Specimen Cross-sectional Area, in ²	6.93
Compressive Strength at Failure, psi	341
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	341

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/23/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39565/4-29	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/26/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.608
Initial Diameter, in	2.976
Height-to-Diameter Ratio	1.88
Area, in ²	6.96
Volume, in ³	39.01
Mass of Sample, g	1199.6
Wet Density, pcf	117.2
Dry Density, pcf	88.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1495.6
Mass of Dry Sample and Tare, g	1200.0
Mass of Tare, g	298.5
Moisture, %	32.8

TEST DATA

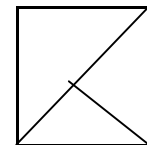
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1408
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	202
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	202

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/23/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39565/4-29	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/26/21

Lab. PR. #	21136-02-5		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.988 in	7.59 cm		Speed	10			Average Height of Sample	2.989 in	7.59 cm	
Diameter	2.962 in	7.52 cm		Board Number	8			Average Diameter of Sample	2.963 in	7.53 cm	
Area	6.89 in ²	44.46 cm ²		Cell Number	15			Area	6.90 in ²	44.49 cm ²	
Volume	337.40 cm ³	0.0119 ft ³		Flow Pump Number	4A			Volume	337.74 cm ³	0.0119 ft ³	
Mass	633.4 g	1.40 lb		Flow Pump Rate*	2.24E-04 cm ³ /sec			Mass	640.0 g	1.41 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	88.4 pcf		
Dry Density	88.5 pcf			Cell Pressure	95.0 psi			Vol. of Voids	160.44 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	177.30 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.90		
				Max Head	147.01 cm			Saturation	100.5 %		
				Min Head	146.31 cm						
				Maximum Gradient	19.36						
				Minimum Gradient	19.27						

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/23/21	7	30	-	2.09	147.01	19.36	18.3	-	-	-
11/23/21	7	40	600	2.08	146.31	19.27	18.3	2.61E-07	1.043	2.72E-07
11/23/21	7	50	600	2.09	147.01	19.36	18.3	2.61E-07	1.043	2.72E-07
11/23/21	8	0	600	2.08	146.31	19.27	18.3	2.61E-07	1.043	2.72E-07
11/23/21	8	10	600	2.09	147.01	19.36	18.3	2.61E-07	1.043	2.72E-07
11/23/21	8	20	600	2.08	146.31	19.27	18.3	2.61E-07	1.043	2.72E-07
11/23/21	8	30	600	2.09	147.01	19.36	18.3	2.61E-07	1.043	2.72E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				2.7E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1047			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/24/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39566/4-33	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	10/27/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.618
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.89
Area, in ²	6.97
Volume, in ³	39.16
Mass of Sample, g	1181.7
Wet Density, pcf	115.0
Dry Density, pcf	85.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1486.4
Mass of Dry Sample and Tare, g	1188.5
Mass of Tare, g	305.7
Moisture, %	33.7

TEST DATA

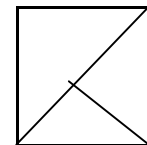
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1807
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	259
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	259

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



Tested By **KP/IH**

Date **11/25/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39567/4-42	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	10/28/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.589
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.88
Area, in ²	6.95
Volume, in ³	38.85
Mass of Sample, g	1191.4
Wet Density, pcf	116.8
Dry Density, pcf	89.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1492.6
Mass of Dry Sample and Tare, g	1214.8
Mass of Tare, g	303.4
Moisture, %	30.5

TEST DATA

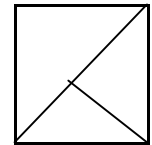
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	629
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	90
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	90

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/25/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39567/4-42	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/28/21

Lab. PR. #	21136-02-5		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.958 in	7.51 cm	Speed	9	Average Height of Sample	2.959 in	7.52 cm				
Diameter	2.959 in	7.52 cm	Board Number	4	Average Diameter of Sample	2.960 in	7.52 cm				
Area	6.88 in ²	44.37 cm ²	Cell Number	15	Area	6.88 in ²	44.40 cm ²				
Volume	333.33 cm ³	0.0118 ft ³	Flow Pump Number	4A	Volume	333.67 cm ³	0.0118 ft ³				
Mass	624.8 g	1.38 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec	Mass	635.9 g	1.40 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density		89.7 pcf				
Dry Density	89.8 pcf		Cell Pressure	95.0 psi	Vol. of Voids		155.99 cm ³				
			Back Pressure	90.0 psi	Vol. of Solids		177.69 cm ³				
			Confining (Effective) Pressure	5.0 psi	Void Ratio		0.88				
			Max Head	14.77 cm	Saturation		100.1 %				
			Min Head	14.07 cm							
			Maximum Gradient	1.97							
			Minimum Gradient	1.87							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/25/21	5	30	-	0.20	14.07	1.87	18.8	-	-	-
11/25/21	5	40	600	0.20	14.07	1.87	18.8	5.39E-06	1.030	5.55E-06
11/25/21	5	50	600	0.21	14.77	1.97	18.8	5.26E-06	1.030	5.42E-06
11/25/21	6	0	600	0.21	14.77	1.97	18.8	5.13E-06	1.030	5.29E-06
11/25/21	6	10	600	0.20	14.07	1.87	18.8	5.26E-06	1.030	5.42E-06
11/25/21	6	20	600	0.20	14.07	1.87	18.8	5.39E-06	1.030	5.55E-06
11/25/21	6	30	600	0.20	14.07	1.87	18.8	5.39E-06	1.030	5.55E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				5.5E-06	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	1047			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



Tested By KP/IH

Date 11/26/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39568/4-32	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	10/29/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.558
Initial Diameter, in	2.948
Height-to-Diameter Ratio	1.89
Area, in ²	6.83
Volume, in ³	37.94
Mass of Sample, g	1163.0
Wet Density, pcf	116.8
Dry Density, pcf	87.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1444.2
Mass of Dry Sample and Tare, g	1152.3
Mass of Tare, g	283.2
Moisture, %	33.6

TEST DATA

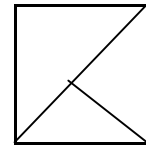
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	236
Specimen Cross-sectional Area, in ²	6.83
Compressive Strength at Failure, psi	35
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	35

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/26/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39568/4-32	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/29/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.991 in	7.60 cm		Speed	8			Average Height of Sample	2.991 in	7.60 cm	
Diameter	2.946 in	7.48 cm		Board Number	7			Average Diameter of Sample	2.947 in	7.49 cm	
Area	6.82 in ²	43.98 cm ²		Cell Number	37			Area	6.82 in ²	44.01 cm ²	
Volume	334.10 cm ³	0.0118 ft ³		Flow Pump Number	4B			Volume	334.32 cm ³	0.0118 ft ³	
Mass	619.3 g	1.37 lb		Flow Pump Rate*	8.96E-04 cm ³ /sec			Mass	627.8 g	1.38 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	86.7 pcf		
Dry Density	86.7 pcf			Cell Pressure	95.0 psi			Vol. of Voids	162.27 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	172.05 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.94		
				Max Head	27.43 cm			Saturation	100.6 %		
				Min Head	26.73 cm						
				Maximum Gradient	3.61						
				Minimum Gradient	3.52						

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/26/21	9	5	-	0.38	26.73	3.52	18.5	-	-	-
11/26/21	9	15	600	0.39	27.43	3.61	18.5	5.71E-06	1.038	5.93E-06
11/26/21	9	25	600	0.39	27.43	3.61	18.5	5.64E-06	1.038	5.85E-06
11/26/21	9	35	600	0.38	26.73	3.52	18.5	5.71E-06	1.038	5.93E-06
11/26/21	9	45	600	0.38	26.73	3.52	18.5	5.79E-06	1.038	6.01E-06
11/26/21	9	55	600	0.39	27.43	3.61	18.5	5.71E-06	1.038	5.93E-06
11/26/21	10	5	600	0.38	26.73	3.52	18.5	5.71E-06	1.038	5.93E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				5.9E-06 cm/sec	
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1046			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



Tested By KP/IH

Date 11/27/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-4		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39569/4-31	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	10/30/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.669
Initial Diameter, in	2.965
Height-to-Diameter Ratio	1.91
Area, in ²	6.90
Volume, in ³	39.14
Mass of Sample, g	1207.5
Wet Density, pcf	117.5
Dry Density, pcf	89.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1480.1
Mass of Dry Sample and Tare, g	1190.7
Mass of Tare, g	275.0
Moisture, %	31.6

TEST DATA

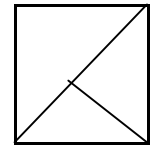
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	923
Specimen Cross-sectional Area, in ²	6.90
Compressive Strength at Failure, psi	134
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	134

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 11/27/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39569/4-31	Subsample ID	2
Add. Info	-	Mixing/Molding Date	10/30/21

Lab. PR. #	21136-02-4		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.932 in	7.45 cm	Speed	8	Average Height of Sample	2.933 in	7.45 cm				
Diameter	2.952 in	7.50 cm	Board Number	8	Average Diameter of Sample	2.953 in	7.50 cm				
Area	6.84 in ²	44.16 cm ²	Cell Number	37	Area	6.85 in ²	44.19 cm ²				
Volume	328.84 cm ³	0.0116 ft ³	Flow Pump Number	4A	Volume	329.18 cm ³	0.0116 ft ³				
Mass	622.8 g	1.37 lb	Flow Pump Rate*	8.96E-04 cm ³ /sec	Mass	633.5 g	1.40 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	89.8 pcf					
Dry Density	89.8 pcf		Cell Pressure	95.0 psi	Vol. of Voids	153.75 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	175.43 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.88					
			Max Head	92.15 cm	Saturation	104.0 %					
			Min Head	91.44 cm							
			Maximum Gradient	12.37							
			Minimum Gradient	12.27							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/26/21	9	5	-	1.31	92.15	12.37	18.5	-	-	-
11/26/21	9	15	600	1.30	91.44	12.27	18.5	1.65E-06	1.038	1.71E-06
11/26/21	9	25	600	1.31	92.15	12.37	18.5	1.65E-06	1.038	1.71E-06
11/26/21	9	35	600	1.31	92.15	12.37	18.5	1.64E-06	1.038	1.70E-06
11/26/21	9	45	600	1.30	91.44	12.27	18.5	1.65E-06	1.038	1.71E-06
11/26/21	9	55	600	1.31	92.15	12.37	18.5	1.65E-06	1.038	1.71E-06
11/26/21	10	5	600	1.30	91.44	12.27	18.5	1.65E-06	1.038	1.71E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA
REMARKS	
Bottom Half of the mold was used for testing.	

Reported Average Hydraulic Conductivity*				1.7E-06	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1047			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/29/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39570/4-35	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	11/01/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.637
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.89
Area, in ²	6.96
Volume, in ³	39.24
Mass of Sample, g	1213.9
Wet Density, pcf	117.9
Dry Density, pcf	91.0
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1517.6
Mass of Dry Sample and Tare, g	1241.6
Mass of Tare, g	305.4
Moisture, %	29.5

TEST DATA

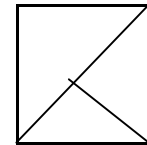
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1130
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	162
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	162

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 11/29/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39570/4-35	Subsample ID	2
Add. Info	-	Mixing/Molding Date	11/01/21

Lab. PR. #	21136-02-5		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.995 in	7.61 cm		Speed	10			Average Height of Sample	2.996 in	7.61 cm	
Diameter	2.960 in	7.52 cm		Board Number	7			Average Diameter of Sample	2.961 in	7.52 cm	
Area	6.88 in ²	44.40 cm ²		Cell Number	2			Area	6.89 in ²	44.43 cm ²	
Volume	337.73 cm ³	0.0119 ft ³		Flow Pump Number	4A			Volume	338.07 cm ³	0.0119 ft ³	
Mass	641.0 g	1.41 lb		Flow Pump Rate*	2.24E-04 cm ³ /sec			Mass	657.0 g	1.45 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	92.0 pcf		
Dry Density	91.4 pcf			Cell Pressure	95.0 psi			Vol. of Voids	153.49 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	184.58 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.83		
				Max Head	124.50 cm			Saturation	103.3 %		
				Min Head	123.80 cm						
				Maximum Gradient	16.36						
				Minimum Gradient	16.27						

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/29/21	7	5	-	1.77	124.50	16.36	18.5	-	-	-
11/29/21	7	15	600	1.76	123.80	16.27	18.5	3.09E-07	1.038	3.21E-07
11/29/21	7	25	600	1.77	124.50	16.36	18.5	3.09E-07	1.038	3.21E-07
11/29/21	7	35	600	1.76	123.80	16.27	18.5	3.09E-07	1.038	3.21E-07
11/29/21	7	45	600	1.77	124.50	16.36	18.5	3.09E-07	1.038	3.21E-07
11/29/21	7	55	600	1.76	123.80	16.27	18.5	3.09E-07	1.038	3.21E-07
11/29/21	8	5	600	1.77	124.50	16.36	18.5	3.09E-07	1.038	3.21E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.2E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1047			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/30/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39571/4-38	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	11/02/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.992
Initial Diameter, in	2.966
Height-to-Diameter Ratio	2.02
Area, in ²	6.91
Volume, in ³	41.40
Mass of Sample, g	1179.6
Wet Density, pcf	108.5
Dry Density, pcf	81.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.83

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1458.1
Mass of Dry Sample and Tare, g	1161.3
Mass of Tare, g	280.0
Moisture, %	33.7

TEST DATA

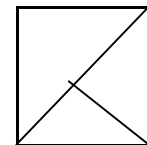
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	427
Specimen Cross-sectional Area, in ²	6.91
Compressive Strength at Failure, psi	62
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	62

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/12/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39572/4-73 Re-Mix	Subsample	1	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	11/02/21	Curing Age, Days	10	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.645
Initial Diameter, in	2.961
Height-to-Diameter Ratio	1.91
Area, in ²	6.89
Volume, in ³	38.87
Mass of Sample, g	1125.2
Wet Density, pcf	110.3
Dry Density, pcf	77.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1483.3
Mass of Dry Sample and Tare, g	1153.5
Mass of Tare, g	359.7
Moisture, %	41.5

TEST DATA

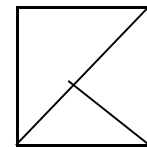
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	273
Specimen Cross-sectional Area, in ²	6.89
Compressive Strength at Failure, psi	40
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	40

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **11/30/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-5	
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev. -
Sample ID	39572/4-73 Re-Mix	Subsample	2	Location	Seattle, WA	
Add. Info	-	Mixing/Molding Date	11/02/21	Curing Age, Days	28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.600
Initial Diameter, in	2.962
Height-to-Diameter Ratio	1.89
Area, in ²	6.89
Volume, in ³	38.59
Mass of Sample, g	1116.7
Wet Density, pcf	110.2
Dry Density, pcf	77.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1395.9
Mass of Dry Sample and Tare, g	1067.0
Mass of Tare, g	280.9
Moisture, %	41.8

TEST DATA

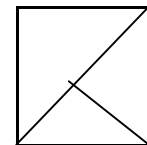
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	680
Specimen Cross-sectional Area, in ²	6.89
Compressive Strength at Failure, psi	99
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	99

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By	EB/KP
Date	11/12/21
Checked By	<i>EB</i>

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39572/4-73 Re-Mix	Subsample ID	3
Add. Info	-	Mixing/Molding Date	11/02/21

Lab. PR. #	21136-02-5		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)							
Height	3.016	in	7.66	cm	Speed	10									
Diameter	2.966	in	7.53	cm	Board Number	3			Average Height of Sample	3.017	in	7.66	cm		
Area	6.91	in ²	44.58	cm ²	Cell Number	41			Average Diameter of Sample	2.967	in	7.54	cm		
Volume	341.48	cm ³	0.0121	ft ³	Flow Pump Number	2A			Area	6.91	in ²	44.61	cm ²		
Mass	596.9	g	1.32	lb	Flow Pump Rate*	2.24E-04	cm ³ /sec		Volume	341.82	cm ³	0.0121	ft ³		
Specific Gravity	2.700	(Assumed)			B - Value	0.95			Mass	604.7	g	1.33	lb		
Dry Density	77.1	pcf			Cell Pressure	95.0	psi						Dry Density	77.0	pcf
					Back Pressure	90.0	psi						Vol. of Voids	185.61	cm ³
					Confining (Effective) Pressure	5.0	psi						Vol. of Solids	156.21	cm ³
					Max Head	14.77	cm						Void Ratio	1.19	
					Min Head	14.07	cm						Saturation	98.6	%
					Maximum Gradient	1.93									
					Minimum Gradient	1.84									
Moisture Content												Moisture Content			
Mass of wet sample & tare	596.9	g								Mass of wet sample & tare	675.2	g			
Mass of dry sample & tare	421.7	g								Mass of dry sample & tare	492.3	g			
Mass of tare	0.0	g								Mass of tare	70.6	g			
% Moisture	41.5									% Moisture	43.4				

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/12/21	7	5	-	0.20	14.07	1.84	20.6	-	-	-
11/12/21	7	15	600	0.21	14.77	1.93	20.6	2.67E-06	0.986	2.63E-06
11/12/21	7	25	600	0.20	14.07	1.84	20.6	2.67E-06	0.986	2.63E-06
11/12/21	7	35	600	0.21	14.77	1.93	20.6	2.67E-06	0.986	2.63E-06
11/12/21	7	45	600	0.20	14.07	1.84	20.6	2.67E-06	0.986	2.63E-06
11/12/21	7	55	600	0.21	14.77	1.93	20.6	2.67E-06	0.986	2.63E-06
11/12/21	8	5	600	0.20	14.07	1.84	20.6	2.67E-06	0.986	2.63E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*		2.6E-06		cm/sec	
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	245			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By	EB/KP
Date	11/30/21
Checked By	<i>EB</i>

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39572/4-73 Re-Mix	Subsample ID	4
Add. Info	-	Mixing/Molding Date	11/02/21

Lab. PR. #	21136-02-5		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.065 in	7.79 cm		Speed	10			Average Height of Sample	3.066 in	7.79 cm	
Diameter	2.958 in	7.51 cm		Board Number	8			Average Diameter of Sample	2.959 in	7.52 cm	
Area	6.87 in ²	44.34 cm ²		Cell Number	4			Area	6.88 in ²	44.37 cm ²	
Volume	345.16 cm ³	0.0122 ft ³		Flow Pump Number	3B			Volume	345.50 cm ³	0.0122 ft ³	
Mass	608.2 g	1.34 lb		Flow Pump Rate*	2.24E-04 cm ³ /sec			Mass	616.6 g	1.36 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	77.8 pcf		
Dry Density	77.8 pcf			Cell Pressure	95.0 psi			Vol. of Voids	186.06 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	159.45 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	1.17		
				Max Head	60.49 cm			Saturation	100.0 %		
				Min Head	59.79 cm						
				Maximum Gradient	7.77						
				Minimum Gradient	7.68						
Moisture Content				Moisture Content				Moisture Content			
Mass of wet sample & tare	608.2 g			Mass of wet sample & tare	699.5 g			Mass of wet sample & tare	699.5 g		
Mass of dry sample & tare	430.3 g			Mass of dry sample & tare	513.5 g			Mass of dry sample & tare	513.5 g		
Mass of tare	0.0 g			Mass of tare	83.2 g			Mass of tare	83.2 g		
% Moisture	41.3			% Moisture	43.2			% Moisture	43.2		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
11/30/21	7	5	-	0.86	60.49	7.77	18.8	-	-	-
11/30/21	7	15	600	0.85	59.79	7.68	18.8	6.54E-07	1.030	6.74E-07
11/30/21	7	25	600	0.86	60.49	7.77	18.8	6.54E-07	1.030	6.74E-07
11/30/21	7	35	600	0.85	59.79	7.68	18.8	6.54E-07	1.030	6.74E-07
11/30/21	7	45	600	0.85	59.79	7.68	18.8	6.58E-07	1.030	6.78E-07
11/30/21	7	55	600	0.86	60.49	7.77	18.8	6.54E-07	1.030	6.74E-07
11/30/21	8	5	600	0.85	59.79	7.68	18.8	6.54E-07	1.030	6.74E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

	Reported Average Hydraulic Conductivity*		6.7E-07	cm/sec	
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	262
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	490			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate is used for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **08/24/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38586/2-42	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/18/21	Curing Age, Days	6		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.518
Initial Diameter, in	3.025
Height-to-Diameter Ratio	1.82
Area, in ²	7.19
Volume, in ³	39.66
Mass of Sample, g	1224.6
Wet Density, pcf	117.6
Dry Density, pcf	91.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.91

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1520.5
Mass of Dry Sample and Tare, g	1250.4
Mass of Tare, g	299.1
Moisture, %	28.4

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	411
Specimen Cross-sectional Area, in ²	7.19
Compressive Strength at Failure, psi	57
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	57

Failure Code 3

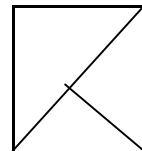
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **08/28/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38586/2-42	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/18/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.566
Initial Diameter, in	3.009
Height-to-Diameter Ratio	1.85
Area, in ²	7.11
Volume, in ³	39.58
Mass of Sample, g	1231.5
Wet Density, pcf	118.5
Dry Density, pcf	92.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1534.7
Mass of Dry Sample and Tare, g	1264.3
Mass of Tare, g	305.2
Moisture, %	28.2

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	776
Specimen Cross-sectional Area, in ²	7.11
Compressive Strength at Failure, psi	109
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	109

Failure Code 3

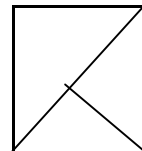
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/08/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38586/2-42	Subsample	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/18/21	Curing Age, Days	21		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.489
Initial Diameter, in	3.014
Height-to-Diameter Ratio	1.82
Area, in ²	7.13
Volume, in ³	39.16
Mass of Sample, g	1221.5
Wet Density, pcf	118.8
Dry Density, pcf	92.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.91

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1517.7
Mass of Dry Sample and Tare, g	1247.1
Mass of Tare, g	298.8
Moisture, %	28.5

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1377
Specimen Cross-sectional Area, in ²	7.13
Compressive Strength at Failure, psi	193
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	193

Failure Code 3

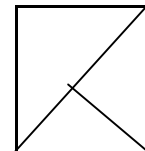
Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 09/15/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38586/2-42	Subsample	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/18/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.601
Initial Diameter, in	3.012
Height-to-Diameter Ratio	1.86
Area, in ²	7.13
Volume, in ³	39.91
Mass of Sample, g	1244.0
Wet Density, pcf	118.7
Dry Density, pcf	92.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1547.2
Mass of Dry Sample and Tare, g	1271.8
Mass of Tare, g	305.3
Moisture, %	28.5

TEST DATA

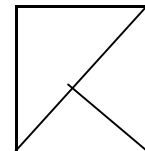
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1596
Specimen Cross-sectional Area, in ²	7.13
Compressive Strength at Failure, psi	224
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	224

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 08/28/21
Checked By: *EB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elevation	-
Sample ID	38586/2-42	Subsample ID	5	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/18/21	Curing Age, Days	10		

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)							
Height	3.027	in	7.69	cm	Speed	10			Average Height of Sample	3.028	in	7.69	cm		
Diameter	3.017	in	7.66	cm	Board Number	9			Average Diameter of Sample	3.018	in	7.67	cm		
Area	7.15	in ²	46.12	cm ²	Cell Number	13			Area	7.15	in ²	46.15	cm ²		
Volume	354.61	cm ³	0.0125	ft ³	Flow Pump Number	4A			Volume	354.96	cm ³	0.0125	ft ³		
Mass	670.0	g	1.48	lb	Flow Pump Rate*	2.24E-04			cm ³ /sec	Mass	677.6	g	1.49	lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Cell Pressure	95.0			psi	Dry Density	91.5	pcf
Dry Density	91.6			pcf	Back Pressure	90.0			psi	Vol. of Voids	162.22			cm ³	
Moisture Content				Confining (Effective) Pressure	5.0			psi	Vol. of Solids	192.74			cm ³		
Mass of wet sample & tare	670.0			g	Max Head	36.58			cm	Void Ratio	0.84				
Mass of dry sample & tare	520.4			g	Min Head	35.87			cm	Saturation	96.9			%	
Mass of tare	0.0			g	Maximum Gradient	4.76			Mass of wet sample & tare	760.2			g		
% Moisture	28.7			Minimum Gradient	4.66			Mass of dry sample & tare	603.0			g			
								Mass of tare	82.6			g			
								% Moisture	30.2						

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
08/28/21	7	30	-	0.51	35.87	4.66	25.6	-	-	-
08/28/21	7	40	600	0.52	36.58	4.76	25.6	1.03E-06	0.877	9.04E-07
08/28/21	7	50	600	0.51	35.87	4.66	25.6	1.03E-06	0.877	9.04E-07
08/28/21	8	0	600	0.52	36.58	4.76	25.6	1.03E-06	0.877	9.04E-07
08/28/21	8	10	600	0.52	36.58	4.76	25.6	1.02E-06	0.877	8.95E-07
08/28/21	8	20	600	0.51	35.87	4.66	25.6	1.03E-06	0.877	9.04E-07
08/28/21	8	30	600	0.52	36.58	4.76	25.6	1.03E-06	0.877	9.04E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS (ASTM D2487;2488)
NA	NA

REMARKS
Bottom Half of the mold was used for testing.

Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	571
Syringe ID #	1047			Pore Pressure Meter ID #	29

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/15/21
Checked By: *EB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elevation	-
Sample ID	38586/2-42	Subsample ID	6	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/18/21	Curing Age, Days	28		

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.978 in	7.56 cm	Speed	12	Average Height of Sample	2.979 in	7.57 cm	Dry Density	92.3 pcf		
Diameter	3.009 in	7.64 cm	Board Number	5	Average Diameter of Sample	3.010 in	7.65 cm	Vol. of Voids	157.04 cm ³		
Area	7.11 in ²	45.88 cm ²	Cell Number	2	Area	7.12 in ²	45.91 cm ²	Vol. of Solids	190.34 cm ³		
Volume	347.02 cm ³	0.0123 ft ³	Flow Pump Number	4A	Volume	347.37 cm ³	0.0123 ft ³	Void Ratio	0.83		
Mass	658.7 g	1.45 lb	Flow Pump Rate*	5.60E-05 cm ³ /sec	Mass	673.4 g	1.48 lb	Saturation	101.6 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	92.4 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	747.0 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	587.6 g				
Mass of wet sample & tare	658.7 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	74.0 g					
Mass of dry sample & tare	513.6 g		Max Head	52.76 cm	% Moisture	31.0					
Mass of tare	0.0 g		Min Head	52.05 cm							
% Moisture	28.3		Maximum Gradient	6.97							
			Minimum Gradient	6.88							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/15/21	8	5	-	0.75	52.76	6.97	24.8	-	-	-
09/15/21	8	15	600	0.74	52.05	6.88	24.8	1.76E-07	0.893	1.57E-07
09/15/21	8	25	600	0.75	52.76	6.97	24.8	1.76E-07	0.893	1.57E-07
09/15/21	8	35	600	0.74	52.05	6.88	24.8	1.76E-07	0.893	1.57E-07
09/15/21	8	45	600	0.75	52.76	6.97	24.8	1.76E-07	0.893	1.57E-07
09/15/21	8	55	600	0.74	52.05	6.88	24.8	1.76E-07	0.893	1.57E-07
09/15/21	9	5	600	0.75	52.76	6.97	24.8	1.76E-07	0.893	1.57E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.6E-07 cm/sec	
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042
Syringe ID #	1047			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 08/26/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38622/2-23	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/20/21	Curing Age, Days	6		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.590
Initial Diameter, in	2.970
Height-to-Diameter Ratio	1.88
Area, in ²	6.93
Volume, in ³	38.73
Mass of Sample, g	1213.5
Wet Density, pcf	119.4
Dry Density, pcf	93.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1511.7
Mass of Dry Sample and Tare, g	1248.5
Mass of Tare, g	299.3
Moisture, %	27.7

TEST DATA

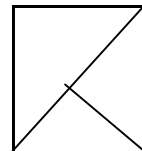
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	373
Specimen Cross-sectional Area, in ²	6.93
Compressive Strength at Failure, psi	54
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	54

Failure Code 3

Failure Sketch



Failure Type:

Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 08/30/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38622/2-23	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/20/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.632
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.89
Area, in ²	6.95
Volume, in ³	39.15
Mass of Sample, g	1216.8
Wet Density, pcf	118.4
Dry Density, pcf	92.8
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1518.6
Mass of Dry Sample and Tare, g	1256.4
Mass of Tare, g	304.1
Moisture, %	27.5

TEST DATA

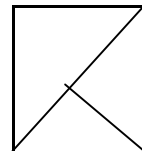
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	862
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	124
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	124

Failure Code 3

Failure Sketch



Failure Type:

Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/10/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38622/2-23	Subsample	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/20/21	Curing Age, Days	21		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.603
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.88
Area, in ²	6.96
Volume, in ³	39.00
Mass of Sample, g	1212.4
Wet Density, pcf	118.4
Dry Density, pcf	92.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1509.9
Mass of Dry Sample and Tare, g	1247.8
Mass of Tare, g	299.8
Moisture, %	27.6

TEST DATA

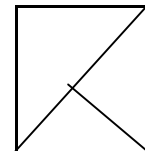
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2298
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	330
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	330

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/17/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38622/2-23	Subsample	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/20/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.654
Initial Diameter, in	2.972
Height-to-Diameter Ratio	1.90
Area, in ²	6.94
Volume, in ³	39.22
Mass of Sample, g	1224.1
Wet Density, pcf	118.9
Dry Density, pcf	93.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1519.5
Mass of Dry Sample and Tare, g	1259.3
Mass of Tare, g	300.9
Moisture, %	27.1

TEST DATA

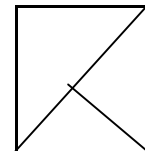
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	3159
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	455
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	455

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/17/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38622/2-23	Subsample ID	6
Add. Info	-	Mixing/Molding Date	08/20/21

Lab. PR. #	21136-02-1		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.022 in	7.68 cm	Speed	11	Average Height of Sample	3.023 in	7.68 cm				
Diameter	2.968 in	7.54 cm	Board Number	1	Average Diameter of Sample	2.969 in	7.54 cm				
Area	6.92 in ²	44.64 cm ²	Cell Number	11	Area	6.92 in ²	44.67 cm ²				
Volume	342.62 cm ³	0.0121 ft ³	Flow Pump Number	1A	Volume	342.96 cm ³	0.0121 ft ³				
Mass	649.2 g	1.43 lb	Flow Pump Rate*	1.12E-04 cm ³ /sec	Mass	664.5 g	1.46 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	92.7 pcf					
Dry Density	92.8 pcf		Cell Pressure	95.0 psi	Vol. of Voids	154.18 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	188.78 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.82					
			Max Head	95.66 cm	Saturation	100.4 %					
			Min Head	94.96 cm							
			Maximum Gradient	12.46							
			Minimum Gradient	12.37							

Moisture Content			
Mass of wet sample & tare	649.2 g	Mass of wet sample & tare	738.3 g
Mass of dry sample & tare	509.4 g	Mass of dry sample & tare	583.6 g
Mass of tare	0.0 g	Mass of tare	74.2 g
% Moisture	27.4	% Moisture	30.4

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/17/21	11	5	-	1.36	95.66	12.46	25.1	-	-	-
09/17/21	11	15	600	1.35	94.96	12.37	25.1	2.02E-07	0.887	1.79E-07
09/17/21	11	25	600	1.36	95.66	12.46	25.1	2.02E-07	0.887	1.79E-07
09/17/21	11	35	600	1.35	94.96	12.37	25.1	2.02E-07	0.887	1.79E-07
09/17/21	11	45	600	1.35	94.96	12.37	25.1	2.03E-07	0.887	1.80E-07
09/17/21	11	55	600	1.36	95.66	12.46	25.1	2.02E-07	0.887	1.79E-07
09/17/21	12	5	600	1.35	94.96	12.37	25.1	2.02E-07	0.887	1.79E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.8E-07	cm/sec
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	1107
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	64
Syringe ID #	140			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **08/28/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38623/2-15	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/23/21	Curing Age, Days	5		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.608
Initial Diameter, in	2.985
Height-to-Diameter Ratio	1.88
Area, in ²	7.00
Volume, in ³	39.25
Mass of Sample, g	1216.5
Wet Density, pcf	118.1
Dry Density, pcf	92.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1519.9
Mass of Dry Sample and Tare, g	1258.6
Mass of Tare, g	305.8
Moisture, %	27.4

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	220
Specimen Cross-sectional Area, in ²	7.00
Compressive Strength at Failure, psi	31
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	31

Failure Code 3

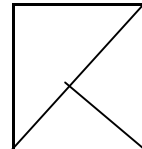
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 09/02/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38623/2-15	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/23/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.589
Initial Diameter, in	2.976
Height-to-Diameter Ratio	1.88
Area, in ²	6.96
Volume, in ³	38.88
Mass of Sample, g	1215.9
Wet Density, pcf	119.1
Dry Density, pcf	93.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1510.0
Mass of Dry Sample and Tare, g	1247.7
Mass of Tare, g	296.8
Moisture, %	27.6

TEST DATA

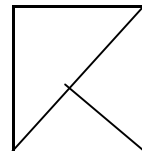
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	785
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	113
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	113

Failure Code 3

Failure Sketch



Failure Type:

Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 09/13/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38623/2-15	Subsample	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/23/21	Curing Age, Days	21		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.596
Initial Diameter, in	2.984
Height-to-Diameter Ratio	1.88
Area, in ²	6.99
Volume, in ³	39.13
Mass of Sample, g	1215.2
Wet Density, pcf	118.3
Dry Density, pcf	92.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1515.8
Mass of Dry Sample and Tare, g	1254.3
Mass of Tare, g	303.7
Moisture, %	27.5

TEST DATA

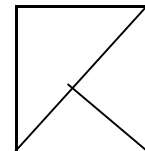
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1891
Specimen Cross-sectional Area, in ²	6.99
Compressive Strength at Failure, psi	270
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	270

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 09/20/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38623/2-15	Subsample	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/23/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.583
Initial Diameter, in	2.984
Height-to-Diameter Ratio	1.87
Area, in ²	6.99
Volume, in ³	39.04
Mass of Sample, g	1213.3
Wet Density, pcf	118.4
Dry Density, pcf	92.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1513.9
Mass of Dry Sample and Tare, g	1250.5
Mass of Tare, g	301.8
Moisture, %	27.8

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2503
Specimen Cross-sectional Area, in ²	6.99
Compressive Strength at Failure, psi	358
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	358

Failure Code 3

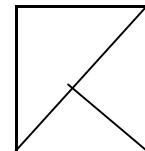
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/02/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38623/2-15	Subsample ID	5
Add. Info	-	Mixing/Molding Date	08/23/21

Lab. PR. #	21136-02-1		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.009 in	7.64 cm	Speed	10	Average Height of Sample	3.010 in	7.65 cm				
Diameter	2.967 in	7.54 cm	Board Number	1	Average Diameter of Sample	2.968 in	7.54 cm				
Area	6.91 in ²	44.61 cm ²	Cell Number	37	Area	6.92 in ²	44.64 cm ²				
Volume	340.92 cm ³	0.0120 ft ³	Flow Pump Number	1B	Volume	341.26 cm ³	0.0121 ft ³				
Mass	651.2 g	1.44 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	659.9 g	1.45 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	93.5 pcf					
Dry Density	93.5 pcf		Cell Pressure	95.0 psi	Vol. of Voids	151.93 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	189.32 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.80					
			Max Head	51.35 cm	Saturation	97.9 %					
			Min Head	50.64 cm							
			Maximum Gradient	6.72							
			Minimum Gradient	6.62							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/02/21	7	20	-	0.72	50.64	6.62	25.2	-	-	-
09/02/21	7	30	600	0.73	51.35	6.72	25.2	7.52E-07	0.885	6.66E-07
09/02/21	7	40	600	0.72	50.64	6.62	25.2	7.52E-07	0.885	6.66E-07
09/02/21	7	50	600	0.72	50.64	6.62	25.2	7.58E-07	0.885	6.71E-07
09/02/21	8	0	600	0.73	51.35	6.72	25.2	7.52E-07	0.885	6.66E-07
09/02/21	8	10	600	0.73	51.35	6.72	25.2	7.47E-07	0.885	6.61E-07
09/02/21	8	20	600	0.72	50.64	6.62	25.2	7.52E-07	0.885	6.66E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				6.7E-07	cm/sec
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	942
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	64
Syringe ID #	141			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **08/29/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38624/2-40	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/24/21	Curing Age, Days	5		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.584
Initial Diameter, in	2.950
Height-to-Diameter Ratio	1.89
Area, in ²	6.83
Volume, in ³	38.17
Mass of Sample, g	1179.1
Wet Density, pcf	117.7
Dry Density, pcf	89.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1480.3
Mass of Dry Sample and Tare, g	1198.2
Mass of Tare, g	303.4
Moisture, %	31.5

TEST DATA

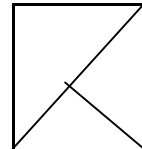
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	412
Specimen Cross-sectional Area, in ²	6.83
Compressive Strength at Failure, psi	60
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	60

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/03/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38624/2-40	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/24/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.619
Initial Diameter, in	2.974
Height-to-Diameter Ratio	1.89
Area, in ²	6.95
Volume, in ³	39.03
Mass of Sample, g	1193.3
Wet Density, pcf	116.5
Dry Density, pcf	88.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1527.3
Mass of Dry Sample and Tare, g	1243.9
Mass of Tare, g	336.3
Moisture, %	31.2

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	804
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	116
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	116

Failure Code 3

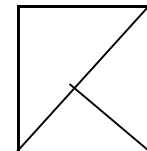
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/14/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38624/2-40	Subsample	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/24/21	Curing Age, Days	21		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.552
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.87
Area, in ²	6.95
Volume, in ³	38.59
Mass of Sample, g	1170.5
Wet Density, pcf	115.5
Dry Density, pcf	87.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1467.2
Mass of Dry Sample and Tare, g	1186.4
Mass of Tare, g	306.0
Moisture, %	31.9

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1541
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	222
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	222

Failure Code 3

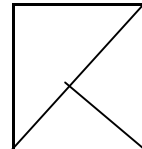
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 09/21/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38624/2-40	Subsample	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/24/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.611
Initial Diameter, in	2.980
Height-to-Diameter Ratio	1.88
Area, in ²	6.97
Volume, in ³	39.13
Mass of Sample, g	1189.9
Wet Density, pcf	115.8
Dry Density, pcf	87.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1605.1
Mass of Dry Sample and Tare, g	1319.4
Mass of Tare, g	416.5
Moisture, %	31.6

TEST DATA

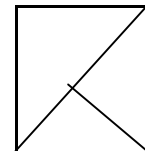
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2068
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	297
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	297

Failure Code 3

Failure Sketch



Failure Type:

Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/03/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38624/2-40	Subsample ID	5
Add. Info	-	Mixing/Molding Date	08/24/21

Lab. PR. #	21136-02-1		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.013 in	7.65 cm	Speed	10	Average Height of Sample	3.014 in	7.66 cm	Dry Density	88.0 pcf		
Diameter	2.960 in	7.52 cm	Board Number	4	Average Diameter of Sample	2.961 in	7.52 cm	Vol. of Voids	162.36 cm ³		
Area	6.88 in ²	44.40 cm ²	Cell Number	43	Area	6.89 in ²	44.43 cm ²	Vol. of Solids	177.74 cm ³		
Volume	339.76 cm ³	0.0120 ft ³	Flow Pump Number	3B	Volume	340.10 cm ³	0.0120 ft ³	Void Ratio	0.91		
Mass	632.2 g	1.39 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	638.0 g	1.41 lb	Saturation	97.4 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	88.1 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	713.5 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	555.5 g				
Mass of wet sample & tare	632.2 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	75.9 g					
Mass of dry sample & tare	479.6 g		Max Head	48.53 cm	% Moisture	32.9					
Mass of tare	0.0 g		Min Head	47.83 cm							
% Moisture	31.8		Maximum Gradient	6.34							
			Minimum Gradient	6.25							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/03/21	11	5	-	0.69	48.53	6.34	25.1	-	-	-
09/03/21	11	15	600	0.68	47.83	6.25	25.1	8.01E-07	0.887	7.11E-07
09/03/21	11	25	600	0.69	48.53	6.34	25.1	8.01E-07	0.887	7.11E-07
09/03/21	11	35	600	0.68	47.83	6.25	25.1	8.01E-07	0.887	7.11E-07
09/03/21	11	45	600	0.69	48.53	6.34	25.1	8.01E-07	0.887	7.11E-07
09/03/21	11	55	600	0.68	47.83	6.25	25.1	8.01E-07	0.887	7.11E-07
09/03/21	12	5	600	0.69	48.53	6.34	25.1	8.01E-07	0.887	7.11E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				7.1E-07 cm/sec	
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	262
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	490			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **08/30/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38690/2-45	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/25/21	Curing Age, Days	5		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.586
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.88
Area, in ²	6.96
Volume, in ³	38.88
Mass of Sample, g	1178.9
Wet Density, pcf	115.5
Dry Density, pcf	87.0
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1474.0
Mass of Dry Sample and Tare, g	1184.8
Mass of Tare, g	299.5
Moisture, %	32.7

TEST DATA

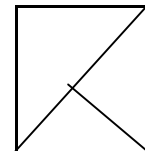
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	373
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	54
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	54

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 09/04/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38690/2-45	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/25/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.628
Initial Diameter, in	2.982
Height-to-Diameter Ratio	1.89
Area, in ²	6.98
Volume, in ³	39.31
Mass of Sample, g	1182.0
Wet Density, pcf	114.6
Dry Density, pcf	86.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1539.2
Mass of Dry Sample and Tare, g	1249.2
Mass of Tare, g	360.1
Moisture, %	32.6

TEST DATA

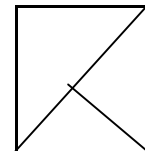
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	815
Specimen Cross-sectional Area, in ²	6.98
Compressive Strength at Failure, psi	117
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	117

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/15/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38690/2-45	Subsample	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/25/21	Curing Age, Days	21		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.617
Initial Diameter, in	2.974
Height-to-Diameter Ratio	1.89
Area, in ²	6.95
Volume, in ³	39.02
Mass of Sample, g	1184.7
Wet Density, pcf	115.7
Dry Density, pcf	87.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1486.6
Mass of Dry Sample and Tare, g	1196.2
Mass of Tare, g	303.8
Moisture, %	32.5

TEST DATA

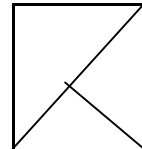
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1555
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	224
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	224

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/22/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38690/2-45	Subsample	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/25/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.752
Initial Diameter, in	2.974
Height-to-Diameter Ratio	1.93
Area, in ²	6.95
Volume, in ³	39.96
Mass of Sample, g	1204.3
Wet Density, pcf	114.8
Dry Density, pcf	86.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.87

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1516.0
Mass of Dry Sample and Tare, g	1218.4
Mass of Tare, g	313.2
Moisture, %	32.9

TEST DATA

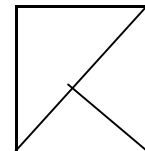
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2299
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	331
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	331

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 09/04/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38690/2-45	Subsample ID	5
Add. Info	-	Mixing/Molding Date	08/25/21

Lab. PR. #	21136-02-1		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.031 in	7.70 cm	Speed	10	Average Height of Sample	3.032 in	7.70 cm	Dry Density	85.8 pcf		
Diameter	2.969 in	7.54 cm	Board Number	6	Average Diameter of Sample	2.970 in	7.54 cm	Vol. of Voids	168.99 cm ³		
Area	6.92 in ²	44.67 cm ²	Cell Number	33	Area	6.93 in ²	44.70 cm ²	Vol. of Solids	175.23 cm ³		
Volume	343.87 cm ³	0.0121 ft ³	Flow Pump Number	3A	Volume	344.22 cm ³	0.0122 ft ³	Void Ratio	0.96		
Mass	628.3 g	1.39 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	634.1 g	1.40 lb	Saturation	95.3 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	85.8 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	715.2 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	554.3 g				
Mass of wet sample & tare	628.3 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	81.4 g					
Mass of dry sample & tare	472.9 g		Max Head	31.65 cm	% Moisture	34.0					
Mass of tare	0.0 g		Min Head	30.95 cm							
% Moisture	32.9		Maximum Gradient	4.11							
			Minimum Gradient	4.02							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/04/21	10	5	-	0.44	30.95	4.02	25.3	-	-	-
09/04/21	10	15	600	0.45	31.65	4.11	25.3	1.23E-06	0.883	1.09E-06
09/04/21	10	25	600	0.44	30.95	4.02	25.3	1.23E-06	0.883	1.09E-06
09/04/21	10	35	600	0.45	31.65	4.11	25.3	1.23E-06	0.883	1.09E-06
09/04/21	10	45	600	0.44	30.95	4.02	25.3	1.23E-06	0.883	1.09E-06
09/04/21	10	55	600	0.45	31.65	4.11	25.3	1.23E-06	0.883	1.09E-06
09/04/21	11	5	600	0.44	30.95	4.02	25.3	1.23E-06	0.883	1.09E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.1E-06	cm/sec
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	469
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042
Syringe ID #	491			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/22/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38690/2-45	Subsample ID	6
Add. Info	-	Mixing/Molding Date	08/25/21

Lab. PR. #	21136-02-1		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.998 in	7.61 cm	Speed	11	Average Height of Sample	2.999 in	7.62 cm	Dry Density	86.7 pcf		
Diameter	2.971 in	7.55 cm	Board Number	4	Average Diameter of Sample	2.972 in	7.55 cm	Vol. of Voids	165.41 cm ³		
Area	6.93 in ²	44.73 cm ²	Cell Number	17	Area	6.94 in ²	44.76 cm ²	Vol. of Solids	175.52 cm ³		
Volume	340.59 cm ³	0.0120 ft ³	Flow Pump Number	2A	Volume	340.93 cm ³	0.0120 ft ³	Void Ratio	0.94		
Mass	626.1 g	1.38 lb	Flow Pump Rate*	1.12E-04 cm ³ /sec	Mass	638.2 g	1.41 lb	Saturation	99.3 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content Mass of wet sample & tare: 723.6 g Mass of dry sample & tare: 559.3 g Mass of tare: 85.4 g % Moisture: 34.7						
Dry Density	86.8 pcf		Cell Pressure	95.0 psi							
Moisture Content				Back Pressure					90.0 psi		
Mass of wet sample & tare	626.1 g	Mass of dry sample & tare	473.9 g	Confining (Effective) Pressure					5.0 psi		
Mass of dry sample & tare	473.9 g	Max Head	136.46 cm	Min Head					135.76 cm		
Mass of tare	0.0 g	Minimum Gradient	17.82	Maximum Gradient					17.91		
% Moisture	32.1	Minimum Gradient	17.82	Minimum Gradient					17.82		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/22/21	10	20	-	1.94	136.46	17.91	25.5	-	-	-
09/22/21	10	30	600	1.93	135.76	17.82	25.5	1.40E-07	0.879	1.23E-07
09/22/21	10	40	600	1.94	136.46	17.91	25.5	1.40E-07	0.879	1.23E-07
09/22/21	10	50	600	1.93	135.76	17.82	25.5	1.40E-07	0.879	1.23E-07
09/22/21	11	0	600	1.94	136.46	17.91	25.5	1.40E-07	0.879	1.23E-07
09/22/21	11	10	600	1.93	135.76	17.82	25.5	1.40E-07	0.879	1.23E-07
09/22/21	11	20	600	1.94	136.46	17.91	25.5	1.40E-07	0.879	1.23E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	245			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **08/31/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38697/2-7	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/26/21	Curing Age, Days	5		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.595
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.88
Area, in ²	6.96
Volume, in ³	38.94
Mass of Sample, g	1237.2
Wet Density, pcf	121.0
Dry Density, pcf	90.0
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1542.4
Mass of Dry Sample and Tare, g	1225.5
Mass of Tare, g	305.7
Moisture, %	34.5

TEST DATA

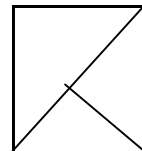
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	249
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	36
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	36

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/05/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38697/2-7	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/26/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.673
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.91
Area, in ²	6.95
Volume, in ³	39.43
Mass of Sample, g	1253.3
Wet Density, pcf	121.1
Dry Density, pcf	90.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1583.7
Mass of Dry Sample and Tare, g	1265.0
Mass of Tare, g	331.4
Moisture, %	34.1

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1086
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	156
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	156

Failure Code 3

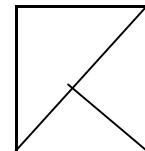
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/16/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38697/2-7	Subsample	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/26/21	Curing Age, Days	21		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.686
Initial Diameter, in	2.987
Height-to-Diameter Ratio	1.90
Area, in ²	7.01
Volume, in ³	39.84
Mass of Sample, g	1272.7
Wet Density, pcf	121.7
Dry Density, pcf	90.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1576.4
Mass of Dry Sample and Tare, g	1250.5
Mass of Tare, g	306.9
Moisture, %	34.5

TEST DATA

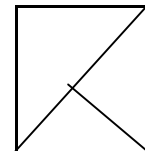
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2933
Specimen Cross-sectional Area, in ²	7.01
Compressive Strength at Failure, psi	419
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	419

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/23/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38697/2-7	Subsample	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/26/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.748
Initial Diameter, in	2.983
Height-to-Diameter Ratio	1.93
Area, in ²	6.99
Volume, in ³	40.17
Mass of Sample, g	1286.8
Wet Density, pcf	122.0
Dry Density, pcf	90.8
Machine Speed, in/min	0.050
Strain rate, % / min	0.87

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1583.3
Mass of Dry Sample and Tare, g	1255.3
Mass of Tare, g	299.6
Moisture, %	34.3

TEST DATA

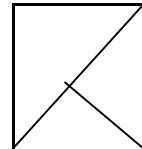
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	3385
Specimen Cross-sectional Area, in ²	6.99
Compressive Strength at Failure, psi	484
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	484

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/05/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38697/2-7	Subsample ID	5
Add. Info	-	Mixing/Molding Date	08/26/21

Lab. PR. #	21136-02-1		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.147 in	5.45 cm	Speed	9	Average Height of Sample	2.148 in	5.46 cm				
Diameter	2.995 in	7.61 cm	Board Number	3	Average Diameter of Sample	2.996 in	7.61 cm				
Area	7.05 in ²	45.45 cm ²	Cell Number	13	Area	7.05 in ²	45.48 cm ²				
Volume	247.87 cm ³	0.0088 ft ³	Flow Pump Number	1A	Volume	248.15 cm ³	0.0088 ft ³				
Mass	458.3 g	1.01 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec	Mass	460.1 g	1.01 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	86.0 pcf					
Dry Density	86.0 pcf		Cell Pressure	95.0 psi	Vol. of Voids	121.55 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	126.60 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.96					
			Max Head	19.70 cm	Saturation	97.3 %					
			Min Head	18.99 cm							
			Maximum Gradient	3.61							
			Minimum Gradient	3.48							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/05/21	8	5	-	0.28	19.70	3.61	25.6	-	-	-
09/05/21	8	15	600	0.27	18.99	3.48	25.6	2.78E-06	0.877	2.44E-06
09/05/21	8	25	600	0.28	19.70	3.61	25.6	2.78E-06	0.877	2.44E-06
09/05/21	8	35	600	0.27	18.99	3.48	25.6	2.78E-06	0.877	2.44E-06
09/05/21	8	45	600	0.28	19.70	3.61	25.6	2.78E-06	0.877	2.44E-06
09/05/21	8	55	600	0.27	18.99	3.48	25.6	2.78E-06	0.877	2.44E-06
09/05/21	9	5	600	0.28	19.70	3.61	25.6	2.78E-06	0.877	2.44E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				2.4E-06	cm/sec
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	1107
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	140			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/23/21
Checked By: *EB*

Client Pr. #	200016			Lab. PR. #	21136-02-1		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elevation	-
Sample ID	38697/2-7	Subsample ID	6	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/26/21	Curing Age, Days	28		

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)						
Height	3.024	in	7.68	cm	Speed	11			Average Height of Sample	3.025	in	7.68	cm	
Diameter	2.969	in	7.54	cm	Board Number	3			Average Diameter of Sample	2.970	in	7.54	cm	
Area	6.92	in ²	44.67	cm ²	Cell Number	55			Area	6.93	in ²	44.70	cm ²	
Volume	343.08	cm ³	0.0121	ft ³	Flow Pump Number	2B			Volume	343.42	cm ³	0.0121	ft ³	
Mass	655.3	g	1.44	lb	Flow Pump Rate*	1.12E-04			cm ³ /sec	Mass	655.3	g	1.44	lb
Specific Gravity	2.700	(Assumed)		B - Value	0.95			Cell Pressure	95.0				psi	
Dry Density	88.6	pcf		Back Pressure	90.0			psi	Moisture Content					
				Confining (Effective) Pressure	5.0			psi	Mass of wet sample & tare	740.5	g	Dry Density	88.5	pcf
				Max Head	114.65			cm	Mass of dry sample & tare	572.3	g	Vol. of Voids	163.00	cm ³
				Min Head	113.95			cm	Mass of tare	85.0	g	Vol. of Solids	180.43	cm ³
				Maximum Gradient	14.92			Minimum Gradient	14.83			Void Ratio	0.90	
				Moisture Content				Mass of wet sample & tare	740.5	g	Saturation	103.2	%	
				Mass of wet sample & tare	655.3	g	Mass of dry sample & tare	572.3	g	% Moisture	34.5			
				Mass of dry sample & tare	487.3	g	Mass of tare	85.0	g					
				Mass of tare	0.0	g	% Moisture	34.5						

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/23/21	10	20	-	1.63	114.65	14.92	25.4	-	-	-
09/23/21	10	30	600	1.62	113.95	14.83	25.4	1.68E-07	0.881	1.48E-07
09/23/21	10	40	600	1.63	114.65	14.92	25.4	1.68E-07	0.881	1.48E-07
09/23/21	10	50	600	1.62	113.95	14.83	25.4	1.68E-07	0.881	1.48E-07
09/23/21	11	0	600	1.63	114.65	14.92	25.4	1.68E-07	0.881	1.48E-07
09/23/21	11	10	600	1.63	114.65	14.92	25.4	1.68E-07	0.881	1.48E-07
09/23/21	11	20	600	1.62	113.95	14.83	25.4	1.68E-07	0.881	1.48E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.5E-07			cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587		
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041		
Syringe ID #	246			Pore Pressure Meter ID #	26/27		

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/04/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38731/2-1	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/30/21	Curing Age, Days	5		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.699
Initial Diameter, in	2.972
Height-to-Diameter Ratio	1.92
Area, in ²	6.94
Volume, in ³	39.54
Mass of Sample, g	1177.3
Wet Density, pcf	113.4
Dry Density, pcf	88.0
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1477.4
Mass of Dry Sample and Tare, g	1214.5
Mass of Tare, g	303.0
Moisture, %	28.8

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	73
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	11
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	11

Failure Code 3

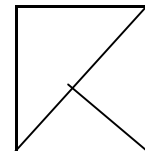
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/09/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38731/2-1	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/30/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.634
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.89
Area, in ²	6.95
Volume, in ³	39.16
Mass of Sample, g	1201.3
Wet Density, pcf	116.9
Dry Density, pcf	90.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1502.1
Mass of Dry Sample and Tare, g	1234.5
Mass of Tare, g	303.0
Moisture, %	28.7

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	324
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	47
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	47

Failure Code 3

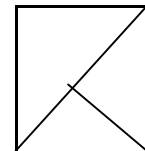
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/20/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38731/2-1	Subsample	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/30/21	Curing Age, Days	21		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.603
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.88
Area, in ²	6.97
Volume, in ³	39.05
Mass of Sample, g	1191.7
Wet Density, pcf	116.2
Dry Density, pcf	90.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1549.8
Mass of Dry Sample and Tare, g	1284.3
Mass of Tare, g	359.9
Moisture, %	28.7

TEST DATA

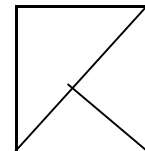
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	674
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	97
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	97

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/27/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38731/2-1	Subsample	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/30/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.641
Initial Diameter, in	2.976
Height-to-Diameter Ratio	1.90
Area, in ²	6.96
Volume, in ³	39.24
Mass of Sample, g	1204.1
Wet Density, pcf	116.9
Dry Density, pcf	90.8
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1503.5
Mass of Dry Sample and Tare, g	1235.5
Mass of Tare, g	302.0
Moisture, %	28.7

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	950
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	137
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	137

Failure Code 3

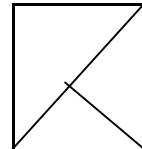
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 09/09/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38731/2-1	Subsample ID	5
Add. Info	-	Mixing/Molding Date	08/30/21

Lab. PR. #	21136-02-2		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.081 in	7.83 cm	Speed	10	Average Height of Sample	3.082 in	7.83 cm	Dry Density	91.3 pcf		
Diameter	2.959 in	7.52 cm	Board Number	1	Average Diameter of Sample	2.960 in	7.52 cm	Vol. of Voids	159.27 cm ³		
Area	6.88 in ²	44.37 cm ²	Cell Number	15	Area	6.88 in ²	44.40 cm ²	Vol. of Solids	188.27 cm ³		
Volume	347.19 cm ³	0.0123 ft ³	Flow Pump Number	1B	Volume	347.54 cm ³	0.0123 ft ³	Void Ratio	0.85		
Mass	652.2 g	1.44 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	664.7 g	1.47 lb	Saturation	98.2 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	91.4 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	746.9 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	590.5 g				
Mass of wet sample & tare	652.2 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	82.1 g					
Mass of dry sample & tare	508.4 g		Max Head	53.46 cm	% Moisture	30.8					
Mass of tare	0.0 g		Min Head	52.76 cm							
% Moisture	28.3		Maximum Gradient	6.83							
			Minimum Gradient	6.74							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/09/21	9	20	-	0.76	53.46	6.83	25.3	-	-	-
09/09/21	9	30	600	0.75	52.76	6.74	25.3	7.44E-07	0.883	6.57E-07
09/09/21	9	40	600	0.76	53.46	6.83	25.3	7.44E-07	0.883	6.57E-07
09/09/21	9	50	600	0.76	53.46	6.83	25.3	7.39E-07	0.883	6.53E-07
09/09/21	10	0	600	0.75	52.76	6.74	25.3	7.44E-07	0.883	6.57E-07
09/09/21	10	10	600	0.76	53.46	6.83	25.3	7.44E-07	0.883	6.57E-07
09/09/21	10	20	600	0.75	52.76	6.74	25.3	7.44E-07	0.883	6.57E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				6.6E-07	cm/sec
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	942
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	64
Syringe ID #	141			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 09/27/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38731/2-1	Subsample ID	6
Add. Info	-	Mixing/Molding Date	08/30/21

Lab. PR. #	21136-02-2		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.009 in	7.64 cm		Speed	11			Average Height of Sample	3.010 in	7.65 cm	
Diameter	2.975 in	7.56 cm		Board Number	18			Average Diameter of Sample	2.976 in	7.56 cm	
Area	6.95 in ²	44.85 cm ²		Cell Number	14			Area	6.96 in ²	44.88 cm ²	
Volume	342.76 cm ³	0.0121 ft ³		Flow Pump Number	2B			Volume	343.10 cm ³	0.0121 ft ³	
Mass	634.2 g	1.40 lb		Flow Pump Rate*	1.12E-04 cm ³ /sec			Mass	644.3 g	1.42 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	89.3 pcf		
Dry Density	89.8 pcf			Cell Pressure	95.0 psi			Vol. of Voids	161.15 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	181.95 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.89		
				Max Head	57.68 cm			Saturation	95.0 %		
				Min Head	56.98 cm						
				Maximum Gradient	7.54						
				Minimum Gradient	7.45						

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/27/21	8	30	-	0.81	56.98	7.45	24.5	-	-	-
09/27/21	8	40	600	0.82	57.68	7.54	24.5	3.33E-07	0.899	2.99E-07
09/27/21	8	50	600	0.81	56.98	7.45	24.5	3.33E-07	0.899	2.99E-07
09/27/21	9	0	600	0.82	57.68	7.54	24.5	3.33E-07	0.899	2.99E-07
09/27/21	9	10	600	0.81	56.98	7.45	24.5	3.33E-07	0.899	2.99E-07
09/27/21	9	20	600	0.82	57.68	7.54	24.5	3.33E-07	0.899	2.99E-07
09/27/21	9	30	600	0.81	56.98	7.45	24.5	3.33E-07	0.899	2.99E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

	Reported Average Hydraulic Conductivity*		3.0E-07 cm/sec		
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	570
Syringe ID #	246			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/05/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38732/2-43	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/31/21	Curing Age, Days	5		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.614
Initial Diameter, in	2.973
Height-to-Diameter Ratio	1.89
Area, in ²	6.94
Volume, in ³	38.97
Mass of Sample, g	1171.1
Wet Density, pcf	114.5
Dry Density, pcf	86.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1480.6
Mass of Dry Sample and Tare, g	1195.3
Mass of Tare, g	310.1
Moisture, %	32.2

TEST DATA

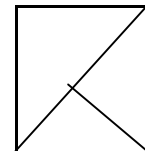
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	522
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	75
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	75

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 09/10/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38732/2-43	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/31/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.616
Initial Diameter, in	2.968
Height-to-Diameter Ratio	1.89
Area, in ²	6.92
Volume, in ³	38.85
Mass of Sample, g	1171.4
Wet Density, pcf	114.9
Dry Density, pcf	86.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1465.5
Mass of Dry Sample and Tare, g	1178.2
Mass of Tare, g	297.1
Moisture, %	32.6

TEST DATA

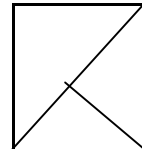
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	858
Specimen Cross-sectional Area, in ²	6.92
Compressive Strength at Failure, psi	124
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	124

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/21/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38732/2-43	Subsample	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/31/21	Curing Age, Days	21		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.622
Initial Diameter, in	2.974
Height-to-Diameter Ratio	1.89
Area, in ²	6.95
Volume, in ³	39.05
Mass of Sample, g	1176.2
Wet Density, pcf	114.7
Dry Density, pcf	86.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1525.1
Mass of Dry Sample and Tare, g	1238.3
Mass of Tare, g	360.1
Moisture, %	32.7

TEST DATA

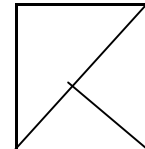
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2102
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	303
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	303

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/28/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38732/2-43	Subsample	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	08/31/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.554
Initial Diameter, in	2.983
Height-to-Diameter Ratio	1.86
Area, in ²	6.99
Volume, in ³	38.82
Mass of Sample, g	1158.3
Wet Density, pcf	113.7
Dry Density, pcf	85.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1515.8
Mass of Dry Sample and Tare, g	1229.7
Mass of Tare, g	359.8
Moisture, %	32.9

TEST DATA

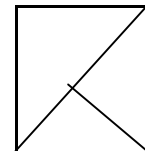
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2207
Specimen Cross-sectional Area, in ²	6.99
Compressive Strength at Failure, psi	316
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	316

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/10/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38732/2-43	Subsample ID	5
Add. Info	-	Mixing/Molding Date	08/31/21

Lab. PR. #	21136-02-2		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.073 in	7.81 cm	Speed	10	Average Height of Sample	3.074 in	7.81 cm	Dry Density	86.4 pcf		
Diameter	2.959 in	7.52 cm	Board Number	19	Average Diameter of Sample	2.960 in	7.52 cm	Vol. of Voids	168.83 cm ³		
Area	6.88 in ²	44.37 cm ²	Cell Number	13	Area	6.88 in ²	44.40 cm ²	Vol. of Solids	177.81 cm ³		
Volume	346.29 cm ³	0.0122 ft ³	Flow Pump Number	2B	Volume	346.64 cm ³	0.0122 ft ³	Void Ratio	0.95		
Mass	635.0 g	1.40 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	648.9 g	1.43 lb	Saturation	100.0 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content Mass of wet sample & tare: 735.6 g Mass of dry sample & tare: 566.8 g Mass of tare: 86.7 g % Moisture: 35.2						
Dry Density	86.5 pcf		Cell Pressure	95.0 psi							
Moisture Content			Back Pressure	90.0 psi							
Mass of wet sample & tare	635.0 g		Confining (Effective) Pressure	5.0 psi							
Mass of dry sample & tare	480.1 g		Max Head	102.70 cm							
Mass of tare	0.0 g		Min Head	101.99 cm							
% Moisture	32.3		Maximum Gradient	13.15							
			Minimum Gradient	13.06							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/10/21	8	5	-	1.46	102.70	13.15	25.7	-	-	-
09/10/21	8	15	600	1.45	101.99	13.06	25.7	3.85E-07	0.875	3.37E-07
09/10/21	8	25	600	1.46	102.70	13.15	25.7	3.85E-07	0.875	3.37E-07
09/10/21	8	35	600	1.45	101.99	13.06	25.7	3.85E-07	0.875	3.37E-07
09/10/21	8	45	600	1.46	102.70	13.15	25.7	3.85E-07	0.875	3.37E-07
09/10/21	8	55	600	1.45	101.99	13.06	25.7	3.85E-07	0.875	3.37E-07
09/10/21	9	5	600	1.46	102.70	13.15	25.7	3.85E-07	0.875	3.37E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.4E-07 cm/sec	
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	570
Syringe ID #	246			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 09/28/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38732/2-43	Subsample ID	6
Add. Info	-	Mixing/Molding Date	08/31/21

Lab. PR. #	21136-02-2		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.022 in	7.68 cm	Speed	12	Average Height of Sample	3.023 in	7.68 cm	Dry Density	84.5 pcf		
Diameter	2.972 in	7.55 cm	Board Number	11	Average Diameter of Sample	2.973 in	7.55 cm	Vol. of Voids	171.38 cm ³		
Area	6.94 in ²	44.76 cm ²	Cell Number	2	Area	6.94 in ²	44.79 cm ²	Vol. of Solids	172.50 cm ³		
Volume	343.54 cm ³	0.0121 ft ³	Flow Pump Number	1A	Volume	343.89 cm ³	0.0121 ft ³	Void Ratio	0.99		
Mass	625.8 g	1.38 lb	Flow Pump Rate*	5.60E-05 cm ³ /sec	Mass	630.8 g	1.39 lb	Saturation	96.3 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	85.6 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	702.8 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	535.8 g				
Mass of wet sample & tare	625.8 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	64.5 g					
Mass of dry sample & tare	471.3 g		Max Head	167.41 cm	% Moisture	35.4					
Mass of tare	0.0 g		Min Head	166.71 cm							
% Moisture	32.8		Maximum Gradient	21.80							
			Minimum Gradient	21.71							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/29/21	7	5	-	2.38	167.41	21.80	26.1	-	-	-
09/29/21	7	15	600	2.37	166.71	21.71	26.1	5.75E-08	0.867	4.99E-08
09/29/21	7	25	600	2.38	167.41	21.80	26.1	5.75E-08	0.867	4.99E-08
09/29/21	7	35	600	2.37	166.71	21.71	26.1	5.75E-08	0.867	4.99E-08
09/29/21	7	45	600	2.38	167.41	21.80	26.1	5.75E-08	0.867	4.99E-08
09/29/21	7	55	600	2.37	166.71	21.71	26.1	5.75E-08	0.867	4.99E-08
09/29/21	8	5	600	2.38	167.41	21.80	26.1	5.75E-08	0.867	4.99E-08

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				5.0E-08 cm/sec	
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	1107
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	776
Syringe ID #	140			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/11/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38741/2-41	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/01/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.555
Initial Diameter, in	2.974
Height-to-Diameter Ratio	1.87
Area, in ²	6.95
Volume, in ³	38.59
Mass of Sample, g	1164.3
Wet Density, pcf	114.9
Dry Density, pcf	81.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1464.5
Mass of Dry Sample and Tare, g	1125.3
Mass of Tare, g	303.4
Moisture, %	41.3

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	646
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	93
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	93

Failure Code 3

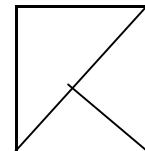
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/29/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38741/2-41	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/01/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.660
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.90
Area, in ²	6.97
Volume, in ³	39.45
Mass of Sample, g	1188.8
Wet Density, pcf	114.8
Dry Density, pcf	81.0
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1485.7
Mass of Dry Sample and Tare, g	1136.3
Mass of Tare, g	298.5
Moisture, %	41.7

TEST DATA

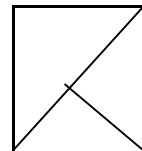
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2280
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	327
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	327

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 09/11/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38741/2-41	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/01/21

Lab. PR. #	21136-02-2		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.029 in	7.69 cm	Speed	9	Average Height of Sample	3.030 in	7.70 cm				
Diameter	2.968 in	7.54 cm	Board Number	5	Average Diameter of Sample	2.969 in	7.54 cm				
Area	6.92 in ²	44.64 cm ²	Cell Number	13	Area	6.92 in ²	44.67 cm ²				
Volume	343.41 cm ³	0.0121 ft ³	Flow Pump Number	4B	Volume	343.76 cm ³	0.0121 ft ³				
Mass	625.0 g	1.38 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec	Mass	628.0 g	1.38 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density		80.3 pcf				
Dry Density	80.4 pcf		Cell Pressure	95.0 psi	Vol. of Voids		179.83 cm ³				
			Back Pressure	90.0 psi	Vol. of Solids		163.93 cm ³				
			Confining (Effective) Pressure	5.0 psi	Void Ratio		1.10				
			Max Head	15.47 cm	Saturation		103.1 %				
			Min Head	14.07 cm							
			Maximum Gradient	2.01							
			Minimum Gradient	1.83							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/11/21	7	10	-	0.20	14.07	1.83	23.6	-	-	-
09/11/21	7	20	600	0.21	14.77	1.92	23.6	5.35E-06	0.918	4.92E-06
09/11/21	7	30	600	0.21	14.77	1.92	23.6	5.23E-06	0.918	4.80E-06
09/11/21	7	40	600	0.22	15.47	2.01	23.6	5.10E-06	0.918	4.69E-06
09/11/21	7	50	600	0.21	14.77	1.92	23.6	5.10E-06	0.918	4.69E-06
09/11/21	8	0	600	0.22	15.47	2.01	23.6	5.10E-06	0.918	4.69E-06
09/11/21	8	10	600	0.21	14.77	1.92	23.6	5.10E-06	0.918	4.69E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				4.7E-06	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042
Syringe ID #	1046			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/29/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38741/2-41	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/01/21

Lab. PR. #	21136-02-2		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.921 in	7.42 cm		Speed	11			Average Height of Sample	2.922 in	7.42 cm	
Diameter	2.969 in	7.54 cm		Board Number	8			Average Diameter of Sample	2.970 in	7.54 cm	
Area	6.92 in ²	44.67 cm ²		Cell Number	5			Area	6.93 in ²	44.70 cm ²	
Volume	331.39 cm ³	0.0117 ft ³		Flow Pump Number	4A			Volume	331.73 cm ³	0.0117 ft ³	
Mass	612.6 g	1.35 lb		Flow Pump Rate*	1.12E-04 cm ³ /sec			Mass	613.0 g	1.35 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	81.5 pcf		
Dry Density	81.6 pcf			Cell Pressure	95.0 psi			Vol. of Voids	171.21 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	160.52 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	1.07		
				Max Head	113.95 cm			Saturation	104.9 %		
				Min Head	112.54 cm						
				Maximum Gradient	15.35						
				Minimum Gradient	15.16						

TIME FUNCTION			Δt (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T_x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T_x	R_T	@ 20 °C
09/29/21	7	5	-	1.62	113.95	15.35	25.2	-	-	-
09/29/21	7	15	600	1.61	113.25	15.26	25.2	1.64E-07	0.885	1.45E-07
09/29/21	7	25	600	1.62	113.95	15.35	25.2	1.64E-07	0.885	1.45E-07
09/29/21	7	35	600	1.61	113.25	15.26	25.2	1.64E-07	0.885	1.45E-07
09/29/21	7	45	600	1.62	113.95	15.35	25.2	1.64E-07	0.885	1.45E-07
09/29/21	7	55	600	1.61	113.25	15.26	25.2	1.64E-07	0.885	1.45E-07
09/29/21	8	5	600	1.60	112.54	15.16	25.2	1.65E-07	0.885	1.46E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS (ASTM D2487;2488)
NA	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.5E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1047			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 09/09/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38742/2-36	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/02/21	Curing Age, Days	7		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.645
Initial Diameter, in	2.965
Height-to-Diameter Ratio	1.90
Area, in ²	6.90
Volume, in ³	38.98
Mass of Sample, g	1179.2
Wet Density, pcf	115.3
Dry Density, pcf	87.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1481.5
Mass of Dry Sample and Tare, g	1202.3
Mass of Tare, g	304.0
Moisture, %	31.1

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	729
Specimen Cross-sectional Area, in ²	6.90
Compressive Strength at Failure, psi	106
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	106

Failure Code 3

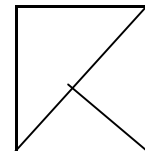
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/12/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38742/2-36	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/02/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.678
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.91
Area, in ²	6.97
Volume, in ³	39.58
Mass of Sample, g	1186.9
Wet Density, pcf	114.3
Dry Density, pcf	86.8
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1489.2
Mass of Dry Sample and Tare, g	1205.0
Mass of Tare, g	305.7
Moisture, %	31.6

TEST DATA

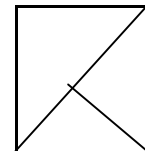
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1302
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	187
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	187

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 09/30/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-2		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38742/2-36	Subsample	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/02/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.675
Initial Diameter, in	2.976
Height-to-Diameter Ratio	1.91
Area, in ²	6.96
Volume, in ³	39.47
Mass of Sample, g	1178.4
Wet Density, pcf	113.7
Dry Density, pcf	86.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1481.1
Mass of Dry Sample and Tare, g	1200.0
Mass of Tare, g	305.3
Moisture, %	31.4

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2603
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	374
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	374

Failure Code 3

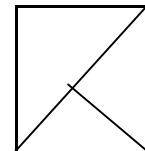
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 09/12/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38742/2-36	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/02/21

Lab. PR. #	21136-02-2		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.992 in	7.60 cm	Speed	9	Average Height of Sample	2.993 in	7.60 cm	Dry Density	87.6 pcf		
Diameter	2.961 in	7.52 cm	Board Number	6	Average Diameter of Sample	2.962 in	7.52 cm	Vol. of Voids	162.30 cm ³		
Area	6.89 in ²	44.43 cm ²	Cell Number	37	Area	6.89 in ²	44.46 cm ²	Vol. of Solids	175.67 cm ³		
Volume	337.62 cm ³	0.0119 ft ³	Flow Pump Number	4A	Volume	337.96 cm ³	0.0119 ft ³	Void Ratio	0.92		
Mass	621.6 g	1.37 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec	Mass	630.3 g	1.39 lb	Saturation	96.1 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	87.7 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	711.1 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	555.1 g				
Mass of wet sample & tare	621.6 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	80.8 g					
Mass of dry sample & tare	474.3 g		Max Head	42.91 cm	% Moisture	32.9					
Mass of tare	0.0 g		Min Head	42.20 cm							
% Moisture	31.1		Maximum Gradient	5.64							
			Minimum Gradient	5.55							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/12/21	8	5	-	0.60	42.20	5.55	24.1	-	-	-
09/12/21	8	15	600	0.61	42.91	5.64	24.1	1.80E-06	0.908	1.63E-06
09/12/21	8	25	600	0.60	42.20	5.55	24.1	1.80E-06	0.908	1.63E-06
09/12/21	8	35	600	0.61	42.91	5.64	24.1	1.80E-06	0.908	1.63E-06
09/12/21	8	45	600	0.60	42.20	5.55	24.1	1.80E-06	0.908	1.63E-06
09/12/21	8	55	600	0.61	42.91	5.64	24.1	1.80E-06	0.908	1.63E-06
09/12/21	9	5	600	0.60	42.20	5.55	24.1	1.80E-06	0.908	1.63E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.6E-06	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042
Syringe ID #	1047			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By **EB/KP**
Date **09/30/21**
Checked By **EB**

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38742/2-36	Subsample ID	5
Add. Info	-	Mixing/Molding Date	09/02/21

Lab. PR. #	21136-02-2		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.922 in	7.42 cm	Speed	10	Average Height of Sample	2.923 in	7.42 cm				
Diameter	2.976 in	7.56 cm	Board Number	11	Average Diameter of Sample	2.937 in	7.46 cm				
Area	6.96 in ²	44.88 cm ²	Cell Number	13	Area	6.77 in ²	43.71 cm ²				
Volume	333.07 cm ³	0.0118 ft ³	Flow Pump Number	1B	Volume	324.51 cm ³	0.0115 ft ³				
Mass	599.4 g	1.32 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	615.4 g	1.36 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density		87.7 pcf				
Dry Density	85.4 pcf		Cell Pressure	95.0 psi	Vol. of Voids		155.67 cm ³				
			Back Pressure	90.0 psi	Vol. of Solids		168.84 cm ³				
			Confining (Effective) Pressure	5.0 psi	Void Ratio		0.92				
			Max Head	66.82 cm	Saturation		102.5 %				
			Min Head	66.12 cm							
			Maximum Gradient	9.00							
			Minimum Gradient	8.91							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/30/21	7	20	-	0.95	66.82	9.00	24.1	-	-	-
09/30/21	7	30	600	0.94	66.12	8.91	24.1	5.72E-07	0.908	5.20E-07
09/30/21	7	40	600	0.95	66.82	9.00	24.1	5.72E-07	0.908	5.20E-07
09/30/21	7	50	600	0.94	66.12	8.91	24.1	5.72E-07	0.908	5.20E-07
09/30/21	8	0	600	0.95	66.82	9.00	24.1	5.72E-07	0.908	5.20E-07
09/30/21	8	10	600	0.94	66.12	8.91	24.1	5.72E-07	0.908	5.20E-07
09/30/21	8	20	600	0.95	66.82	9.00	24.1	5.72E-07	0.908	5.20E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				5.2E-07	cm/sec
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	942
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	776
Syringe ID #	141			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/12/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal						
Sample ID	38765/2-4	Subsample	1	S. Type	Mold	Depth/Elev.	-
Add. Info	-	Mixing/Molding Date	09/02/21	Location	Seattle, WA		
				Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.560
Initial Diameter, in	2.967
Height-to-Diameter Ratio	1.87
Area, in ²	6.91
Volume, in ³	38.44
Mass of Sample, g	1182.7
Wet Density, pcf	117.2
Dry Density, pcf	89.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1483.0
Mass of Dry Sample and Tare, g	1205.3
Mass of Tare, g	305.1
Moisture, %	30.8

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	121
Specimen Cross-sectional Area, in ²	6.91
Compressive Strength at Failure, psi	18
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	18

Failure Code 3

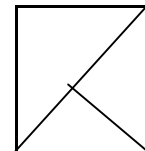
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/30/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38765/2-4	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/02/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.698
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.91
Area, in ²	6.97
Volume, in ³	39.71
Mass of Sample, g	1205.0
Wet Density, pcf	115.6
Dry Density, pcf	88.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1502.3
Mass of Dry Sample and Tare, g	1221.0
Mass of Tare, g	299.6
Moisture, %	30.5

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	616
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	88
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	88

Failure Code 3

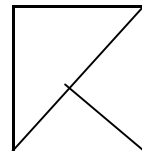
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/13/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38766/2-46	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/03/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.610
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.88
Area, in ²	6.97
Volume, in ³	39.10
Mass of Sample, g	1187.0
Wet Density, pcf	115.6
Dry Density, pcf	88.0
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1490.2
Mass of Dry Sample and Tare, g	1207.0
Mass of Tare, g	305.9
Moisture, %	31.4

TEST DATA

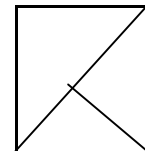
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	487
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	70
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	70

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/01/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3					
Pr. Name	Time Oil Terminal						S. Type	Mold	Depth/Elev.	-
Sample ID	38766/2-46		Subsample	2		Location				
Add. Info	-	Mixing/Molding Date		09/03/21		Curing Age, Days			28	

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.588
Initial Diameter, in	2.971
Height-to-Diameter Ratio	1.88
Area, in ²	6.93
Volume, in ³	38.74
Mass of Sample, g	1180.6
Wet Density, pcf	116.1
Dry Density, pcf	88.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1484.0
Mass of Dry Sample and Tare, g	1203.3
Mass of Tare, g	305.8
Moisture, %	31.3

TEST DATA

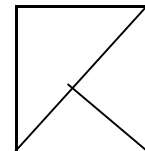
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1501
Specimen Cross-sectional Area, in ²	6.93
Compressive Strength at Failure, psi	217
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	217

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/13/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38766/2-46	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/03/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.038 in	7.72 cm	Speed	10	Average Height of Sample	3.039 in	7.72 cm	Dry Density	87.1 pcf		
Diameter	2.975 in	7.56 cm	Board Number	4	Average Diameter of Sample	2.976 in	7.56 cm	Vol. of Voids	167.29 cm ³		
Area	6.95 in ²	44.85 cm ²	Cell Number	33	Area	6.96 in ²	44.88 cm ²	Vol. of Solids	179.12 cm ³		
Volume	346.06 cm ³	0.0122 ft ³	Flow Pump Number	2B	Volume	346.41 cm ³	0.0122 ft ³	Void Ratio	0.93		
Mass	634.7 g	1.40 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	645.0 g	1.42 lb	Saturation	96.5 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	87.2 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	729.7 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	568.3 g				
Mass of wet sample & tare	634.7 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	84.6 g					
Mass of dry sample & tare	483.7 g		Max Head	28.84 cm	% Moisture	33.4					
Mass of tare	0.0 g		Min Head	27.43 cm							
% Moisture	31.2		Maximum Gradient	3.74							
			Minimum Gradient	3.55							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/13/21	7	40	-	0.40	28.14	3.65	23.3	-	-	-
09/13/21	7	50	600	0.39	27.43	3.55	23.3	1.39E-06	0.925	1.28E-06
09/13/21	8	0	600	0.40	28.14	3.65	23.3	1.39E-06	0.925	1.28E-06
09/13/21	8	10	600	0.39	27.43	3.55	23.3	1.39E-06	0.925	1.28E-06
09/13/21	8	20	600	0.41	28.84	3.74	23.3	1.37E-06	0.925	1.27E-06
09/13/21	8	30	600	0.40	28.14	3.65	23.3	1.35E-06	0.925	1.25E-06
09/13/21	8	40	600	0.41	28.84	3.74	23.3	1.35E-06	0.925	1.25E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.3E-06	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	246			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/01/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38766/2-46	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/03/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.958 in	7.51 cm	Speed	11	Average Height of Sample	2.959 in	7.52 cm				
Diameter	2.966 in	7.53 cm	Board Number	14	Average Diameter of Sample	2.967 in	7.54 cm				
Area	6.91 in ²	44.58 cm ²	Cell Number	2	Area	6.91 in ²	44.61 cm ²				
Volume	334.91 cm ³	0.0118 ft ³	Flow Pump Number	3A	Volume	335.25 cm ³	0.0118 ft ³				
Mass	624.5 g	1.38 lb	Flow Pump Rate*	1.12E-04 cm ³ /sec	Mass	631.4 g	1.39 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	88.4 pcf					
Dry Density	88.4 pcf		Cell Pressure	95.0 psi	Vol. of Voids	159.35 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	175.90 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.91					
			Max Head	81.59 cm	Saturation	98.2 %					
			Min Head	80.89 cm							
			Maximum Gradient	10.86							
			Minimum Gradient	10.76							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/01/21	10	50	-	1.15	80.89	10.76	24.2	-	-	-
10/01/21	11	0	600	1.16	81.59	10.86	24.2	2.32E-07	0.906	2.10E-07
10/01/21	11	10	600	1.15	80.89	10.76	24.2	2.32E-07	0.906	2.10E-07
10/01/21	11	20	600	1.16	81.59	10.86	24.2	2.32E-07	0.906	2.10E-07
10/01/21	11	30	600	1.15	80.89	10.76	24.2	2.32E-07	0.906	2.10E-07
10/01/21	11	40	600	1.16	81.59	10.86	24.2	2.32E-07	0.906	2.10E-07
10/01/21	11	50	600	1.15	80.89	10.76	24.2	2.32E-07	0.906	2.10E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				2.1E-07	cm/sec
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	469
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	694/459
Syringe ID #	491			Pore Pressure Meter ID #	372

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/17/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38789/2-47	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/07/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.657
Initial Diameter, in	2.967
Height-to-Diameter Ratio	1.91
Area, in ²	6.91
Volume, in ³	39.11
Mass of Sample, g	1194.4
Wet Density, pcf	116.3
Dry Density, pcf	88.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1497.0
Mass of Dry Sample and Tare, g	1216.5
Mass of Tare, g	304.9
Moisture, %	30.8

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	485
Specimen Cross-sectional Area, in ²	6.91
Compressive Strength at Failure, psi	70
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	70

Failure Code 3

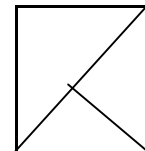
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/05/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38789/2-47	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/07/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.651
Initial Diameter, in	2.969
Height-to-Diameter Ratio	1.90
Area, in ²	6.92
Volume, in ³	39.12
Mass of Sample, g	1190.4
Wet Density, pcf	115.9
Dry Density, pcf	88.8
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1548.5
Mass of Dry Sample and Tare, g	1271.3
Mass of Tare, g	359.9
Moisture, %	30.4

TEST DATA

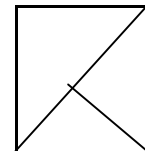
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1180
Specimen Cross-sectional Area, in ²	6.92
Compressive Strength at Failure, psi	170
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	170

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 09/17/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38789/2-47	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/07/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)							
Height	3.019	in	7.67	cm	Speed	9			Average Height of Sample	3.020	in	7.67	cm		
Diameter	2.972	in	7.55	cm	Board Number	16			Average Diameter of Sample	2.973	in	7.55	cm		
Area	6.94	in ²	44.76	cm ²	Cell Number	55			Area	6.94	in ²	44.79	cm ²		
Volume	343.20	cm ³	0.0121	ft ³	Flow Pump Number	2A			Volume	343.55	cm ³	0.0121	ft ³		
Mass	631.1	g	1.39	lb	Flow Pump Rate*	4.48E-04			cm ³ /sec	Mass	639.5	g	1.41	lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95				Dry Density	87.8			pcf		
Dry Density	87.8			pcf	Cell Pressure	95.0			psi	Vol. of Voids	164.60			cm ³	
	Moisture Content			Back Pressure	90.0			psi	Vol. of Solids	178.94			cm ³		
Mass of wet sample & tare	631.1	g	Mass of dry sample & tare	483.0	g	Confining (Effective) Pressure	5.0			psi	Void Ratio	0.92			
Mass of dry sample & tare	483.0	g	Mass of tare	0.0	g	Max Head	28.84			cm	Saturation	95.0			%
Mass of tare	0.0	g	% Moisture	30.7	Min Head	28.14			cm	Mass of wet sample & tare	720.3	g	Mass of dry sample & tare	564.0	g
% Moisture	30.7				Maximum Gradient	3.76			Mass of tare	81.0	g	% Moisture	32.4		
					Minimum Gradient	3.67									

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/17/21	8	5	-	0.41	28.84	3.76	25.1	-	-	-
09/17/21	8	15	600	0.40	28.14	3.67	25.1	2.69E-06	0.887	2.39E-06
09/17/21	8	25	600	0.41	28.84	3.76	25.1	2.69E-06	0.887	2.39E-06
09/17/21	8	35	600	0.40	28.14	3.67	25.1	2.69E-06	0.887	2.39E-06
09/17/21	8	45	600	0.41	28.84	3.76	25.1	2.69E-06	0.887	2.39E-06
09/17/21	8	55	600	0.40	28.14	3.67	25.1	2.69E-06	0.887	2.39E-06
09/17/21	9	5	600	0.41	28.84	3.76	25.1	2.69E-06	0.887	2.39E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				2.4E-06	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	694/459
Syringe ID #	245			Pore Pressure Meter ID #	1104

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/05/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38789/2-47	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/07/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.032 in	7.70 cm	Speed	10	Average Height of Sample	3.033 in	7.70 cm	Dry Density	88.2 pcf		
Diameter	2.964 in	7.53 cm	Board Number	24	Average Diameter of Sample	2.965 in	7.53 cm	Vol. of Voids	163.44 cm ³		
Area	6.90 in ²	44.52 cm ²	Cell Number	5	Area	6.90 in ²	44.55 cm ²	Vol. of Solids	179.73 cm ³		
Volume	342.83 cm ³	0.0121 ft ³	Flow Pump Number	2B	Volume	343.17 cm ³	0.0121 ft ³	Void Ratio	0.91		
Mass	631.0 g	1.39 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	646.7 g	1.43 lb	Saturation	98.8 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	88.3 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	729.0 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	567.6 g				
Mass of wet sample & tare	631.0 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	82.4 g					
Mass of dry sample & tare	485.2 g		Max Head	103.40 cm	% Moisture	33.3					
Mass of tare	0.0 g		Min Head	101.99 cm							
% Moisture	30.0		Maximum Gradient	13.42							
			Minimum Gradient	13.24							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/05/21	7	40	-	1.45	101.99	13.24	24.3	-	-	-
10/05/21	7	50	600	1.47	103.40	13.42	24.3	3.77E-07	0.904	3.41E-07
10/05/21	8	0	600	1.45	101.99	13.24	24.3	3.77E-07	0.904	3.41E-07
10/05/21	8	10	600	1.46	102.70	13.33	24.3	3.79E-07	0.904	3.42E-07
10/05/21	8	20	600	1.47	103.40	13.42	24.3	3.76E-07	0.904	3.40E-07
10/05/21	8	30	600	1.45	101.99	13.24	24.3	3.77E-07	0.904	3.41E-07
10/05/21	8	40	600	1.46	102.70	13.33	24.3	3.79E-07	0.904	3.42E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.4E-07	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1033
Syringe ID #	246			Pore Pressure Meter ID #	1106

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/18/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38790/2-24	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/08/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.629
Initial Diameter, in	2.971
Height-to-Diameter Ratio	1.89
Area, in ²	6.93
Volume, in ³	39.02
Mass of Sample, g	1195.1
Wet Density, pcf	116.7
Dry Density, pcf	89.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1495.9
Mass of Dry Sample and Tare, g	1218.2
Mass of Tare, g	305.8
Moisture, %	30.4

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	639
Specimen Cross-sectional Area, in ²	6.93
Compressive Strength at Failure, psi	92
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	92

Failure Code 3

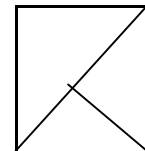
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/06/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38790/2-24	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/08/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.653
Initial Diameter, in	2.981
Height-to-Diameter Ratio	1.90
Area, in ²	6.98
Volume, in ³	39.45
Mass of Sample, g	1207.4
Wet Density, pcf	116.6
Dry Density, pcf	89.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1511.9
Mass of Dry Sample and Tare, g	1230.4
Mass of Tare, g	305.8
Moisture, %	30.4

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2744
Specimen Cross-sectional Area, in ²	6.98
Compressive Strength at Failure, psi	393
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	393

Failure Code 3

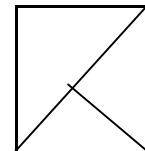
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 09/18/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38790/2-24	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/08/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.013 in	7.65 cm	Speed	9	Average Height of Sample	3.014 in	7.66 cm	Dry Density	88.8 pcf		
Diameter	2.962 in	7.52 cm	Board Number	15	Average Diameter of Sample	2.963 in	7.53 cm	Vol. of Voids	161.13 cm ³		
Area	6.89 in ²	44.46 cm ²	Cell Number	17	Area	6.90 in ²	44.49 cm ²	Vol. of Solids	179.44 cm ³		
Volume	340.22 cm ³	0.0120 ft ³	Flow Pump Number	2B	Volume	340.56 cm ³	0.0120 ft ³	Void Ratio	0.90		
Mass	631.3 g	1.39 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec	Mass	641.6 g	1.41 lb	Saturation	97.5 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	88.8 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	723.3 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	566.2 g				
Mass of wet sample & tare	631.3 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	81.8 g					
Mass of dry sample & tare	484.4 g		Max Head	46.42 cm	% Moisture	32.4					
Mass of tare	0.0 g		Min Head	45.72 cm							
% Moisture	30.3		Maximum Gradient	6.06							
			Minimum Gradient	5.97							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/18/21	8	10	-	0.65	45.72	5.97	25.3	-	-	-
09/18/21	8	20	600	0.66	46.42	6.06	25.3	1.67E-06	0.883	1.48E-06
09/18/21	8	30	600	0.65	45.72	5.97	25.3	1.67E-06	0.883	1.48E-06
09/18/21	8	40	600	0.66	46.42	6.06	25.3	1.67E-06	0.883	1.48E-06
09/18/21	8	50	600	0.65	45.72	5.97	25.3	1.67E-06	0.883	1.48E-06
09/18/21	9	0	600	0.66	46.42	6.06	25.3	1.67E-06	0.883	1.48E-06
09/18/21	9	10	600	0.65	45.72	5.97	25.3	1.67E-06	0.883	1.48E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.5E-06	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	694/459
Syringe ID #	246			Pore Pressure Meter ID #	372

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/06/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38790/2-24	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/08/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.013 in	7.65 cm	Speed	11	Average Height of Sample	3.014 in	7.66 cm	Dry Density	88.5 pcf		
Diameter	2.969 in	7.54 cm	Board Number	7	Average Diameter of Sample	2.970 in	7.54 cm	Vol. of Voids	162.43 cm ³		
Area	6.92 in ²	44.67 cm ²	Cell Number	33	Area	6.93 in ²	44.70 cm ²	Vol. of Solids	179.74 cm ³		
Volume	341.83 cm ³	0.0121 ft ³	Flow Pump Number	2A	Volume	342.17 cm ³	0.0121 ft ³	Void Ratio	0.90		
Mass	631.9 g	1.39 lb	Flow Pump Rate*	1.12E-04 cm ³ /sec	Mass	643.9 g	1.42 lb	Saturation	97.6 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	88.6 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	725.8 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	567.2 g				
Mass of wet sample & tare	631.9 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	81.9 g					
Mass of dry sample & tare	485.3 g		Max Head	185.70 cm	% Moisture	32.7					
Mass of tare	0.0 g		Min Head	184.99 cm							
% Moisture	30.2		Maximum Gradient	24.26							
			Minimum Gradient	24.16							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/06/21	8	5	-	2.64	185.70	24.26	23.1	-	-	-
10/06/21	8	15	600	2.63	184.99	24.16	23.1	1.04E-07	0.929	9.62E-08
10/06/21	8	25	600	2.64	185.70	24.26	23.1	1.04E-07	0.929	9.62E-08
10/06/21	8	35	600	2.63	184.99	24.16	23.1	1.04E-07	0.929	9.62E-08
10/06/21	8	45	600	2.64	185.70	24.26	23.1	1.04E-07	0.929	9.62E-08
10/06/21	8	55	600	2.63	184.99	24.16	23.1	1.04E-07	0.929	9.62E-08
10/06/21	9	5	600	2.64	185.70	24.26	23.1	1.04E-07	0.929	9.62E-08

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				9.6E-08	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	245			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/19/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38854/2-32	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/09/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.567
Initial Diameter, in	2.962
Height-to-Diameter Ratio	1.88
Area, in ²	6.89
Volume, in ³	38.36
Mass of Sample, g	1151.0
Wet Density, pcf	114.3
Dry Density, pcf	84.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1507.2
Mass of Dry Sample and Tare, g	1209.3
Mass of Tare, g	358.6
Moisture, %	35.0

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	560
Specimen Cross-sectional Area, in ²	6.89
Compressive Strength at Failure, psi	81
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	81

Failure Code 3

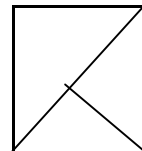
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/07/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38854/2-32	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/09/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.635
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.89
Area, in ²	6.95
Volume, in ³	39.17
Mass of Sample, g	1160.3
Wet Density, pcf	112.8
Dry Density, pcf	83.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1457.3
Mass of Dry Sample and Tare, g	1155.9
Mass of Tare, g	298.6
Moisture, %	35.2

TEST DATA

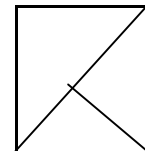
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2866
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	412
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	412

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/19/21
Checked By: *EB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elevation	-
Sample ID	38854/2-32	Subsample ID	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/09/21	Curing Age, Days	10		

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.992 in	7.60 cm	Speed	9			Average Height of Sample	2.993 in	7.60 cm		
Diameter	2.971 in	7.55 cm	Board Number	3			Average Diameter of Sample	2.972 in	7.55 cm		
Area	6.93 in ²	44.73 cm ²	Cell Number	2			Area	6.94 in ²	44.76 cm ²		
Volume	339.91 cm ³	0.0120 ft ³	Flow Pump Number	2A			Volume	340.25 cm ³	0.0120 ft ³	Dry Density	83.0 pcf
Mass	612.2 g	1.35 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec			Mass	617.7 g	1.36 lb	Vol. of Voids	172.58 cm ³
Specific Gravity	2.700 (Assumed)		B - Value	0.95						Vol. of Solids	167.67 cm ³
Dry Density	83.1 pcf		Cell Pressure	95.0 psi						Void Ratio	1.03
			Back Pressure	90.0 psi						Saturation	95.6 %
			Confining (Effective) Pressure	5.0 psi							
Moisture Content			Max Head	41.50 cm			Moisture Content				
Mass of wet sample & tare	612.2 g		Min Head	40.09 cm			Mass of wet sample & tare	699.5 g			
Mass of dry sample & tare	452.7 g		Maximum Gradient	5.46			Mass of dry sample & tare	534.5 g			
Mass of tare	0.0 g		Minimum Gradient	5.27			Mass of tare	81.8 g			
% Moisture	35.2						% Moisture	36.4			

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/19/21	8	5	-	0.58	40.80	5.37	25.1	-	-	-
09/19/21	8	15	600	0.57	40.09	5.27	25.1	1.88E-06	0.887	1.67E-06
09/19/21	8	25	600	0.59	41.50	5.46	25.1	1.87E-06	0.887	1.65E-06
09/19/21	8	35	600	0.58	40.80	5.37	25.1	1.85E-06	0.887	1.64E-06
09/19/21	8	45	600	0.59	41.50	5.46	25.1	1.85E-06	0.887	1.64E-06
09/19/21	8	55	600	0.58	40.80	5.37	25.1	1.85E-06	0.887	1.64E-06
09/19/21	9	5	600	0.59	41.50	5.46	25.1	1.85E-06	0.887	1.64E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.6E-06 cm/sec			
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346		
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041		
Syringe ID #	245			Pore Pressure Meter ID #	26/27		

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/07/21
Checked By: *[Signature]*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38854/2-32	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/09/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)						
Height	3.027	in	7.69	cm	Speed	11			Average Height of Sample	3.028	in	7.69	cm	
Diameter	2.971	in	7.55	cm	Board Number	8			Average Diameter of Sample	2.972	in	7.55	cm	
Area	6.93	in ²	44.73	cm ²	Cell Number	15			Area	6.94	in ²	44.76	cm ²	
Volume	343.88	cm ³	0.0121	ft ³	Flow Pump Number	1A			Volume	344.23	cm ³	0.0122	ft ³	
Mass	618.6	g	1.36	lb	Flow Pump Rate*	1.12E-04			cm ³ /sec	Mass	633.3	g	1.40	lb
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	83.0			pcf		
Dry Density	83.1			pcf	Cell Pressure	95.0			psi	Vol. of Voids	174.62			cm ³
Moisture Content				Back Pressure	90.0			psi	Vol. of Solids	169.60			cm ³	
Mass of wet sample & tare	618.6			g	Confining (Effective) Pressure	5.0			psi	Void Ratio	1.03			
Mass of dry sample & tare	458.0			g	Max Head	203.99			cm	Saturation	100.4			%
Mass of tare	0.0			g	Min Head	203.28			cm	Moisture Content				
% Moisture	35.1			Maximum Gradient	26.52			Mass of wet sample & tare	710.4			g		
				Minimum Gradient	26.43			Mass of dry sample & tare	535.0			g		
								Mass of tare	77.0			g		
								% Moisture	38.3					

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/07/21	7	5	-	2.90	203.99	26.52	23.4	-	-	-
10/07/21	7	15	600	2.89	203.28	26.43	23.4	9.45E-08	0.923	8.72E-08
10/07/21	7	25	600	2.90	203.99	26.52	23.4	9.45E-08	0.923	8.72E-08
10/07/21	7	35	600	2.89	203.28	26.43	23.4	9.45E-08	0.923	8.72E-08
10/07/21	7	45	600	2.89	203.28	26.43	23.4	9.47E-08	0.923	8.73E-08
10/07/21	7	55	600	2.90	203.99	26.52	23.4	9.45E-08	0.923	8.72E-08
10/07/21	8	5	600	2.89	203.28	26.43	23.4	9.45E-08	0.923	8.72E-08

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				8.7E-08		cm/sec
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	1107	
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290	
Syringe ID #	140			Pore Pressure Meter ID #	216	

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/20/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38855/2-32(2)	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/10/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.541
Initial Diameter, in	2.960
Height-to-Diameter Ratio	1.87
Area, in ²	6.88
Volume, in ³	38.13
Mass of Sample, g	1197.3
Wet Density, pcf	119.6
Dry Density, pcf	93.0
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1456.1
Mass of Dry Sample and Tare, g	1190.3
Mass of Tare, g	261.7
Moisture, %	28.6

TEST DATA

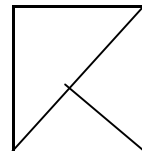
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	224
Specimen Cross-sectional Area, in ²	6.88
Compressive Strength at Failure, psi	33
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	33

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/08/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38855/2-32(2)	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/10/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.641
Initial Diameter, in	2.970
Height-to-Diameter Ratio	1.90
Area, in ²	6.93
Volume, in ³	39.08
Mass of Sample, g	1206.5
Wet Density, pcf	117.6
Dry Density, pcf	91.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1511.9
Mass of Dry Sample and Tare, g	1242.6
Mass of Tare, g	306.9
Moisture, %	28.8

TEST DATA

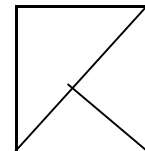
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1124
Specimen Cross-sectional Area, in ²	6.93
Compressive Strength at Failure, psi	162
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	162

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/20/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38855/2-32(2)	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/10/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.957 in	7.51 cm		Speed	9			Average Height of Sample	2.958 in	7.51 cm	
Diameter	2.929 in	7.44 cm		Board Number	4			Average Diameter of Sample	2.930 in	7.44 cm	
Area	6.74 in ²	43.47 cm ²		Cell Number	37			Area	6.74 in ²	43.50 cm ²	
Volume	326.50 cm ³	0.0115 ft ³		Flow Pump Number	2A			Volume	326.83 cm ³	0.0115 ft ³	
Mass	629.8 g	1.39 lb		Flow Pump Rate*	4.48E-04 cm ³ /sec			Mass	634.4 g	1.40 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	93.9 pcf		
Dry Density	93.8 pcf			Cell Pressure	95.0 psi			Vol. of Voids	144.71 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	182.12 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.79		
				Max Head	54.87 cm			Saturation	98.6 %		
				Min Head	54.16 cm						
				Maximum Gradient	7.30						
				Minimum Gradient	7.21						
Moisture Content				Moisture Content				Moisture Content			
Mass of wet sample & tare	629.8 g			Mass of wet sample & tare	714.0 g			Mass of wet sample & tare	714.0 g		
Mass of dry sample & tare	490.8 g			Mass of dry sample & tare	571.6 g			Mass of dry sample & tare	571.6 g		
Mass of tare	0.0 g			Mass of tare	80.8 g			Mass of tare	80.8 g		
% Moisture	28.3			% Moisture	29.0			% Moisture	29.0		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/20/21	9	5	-	0.78	54.87	7.30	25.5	-	-	-
09/20/21	9	15	600	0.77	54.16	7.21	25.5	1.42E-06	0.879	1.25E-06
09/20/21	9	25	600	0.78	54.87	7.30	25.5	1.42E-06	0.879	1.25E-06
09/20/21	9	35	600	0.78	54.87	7.30	25.5	1.41E-06	0.879	1.24E-06
09/20/21	9	45	600	0.77	54.16	7.21	25.5	1.42E-06	0.879	1.25E-06
09/20/21	9	55	600	0.78	54.87	7.30	25.5	1.42E-06	0.879	1.25E-06
09/20/21	10	5	600	0.77	54.16	7.21	25.5	1.42E-06	0.879	1.25E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.2E-06 cm/sec	
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	245			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/08/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38855/2-32(2)	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/10/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.999 in	7.62 cm	Speed	10	Average Height of Sample	3.000 in	7.62 cm				
Diameter	2.964 in	7.53 cm	Board Number	22	Average Diameter of Sample	2.965 in	7.53 cm				
Area	6.90 in ²	44.52 cm ²	Cell Number	41	Area	6.90 in ²	44.55 cm ²				
Volume	339.10 cm ³	0.0120 ft ³	Flow Pump Number	2B	Volume	339.44 cm ³	0.0120 ft ³				
Mass	639.3 g	1.41 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	646.5 g	1.43 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	91.4 pcf					
Dry Density	91.5 pcf		Cell Pressure	95.0 psi	Vol. of Voids	155.27 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	184.17 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.84					
			Max Head	45.02 cm	Saturation	96.1 %					
			Min Head	44.31 cm							
			Maximum Gradient	5.91							
			Minimum Gradient	5.82							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/08/21	10	5	-	0.63	44.31	5.82	22.5	-	-	-
10/08/21	10	15	600	0.63	44.31	5.82	22.5	8.65E-07	0.942	8.15E-07
10/08/21	10	25	600	0.64	45.02	5.91	22.5	8.58E-07	0.942	8.08E-07
10/08/21	10	35	600	0.63	44.31	5.82	22.5	8.58E-07	0.942	8.08E-07
10/08/21	10	45	600	0.64	45.02	5.91	22.5	8.58E-07	0.942	8.08E-07
10/08/21	10	55	600	0.63	44.31	5.82	22.5	8.58E-07	0.942	8.08E-07
10/08/21	11	5	600	0.64	45.02	5.91	22.5	8.58E-07	0.942	8.08E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				8.1E-07	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	777
Syringe ID #	246			Pore Pressure Meter ID #	1054

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/21/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38873/2-25	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/11/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.697
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.91
Area, in ²	6.97
Volume, in ³	39.71
Mass of Sample, g	1222.0
Wet Density, pcf	117.2
Dry Density, pcf	90.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1519.7
Mass of Dry Sample and Tare, g	1240.3
Mass of Tare, g	299.0
Moisture, %	29.7

TEST DATA

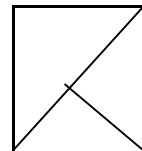
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	740
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	106
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	106

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/09/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38873/2-25	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/11/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.636
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.89
Area, in ²	6.95
Volume, in ³	39.18
Mass of Sample, g	1206.6
Wet Density, pcf	117.3
Dry Density, pcf	90.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1506.4
Mass of Dry Sample and Tare, g	1231.5
Mass of Tare, g	304.0
Moisture, %	29.6

TEST DATA

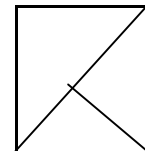
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2580
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	371
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	371

Failure Code 3

Failure Sketch



Failure Type:

Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/21/21
Checked By: *[Signature]*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38873/2-25	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/11/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.006 in	7.64 cm	Speed	10	Average Height of Sample	3.007 in	7.64 cm	Dry Density	89.0 pcf		
Diameter	2.976 in	7.56 cm	Board Number	19	Average Diameter of Sample	2.977 in	7.56 cm	Vol. of Voids	161.85 cm ³		
Area	6.96 in ²	44.88 cm ²	Cell Number	14	Area	6.96 in ²	44.91 cm ²	Vol. of Solids	181.14 cm ³		
Volume	342.65 cm ³	0.0121 ft ³	Flow Pump Number	3B	Volume	342.99 cm ³	0.0121 ft ³	Void Ratio	0.89		
Mass	633.0 g	1.40 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	642.8 g	1.42 lb	Saturation	95.0 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content Mass of wet sample & tare: 727.3 g Mass of dry sample & tare: 573.6 g Mass of tare: 84.6 g % Moisture: 31.4						
Dry Density	89.1 pcf		Cell Pressure	95.0 psi							
Moisture Content			Back Pressure	90.0 psi							
Mass of wet sample & tare	633.0 g		Confining (Effective) Pressure	5.0 psi							
Mass of dry sample & tare	489.0 g		Max Head	120.28 cm							
Mass of tare	0.0 g		Min Head	119.58 cm							
% Moisture	29.4		Maximum Gradient	15.75							
			Minimum Gradient	15.66							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/21/21	7	5	-	1.71	120.28	15.75	25.7	-	-	-
09/21/21	7	15	600	1.70	119.58	15.66	25.7	3.18E-07	0.875	2.78E-07
09/21/21	7	25	600	1.71	120.28	15.75	25.7	3.18E-07	0.875	2.78E-07
09/21/21	7	35	600	1.70	119.58	15.66	25.7	3.18E-07	0.875	2.78E-07
09/21/21	7	45	600	1.71	120.28	15.75	25.7	3.18E-07	0.875	2.78E-07
09/21/21	7	55	600	1.70	119.58	15.66	25.7	3.18E-07	0.875	2.78E-07
09/21/21	8	5	600	1.71	120.28	15.75	25.7	3.18E-07	0.875	2.78E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA
REMARKS	
Bottom Half of the mold was used for testing.	

Reported Average Hydraulic Conductivity*				2.8E-07 cm/sec	
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	262
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	570
Syringe ID #	490			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/09/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38873/2-25	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/11/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.012 in	7.65 cm	Speed	12	Average Height of Sample	3.013 in	7.65 cm	Dry Density	89.4 pcf		
Diameter	2.970 in	7.54 cm	Board Number	7	Average Diameter of Sample	2.971 in	7.55 cm	Vol. of Voids	160.62 cm ³		
Area	6.93 in ²	44.70 cm ²	Cell Number	2	Area	6.93 in ²	44.73 cm ²	Vol. of Solids	181.68 cm ³		
Volume	341.95 cm ³	0.0121 ft ³	Flow Pump Number	4B	Volume	342.29 cm ³	0.0121 ft ³	Void Ratio	0.88		
Mass	633.2 g	1.40 lb	Flow Pump Rate*	5.60E-05 cm ³ /sec	Mass	647.4 g	1.43 lb	Saturation	97.7 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	89.5 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	729.5 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	572.6 g				
Mass of wet sample & tare	633.2 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	82.0 g					
Mass of dry sample & tare	490.6 g		Max Head	173.74 cm	% Moisture	32.0					
Mass of tare	0.0 g		Min Head	172.33 cm							
% Moisture	29.1		Maximum Gradient	22.70							
			Minimum Gradient	22.52							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/09/21	7	10	-	2.47	173.74	22.70	22.7	-	-	-
10/09/21	7	20	600	2.45	172.33	22.52	22.7	5.54E-08	0.938	5.19E-08
10/09/21	7	30	600	2.45	172.33	22.52	22.7	5.56E-08	0.938	5.21E-08
10/09/21	7	40	600	2.46	173.04	22.61	22.7	5.55E-08	0.938	5.20E-08
10/09/21	7	50	600	2.45	172.33	22.52	22.7	5.55E-08	0.938	5.20E-08
10/09/21	8	0	600	2.47	173.74	22.70	22.7	5.54E-08	0.938	5.19E-08
10/09/21	8	10	600	2.45	172.33	22.52	22.7	5.54E-08	0.938	5.19E-08

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				5.2E-08 cm/sec	
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1046			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/23/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38874/2-16	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/13/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.660
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.90
Area, in ²	6.97
Volume, in ³	39.45
Mass of Sample, g	1246.7
Wet Density, pcf	120.4
Dry Density, pcf	94.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1541.2
Mass of Dry Sample and Tare, g	1276.6
Mass of Tare, g	297.0
Moisture, %	27.0

TEST DATA

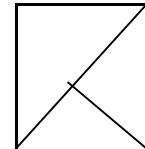
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	895
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	128
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	128

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/11/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38874/2-16	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/13/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.661
Initial Diameter, in	2.974
Height-to-Diameter Ratio	1.90
Area, in ²	6.95
Volume, in ³	39.32
Mass of Sample, g	1239.5
Wet Density, pcf	120.1
Dry Density, pcf	94.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1534.1
Mass of Dry Sample and Tare, g	1270.5
Mass of Tare, g	297.2
Moisture, %	27.1

TEST DATA

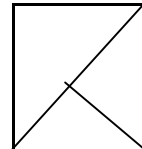
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2589
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	373
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	373

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/23/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38874/2-16	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/13/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.008 in	7.64 cm	Speed	9			Average Height of Sample	3.009 in	7.64 cm		
Diameter	2.968 in	7.54 cm	Board Number	18			Average Diameter of Sample	2.969 in	7.54 cm		
Area	6.92 in ²	44.64 cm ²	Cell Number	5			Area	6.92 in ²	44.67 cm ²		
Volume	341.03 cm ³	0.0120 ft ³	Flow Pump Number	4B			Volume	341.38 cm ³	0.0121 ft ³		
Mass	652.1 g	1.44 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec			Mass	659.2 g	1.45 lb		
Specific Gravity	2.700 (Assumed)		B - Value	0.95			Dry Density	93.7 pcf			
Dry Density	93.8 pcf		Cell Pressure	95.0 psi			Vol. of Voids	151.42 cm ³			
			Back Pressure	90.0 psi			Vol. of Solids	189.95 cm ³			
			Confining (Effective) Pressure	5.0 psi			Void Ratio	0.80			
			Max Head	21.10 cm			Saturation	96.6 %			
			Min Head	20.40 cm							
			Maximum Gradient	2.76							
			Minimum Gradient	2.67							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/23/21	8	5	-	0.29	20.40	2.67	25.4	-	-	-
09/23/21	8	15	600	0.30	21.10	2.76	25.4	3.69E-06	0.881	3.26E-06
09/23/21	8	25	600	0.29	20.40	2.67	25.4	3.69E-06	0.881	3.26E-06
09/23/21	8	35	600	0.30	21.10	2.76	25.4	3.69E-06	0.881	3.26E-06
09/23/21	8	45	600	0.29	20.40	2.67	25.4	3.69E-06	0.881	3.26E-06
09/23/21	8	55	600	0.30	21.10	2.76	25.4	3.69E-06	0.881	3.26E-06
09/23/21	9	5	600	0.29	20.40	2.67	25.4	3.69E-06	0.881	3.26E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.3E-06	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	570
Syringe ID #	1046			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/11/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38874/2-16	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/13/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.037 in	7.71 cm	Speed	12	Average Height of Sample	3.038 in	7.72 cm	Dry Density	93.6 pcf		
Diameter	2.973 in	7.55 cm	Board Number	8	Average Diameter of Sample	2.974 in	7.55 cm	Vol. of Voids	153.75 cm ³		
Area	6.94 in ²	44.79 cm ²	Cell Number	55	Area	6.95 in ²	44.82 cm ²	Vol. of Solids	192.07 cm ³		
Volume	345.48 cm ³	0.0122 ft ³	Flow Pump Number	2B	Volume	345.83 cm ³	0.0122 ft ³	Void Ratio	0.80		
Mass	659.2 g	1.45 lb	Flow Pump Rate*	5.60E-05 cm ³ /sec	Mass	671.4 g	1.48 lb	Saturation	99.4 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95							
Dry Density	93.7 pcf		Cell Pressure	95.0 psi							
Moisture Content				Back Pressure	90.0 psi						
Mass of wet sample & tare	659.2 g		Confining (Effective) Pressure	5.0 psi							
Mass of dry sample & tare	518.6 g		Max Head	186.40 cm							
Mass of tare	0.0 g		Min Head	185.70 cm							
% Moisture	27.1		Maximum Gradient	24.16							
				Minimum Gradient	24.06						
								Moisture Content			
								Mass of wet sample & tare	752.8 g		
								Mass of dry sample & tare	600.0 g		
								Mass of tare	81.4 g		
								% Moisture	29.5		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/11/21	6	30	-	2.64	185.70	24.06	22.1	-	-	-
10/11/21	6	40	600	2.65	186.40	24.16	22.1	5.18E-08	0.951	4.93E-08
10/11/21	6	50	600	2.64	185.70	24.06	22.1	5.18E-08	0.951	4.93E-08
10/11/21	7	0	600	2.65	186.40	24.16	22.1	5.18E-08	0.951	4.93E-08
10/11/21	7	10	600	2.65	186.40	24.16	22.1	5.17E-08	0.951	4.92E-08
10/11/21	7	20	600	2.64	185.70	24.06	22.1	5.18E-08	0.951	4.93E-08
10/11/21	7	30	600	2.65	186.40	24.16	22.1	5.18E-08	0.951	4.93E-08

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				4.9E-08	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	246			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/24/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38893/2-2	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/14/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.633
Initial Diameter, in	2.960
Height-to-Diameter Ratio	1.90
Area, in ²	6.88
Volume, in ³	38.76
Mass of Sample, g	1211.7
Wet Density, pcf	119.1
Dry Density, pcf	91.0
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1506.5
Mass of Dry Sample and Tare, g	1222.4
Mass of Tare, g	299.0
Moisture, %	30.8

TEST DATA

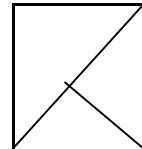
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	333
Specimen Cross-sectional Area, in ²	6.88
Compressive Strength at Failure, psi	48
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	48

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/12/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38893/2-2	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/14/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.675
Initial Diameter, in	2.973
Height-to-Diameter Ratio	1.91
Area, in ²	6.94
Volume, in ³	39.40
Mass of Sample, g	1223.8
Wet Density, pcf	118.3
Dry Density, pcf	90.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1482.3
Mass of Dry Sample and Tare, g	1197.5
Mass of Tare, g	261.8
Moisture, %	30.4

TEST DATA

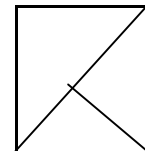
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2131
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	307
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	307

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 09/24/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38893/2-2	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/14/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)						
Height	3.027	in	7.69	cm	Speed	9			Average Height of Sample	3.028	in	7.69	cm	
Diameter	2.964	in	7.53	cm	Board Number	7			Average Diameter of Sample	2.965	in	7.53	cm	
Area	6.90	in ²	44.52	cm ²	Cell Number	15			Area	6.90	in ²	44.55	cm ²	
Volume	342.26	cm ³	0.0121	ft ³	Flow Pump Number	4B			Volume	342.61	cm ³	0.0121	ft ³	
Mass	644.9	g	1.42	lb	Flow Pump Rate*	4.48E-04			cm ³ /sec	Mass	648.9	g	1.43	lb
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	90.0			pcf		
Dry Density	90.1			pcf	Cell Pressure	95.0			psi	Vol. of Voids	159.57			cm ³
Moisture Content				Back Pressure	90.0			psi	Vol. of Solids	183.04			cm ³	
Mass of wet sample & tare	644.9			g	Confining (Effective) Pressure	5.0			psi	Void Ratio	0.87			
Mass of dry sample & tare	494.2			g	Max Head	20.40			cm	Saturation	96.9			%
Mass of tare	0.0			g	Min Head	18.99			cm	Mass of wet sample & tare	730.6			g
% Moisture	30.5			Maximum Gradient	2.65			Mass of dry sample & tare	575.9			g		
				Minimum Gradient	2.47			Mass of tare	81.7			g		
								% Moisture	31.3					

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/24/21	7	5	-	0.28	19.70	2.56	24.5	-	-	-
09/24/21	7	15	600	0.27	18.99	2.47	24.5	4.00E-06	0.899	3.60E-06
09/24/21	7	25	600	0.29	20.40	2.65	24.5	3.93E-06	0.899	3.53E-06
09/24/21	7	35	600	0.28	19.70	2.56	24.5	3.86E-06	0.899	3.47E-06
09/24/21	7	45	600	0.28	19.70	2.56	24.5	3.93E-06	0.899	3.53E-06
09/24/21	7	55	600	0.27	18.99	2.47	24.5	4.00E-06	0.899	3.60E-06
09/24/21	8	5	600	0.28	19.70	2.56	24.5	4.00E-06	0.899	3.60E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.5E-06		cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049	
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290	
Syringe ID #	1046			Pore Pressure Meter ID #	216	

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/12/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38893/2-2	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/14/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.019 in	7.67 cm	Speed	11	Average Height of Sample	3.019 in	7.67 cm	Dry Density	90.0 pcf		
Diameter	2.969 in	7.54 cm	Board Number	18	Average Diameter of Sample	2.970 in	7.54 cm	Vol. of Voids	159.62 cm ³		
Area	6.92 in ²	44.67 cm ²	Cell Number	14	Area	6.93 in ²	44.70 cm ²	Vol. of Solids	183.12 cm ³		
Volume	342.51 cm ³	0.0121 ft ³	Flow Pump Number	4B	Volume	342.74 cm ³	0.0121 ft ³	Void Ratio	0.87		
Mass	643.9 g	1.42 lb	Flow Pump Rate*	1.12E-04 cm ³ /sec	Mass	650.2 g	1.43 lb	Saturation	97.6 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95							
Dry Density	90.1 pcf		Cell Pressure	95.0 psi							
Moisture Content				Back Pressure	90.0 psi						
Mass of wet sample & tare	643.9 g		Confining (Effective) Pressure	5.0 psi							
Mass of dry sample & tare	494.5 g		Max Head	166.00 cm							
Mass of tare	0.0 g		Min Head	164.60 cm							
% Moisture	30.2		Maximum Gradient	21.65							
				Minimum Gradient	21.46						
								Moisture Content			
								Mass of wet sample & tare	732.7 g		
								Mass of dry sample & tare	576.9 g		
								Mass of tare	82.4 g		
								% Moisture	31.5		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/12/21	7	20	-	2.35	165.30	21.56	21.6	-	-	-
10/12/21	7	30	600	2.36	166.00	21.65	21.6	1.16E-07	0.962	1.12E-07
10/12/21	7	40	600	2.34	164.60	21.46	21.6	1.16E-07	0.962	1.12E-07
10/12/21	7	50	600	2.35	165.30	21.56	21.6	1.16E-07	0.962	1.12E-07
10/12/21	8	0	600	2.35	165.30	21.56	21.6	1.16E-07	0.962	1.12E-07
10/12/21	8	10	600	2.34	164.60	21.46	21.6	1.16E-07	0.962	1.12E-07
10/12/21	8	20	600	2.36	166.00	21.65	21.6	1.16E-07	0.962	1.12E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.1E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	570
Syringe ID #	1046			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/25/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38894/2-17	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/15/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.661
Initial Diameter, in	2.985
Height-to-Diameter Ratio	1.90
Area, in ²	7.00
Volume, in ³	39.62
Mass of Sample, g	1238.1
Wet Density, pcf	119.1
Dry Density, pcf	93.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1541.0
Mass of Dry Sample and Tare, g	1273.4
Mass of Tare, g	305.6
Moisture, %	27.7

TEST DATA

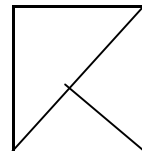
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	528
Specimen Cross-sectional Area, in ²	7.00
Compressive Strength at Failure, psi	75
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	75

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/13/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38894/2-17	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/15/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.641
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.89
Area, in ²	6.97
Volume, in ³	39.32
Mass of Sample, g	1228.0
Wet Density, pcf	119.0
Dry Density, pcf	93.0
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1532.0
Mass of Dry Sample and Tare, g	1265.0
Mass of Tare, g	306.9
Moisture, %	27.9

TEST DATA

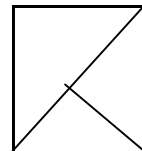
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2557
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	367
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	367

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 09/25/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38894/2-17	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/15/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.984 in	7.58 cm		Speed	9			Average Height of Sample	2.985 in	7.58 cm	
Diameter	2.973 in	7.55 cm		Board Number	5			Average Diameter of Sample	2.974 in	7.55 cm	
Area	6.94 in ²	44.79 cm ²		Cell Number	5			Area	6.95 in ²	44.82 cm ²	
Volume	339.45 cm ³	0.0120 ft ³		Flow Pump Number	3B			Volume	339.79 cm ³	0.0120 ft ³	
Mass	644.0 g	1.42 lb		Flow Pump Rate*	4.48E-04 cm ³ /sec			Mass	655.5 g	1.45 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	92.8 pcf		
Dry Density	92.9 pcf			Cell Pressure	95.0 psi			Vol. of Voids	152.59 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	187.21 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.82		
				Max Head	21.10 cm			Saturation	98.3 %		
				Min Head	20.40 cm						
				Maximum Gradient	2.78						
				Minimum Gradient	2.69						
Moisture Content				Moisture Content				Moisture Content			
Mass of wet sample & tare	644.0 g			Mass of wet sample & tare	719.8 g			Mass of wet sample & tare	719.8 g		
Mass of dry sample & tare	505.3 g			Mass of dry sample & tare	569.8 g			Mass of dry sample & tare	569.8 g		
Mass of tare	0.0 g			Mass of tare	64.5 g			Mass of tare	64.5 g		
% Moisture	27.4			% Moisture	29.7			% Moisture	29.7		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/25/21	8	5	-	0.30	21.10	2.78	24.8	-	-	-
09/25/21	8	15	600	0.29	20.40	2.69	24.8	3.65E-06	0.893	3.26E-06
09/25/21	8	25	600	0.30	21.10	2.78	24.8	3.65E-06	0.893	3.26E-06
09/25/21	8	35	600	0.29	20.40	2.69	24.8	3.65E-06	0.893	3.26E-06
09/25/21	8	45	600	0.30	21.10	2.78	24.8	3.65E-06	0.893	3.26E-06
09/25/21	8	55	600	0.30	21.10	2.78	24.8	3.59E-06	0.893	3.21E-06
09/25/21	9	5	600	0.29	20.40	2.69	24.8	3.65E-06	0.893	3.26E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

	Reported Average Hydraulic Conductivity*				3.2E-06 cm/sec	
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	262	
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042	
Syringe ID #	490			Pore Pressure Meter ID #	779/780	

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/13/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38894/2-17	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/15/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.992 in	7.60 cm	Speed	11	Average Height of Sample	2.993 in	7.60 cm	Dry Density	93.5 pcf		
Diameter	2.968 in	7.54 cm	Board Number	18	Average Diameter of Sample	2.969 in	7.54 cm	Vol. of Voids	151.09 cm ³		
Area	6.92 in ²	44.64 cm ²	Cell Number	17	Area	6.92 in ²	44.67 cm ²	Vol. of Solids	188.47 cm ³		
Volume	339.22 cm ³	0.0120 ft ³	Flow Pump Number	1A	Volume	339.56 cm ³	0.0120 ft ³	Void Ratio	0.80		
Mass	646.6 g	1.43 lb	Flow Pump Rate*	1.12E-04 cm ³ /sec	Mass	654.2 g	1.44 lb	Saturation	96.2 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	93.5 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	730.8 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	585.6 g				
Mass of wet sample & tare	646.6 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	77.1 g					
Mass of dry sample & tare	508.5 g		Max Head	121.69 cm	% Moisture	28.6					
Mass of tare	0.0 g		Min Head	120.98 cm							
% Moisture	27.2		Maximum Gradient	16.01							
			Minimum Gradient	15.91							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/13/21	7	5	-	1.73	121.69	16.01	21.7	-	-	-
10/13/21	7	15	600	1.72	120.98	15.91	21.7	1.57E-07	0.960	1.51E-07
10/13/21	7	25	600	1.73	121.69	16.01	21.7	1.57E-07	0.960	1.51E-07
10/13/21	7	35	600	1.72	120.98	15.91	21.7	1.57E-07	0.960	1.51E-07
10/13/21	7	45	600	1.73	121.69	16.01	21.7	1.57E-07	0.960	1.51E-07
10/13/21	7	55	600	1.72	120.98	15.91	21.7	1.57E-07	0.960	1.51E-07
10/13/21	8	5	600	1.73	121.69	16.01	21.7	1.57E-07	0.960	1.51E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.5E-07	cm/sec
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	1107
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	570
Syringe ID #	140			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/26/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38895/2-5	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/16/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.694
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.91
Area, in ²	6.95
Volume, in ³	39.58
Mass of Sample, g	1210.2
Wet Density, pcf	116.5
Dry Density, pcf	87.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1506.1
Mass of Dry Sample and Tare, g	1209.8
Mass of Tare, g	298.4
Moisture, %	32.5

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	727
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	105
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	105

Failure Code 3

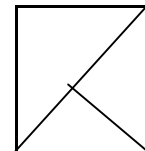
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/14/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38895/2-5	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/16/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.659
Initial Diameter, in	2.978
Height-to-Diameter Ratio	1.90
Area, in ²	6.97
Volume, in ³	39.42
Mass of Sample, g	1198.6
Wet Density, pcf	115.8
Dry Density, pcf	87.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1501.8
Mass of Dry Sample and Tare, g	1207.5
Mass of Tare, g	305.2
Moisture, %	32.6

TEST DATA

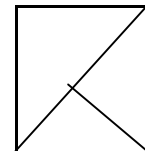
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	3146
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	452
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	452

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 09/26/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38895/2-5	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/16/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.009 in	7.64 cm	Speed	9	Average Height of Sample	3.010 in	7.65 cm				
Diameter	2.962 in	7.52 cm	Board Number	8	Average Diameter of Sample	2.963 in	7.53 cm				
Area	6.89 in ²	44.46 cm ²	Cell Number	2	Area	6.90 in ²	44.49 cm ²				
Volume	339.77 cm ³	0.0120 ft ³	Flow Pump Number	4B	Volume	340.11 cm ³	0.0120 ft ³				
Mass	632.6 g	1.39 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec	Mass	641.5 g	1.41 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density		87.8 pcf				
Dry Density	87.9 pcf		Cell Pressure	95.0 psi	Vol. of Voids		162.79 cm ³				
			Back Pressure	90.0 psi	Vol. of Solids		177.32 cm ³				
			Confining (Effective) Pressure	5.0 psi	Void Ratio		0.92				
			Max Head	29.54 cm	Saturation		100.0 %				
			Min Head	28.84 cm							
			Maximum Gradient	3.86							
			Minimum Gradient	3.77							

Moisture Content			
Mass of wet sample & tare	632.6 g		
Mass of dry sample & tare	478.7 g		
Mass of tare	0.0 g		
% Moisture	32.1		

Moisture Content			
Mass of wet sample & tare	722.7 g		
Mass of dry sample & tare	560.0 g		
Mass of tare	81.3 g		
% Moisture	34.0		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
09/26/21	7	5	-	0.42	29.54	3.86	25.0	-	-	-
09/26/21	7	15	600	0.41	28.84	3.77	25.0	2.64E-06	0.889	2.35E-06
09/26/21	7	25	600	0.42	29.54	3.86	25.0	2.64E-06	0.889	2.35E-06
09/26/21	7	35	600	0.41	28.84	3.77	25.0	2.64E-06	0.889	2.35E-06
09/26/21	7	45	600	0.42	29.54	3.86	25.0	2.64E-06	0.889	2.35E-06
09/26/21	7	55	600	0.41	28.84	3.77	25.0	2.64E-06	0.889	2.35E-06
09/26/21	8	5	600	0.42	29.54	3.86	25.0	2.64E-06	0.889	2.35E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				2.3E-06	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1046			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **09/27/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38896/2-9	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/17/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.593
Initial Diameter, in	2.963
Height-to-Diameter Ratio	1.89
Area, in ²	6.90
Volume, in ³	38.57
Mass of Sample, g	1218.9
Wet Density, pcf	120.4
Dry Density, pcf	93.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1516.3
Mass of Dry Sample and Tare, g	1245.6
Mass of Tare, g	299.8
Moisture, %	28.6

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	639
Specimen Cross-sectional Area, in ²	6.90
Compressive Strength at Failure, psi	93
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	93

Failure Code 3

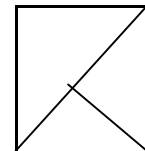
Note 2: * - A conversion factor based on H/D=1.15 (C.F. -.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/15/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	38896/2-9	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/17/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.623
Initial Diameter, in	2.969
Height-to-Diameter Ratio	1.89
Area, in ²	6.92
Volume, in ³	38.93
Mass of Sample, g	1222.6
Wet Density, pcf	119.6
Dry Density, pcf	93.0
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1519.1
Mass of Dry Sample and Tare, g	1248.0
Mass of Tare, g	298.8
Moisture, %	28.6

TEST DATA

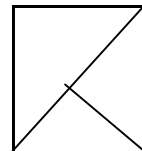
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2206
Specimen Cross-sectional Area, in ²	6.92
Compressive Strength at Failure, psi	319
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	319

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/15/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	38896/2-9	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/17/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.047 in	7.74 cm	Speed	12	Average Height of Sample	3.048 in	7.74 cm	Dry Density	93.2 pcf		
Diameter	2.956 in	7.51 cm	Board Number	3	Average Diameter of Sample	2.957 in	7.51 cm	Vol. of Voids	153.27 cm ³		
Area	6.86 in ²	44.28 cm ²	Cell Number	33	Area	6.87 in ²	44.31 cm ²	Vol. of Solids	189.74 cm ³		
Volume	342.67 cm ³	0.0121 ft ³	Flow Pump Number	3B	Volume	343.01 cm ³	0.0121 ft ³	Void Ratio	0.81		
Mass	657.9 g	1.45 lb	Flow Pump Rate*	5.60E-05 cm ³ /sec	Mass	670.0 g	1.48 lb	Saturation	102.9 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	93.3 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	754.1 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	596.4 g				
Mass of wet sample & tare	657.9 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	84.1 g					
Mass of dry sample & tare	512.3 g		Max Head	115.36 cm	% Moisture	30.8					
Mass of tare	0.0 g		Min Head	114.65 cm							
% Moisture	28.4		Maximum Gradient	14.90							
			Minimum Gradient	14.81							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/15/21	9	5	-	1.64	115.36	14.90	22.7	-	-	-
10/15/21	9	15	600	1.63	114.65	14.81	22.7	8.51E-08	0.938	7.98E-08
10/15/21	9	25	600	1.64	115.36	14.90	22.7	8.51E-08	0.938	7.98E-08
10/15/21	9	35	600	1.63	114.65	14.81	22.7	8.51E-08	0.938	7.98E-08
10/15/21	9	45	600	1.64	115.36	14.90	22.7	8.51E-08	0.938	7.98E-08
10/15/21	9	55	600	1.64	115.36	14.90	22.7	8.48E-08	0.938	7.95E-08
10/15/21	10	5	600	1.63	114.65	14.81	22.7	8.51E-08	0.938	7.98E-08

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				8.0E-08 cm/sec	
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	262
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	490			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/01/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39007/2-33	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/21/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.684
Initial Diameter, in	2.980
Height-to-Diameter Ratio	1.91
Area, in ²	6.97
Volume, in ³	39.64
Mass of Sample, g	1199.2
Wet Density, pcf	115.2
Dry Density, pcf	86.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1498.5
Mass of Dry Sample and Tare, g	1198.9
Mass of Tare, g	301.3
Moisture, %	33.4

TEST DATA

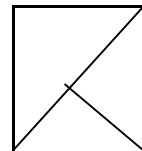
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1110
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	159
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	159

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/19/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39007/2-33	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/21/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.702
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.92
Area, in ²	6.95
Volume, in ³	39.64
Mass of Sample, g	1201.0
Wet Density, pcf	115.4
Dry Density, pcf	86.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1507.5
Mass of Dry Sample and Tare, g	1208.0
Mass of Tare, g	309.4
Moisture, %	33.3

TEST DATA

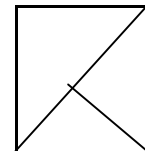
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	3746
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	539
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	539

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/01/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39007/2-33	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/21/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.051 in	7.75 cm	Speed	10	Average Height of Sample	3.052 in	7.75 cm	Dry Density	86.2 pcf		
Diameter	2.971 in	7.55 cm	Board Number	7	Average Diameter of Sample	2.972 in	7.55 cm	Vol. of Voids	169.46 cm ³		
Area	6.93 in ²	44.73 cm ²	Cell Number	15	Area	6.94 in ²	44.76 cm ²	Vol. of Solids	177.49 cm ³		
Volume	346.61 cm ³	0.0122 ft ³	Flow Pump Number	4A	Volume	346.95 cm ³	0.0123 ft ³	Void Ratio	0.95		
Mass	637.4 g	1.41 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	644.4 g	1.42 lb	Saturation	97.5 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	86.2 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	728.6 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	563.5 g				
Mass of wet sample & tare	637.4 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	84.5 g					
Mass of dry sample & tare	479.0 g		Max Head	74.56 cm	% Moisture	34.5					
Mass of tare	0.0 g		Min Head	73.86 cm							
% Moisture	33.1		Maximum Gradient	9.62							
			Minimum Gradient	9.53							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/01/21	7	5	-	1.05	73.86	9.53	24.6	-	-	-
10/01/21	7	15	600	1.06	74.56	9.62	24.6	5.23E-07	0.897	4.69E-07
10/01/21	7	20	300	1.05	73.86	9.53	24.6	5.23E-07	0.897	4.69E-07
10/01/21	7	25	300	1.06	74.56	9.62	24.6	5.23E-07	0.897	4.69E-07
10/01/21	7	30	300	1.05	73.86	9.53	24.6	5.23E-07	0.897	4.69E-07
10/01/21	7	35	300	1.06	74.56	9.62	24.6	5.23E-07	0.897	4.69E-07
10/01/21	7	40	300	1.05	73.86	9.53	24.6	5.23E-07	0.897	4.69E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				4.7E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1047			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/19/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39007/2-33	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/21/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.019 in	7.67 cm	Speed	11	Average Height of Sample	3.020 in	7.67 cm				
Diameter	2.973 in	7.55 cm	Board Number	5	Average Diameter of Sample	2.974 in	7.55 cm				
Area	6.94 in ²	44.79 cm ²	Cell Number	41	Area	6.95 in ²	44.82 cm ²				
Volume	343.43 cm ³	0.0121 ft ³	Flow Pump Number	4A	Volume	343.78 cm ³	0.0121 ft ³				
Mass	631.3 g	1.39 lb	Flow Pump Rate*	1.12E-04 cm ³ /sec	Mass	636.4 g	1.40 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	86.1 pcf					
Dry Density	86.2 pcf		Cell Pressure	95.0 psi	Vol. of Voids	168.18 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	175.60 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.96					
			Max Head	51.35 cm	Saturation	96.5 %					
			Min Head	49.94 cm							
			Maximum Gradient	6.69							
			Minimum Gradient	6.51							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/19/21	7	10	-	0.72	50.64	6.60	22.6	-	-	-
10/19/21	7	20	600	0.72	50.64	6.60	22.6	3.79E-07	0.940	3.56E-07
10/19/21	7	30	600	0.73	51.35	6.69	22.6	3.76E-07	0.940	3.53E-07
10/19/21	7	40	600	0.71	49.94	6.51	22.6	3.79E-07	0.940	3.56E-07
10/19/21	7	50	600	0.72	50.64	6.60	22.6	3.81E-07	0.940	3.58E-07
10/19/21	8	0	600	0.71	49.94	6.51	22.6	3.81E-07	0.940	3.58E-07
10/19/21	8	10	600	0.73	51.35	6.69	22.6	3.79E-07	0.940	3.56E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.6E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042
Syringe ID #	1047			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/02/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39008/2-13	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/22/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.658
Initial Diameter, in	2.978
Height-to-Diameter Ratio	1.90
Area, in ²	6.97
Volume, in ³	39.41
Mass of Sample, g	1225.8
Wet Density, pcf	118.5
Dry Density, pcf	91.1
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1522.7
Mass of Dry Sample and Tare, g	1239.8
Mass of Tare, g	298.9
Moisture, %	30.1

TEST DATA

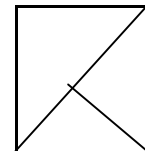
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	884
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	127
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	127

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/20/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39008/2-13	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/22/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.653
Initial Diameter, in	2.976
Height-to-Diameter Ratio	1.90
Area, in ²	6.96
Volume, in ³	39.32
Mass of Sample, g	1218.8
Wet Density, pcf	118.1
Dry Density, pcf	90.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1514.3
Mass of Dry Sample and Tare, g	1232.5
Mass of Tare, g	298.6
Moisture, %	30.2

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2604
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	374
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	374

Failure Code 3

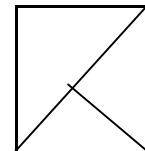
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/02/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39008/2-13	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/22/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.957 in	7.51 cm	Speed	10	Average Height of Sample	2.958 in	7.51 cm				
Diameter	2.969 in	7.54 cm	Board Number	8	Average Diameter of Sample	2.970 in	7.54 cm				
Area	6.92 in ²	44.67 cm ²	Cell Number	55	Area	6.93 in ²	44.70 cm ²				
Volume	335.48 cm ³	0.0118 ft ³	Flow Pump Number	4B	Volume	335.82 cm ³	0.0119 ft ³				
Mass	633.6 g	1.40 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	640.9 g	1.41 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	90.6 pcf					
Dry Density	90.7 pcf		Cell Pressure	95.0 psi	Vol. of Voids	155.33 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	180.49 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.86					
			Max Head	49.24 cm	Saturation	98.9 %					
			Min Head	48.53 cm							
			Maximum Gradient	6.55							
			Minimum Gradient	6.46							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/02/21	8	5	-	0.70	49.24	6.55	24.6	-	-	-
10/02/21	8	15	600	0.69	48.53	6.46	24.6	7.70E-07	0.897	6.91E-07
10/02/21	8	25	600	0.70	49.24	6.55	24.6	7.70E-07	0.897	6.91E-07
10/02/21	8	35	600	0.69	48.53	6.46	24.6	7.70E-07	0.897	6.91E-07
10/02/21	8	45	600	0.70	49.24	6.55	24.6	7.70E-07	0.897	6.91E-07
10/02/21	8	55	600	0.69	48.53	6.46	24.6	7.70E-07	0.897	6.91E-07
10/02/21	9	5	600	0.70	49.24	6.55	24.6	7.70E-07	0.897	6.91E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				6.9E-07 cm/sec	
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	290
Syringe ID #	1046			Pore Pressure Meter ID #	216

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/20/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39008/2-13	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/22/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.030 in	7.70 cm	Speed	11	Average Height of Sample	3.031 in	7.70 cm	Dry Density	90.0 pcf		
Diameter	2.969 in	7.54 cm	Board Number	15	Average Diameter of Sample	2.970 in	7.54 cm	Vol. of Voids	160.38 cm ³		
Area	6.92 in ²	44.67 cm ²	Cell Number	55	Area	6.93 in ²	44.70 cm ²	Vol. of Solids	183.72 cm ³		
Volume	343.76 cm ³	0.0121 ft ³	Flow Pump Number	2B	Volume	344.10 cm ³	0.0122 ft ³	Void Ratio	0.87		
Mass	646.9 g	1.43 lb	Flow Pump Rate*	1.12E-04 cm ³ /sec	Mass	658.8 g	1.45 lb	Saturation	101.5 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95							
Dry Density	90.0 pcf		Cell Pressure	95.0 psi							
Moisture Content				Back Pressure	90.0 psi						
Mass of wet sample & tare	646.9 g		Confining (Effective) Pressure	5.0 psi							
Mass of dry sample & tare	495.9 g		Max Head	139.27 cm							
Mass of tare	0.0 g		Min Head	137.16 cm							
% Moisture	30.4		Maximum Gradient	18.09							
				Minimum Gradient	17.82						
								Moisture Content			
								Mass of wet sample & tare	741.2 g		
								Mass of dry sample & tare	578.5 g		
								Mass of tare	82.6 g		
								% Moisture	32.8		

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/20/21	7	10	-	1.97	138.57	18.00	22.5	-	-	-
10/20/21	7	20	600	1.95	137.16	17.82	22.5	1.40E-07	0.942	1.32E-07
10/20/21	7	30	600	1.98	139.27	18.09	22.5	1.40E-07	0.942	1.31E-07
10/20/21	7	40	600	1.96	137.87	17.91	22.5	1.39E-07	0.942	1.31E-07
10/20/21	7	50	600	1.97	138.57	18.00	22.5	1.40E-07	0.942	1.31E-07
10/20/21	8	0	600	1.95	137.16	17.82	22.5	1.40E-07	0.942	1.32E-07
10/20/21	8	10	600	1.98	139.27	18.09	22.5	1.40E-07	0.942	1.31E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS (ASTM D2487;2488)
NA	NA

REMARKS

Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.3E-07 cm/sec	
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	587
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	694/459
Syringe ID #	246			Pore Pressure Meter ID #	372

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/02/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39009/CAA-4 Ex-Situ (1)	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/22/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.622
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.89
Area, in ²	6.96
Volume, in ³	39.13
Mass of Sample, g	1184.5
Wet Density, pcf	115.3
Dry Density, pcf	86.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1482.2
Mass of Dry Sample and Tare, g	1191.3
Mass of Tare, g	299.7
Moisture, %	32.6

TEST DATA

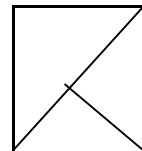
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1086
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	156
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	156

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/20/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39009/CAA-4 Ex-Situ (1)	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/22/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.683
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.91
Area, in ²	6.97
Volume, in ³	39.61
Mass of Sample, g	1191.8
Wet Density, pcf	114.6
Dry Density, pcf	86.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1495.5
Mass of Dry Sample and Tare, g	1205.0
Mass of Tare, g	305.6
Moisture, %	32.3

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2684
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	385
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	385

Failure Code 3

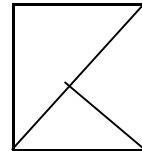
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/02/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39009/CAA-4 Ex-Situ (1)	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/22/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.988 in	7.59 cm	Speed	10	Average Height of Sample	2.989 in	7.59 cm	Dry Density	86.7 pcf		
Diameter	2.970 in	7.54 cm	Board Number	18	Average Diameter of Sample	2.971 in	7.55 cm	Vol. of Voids	164.91 cm ³		
Area	6.93 in ²	44.70 cm ²	Cell Number	37	Area	6.93 in ²	44.73 cm ²	Vol. of Solids	174.66 cm ³		
Volume	339.22 cm ³	0.0120 ft ³	Flow Pump Number	4A	Volume	339.56 cm ³	0.0120 ft ³	Void Ratio	0.94		
Mass	623.4 g	1.37 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	634.6 g	1.40 lb	Saturation	98.9 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	86.7 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	717.3 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	554.3 g				
Mass of wet sample & tare	623.4 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	82.8 g					
Mass of dry sample & tare	471.5 g		Max Head	188.51 cm	% Moisture	34.6					
Mass of tare	0.0 g		Min Head	187.81 cm							
% Moisture	32.2		Maximum Gradient	24.83							
			Minimum Gradient	24.74							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/02/21	8	5	-	2.68	188.51	24.83	24.6	-	-	-
10/02/21	8	15	600	2.67	187.81	24.74	24.6	2.02E-07	0.897	1.81E-07
10/02/21	8	25	600	2.68	188.51	24.83	24.6	2.02E-07	0.897	1.81E-07
10/02/21	8	35	600	2.68	188.51	24.83	24.6	2.02E-07	0.897	1.81E-07
10/02/21	8	45	600	2.67	187.81	24.74	24.6	2.02E-07	0.897	1.81E-07
10/02/21	8	55	600	2.67	187.81	24.74	24.6	2.02E-07	0.897	1.82E-07
10/02/21	9	5	600	2.68	188.51	24.83	24.6	2.02E-07	0.897	1.81E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.8E-07	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	570
Syringe ID #	1047			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By **EB/KP**
Date **10/20/21**
Checked By **EB**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elevation	-
Sample ID	39009/CAA-4 Ex-Situ (1)	Subsample ID	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/22/21	Curing Age, Days	28		

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.013 in	7.65 cm	Speed	11	Average Height of Sample	3.014 in	7.66 cm				
Diameter	2.973 in	7.55 cm	Board Number	16	Average Diameter of Sample	2.974 in	7.55 cm				
Area	6.94 in ²	44.79 cm ²	Cell Number	4	Area	6.95 in ²	44.82 cm ²				
Volume	342.75 cm ³	0.0121 ft ³	Flow Pump Number	2A	Volume	343.10 cm ³	0.0121 ft ³				
Mass	621.6 g	1.37 lb	Flow Pump Rate*	1.12E-04 cm ³ /sec	Mass	633.2 g	1.40 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	85.3 pcf					
Dry Density	85.3 pcf		Cell Pressure	95.0 psi	Vol. of Voids	169.49 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	173.61 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.98					
			Max Head	156.86 cm	Saturation	97.0 %					
			Min Head	154.75 cm							
			Maximum Gradient	20.49							
			Minimum Gradient	20.21							
Moisture Content				Moisture Content							
Mass of wet sample & tare	621.6 g		Mass of wet sample & tare	712.4 g							
Mass of dry sample & tare	468.6 g		Mass of dry sample & tare	548.0 g							
Mass of tare	0.0 g		Mass of tare	79.4 g							
% Moisture	32.7		% Moisture	35.1							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/20/21	7	10	-	2.22	156.15	20.40	22.5	-	-	-
10/20/21	7	20	600	2.20	154.75	20.21	22.5	1.23E-07	0.942	1.16E-07
10/20/21	7	30	600	2.23	156.86	20.49	22.5	1.23E-07	0.942	1.16E-07
10/20/21	7	40	600	2.21	155.45	20.31	22.5	1.23E-07	0.942	1.15E-07
10/20/21	7	50	600	2.22	156.15	20.40	22.5	1.23E-07	0.942	1.16E-07
10/20/21	8	0	600	2.20	154.75	20.21	22.5	1.23E-07	0.942	1.16E-07
10/20/21	8	10	600	2.23	156.86	20.49	22.5	1.23E-07	0.942	1.16E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS (ASTM D2487;2488)
NA	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.2E-07 cm/sec	
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	694/459
Syringe ID #	245			Pore Pressure Meter ID #	1104

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/03/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39010/CAA-4 Ex-Situ (2)	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/23/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.634
Initial Diameter, in	2.969
Height-to-Diameter Ratio	1.90
Area, in ²	6.92
Volume, in ³	39.01
Mass of Sample, g	1161.6
Wet Density, pcf	113.4
Dry Density, pcf	83.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1578.5
Mass of Dry Sample and Tare, g	1270.6
Mass of Tare, g	419.9
Moisture, %	36.2

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1392
Specimen Cross-sectional Area, in ²	6.92
Compressive Strength at Failure, psi	201
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	201

Failure Code 3

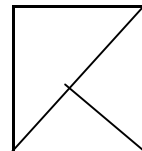
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/21/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39010/CAA-4 Ex-Situ (2)	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/23/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.656
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.90
Area, in ²	6.96
Volume, in ³	39.37
Mass of Sample, g	1163.5
Wet Density, pcf	112.6
Dry Density, pcf	82.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1453.4
Mass of Dry Sample and Tare, g	1145.7
Mass of Tare, g	297.1
Moisture, %	36.3

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	3313
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	476
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	476

Failure Code 3

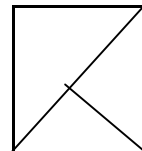
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/21/21
Checked By *EB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elevation	-
Sample ID	39010/CAA-4 Ex-Situ (2)	Subsample ID	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/23/21	Curing Age, Days	28		

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)						
Height	3.002	in	7.63	cm	Speed	11			Average Height of Sample	3.003	in	7.63	cm	
Diameter	2.961	in	7.52	cm	Board Number	3			Average Diameter of Sample	2.962	in	7.52	cm	
Area	6.89	in ²	44.43	cm ²	Cell Number	5			Area	6.89	in ²	44.46	cm ²	
Volume	338.75	cm ³	0.0120	ft ³	Flow Pump Number	4B			Volume	339.09	cm ³	0.0120	ft ³	
Mass	613.9	g	1.35	lb	Flow Pump Rate*	1.12E-04			cm ³ /sec	Mass	621.7	g	1.37	lb
Specific Gravity	2.700	(Assumed)		B - Value	0.95			Dry Density	82.6	pcf				
Dry Density	82.7	pcf		Cell Pressure	95.0			psi	Vol. of Voids	172.79	cm ³			
Moisture Content				Back Pressure	90.0			psi	Vol. of Solids	166.30	cm ³			
Mass of wet sample & tare	613.9	g		Confining (Effective) Pressure	5.0			psi	Void Ratio	1.04				
Mass of dry sample & tare	449.0	g		Max Head	48.53			cm	Saturation	99.9	%			
Mass of tare	0.0	g		Min Head	47.13			cm	Mass of wet sample & tare	704.7	g			
% Moisture	36.7			Maximum Gradient	6.36			Mass of dry sample & tare	532.0	g				
				Minimum Gradient	6.18			Mass of tare	83.0	g				
								% Moisture	38.5					

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/21/21	7	20	-	0.68	47.83	6.27	23.4	-	-	-
10/21/21	7	30	600	0.67	47.13	6.18	23.4	4.05E-07	0.923	3.73E-07
10/21/21	7	40	600	0.69	48.53	6.36	23.4	4.02E-07	0.923	3.71E-07
10/21/21	7	50	600	0.68	47.83	6.27	23.4	3.99E-07	0.923	3.68E-07
10/21/21	8	0	600	0.69	48.53	6.36	23.4	3.99E-07	0.923	3.68E-07
10/21/21	8	10	600	0.67	47.13	6.18	23.4	4.02E-07	0.923	3.71E-07
10/21/21	8	20	600	0.68	47.83	6.27	23.4	4.05E-07	0.923	3.73E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS (ASTM D2487;2488)
NA	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.7E-07		cm/sec	
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1045/1049		
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041		
Syringe ID #	1046			Pore Pressure Meter ID #	26/27		

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/03/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39011/2-10	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/23/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.651
Initial Diameter, in	2.969
Height-to-Diameter Ratio	1.90
Area, in ²	6.92
Volume, in ³	39.12
Mass of Sample, g	1207.4
Wet Density, pcf	117.6
Dry Density, pcf	88.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1564.1
Mass of Dry Sample and Tare, g	1270.3
Mass of Tare, g	359.1
Moisture, %	32.2

TEST DATA

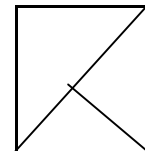
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	642
Specimen Cross-sectional Area, in ²	6.92
Compressive Strength at Failure, psi	93
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	93

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/21/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39011/2-10	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/23/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.627
Initial Diameter, in	2.976
Height-to-Diameter Ratio	1.89
Area, in ²	6.96
Volume, in ³	39.14
Mass of Sample, g	1193.2
Wet Density, pcf	116.1
Dry Density, pcf	87.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1491.4
Mass of Dry Sample and Tare, g	1199.4
Mass of Tare, g	300.9
Moisture, %	32.5

TEST DATA

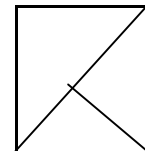
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1384
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	199
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	199

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/03/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39011/2-10	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/23/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.973 in	7.55 cm	Speed	9	Average Height of Sample	2.974 in	7.55 cm	Dry Density	87.9 pcf		
Diameter	2.969 in	7.54 cm	Board Number	5	Average Diameter of Sample	2.970 in	7.54 cm	Vol. of Voids	161.42 cm ³		
Area	6.92 in ²	44.67 cm ²	Cell Number	5	Area	6.93 in ²	44.70 cm ²	Vol. of Solids	176.21 cm ³		
Volume	337.29 cm ³	0.0119 ft ³	Flow Pump Number	3B	Volume	337.63 cm ³	0.0119 ft ³	Void Ratio	0.92		
Mass	629.2 g	1.39 lb	Flow Pump Rate*	4.48E-04 cm ³ /sec	Mass	635.2 g	1.40 lb	Saturation	98.8 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	88.0 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	708.5 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	549.1 g				
Mass of wet sample & tare	629.2 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	73.4 g					
Mass of dry sample & tare	475.7 g		Max Head	28.84 cm	% Moisture	33.5					
Mass of tare	0.0 g		Min Head	28.14 cm							
% Moisture	32.3		Maximum Gradient	3.82							
			Minimum Gradient	3.72							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/03/21	7	20	-	0.40	28.14	3.72	24.1	-	-	-
10/03/21	7	30	600	0.41	28.84	3.82	24.1	2.66E-06	0.908	2.41E-06
10/03/21	7	40	600	0.41	28.84	3.82	24.1	2.63E-06	0.908	2.38E-06
10/03/21	7	50	600	0.40	28.14	3.72	24.1	2.66E-06	0.908	2.41E-06
10/03/21	8	0	600	0.40	28.14	3.72	24.1	2.69E-06	0.908	2.44E-06
10/03/21	8	10	600	0.41	28.84	3.82	24.1	2.66E-06	0.908	2.41E-06
10/03/21	8	20	600	0.41	28.84	3.82	24.1	2.63E-06	0.908	2.38E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				2.4E-06	cm/sec
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	262
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042
Syringe ID #	490			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/04/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39012/2-22	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/24/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.611
Initial Diameter, in	2.972
Height-to-Diameter Ratio	1.89
Area, in ²	6.94
Volume, in ³	38.92
Mass of Sample, g	1205.5
Wet Density, pcf	118.0
Dry Density, pcf	90.4
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1619.7
Mass of Dry Sample and Tare, g	1339.3
Mass of Tare, g	416.4
Moisture, %	30.4

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	720
Specimen Cross-sectional Area, in ²	6.94
Compressive Strength at Failure, psi	104
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	104

Failure Code 3

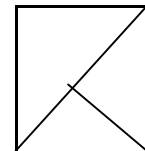
Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/22/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39012/2-22	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/24/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.544
Initial Diameter, in	2.982
Height-to-Diameter Ratio	1.86
Area, in ²	6.98
Volume, in ³	38.72
Mass of Sample, g	1190.6
Wet Density, pcf	117.1
Dry Density, pcf	89.5
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1493.2
Mass of Dry Sample and Tare, g	1213.0
Mass of Tare, g	304.2
Moisture, %	30.8

TEST DATA

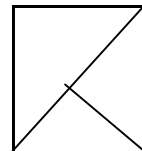
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1451
Specimen Cross-sectional Area, in ²	6.98
Compressive Strength at Failure, psi	208
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	208

Failure Code 3

Failure Sketch



Failure Type:

Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By EB/KP
Date 10/04/21
Checked By *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39012/2-22	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/24/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.002 in	7.63 cm		Speed	9			Average Height of Sample	3.003 in	7.63 cm	
Diameter	2.972 in	7.55 cm		Board Number	6			Average Diameter of Sample	2.973 in	7.55 cm	
Area	6.94 in ²	44.76 cm ²		Cell Number	11			Area	6.94 in ²	44.79 cm ²	
Volume	341.27 cm ³	0.0121 ft ³		Flow Pump Number	4A			Volume	341.61 cm ³	0.0121 ft ³	
Mass	637.7 g	1.41 lb		Flow Pump Rate*	4.48E-04 cm ³ /sec			Mass	645.7 g	1.42 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	89.5 pcf		
Dry Density	89.6 pcf			Cell Pressure	95.0 psi			Vol. of Voids	160.06 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	181.56 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.88		
				Max Head	21.81 cm			Saturation	97.2 %		
				Min Head	21.10 cm						
				Maximum Gradient	2.86						
				Minimum Gradient	2.77						

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/04/21	7	40	-	0.30	21.10	2.77	24.7	-	-	-
10/04/21	7	50	600	0.31	21.81	2.86	24.7	3.56E-06	0.895	3.18E-06
10/04/21	8	0	600	0.31	21.81	2.86	24.7	3.50E-06	0.895	3.13E-06
10/04/21	8	10	600	0.30	21.10	2.77	24.7	3.56E-06	0.895	3.18E-06
10/04/21	8	20	600	0.30	21.10	2.77	24.7	3.62E-06	0.895	3.24E-06
10/04/21	8	30	600	0.31	21.81	2.86	24.7	3.56E-06	0.895	3.18E-06
10/04/21	8	40	600	0.30	21.10	2.77	24.7	3.56E-06	0.895	3.18E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				3.2E-06	cm/sec
Flow pump ID #	1043	Balance ID #	1035/1036	Differential Pressure Meter ID #	1044/1048
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042
Syringe ID #	1047			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/22/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39012/2-22	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/24/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.066 in	7.79 cm		Speed	12			Average Height of Sample	3.067 in	7.79 cm	
Diameter	2.965 in	7.53 cm		Board Number	18			Average Diameter of Sample	2.966 in	7.53 cm	
Area	6.90 in ²	44.55 cm ²		Cell Number	15			Area	6.91 in ²	44.58 cm ²	
Volume	346.91 cm ³	0.0123 ft ³		Flow Pump Number	4B			Volume	347.25 cm ³	0.0123 ft ³	
Mass	653.9 g	1.44 lb		Flow Pump Rate*	5.60E-05 cm ³ /sec			Mass	664.5 g	1.46 lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Dry Density	90.2 pcf		
Dry Density	90.3 pcf			Cell Pressure	95.0 psi			Vol. of Voids	161.37 cm ³		
				Back Pressure	90.0 psi			Vol. of Solids	185.88 cm ³		
				Confining (Effective) Pressure	5.0 psi			Void Ratio	0.87		
				Max Head	104.10 cm			Saturation	100.8 %		
				Min Head	102.70 cm						
				Maximum Gradient	13.36						
				Minimum Gradient	13.18						

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/22/21	8	35	-	1.47	103.40	13.27	21.3	-	-	-
10/22/21	8	45	600	1.48	104.10	13.36	21.3	9.43E-08	0.969	9.14E-08
10/22/21	8	55	600	1.46	102.70	13.18	21.3	9.46E-08	0.969	9.17E-08
10/22/21	8	5	-3000	1.48	104.10	13.36	21.3	9.46E-08	0.969	9.17E-08
10/22/21	9	15	4200	1.47	103.40	13.27	21.3	9.43E-08	0.969	9.14E-08
10/22/21	9	25	600	1.48	104.10	13.36	21.3	9.43E-08	0.969	9.14E-08
10/22/21	9	35	600	1.46	102.70	13.18	21.3	9.46E-08	0.969	9.17E-08

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*		9.2E-08 cm/sec	
Flow pump ID #	1043	Balance ID #	1035/1036
Thermometer ID #	796/985	Oven ID #	496/758
Syringe ID #	1046	Differential Pressure Meter ID #	1045/1049
		Board Pressure Meter ID #	570
		Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/04/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39044/CAA-4 Ex-Situ (3)	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/24/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.747
Initial Diameter, in	2.975
Height-to-Diameter Ratio	1.93
Area, in ²	6.95
Volume, in ³	39.95
Mass of Sample, g	1153.2
Wet Density, pcf	110.0
Dry Density, pcf	77.6
Machine Speed, in/min	0.050
Strain rate, % / min	0.87

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1409.4
Mass of Dry Sample and Tare, g	1070.6
Mass of Tare, g	258.3
Moisture, %	41.7

TEST DATA

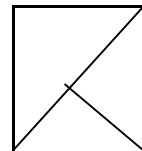
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2083
Specimen Cross-sectional Area, in ²	6.95
Compressive Strength at Failure, psi	300
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	300

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F. -.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/22/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39044/CAA-4 Ex-Situ (3)	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/24/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.681
Initial Diameter, in	2.979
Height-to-Diameter Ratio	1.91
Area, in ²	6.97
Volume, in ³	39.60
Mass of Sample, g	1142.5
Wet Density, pcf	109.9
Dry Density, pcf	77.7
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1445.0
Mass of Dry Sample and Tare, g	1110.8
Mass of Tare, g	303.7
Moisture, %	41.4

TEST DATA

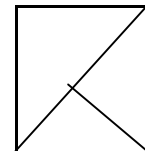
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	4268
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	612
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	612

Failure Code 3

Failure Sketch



Failure Type: Cone and Shear

Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/05/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39045/CAA-4 Ex-Situ (4)	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/25/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.682
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.91
Area, in ²	6.96
Volume, in ³	39.55
Mass of Sample, g	1162.0
Wet Density, pcf	111.9
Dry Density, pcf	81.1
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1451.5
Mass of Dry Sample and Tare, g	1150.8
Mass of Tare, g	360.0
Moisture, %	38.0

TEST DATA

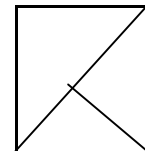
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1642
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	236
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	236

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F. -.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/23/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39045/CAA-4 Ex-Situ (4)	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/25/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.689
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.91
Area, in ²	6.96
Volume, in ³	39.60
Mass of Sample, g	1162.5
Wet Density, pcf	111.8
Dry Density, pcf	80.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1460.6
Mass of Dry Sample and Tare, g	1139.2
Mass of Tare, g	299.0
Moisture, %	38.3

TEST DATA

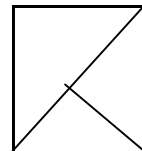
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	4685
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	673
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	673

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/05/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39046/2-21	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/25/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.585
Initial Diameter, in	2.965
Height-to-Diameter Ratio	1.88
Area, in ²	6.90
Volume, in ³	38.56
Mass of Sample, g	1202.2
Wet Density, pcf	118.8
Dry Density, pcf	92.3
Machine Speed, in/min	0.050
Strain rate, % / min	0.90

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1502.3
Mass of Dry Sample and Tare, g	1235.2
Mass of Tare, g	301.8
Moisture, %	28.6

TEST DATA

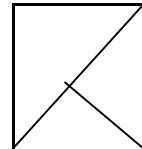
Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	385
Specimen Cross-sectional Area, in ²	6.90
Compressive Strength at Failure, psi	56
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	56

Failure Code 3

Failure Sketch



Failure Type: **Cone and Shear**

Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/23/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39046/2-21	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/25/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.676
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.91
Area, in ²	6.96
Volume, in ³	39.51
Mass of Sample, g	1216.3
Wet Density, pcf	117.3
Dry Density, pcf	91.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.88

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1513.4
Mass of Dry Sample and Tare, g	1243.3
Mass of Tare, g	298.4
Moisture, %	28.6

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	1600
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	230
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	230

Failure Code 3

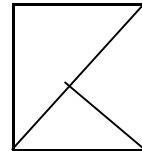
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/05/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39046/2-21	Subsample ID	3
Add. Info	-	Mixing/Molding Date	09/25/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	10	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	2.987 in	7.59 cm	Speed	10	Average Height of Sample	2.988 in	7.59 cm	Dry Density	91.0 pcf		
Diameter	2.968 in	7.54 cm	Board Number	3	Average Diameter of Sample	2.969 in	7.54 cm	Vol. of Voids	155.84 cm ³		
Area	6.92 in ²	44.64 cm ²	Cell Number	41	Area	6.92 in ²	44.67 cm ²	Vol. of Solids	183.16 cm ³		
Volume	338.65 cm ³	0.0120 ft ³	Flow Pump Number	3A	Volume	338.99 cm ³	0.0120 ft ³	Void Ratio	0.85		
Mass	636.9 g	1.40 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	646.1 g	1.42 lb	Saturation	97.3 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	91.1 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	727.7 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	576.1 g				
Mass of wet sample & tare	636.9 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	81.5 g					
Mass of dry sample & tare	494.6 g		Max Head	15.47 cm	% Moisture	30.7					
Mass of tare	0.0 g		Min Head	14.77 cm							
% Moisture	28.8		Maximum Gradient	2.04							
			Minimum Gradient	1.95							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/05/21	9	20	-	0.21	14.77	1.95	23.5	-	-	-
10/05/21	9	30	600	0.22	15.47	2.04	23.5	2.52E-06	0.920	2.32E-06
10/05/21	9	40	600	0.21	14.77	1.95	23.5	2.52E-06	0.920	2.32E-06
10/05/21	9	50	600	0.22	15.47	2.04	23.5	2.52E-06	0.920	2.32E-06
10/05/21	10	0	600	0.21	14.77	1.95	23.5	2.52E-06	0.920	2.32E-06
10/05/21	10	10	600	0.22	15.47	2.04	23.5	2.52E-06	0.920	2.32E-06
10/05/21	10	20	600	0.21	14.77	1.95	23.5	2.52E-06	0.920	2.32E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				2.3E-06	cm/sec
Flow pump ID #	475	Balance ID #	1035/1036	Differential Pressure Meter ID #	469
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1041
Syringe ID #	491			Pore Pressure Meter ID #	26/27

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/23/21
Checked By: *EB*

Client Pr. #	200016		
Pr. Name	Time Oil Terminal		
Sample ID	39046/2-21	Subsample ID	4
Add. Info	-	Mixing/Molding Date	09/25/21

Lab. PR. #	21136-02-3		
S. Type	Mold	Depth/Elevation	-
Location	Seattle, WA		
	Curing Age, Days	28	

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.031 in	7.70 cm	Speed	11	Average Height of Sample	3.032 in	7.70 cm	Dry Density	90.6 pcf		
Diameter	2.967 in	7.54 cm	Board Number	6	Average Diameter of Sample	2.968 in	7.54 cm	Vol. of Voids	158.91 cm ³		
Area	6.91 in ²	44.61 cm ²	Cell Number	5	Area	6.92 in ²	44.64 cm ²	Vol. of Solids	184.84 cm ³		
Volume	343.41 cm ³	0.0121 ft ³	Flow Pump Number	1A	Volume	343.75 cm ³	0.0121 ft ³	Void Ratio	0.86		
Mass	641.0 g	1.41 lb	Flow Pump Rate*	1.12E-04 cm ³ /sec	Mass	650.6 g	1.43 lb	Saturation	95.4 %		
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Moisture Content						
Dry Density	90.7 pcf		Cell Pressure	95.0 psi	Mass of wet sample & tare	731.6 g					
Moisture Content				Back Pressure	90.0 psi	Mass of dry sample & tare	580.1 g				
Mass of wet sample & tare	641.0 g		Confining (Effective) Pressure	5.0 psi	Mass of tare	81.1 g					
Mass of dry sample & tare	499.0 g		Max Head	68.93 cm	% Moisture	30.4					
Mass of tare	0.0 g		Min Head	66.12 cm							
% Moisture	28.5		Maximum Gradient	8.95							
			Minimum Gradient	8.59							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/23/21	6	40	-	0.94	66.12	8.59	23.3	-	-	-
10/23/21	6	50	600	0.98	68.93	8.95	23.3	2.86E-07	0.925	2.65E-07
10/23/21	7	0	600	0.97	68.23	8.86	23.3	2.82E-07	0.925	2.61E-07
10/23/21	7	10	600	0.97	68.23	8.86	23.3	2.83E-07	0.925	2.62E-07
10/23/21	7	20	600	0.95	66.82	8.68	23.3	2.86E-07	0.925	2.65E-07
10/23/21	7	30	600	0.97	68.23	8.86	23.3	2.86E-07	0.925	2.65E-07
10/23/21	7	40	600	0.96	67.53	8.77	23.3	2.85E-07	0.925	2.63E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				2.6E-07	cm/sec
Flow pump ID #	22	Balance ID #	1035/1036	Differential Pressure Meter ID #	1107
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	1042
Syringe ID #	140			Pore Pressure Meter ID #	779/780

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By **KP/IH**

Date **10/07/21**

Checked By **[Signature]**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39047/2-20	Subsample	1	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/27/21	Curing Age, Days	10		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.633
Initial Diameter, in	2.977
Height-to-Diameter Ratio	1.89
Area, in ²	6.96
Volume, in ³	39.21
Mass of Sample, g	1187.9
Wet Density, pcf	115.4
Dry Density, pcf	87.9
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1485.6
Mass of Dry Sample and Tare, g	1203.4
Mass of Tare, g	299.2
Moisture, %	31.2

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	896
Specimen Cross-sectional Area, in ²	6.96
Compressive Strength at Failure, psi	129
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	129

Failure Code 3

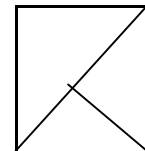
Note 2: * - A conversion factor based on H/D=1.15 (C.F.=.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084

Phone: 770-938-8233

Fax: 770-923-8973

Web: www.test-llc.com



**AASHTO
ACCREDITED**

Tested By KP/IH

Date 10/25/21

Checked By *IB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elev.	-
Sample ID	39047/2-20	Subsample	2	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/27/21	Curing Age, Days	28		

ASTM D 1633: Standard Test Methods for Compressive Strength of Molded Soil-Cement Cylinders

METHOD B

SAMPLE DATA

Initial Height, in	5.594
Initial Diameter, in	2.980
Height-to-Diameter Ratio	1.88
Area, in ²	6.97
Volume, in ³	39.02
Mass of Sample, g	1175.7
Wet Density, pcf	114.8
Dry Density, pcf	87.2
Machine Speed, in/min	0.050
Strain rate, % / min	0.89

WATER CONTENT DETERMINATION

Mass of Wet Sample and Tare, g	1472.7
Mass of Dry Sample and Tare, g	1191.5
Mass of Tare, g	302.0
Moisture, %	31.6

TEST DATA

Load Cell ID #	11/1015
Compression Device ID #	10/1014
Balance ID #	1036/1037

Digital Caliper ID #	17/583
Readout Device ID #	10/1016
Oven ID #	758/496

Maximum Load at Failure, lbf	2742
Specimen Cross-sectional Area, in ²	6.97
Compressive Strength at Failure, psi	393
Conversion Factor for Height to Diameter Ratio	1.00
Reported Compressive Strength at Failure, psi	393

Failure Code 3

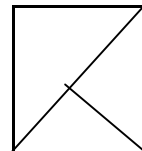
Note 2: * - A conversion factor based on H/D=1.15 (C.F.-.908 as 100% and add. correction per ASTM C42)

DESCRIPTION

USCS (ASTM D2487: D2488)

REMARKS

Failure Sketch



Failure Type:

Cone and Shear



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By **EB/KP**
Date **10/07/21**
Checked By **EB**

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elevation	-
Sample ID	39047/2-20	Subsample ID	3	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/27/21	Curing Age, Days	10		

**ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous
Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)**

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)			
Height	3.005 in	7.63 cm	Speed	10	Average Height of Sample	3.006 in	7.64 cm				
Diameter	2.969 in	7.54 cm	Board Number	9	Average Diameter of Sample	2.970 in	7.54 cm				
Area	6.92 in ²	44.67 cm ²	Cell Number	41	Area	6.93 in ²	44.70 cm ²				
Volume	340.92 cm ³	0.0120 ft ³	Flow Pump Number	2A	Volume	341.27 cm ³	0.0121 ft ³				
Mass	629.4 g	1.39 lb	Flow Pump Rate*	2.24E-04 cm ³ /sec	Mass	642.7 g	1.42 lb				
Specific Gravity	2.700 (Assumed)		B - Value	0.95	Dry Density	87.6 pcf					
Dry Density	87.7 pcf		Cell Pressure	95.0 psi	Vol. of Voids	163.80 cm ³					
			Back Pressure	90.0 psi	Vol. of Solids	177.46 cm ³					
			Confining (Effective) Pressure	5.0 psi	Void Ratio	0.92					
			Max Head	17.59 cm	Saturation	99.8 %					
			Min Head	16.88 cm							
			Maximum Gradient	2.30							
			Minimum Gradient	2.21							

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/07/21	8	5	-	0.25	17.59	2.30	23.1	-	-	-
10/07/21	8	15	600	0.24	16.88	2.21	23.1	2.22E-06	0.929	2.06E-06
10/07/21	8	25	600	0.25	17.59	2.30	23.1	2.22E-06	0.929	2.06E-06
10/07/21	8	35	600	0.24	16.88	2.21	23.1	2.22E-06	0.929	2.06E-06
10/07/21	8	45	600	0.25	17.59	2.30	23.1	2.22E-06	0.929	2.06E-06
10/07/21	8	55	600	0.24	16.88	2.21	23.1	2.22E-06	0.929	2.06E-06
10/07/21	9	5	600	0.25	17.59	2.30	23.1	2.22E-06	0.929	2.06E-06

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				2.1E-06	cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	571
Syringe ID #	245			Pore Pressure Meter ID #	29

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.



**TIMELY
ENGINEERING
SOIL
TESTS, LLC**

1874 Forge Street Tucker, GA 30084
Phone: 770-938-8233
Fax: 770-923-8973
Web: www.test-llc.com



Tested By: EB/KP
Date: 10/25/21
Checked By: *EB*

Client Pr. #	200016			Lab. PR. #	21136-02-3		
Pr. Name	Time Oil Terminal			S. Type	Mold	Depth/Elevation	-
Sample ID	39047/2-20	Subsample ID	4	Location	Seattle, WA		
Add. Info	-	Mixing/Molding Date	09/27/21	Curing Age, Days	28		

ASTM D 5084; Standard Test Method for Measurement of Hydraulic Conductivity of Saturated Porous Materials Using a Flexible Wall Permeameter (Method D, Constant Rate of Flow)

Initial Sample Data (Before Test)				Test Data				Final Data (After Test)							
Height	3.035	in	7.71	cm	Speed	10			Average Height of Sample	3.036	in	7.71	cm		
Diameter	2.967	in	7.54	cm	Board Number	14			Average Diameter of Sample	2.968	in	7.54	cm		
Area	6.91	in ²	44.61	cm ²	Cell Number	14			Area	6.92	in ²	44.64	cm ²		
Volume	343.86	cm ³	0.0121	ft ³	Flow Pump Number	2a			Volume	344.21	cm ³	0.0122	ft ³		
Mass	635.1	g	1.40	lb	Flow Pump Rate*	2.24E-04			cm ³ /sec	Mass	645.4	g	1.42	lb	
Specific Gravity	2.700 (Assumed)			B - Value	0.95			Cell Pressure	95.0				psi		
Dry Density	87.4			pcf	Back Pressure	90.0			psi	Dry Density	87.4			pcf	
Moisture Content				Confining (Effective) Pressure	5.0			psi	Vol. of Voids	165.74			cm ³		
Mass of wet sample & tare	635.1			g	Max Head	205.39			cm	Mass of wet sample & tare	725.8			g	
Mass of dry sample & tare	481.8			g	Min Head	203.99			cm	Mass of dry sample & tare	562.3			g	
Mass of tare	0.0			g	Maximum Gradient	26.63			Mass of tare	80.5			g		
% Moisture	31.8			Minimum Gradient	26.45			% Moisture	33.9			Vol. of Solids	178.47		cm ³
				Void Ratio	0.93			Saturation	98.7			%			

TIME FUNCTION			Δ t (sec)	READING DP, (psi)	Head (cm)	Gradient	Temp. T _x (°C)	PERMEABILITY (cm/sec)		
DATE	HOUR	MIN						@ T _x	R _T	@ 20 °C
10/25/21	7	0	-	2.91	204.69	26.54	24.7	-	-	-
10/25/21	7	10	600	2.90	203.99	26.45	24.7	1.89E-07	0.895	1.69E-07
10/25/21	7	20	600	2.92	205.39	26.63	24.7	1.89E-07	0.895	1.69E-07
10/25/21	7	30	600	2.92	205.39	26.63	24.7	1.88E-07	0.895	1.69E-07
10/25/21	7	40	600	2.90	203.99	26.45	24.7	1.89E-07	0.895	1.69E-07
10/25/21	7	50	600	2.92	205.39	26.63	24.7	1.89E-07	0.895	1.69E-07
10/25/21	8	0	600	2.91	204.69	26.54	24.7	1.89E-07	0.895	1.69E-07

Note: Deaired Water Used for Permeability Test.

DESCRIPTION	USCS
NA	(ASTM D2487;2488)
	NA

REMARKS
Bottom Half of the mold was used for testing.

Reported Average Hydraulic Conductivity*				1.7E-07		cm/sec
Flow pump ID #	244	Balance ID #	1035/1036	Differential Pressure Meter ID #	346	
Thermometer ID #	796/985	Oven ID #	496/758	Board Pressure Meter ID #	694/459	
Syringe ID #	245			Pore Pressure Meter ID #	372	

*Constant Rate of Flow System (Flow Pump with Calibrated Syringe for Inflow and Calibrated Graduated Pipette for outflow) is capable to maintain a constant rate of inflow & outflow through the fully saturated sample with accuracy +/-5%. Flow Pump Rate issued for calculations of HC (ASTM STP 977) results at steady Differential Pressure (DP) Readings at the range of +/-5%. Permeation was stopped after HC versus Time (see table above) showed no significant upward or downward trend.

Cell #	Sample #	Date Sampled	Sample Depth (ft. BGS)	30 - 50 psi					$>1 \times 10^{-6}$ cm/sec				$1 \times 10^{-6} - 1 \times 10^{-7}$ cm/sec		Passing Result
				UCS (± 50 psi)					HYDRAULIC CONDUCTIVITY				$<1 \times 10^{-6}$ cm/sec		COMMENTS
				5-7 Day	10-DAY	21-DAY	28-DAY	42-DAY	7-DAY	10-DAY	28-DAY	42-DAY			
2-42	1	08/18/21	14.74	57	109	193	224				9.0E-07	1.6E-07			
2-23	3	08/20/21	10	54	124	330	455				2.7E-06	1.8E-07			
2-15	4	08/23/21	13.3	31	113	270	358				6.7E-07	1.2E-07			
2-40	5	08/24/21	13	60	116	222	297				7.1E-07	1.3E-07			
2-45	6	08/25/21	16.3	54	117	224	331				1.1E-06	1.2E-07			
2-7	7	08/26/21	17.7	38	156	419	484				2.4E-06	1.5E-07			
2-1	8	08/30/21	18.9	11	47	97	137				6.6E-07	3.0E-07			
2-43	9	08/31/21	11.3	75	124	303	316				3.4E-07	5.0E-08			
2-41	10	09/01/21	17.75		93		327				4.7E-06	1.5E-07			
2-4	11	09/02/21	20		18		88				7.9E-07	6.6E-07			
2-36	12	09/02/21	16.42	106	187		374				1.6E-06	5.2E-07			
2-46	13	09/03/21	18.7		70		217				1.3E-06	2.1E-07			
2-47	14	09/07/21	18.5		70		170				2.4E-06	3.4E-07			
2-24	15	09/08/21	17		92		393				1.5E-06	9.6E-07			
2-32	16	09/09/21	13.5		81		412				1.6E-06	8.7E-08			
2-32(2)	17	09/10/21	20		33		162				1.2E-06	8.1E-07			
2-25	18	09/11/21	12.5		106		371				2.8E-07	5.2E-08			
2-16	19	09/13/21	20		128		373				3.3E-06	4.9E-08			
2-2	20	09/14/21	17.6		48		307				3.5E-06	1.1E-07			
2-17	21	09/15/21	16.5		75		367				3.2E-06	1.5E-07			
2-5	22	09/16/21	12		105		452				2.3E-06	1.2E-07			
2-9	23	09/17/21	15.5		93		319				3.2E-06	8.0E-08			
2-33	24	09/21/21	20		159		539				4.7E-07	3.6E-07			
2-13	25	09/22/21	20		127		374				6.9E-07	1.3E-07			
CAA-4 Ex-Situ (1)	26	09/22/21	-		156		385				1.8E-07	1.2E-07			
2-10	27	09/23/21	7.6		93		199				2.4E-06	2.2E-07			
CAA-4 Ex-Situ (2)	28	09/23/21	-		201		476				7.5E-07	3.7E-07			
2-22 EH	29	09/24/21	19.5		104		208				3.2E-06	9.2E-08			
CAA-4 Ex-Situ (3)	30	09/24/21	-		300		612				2.5E-07	6.0E-08			
2-21 East	31	09/25/21	15.3		56		230				2.3E-06	2.6E-07			
CAA-4 Ex-Situ (4)	32	09/25/21	-		236		673				1.1E-07	4.7E-08			
2-20 East	33	09/27/21	18		129		393				2.1E-06	1.7E-07			
2-27	34	09/28/21	17		70		450				3.4E-06	3.0E-07			
CAA-4 Ex-Situ (5)	35	09/28/21	-		280		768				7.6E-07	1.7E-07			
4-72	36	09/29/21	-		88		335				3.7E-07	5.9E-08			
CAA-4 SP	37	09/30/21	-				577					7.9E-08			
4-9	38	10/02/21	20				132					2.8E-07			
4-12	40	10/09/21	19				125					1.8E-07			
4-2	41	10/11/21	18				75					1.7E-06	6.4E-07		
4-7	42	10/12/21	18				66					9.3E-07			
4-1	43	10/13/21	15				34	73				5.8E-06	9.8E-07		
4-63	44	10/14/21	20				79					6.6E-07			
4-58	45	10/15/21	10				92					7.3E-07			
4-44	46	10/16/21	13				53					5.8E-07			
4-60	47	10/18/21	20				77					1.7E-07			
4-53	48	10/19/21	16.5				118					7.0E-07			
4-46	49	10/20/21	13				99					4.7E-07			
4-20	50	10/21/21	20				230					1.9E-07			
4-22	51	10/22/21	18				336					2.0E-07			
4-24	52	10/23/21	18				402					1.0E-07			
4-26	53	10/25/21	20				341					2.7E-07			
4-29	54	10/26/21	13				202					2.7E-07			
4-33	55	10/27/21	15				259					2.4E-07			
4-42	56	10/28/21	15.5				90					5.5E-06			
4-32	57	10/29/21	17				35					5.9E-06			
4-31	58	10/30/21	10				134					1.7E-06			
4-35	59	11/01/21	20				162					3.2E-07			
4-38	60	11/02/21	16				62					8.5E-07			
4-73 Re-Mix	61	11/02/21	-		40		99				2.6E-06	6.7E-07			

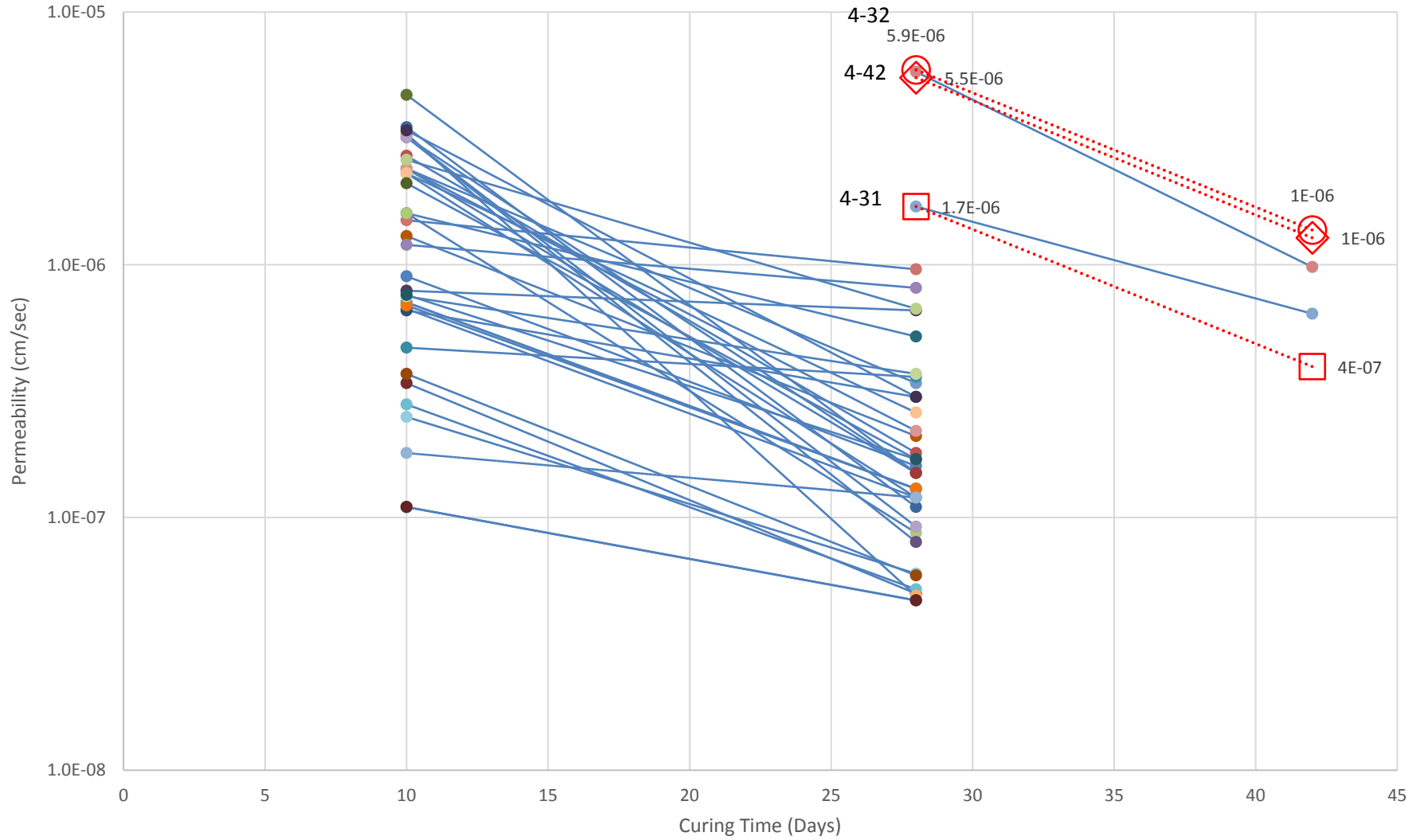


Chart 1 - Permeability vs Curing Time

Shows results of 10 day and 28 day across CAA-2 and 4. Also includes the 28 day test results projected with the average reduction based on data collected at CAA-4 for the 28 and 42 day sample results. Working conceptual draft figure plotted on 7/20/22.

Appendix J

Regenesis Remediation Application Summary



Global Headquarters
1011 Calle Sombra
San Clemente, CA 92673
Ph: (949) 366-8000
Fax: (949) 366-8090

12/28/2021

REGENESIS Proposal No. ChL66181

Kristin Anderson
Floyd Snider
401 Union St.
Seattle, Washington, 98101

SUBJECT: Remediation Application Services – Time Oil Site – Seattle, WA

Kristin,

REGENESIS Remediation Services (RRS) has recently completed an in-situ injection application of PlumeStop® Liquid Activated Carbon™ (PlumeStop), S-Micro ZVI® and Bio-Dechlor Inoculum Plus® (BDI Plus). The goal of the remedial application was to reduce CVOC compounds in the groundwater. RRS employed in-situ sorption and biodegradation, bioaugmentation along with in-situ chemical reduction methods to achieve remediation goals.

RRS mobilized experienced 40-hour HAZWOPER trained personnel, custom built injection trailer, support truck and equipment on December 6th, 2021. On-site application of the remediation technology was completed over eight days between December 7th and December 16th, 2021. Site cleanup and demobilization was completed on December 16th.

Please review the attached application summary, map, injection log and photo log for more detail on the application.

RRS appreciates the opportunity to work at this site with Floyd Snider. RRS will be available to interpret the field data as it is collected or answer any questions. If you need additional information regarding the application process or attached field notes, please contact Isaac Gregg at (720.955.5142) or Will Mohan at (224.754.2660).

Sincerely,

Isaac Gregg
Remediation Services Project Manager
REGENESIS Remediation Services

Will Mohan
Project Supervisor
REGENESIS Remediation Services

Application Summary Page



OVERVIEW

Client: Floyd Snider

Client PM: Kristin Anderson

RRS Project Manager: Isaac Gregg

RRS Project Supervisor: Will Mohan

Site Address: 2737 W. Commodore Way, Seattle, WA, 98199

Project Name: Time Oil Cantera

Project Dates: 12/07/2021 to 12/16/2021

Product

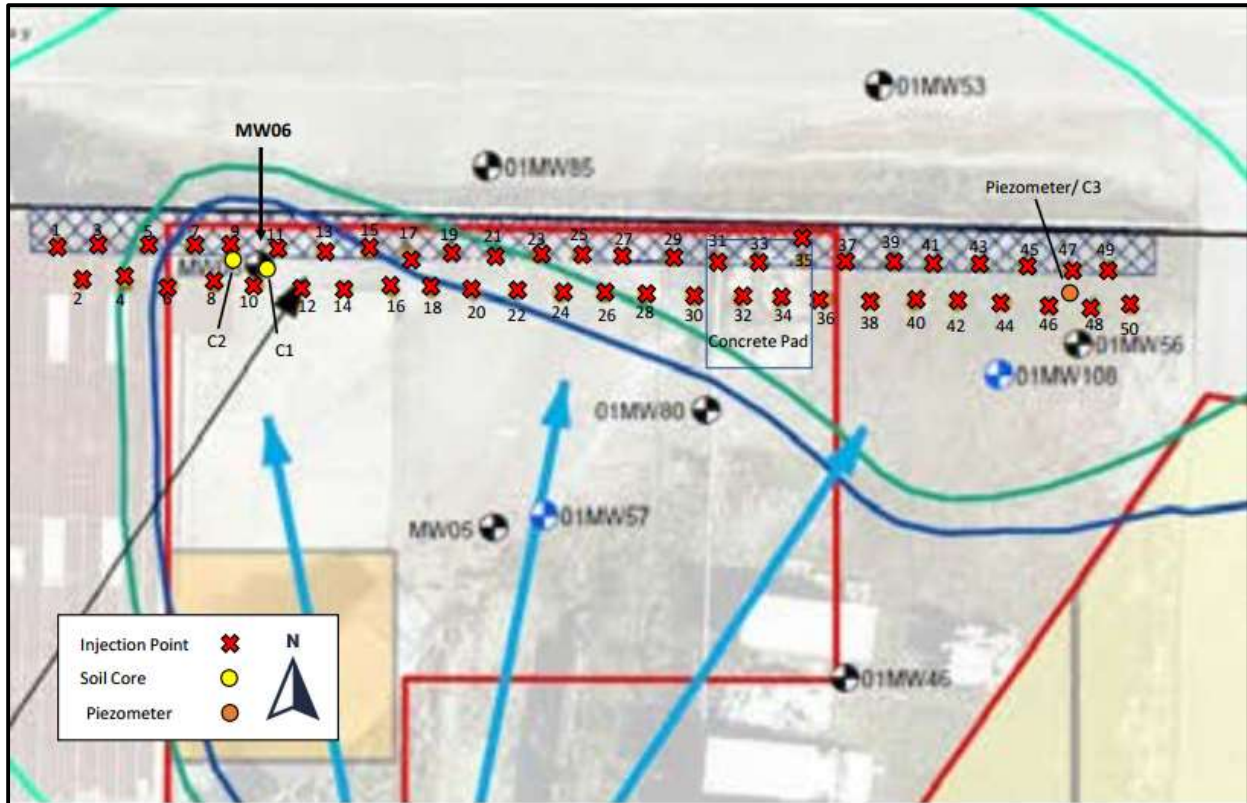
RegenesiS Remediation Services (RRS) applied PlumeStop, S-Micro ZVI and BDI Plus on-site by using an *in-situ* remediation method to treat a CVOC plume by installing a permeable reactive barrier (PRB).

PlumeStop consists of carbon particles milled to 1 to 2 micrometers. The particle size and the proprietary surface chemistry allow the carbon particles to be suspended as a colloid. The material was formulated to not only flow as a colloidal liquid without fracturing (i.e. through well networks and aquifers), but also allow the PlumeStop carbon to attach to soil particles once contacted.

S-MicroZVI, an advanced zero-valent iron (ZVI) product proven to accomplish *In Situ* Chemical Reduction (ISCR) of contaminants within the subsurface environment. S-MicroZVI is delivered as a colloidal suspension 40% ZVI by weight in glycerol with a particle size of less than 5 microns. S-MicroZVI is manufactured using a state-of-the-art sulfidation process resulting in a particle coating which increases activation toward specific contaminants and extends performance longevity. S-MicroZVI destroys contaminants abiotically and applied to stimulate ISCR-enhanced bioremediation.

BDI Plus is an enriched natural consortium containing species of *Dehalococcoides* sp. (DHC). BDI Plus has been shown to simulate the rapid and complete dechlorination of chlorinated solvents such as tetrachloroethene (PCE), trichloroethene (TCE), dichloroethene (DCE) and vinyl chloride (VC) to non-toxic end products, ethene, carbon dioxide and water.

Figure 1- Map



Application

The injection was completed by pumping on three to four injection points at a time using the RRS injection trailer manifold system. Injection tooling was driven to the target treatment depth via Direct Push Technology (DPT). The initial strategy was to use pressure activated injection probe with a top-down approach. This tool was used overcome potential flowing sands. The odd numbered, downgradient injection points would be set at depths of 21, 23, 25 and 27 feet below ground surface (bgs). The even numbered, upgradient points were set at depths of 22, 24, 26 and 28. This offsetting technique helped install a PRB without any gaps or weak areas. Due to having issues initiating flow with the pressure activated injection probes the RRS team decided to switch to a 2-foot retractable injection screen tool with a bottom-up approach.



Pressure Activated Injection Probe



2-Foot Retractable Screen

Site Preparations

On Site Equipment

- RRS custom-built injection trailer
- Support vehicle
- Auxiliary equipment
- Site safety equipment

Health and Safety Compliance

- RRS arrived on-site on December 7th, 2021. A health and safety meeting was held with all field staff present. RRS performed site reconnaissance, became familiar with the project site, water source, site hazards and completed a jobsite safety inspection. Notable site hazards included: direct contaminant contact, cold weather dangers, dehydration, slip/trip potential on injection hosing, injection line pressure, uneven terrain and multiple third-party crews performing their own tasks. Once completed, the injection trailer was staged and prepared for product transfer and mixing.

General Application Information

The remediation reagent was prepared and applied via an RRS custom-built injection trailer. The injection trailer is fully enclosed and contains mixing tanks, pumps, and a delivery system. Retractable injection screens were used for application into the injection points. The RRS injection trailer used for the completion of this project contains the following components:

- Complete drain conical mixing tanks
- Vortex/Cyclone mixer
- Application pump

- Multiple fluid delivery lines
- Self-sufficient, dedicated power
- Flow and pressure controls
- Backflow prevention
- Pressure bypass controls
- Emergency eyewash and First-Aid station

The application pump is a multiple diaphragm positive displacement pump designed to prevent pulsation of the remediation reagent while being applied. The application pump can deliver the remediation reagent at up to 250 pounds per square inch (psi) at up to 20 gallons per minute (gpm) to overcome potential hydraulic limitations. Mechanisms capable of maintaining and controlling injection pressures and injection flowrates per injection point have been installed to achieve and maintain desired application pressures and flowrates. Safety bypass mechanisms are also installed to release back pressure in the event injection pressures exceed desired application ranges. Our application delivery system can deliver the remediation reagent at up to four (4) separate delivery lines simultaneously, each having the capability of monitoring injection pressures and injection flowrates/totals at any given time. Each delivery line can reach beyond the injection trailer of at least 100 linear feet, limiting the need to move the injection trailer from point to point or in this case limiting the need to move the trailer several times each day. Additional line extensions were utilized when necessary to increase the trailers range without being moved. The remediation reagent solutions were prepared in two (2) 350-gallon conical tanks that are configured with chemically resistant materials. This system setup allows for the remediation reagent solutions to be injected while mixing and preparing the second tank so that downtime is avoided due to mixing and continuous pumping can occur. A vortex/cyclone mixer mounted to the mixing tanks rated with a liquid movement of 1800 gpm in water and is outfitted with a shaft and propellers capable of sustaining a homogenous mixture was used to help mix the reagents properly. For each batch, mix water was extracted from the nearby fire hydrant. Once the water filled to the appropriate volume per the design concentration the remedial reagent was transferred from the totes via an air-driven diaphragm pump. Each tote was measured and marked to show volumetric measurements to ensure accurate reagent dosing.

On-Site Work Summary

2021 Project Schedule:

December 6th: RRS mobilize to Seattle, WA

December 7th – December 10th: On-site Injections

December 13th – December 16th: On-site Injections

December 16th: Site Cleanup and demobilize

Distribution Confirmation

The beginning of the injections took place near MW06 to validate the designed point placement. While injecting into the points adjacent to MW06 (IP-9, IP-10 and IP-11) ground water was continuously monitored using a peristaltic pump. After injecting 140 of the 400 total gallons into IP-9 PlumeStop was observed being pumped out of MW06. During the duration of the injections of the adjacent points the PlumeStop concentrations were measured and reached a concentration of 5,000 milligrams of carbon per liter (mg C/L).

A piezometer (Piezometer-1) was installed between IP-46, IP-47 and IP-48 to validate point placement of the eastern end of the barrier. While injecting on IP-47 and IP-48 groundwater was pumped to the surface using a peristaltic pump. After 350 gallons was injected into each of IP-47 and 48 PlumeStop was observed, a concentration of 2,000 mg C/L was recorded. After the completion of IP-46 the PlumeStop concentration increased to 4,000 mg C/L.

There were three soil cores collected throughout the project, including one soil core taken during the piezometer installation. Due to the high surface area created by the high percentages of clays and fines in the target treatment zone it would not be expected to see free phase carbon in the soil cores. Also, the dark gray sand, silts and clays in the cores make a poor contrast between them and the PlumeStop. The relatively low designed injection concentration would not provide for visual black staining of the soil. Locations of the wells, injection points, piezometer and cores can be found in **Figure 1**.

Plumestop/S-Micro ZVI/BDI Plus Permeable Reactive Barrier

A total of 10,000 lbs. of Plumestop, 3,500 lbs. of S-Micro ZVI and 18 liters of BDI Plus was mixed with 18,628 gallons of water and applied to the 50 injection points, totaling 20,000 gallons of mixed product.

Application Method: Direct push drilling with 2-foot retractable screens and pressure activated injection probes.

Injection Depth: 20 to 28 feet below ground surface

Number of Injection Points: 50

Deviations From Proposal: The pressure activated probes were not functioning as expected so a decision was made to switch to 2-foot retractable screens to accomplish design goals.

Please see attached Table 1 for details on injection flow rates and pressures observed.

RRS appreciates the opportunity to work with Floyd Snider at this site. If you need additional information regarding the application event or have any questions, please feel free to contact Isaac Gregg at (720.955.5142) or Will Mohan at (224.754.2660).

Table 1

Injection Point	Date	Time	Injection Interval (feet)	Injection Tool Depth (feet)	Injection Pressure (psi)	Flow Rate (gpm)	Volume of PlumeStop Injected			Total Gallons Per Location	Batches Injected Per Location	Pounds of PlumeStop Injected Per Location	Pounds of S-Micro ZVI Per Location	Liters of BDI Per Interval	Comments	Injection Tooling
							Beginning Flow Meter (gal)	Ending Flow Meter (gal)	Gallons Injected Per Interval							
IP-1	12/9/2021	13:02	26-28	-	91	4.20	0.00	100.00	100.00	400	1.33	200	70	0.090	Short circuiting out of IP-2. ~1 gallons of surfaced material. Plug with bentonite	2-Foot Screen
	12/9/2021	13:30	24-26	-	80	4.50	100.00	200.00	100.00					0.090		
	12/9/2021	13:52	22-24	-	23	5.60	200.00	300.00	100.00					0.090		
	12/9/2021	14:20	20-22	-	22	5.50	300.00	400.00	100.00					0.090		
IP-2	12/9/2021	13:10	26-28	-	82	3.20	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/9/2021	13:27	24-26	-	66	5.60	100.00	200.00	100.00					0.090		
	12/9/2021	13:50	22-24	-	49	4.80	200.00	300.00	100.00					0.090		
	12/9/2021	14:20	20-22	-	44	4.50	300.00	400.00	100.00					0.090		
IP-3	12/10/2021	8:33	26-28	-	114	3.60	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/10/2021	9:04	24-26	-	118	5.60	100.00	200.00	100.00					0.090		
	12/10/2021	9:22	22-24	-	86	5.90	200.00	300.00	100.00					0.090		
	12/10/2021	9:44	20-22	-	75	5.90	300.00	400.00	100.00					0.090		
IP-4	12/9/2021	9:47	20-22	22	147	3.00	0.00	100.00	100.00	400	1.33	200	70	0.090		Pressure Activated Probe
	12/9/2021	10:24	22-24	24	127	5.40	100.00	200.00	100.00					0.090		
	12/9/2021	11:04	24-26	26	120	5.00	200.00	300.00	100.00					0.090		
	12/9/2021	11:38	26-28	28	134	3.80	300.00	400.00	100.00					0.090		
IP-5	12/10/2021	11:02	26-28	-	115	4.00	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/10/2021	11:28	24-26	-	89	4.80	100.00	200.00	100.00					0.090		
	12/10/2021	11:51	22-24	-	77	5.00	200.00	300.00	100.00					0.090		
	12/10/2021	12:18	20-22	-	70	4.80	300.00	400.00	100.00					0.090		
IP-6	12/8/2021	14:52	20-22	22	115	5.50	0.00	100.00	100.00	400	1.33	200	70	0.090		Pressure Activated Probe
	12/8/2021	15:11	22-24	24	136	4.00	100.00	200.00	100.00					0.090		
	12/8/2021	15:53	24-26	26	144	3.40	200.00	300.00	100.00					0.090		
	12/9/2021	8:10	26-28	28	152	2.70	300.00	400.00	100.00					0.090		
IP-7	12/13/2021	8:55	20-22	21	137	3.80	0.00	100.00	100.00	400	1.33	200	70	0.090		Pressure Activated Probe
	12/13/2021	9:33	22-24	23	99	3.30	100.00	200.00	100.00					0.090		
	12/13/2021	9:42	24-26	25	30	6.20	200.00	300.00	100.00					0.090		
	12/13/2021	10:00	26-28	27	10	2.20	300.00	400.00	100.00					0.090		
IP-8	12/8/2021	10:12	20-22	22	130	2.80	0.00	100.00	100.00	400	1.33	200	70	0.090		Pressure Activated Probe
	12/8/2021	11:44	22-24	24	148	3.00	100.00	200.00	100.00					0.090		
	12/8/2021	12:25	24-26	26	108	4.60	200.00	300.00	100.00					0.090		
	12/8/2021	12:55	26-28	28	150	2.50	300.00	400.00	100.00					0.090		
IP-9	12/7/2021	11:09	20-22	21	151	3.30	0.00	100.00	100.00	400	1.33	200	70	0.090	PS in MW-06 after 140 gallons injected. MW-06 contains 5,000 mg C/L	Pressure Activated Probe
	12/7/2021	11:50	22-24	23	147	1.00	100.00	200.00	100.00					0.090		
	12/7/2021	12:54	24-26	25	118	2.90	200.00	300.00	100.00					0.090		
	12/7/2021	13:58	26-28	27	134	3.40	300.00	400.00	100.00					0.090		
IP-10	12/7/2021	14:40	20-22	22	139	3.00	0.00	100.00	100.00	400	1.33	200	70	0.090		Pressure Activated Probe
	12/7/2021	15:17	22-24	24	114	5.40	100.00	200.00	100.00					0.090		
	12/7/2021	16:00	24-26	26	154	3.30	200.00	300.00	100.00					0.090		
	12/8/2021	8:24	26-28	28	88	3.50	300.00	400.00	100.00					0.090		
IP-11	12/7/2021	11:10	20-22	21	150	4.50	0.00	100.00	100.00	400	1.33	200	70	0.090	No flow. Pull up 2 feet then push back down 2 feet to initiate flow	Pressure Activated Probe
	12/7/2021	12:04	22-24	23	155	1.60	100.00	200.00	100.00					0.090		
	12/7/2021	13:02	24-26	25	120	3.20	200.00	300.00	100.00					0.090		
	12/7/2021	13:49	26-28	27	118	2.80	300.00	400.00	100.00					0.090		
IP-12	12/7/2021	14:06	20-22	22	149	3.70	0.00	100.00	100.00	400	1.33	200	70	0.090		Pressure Activated Probe
	12/7/2021	15:50	22-24	24	161	2.80	100.00	200.00	100.00					0.090		
	12/8/2021	8:24	24-26	26	120	1.80	200.00	300.00	100.00					0.090		
	12/8/2021	9:47	26-28	28	123	4.40	300.00	400.00	100.00					0.090		
IP-13	12/8/2021	12:26	20-22	21	112	3.20	0.00	100.00	100.00	400	1.33	200	70	0.090		Pressure Activated Probe
	12/8/2021	13:00	22-24	23	136	3.60	100.00	200.00	100.00					0.090		
	12/8/2021	13:31	24-26	25	139	3.20	200.00	300.00	100.00					0.090		
	12/8/2021	14:19	26-28	27	144	3.00	300.00	400.00	100.00					0.090		
IP-14	12/8/2021	8:57	20-22	22	90	3.80	0.00	100.00	100.00	400	1.33	200	70	0.090		Pressure Activated Probe
	12/8/2021	9:47	22-24	24	126	3.60	100.00	200.00	100.00					0.090		
	12/8/2021	10:18	24-26	26	99	6.10	200.00	300.00	100.00					0.090		
	12/8/2021	11:43	26-28	28	130	4.20	300.00	400.00	100.00					0.090		
IP-15	12/8/2021	13:41	20-22	21	144	3.80	0.00	100.00	100.00	400	1.33	200	70	0.090		Pressure Activated Probe
	12/8/2021	14:11	22-24	23	120	3.30	100.00	200.00	100.00					0.090		
	12/8/2021	14:54	24-26	25	151	3.00	200.00	300.00	100.00					0.090		
	12/8/2021	13:30	26-28	27	139	3.10	300.00	400.00	100.00					0.090		
IP-16	12/9/2021	8:15	20-22	22	150	2.00	0.00	100.00	100.00	400	1.33	200	70	0.090		Pressure Activated Probe
	12/9/2021	9:30	22-24	24	150	2.20	100.00	200.00	100.00					0.090		
	12/9/2021	10:05	24-26	26	143	2.60	200.00	300.00	100.00					0.090		
	12/9/2021	11:12	26-28	28	122	3.10	300.00	400.00	100.00					0.090		
IP-17	12/9/2021	14:00	26-28	-	48	5.10	0.00	100.00	100.00	400	1.33	200	70	0.090	Injection point moved 1' South to avoid catch basin	2-Foot Screen
	12/9/2021	15:06	24-26	-	55	5.80	100.00	200.00	100.00					0.090		
	12/9/2021	15:29	22-24	-	37	4.20	200.00	300.00	100.00					0.090		
	12/9/2021	16:02	20-22	-	24	4.10	300.00	400.00	100.00					0.090		

IP-18	12/9/2021	10:40	26-28	-	73	5.80	0.00	100.00	100.00	400	1.33	200	70	0.090	Attempting using 2 ft retractable screen with bottom-up approach	2-Foot Screen	
	12/9/2021	10:59	24-26	-	94	4.40	100.00	200.00	100.00					0.090			
	12/9/2021	11:37	22-24	-	92	5.20	200.00	300.00	100.00					0.090			
	12/9/2021	11:48	20-22	-	90	5.00	300.00	400.00	100.00					0.090			
IP-19	12/10/2021	8:57	26-28	-	53	5.00	0.00	100.00	100.00	450	1.50	225	79	0.090		2-Foot Screen	
	12/10/2021	9:15	24-26	-	70	5.10	100.00	200.00	100.00					0.090			
	12/10/2021	9:42	22-24	-	88	5.30	200.00	300.00	100.00					0.090			
	12/10/2021	10:15	20-22	-	66	5.20	300.00	450.00	150.00					0.135			Pumped 50 extra gallons to make up for IP-20
IP-20	12/9/2021	13:10	26-28	-	80	7.20	0.00	100.00	100.00	300	1.00	150	53	0.090		2-Foot Screen	
	12/9/2021	13:27	24-26	-	56	8.40	100.00	200.00	100.00					0.090			
	12/9/2021	13:52	22-24	-	44	7.00	200.00	300.00	100.00					0.090			Stop early due to surfacing 30' to the south underneath the stack of pipes
IP-21	12/10/2021	11:20	26-28	-	48	4.80	0.00	100.00	100.00	450	1.50	225	79	0.090		2-Foot Screen	
	12/10/2021	11:46	24-26	-	33	4.20	100.00	200.00	100.00					0.090			
	12/10/2021	12:10	22-24	-	45	5.50	200.00	300.00	100.00					0.090			
	12/10/2021	12:45	20-22	-	47	6.00	300.00	450.00	150.00					0.135			Pumped 50 extra gallons to make up for IP-20
IP-22	12/10/2021	8:31	26-28	-	52	4.40	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/10/2021	8:59	24-26	-	117	4.90	100.00	200.00	100.00					0.090			
	12/10/2021	9:20	22-24	-	77	6.00	200.00	300.00	100.00					0.090			
	12/10/2021	9:41	20-22	-	54	5.60	300.00	400.00	100.00					0.090			
IP-23	12/13/2021	8:55	26-28	-	237	1.90	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/13/2021	9:33	24-26	-	105	4.00	100.00	200.00	100.00					0.090			
	12/13/2021	9:42	22-24	-	30	6.10	200.00	300.00	100.00					0.090			
	12/13/2021	10:00	20-22	-	10	3.60	300.00	400.00	100.00					0.090			
IP-24	12/10/2021	10:40	26-28	-	47	4.60	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/10/2021	11:08	24-26	-	44	4.40	100.00	200.00	100.00					0.090			
	12/10/2021	11:40	22-24	-	64	4.10	200.00	300.00	100.00					0.090			
	12/10/2021	12:04	20-22	-	55	5.00	300.00	400.00	100.00					0.090			
IP-25	12/13/2021	14:25	26-28	-	57	4.70	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/13/2021	15:02	24-26	-	87	4.20	100.00	200.00	100.00					0.090			
	12/13/2021	15:24	22-24	-	72	4.80	200.00	300.00	100.00					0.090			
	12/13/2021	15:48	20-22	-	50	5.10	300.00	400.00	100.00					0.090			
IP-26	12/13/2021	8:55	26-28	-	123	3.50	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/13/2021	9:33	24-26	-	87	4.00	100.00	200.00	100.00					0.090			
	12/13/2021	9:42	22-24	-	45	4.20	200.00	300.00	100.00					0.090			Sufacing urder underneath pipes ~45' away. Stop pumping for 15 min then resume at lower flowrate. Approximately 5 gallons of surfaced material.
	12/13/2021	10:00	20-22	-	41	4.40	300.00	400.00	100.00					0.090			
IP-27	12/13/2021	12:10	26-28	-	132	3.90	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/13/2021	12:38	24-26	-	86	4.90	100.00	200.00	100.00					0.090			
	12/13/2021	13:00	22-24	-	122	5.40	200.00	300.00	100.00					0.090			
	12/13/2021	13:21	20-22	-	120	5.00	300.00	400.00	100.00					0.090			
IP-28	12/13/2021	15:00	26-28	-	71	4.80	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/13/2021	15:19	24-26	-	66	5.50	100.00	200.00	100.00					0.090			
	12/13/2021	15:39	22-24	-	54	6.00	200.00	300.00	100.00					0.090			
	12/13/2021	13:23	20-22	-	42	4.80	300.00	400.00	100.00					0.090			
IP-29	12/14/2021	8:28	26-28	-	124	2.60	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/14/2021	9:04	24-26	-	11	3.00	100.00	200.00	100.00					0.090			
	12/14/2021	9:27	22-24	-	53	9.40	200.00	300.00	100.00					0.090			
	12/14/2021	10:01	20-22	-	12	3.40	300.00	400.00	100.00					0.090			
IP-30	12/13/2021	12:01	26-28	-	104	4.30	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/13/2021	12:40	24-26	-	88	5.10	100.00	200.00	100.00					0.090			
	12/13/2021	12:58	22-24	-	65	3.60	200.00	300.00	100.00					0.090			
	12/13/2021	13:23	20-22	-	31	4.00	300.00	400.00	100.00					0.090			
IP-31	12/14/2021	11:33	26-28	-	48	6.30	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/14/2021	11:49	24-26	-	44	5.00	100.00	200.00	100.00					0.090			
	12/14/2021	12:11	22-24	-	37	5.30	200.00	300.00	100.00					0.090			
	12/14/2021	12:30	20-22	-	70	5.20	300.00	400.00	100.00					0.090			
IP-32	12/15/2021	10:24	26-28	-	39	4.20	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/15/2021	10:57	24-26	-	114	5.10	100.00	200.00	100.00					0.090			
	12/15/2021	11:25	22-24	-	71	6.40	200.00	300.00	100.00					0.090			
	12/15/2021	11:47	20-22	-	33	3.60	300.00	400.00	100.00					0.090			
IP-33	12/14/2021	13:53	26-28	-	40	4.50	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/14/2021	14:20	24-26	-	32	5.80	100.00	200.00	100.00					0.090			
	12/14/2021	14:42	22-24	-	28	5.50	200.00	300.00	100.00					0.090			
	12/14/2021	15:04	20-22	-	21	4.00	300.00	400.00	100.00					0.090			
IP-34	12/14/2021	11:33	26-28	-	48	3.80	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/14/2021	11:49	24-26	-	78	5.80	100.00	200.00	100.00					0.090			
	12/14/2021	12:11	22-24	-	63	5.50	200.00	300.00	100.00					0.090			
	12/14/2021	12:30	20-22	-	41	5.10	300.00	400.00	100.00					0.090			
IP-35	12/15/2021	13:00	26-28	-	60	8.00	0.00	100.00	100.00	400	1.33	200	70	0.090	Point redrilled just North off concrete pad due to refusal at 4 ft.	2-Foot Screen	
	12/15/2021	13:24	24-26	-	75	2.40	100.00	200.00	100.00					0.090			
	12/15/2021	13:56	22-24	-	43	2.20	200.00	300.00	100.00					0.090			
	12/15/2021	14:33	20-22	-	29	1.40	300.00	400.00	100.00					0.090			
IP-36	12/13/2021	12:38	26-28	-	122	4.00	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen	
	12/13/2021	12:58	24-26	-	101	4.80	100.00	200.00	100.00					0.090			
	12/13/2021	13:20	22-24	-	80	5.30	200.00	300.00	100.00					0.090			
	12/13/2021	13:37	20-22	-	77	4.60	300.00	400.00	100.00					0.090			

IP-37	12/14/2021	13:55	26-28	-	129	4.00	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/14/2021	14:21	24-26	-	102	5.00	100.00	200.00	100.00					0.090		
	12/14/2021	14:45	22-24	-	110	4.60	200.00	300.00	100.00					0.090		
	12/14/2021	15:10	20-22	-	78	4.90	300.00	400.00	100.00					0.090		
IP-38	12/13/2021	15:18	26-28	-	110	4.70	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/13/2021	15:40	24-26	-	77	5.10	100.00	200.00	100.00					0.090		
	12/13/2021	15:58	22-24	-	62	4.90	200.00	300.00	100.00					0.090		
	12/13/2021	16:22	20-22	-	55	5.00	300.00	400.00	100.00					0.090		
IP-39	12/15/2021	12:31	26-28	-	27	2.00	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/15/2021	13:10	24-26	-	94	2.70	100.00	200.00	100.00					0.090		
	12/15/2021	13:56	22-24	-	40	6.30	200.00	300.00	100.00					0.090		
	12/15/2021	14:10	20-22	-	45	3.10	300.00	400.00	100.00					0.090		
IP-40	12/14/2021	8:29	26-28	-	33	3.70	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/14/2021	9:05	24-26	-	53	1.10	100.00	200.00	100.00					0.090		
	12/14/2021	9:51	22-24	-	43	2.30	200.00	300.00	100.00					0.090		
	12/14/2021	10:29	20-22	-	46	3.10	300.00	400.00	100.00					0.090		
IP-41	12/15/2021	14:31	26-28	-	80	4.00	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/15/2021	15:02	24-26	-	105	2.50	100.00	200.00	100.00					0.090		
	12/15/2021	15:20	22-24	-	73	7.10	200.00	300.00	100.00					0.090		
	12/15/2021	15:55	20-22	-	63	4.20	300.00	400.00	100.00					0.090		
IP-42	12/14/2021	11:42	26-28	-	49	3.20	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/14/2021	12:08	24-26	-	57	4.40	100.00	200.00	100.00					0.090		
	12/14/2021	12:33	22-24	-	44	4.00	200.00	300.00	100.00					0.090		
	12/14/2021	12:52	20-22	-	40	3.80	300.00	400.00	100.00					0.090		
IP-43	12/16/2021	9:15	26-28	-	40	3.40	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/16/2021	9:48	24-26	-	28	1.80	100.00	200.00	100.00					0.090		
	12/16/2021	10:20	22-24	-	32	2.90	200.00	300.00	100.00					0.090		
	12/16/2021	10:58	20-22	-	39	3.10	300.00	400.00	100.00					0.090		
IP-44	12/14/2021	8:47	26-28	-	46	5.30	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/14/2021	9:05	24-26	-	53	7.70	100.00	200.00	100.00					0.090		
	12/14/2021	10:01	22-24	-	53	6.50	200.00	300.00	100.00					0.090		
	12/14/2021	10:31	20-22	-	49	4.80	300.00	400.00	100.00					0.090		
IP-45	12/16/2021	9:15	26-28	-	20	3.30	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/16/2021	9:47	24-26	-	51	3.00	100.00	200.00	100.00					0.090		
	12/16/2021	10:29	22-24	-	43	4.10	200.00	300.00	100.00					0.090		
	12/16/2021	11:10	20-22	-	32	2.40	300.00	400.00	100.00					0.090		
IP-46	12/15/2021	12:17	26-28	-	80	3.10	0.00	100.00	100.00	400	1.33	200	70	0.090	Piezometer reading at 3000 mg/l after 40 gallons injected	2-Foot Screen
	12/15/2021	13:14	24-26	-	25	3.70	100.00	200.00	100.00					0.090	Piezometer reading at 4000 mg/l after 115 gallons injected	
	12/15/2021	13:56	22-24	-	25	2.70	200.00	300.00	100.00					0.090		
	12/15/2021	14:19	20-22	-	32	3.60	300.00	400.00	100.00					0.090		
IP-47	12/15/2021	9:52	26-28	-	53	4.20	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/15/2021	10:33	24-26	-	20	3.30	100.00	200.00	100.00					0.090		
	12/15/2021	10:55	22-24	-	38	6.90	200.00	300.00	100.00					0.090		
	12/15/2021	11:20	20-22	-	34	2.70	300.00	400.00	100.00					0.090		
IP-48	12/15/2021	9:39	26-28	-	68	2.80	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/15/2021	9:57	24-26	-	80	3.80	100.00	200.00	100.00					0.090		
	12/15/2021	10:43	22-24	-	26	2.50	200.00	300.00	100.00					0.090		
	12/15/2021	11:13	20-22	-	30	3.40	300.00	400.00	100.00					0.090		
IP-49	12/16/2021	11:45	26-28	-	43	7.90	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/16/2021	12:01	24-26	-	38	4.20	100.00	200.00	100.00					0.090		
	12/16/2021	12:28	22-24	-	42	5.10	200.00	300.00	100.00					0.090		
	12/16/2021	12:50	20-22	-	34	5.70	300.00	400.00	100.00					0.090		
IP-50	12/16/2021	9:16	26-28	-	40	5.50	0.00	100.00	100.00	400	1.33	200	70	0.090		2-Foot Screen
	12/16/2021	9:46	24-26	-	49	7.60	100.00	200.00	100.00					0.090		
	12/16/2021	10:09	22-24	-	38	6.40	200.00	300.00	100.00					0.090		
	12/16/2021	10:40	20-22	-	43	6.70	300.00	400.00	100.00					0.090		
										Total Gallons:	Total Number of Batches:	Total Lbs. PlumeStop	Total Lbs. of S-Micro ZVI	Total Litres of BDI:		
										20000	66.67	10000	3500	18.000		

Photo Log



Photo 1: View of Plumestop totes and S-Micro ZVI barrels on site at TOC. East view.



Photo 2: View of 500-gallon water wagon provided by ESN that is connected to RRS injection trailer. Southeast view.



Photo 3: ESN personnel lifting injection rods to specified interval. Southeast view.



Photo 4: View of Floyd Snider's monitoring well equipment.



Photo 5: A concrete coring drill was brought out to pre-core IP-31 to IP-35. Northeast view



Photo 6: A piezometer was installed between IP-47 (left) and IP-48 (right). Northeast view.



Core 1- Taken between IP-11 and IP-12 at 11:00 on 12/8/21

Table J.1
Water Quality Monitoring Confirmation Data During PlumeStop Injections

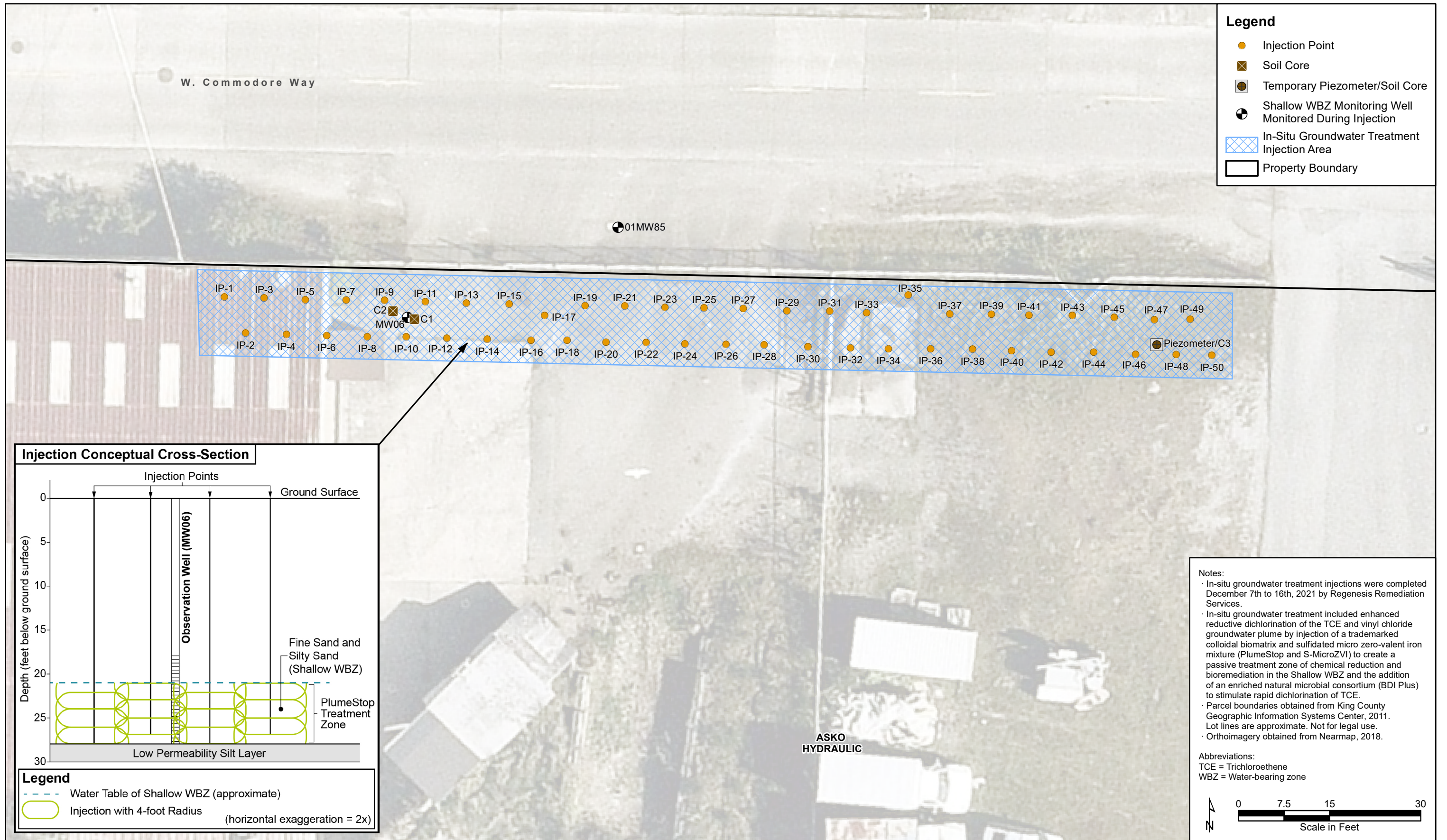
Monitoring Well	Date	Time	Temp (°C)	Dissolved Oxygen (mg/L)	Specific Conductivity (µS/cm)	pH	ORP (mV)	Turbidity (NTU)	Color
MW06 ⁽¹⁾	7-Dec	11:20	13.5	1.0	538	6.65	102.8	--	Clear
		13:20	14.4	1.6	1500	7.09	-31.5	1.77	Black
		13:27	14.2	0.73	1770	7.25	-107	1.83	Black
		13:47	13.4	0.46	1881	9.05	-240	2.21	Black
		14:02	12.3	0.42	1915	9.76	-230.8	2.96	Black
		14:20	12.0	0.40	1910	9.46	-231.2	3.34	Black
		15:04	12.4	0.39	2294	9.17	-233.6	3.49	Black
	8-Dec	15:36	12.3	0.35	2295	8.97	-250.1	3.58	Black
		9:50	11.4	1.04	2134	9.92	-60.2	9.9	Black
		10:20	12.3	0.52	2154	8.86	-296.7	3.32	Black
		11:50	10.3	0.4	2150	8.95	-244.5	2.95	Black
		13:20	12.7	0.51	2120	8.89	-304.5	3.23	Black
		14:10	13	0.32	2071	8.91	-321.4	2.65	Black
		14:55	12.4	0.31	2037	8.94	-268.5	2.36	Black
	9-Dec	15:45	12.9	0.29	1999	8.92	-252.3	2.16	Black
		16:15	12.6	0.29	1973	8.9	-276.5	2.00	Black
		8:45	11.6	1.18	1805	8.9	-93.3	2.55	Black
		9:00	12	0.8	1785	8.87	-320.4	2.08	Black
		9:15	12	0.67	1796	8.88	-358.2	1.76	Black
		10:20	11.7	0.74	1776	8.82	-323.7	2.11	Black
	01MW85 ⁽²⁾	9-Dec	11:15	12	0.5	1851	8.92	-255	1.29
12:05			11.5	0.41	1642	8.86	-347	0.85	Black
10-Dec		16:15	12	0.49	582	6.81	-88.6	162	Clear
		16:25	12.1	0.49	579	6.84	-84.3	126	Clear
		10:30	14	1.3	572	6.67	160.8	21.8	Clear
		10:55	13.3	0.95	575	6.71	158.3	7.2	Clear
		11:40	12.4	0.94	563	6.69	154	5.93	Clear
		12:15	13.7	0.69	566	6.71	152	12.8	Clear
13-Dec		13:05	13.7	0.64	565	6.74	143	3.70	Clear
		13:30	13.4	0.63	560	6.73	139	2.85	Clear
		9:50	12.2	1.49	542	6.62	187.9	29	Clear
	10:50	13.5	0.87	554	6.78	184.2	15	Clear	
	12:10	13.1	0.89	545	6.72	172	13.5	Clear	
		13:20	14.6	0.61	569	6.73	145	0.67	Clear

Notes:

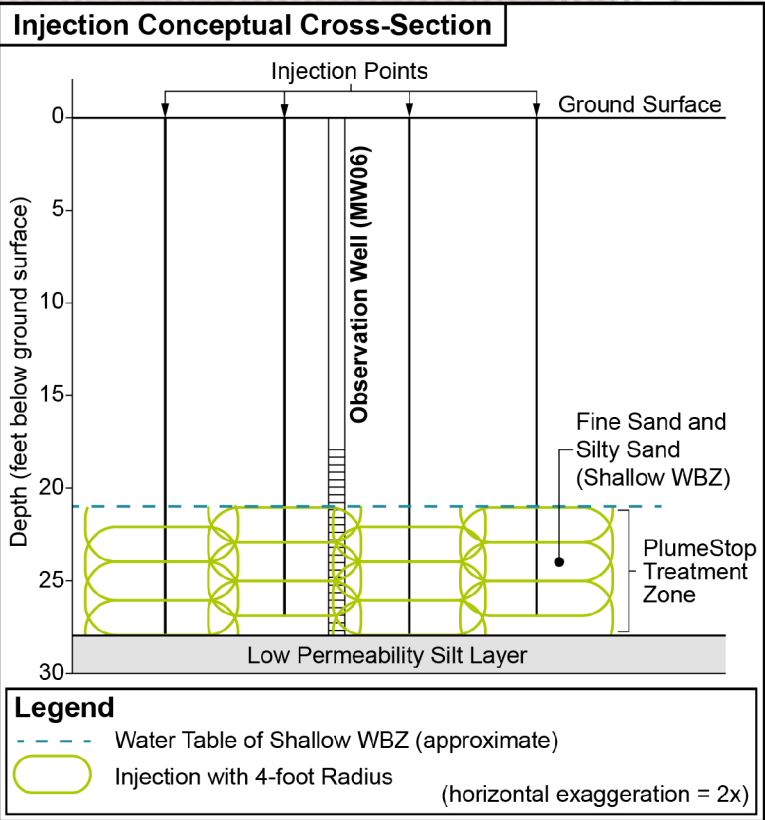
- Groundwater was pumped using a low-flow method with a peristaltic pump. Groundwater quality was measured using a YSI instrument.
- 1 PlumeStop was observed in monitoring well MW06 after pumping 140 gallons of PlumeStop into adjacent injection point IP-9.
- 2 Monitoring well 01MW85 was not anticipated to be inside the radius of influence for the PlumeStop injections; however, groundwater monitoring was completed at this location until the nearest injection point to 01MW85 was finished to determine if PlumeStop was migrating downstream.

Abbreviations:

- °C Degrees Celsius
- mg/L Milligram per liter
- mV Millivolts
- NTU Nephelometric Turbidity unit
- ORP Oxidation reduction potential
- µS/cm Microsiemens per centimeter



- Legend**
- Injection Point
 - ⊠ Soil Core
 - ⊙ Temporary Piezometer/Soil Core
 - ⊕ Shallow WBZ Monitoring Well Monitored During Injection
 - ▨ In-Situ Groundwater Treatment Injection Area
 - ▭ Property Boundary



Notes:

- In-situ groundwater treatment injections were completed December 7th to 16th, 2021 by Regensis Remediation Services.
- In-situ groundwater treatment included enhanced reductive dichlorination of the TCE and vinyl chloride groundwater plume by injection of a trademarked colloidal biomatrix and sulfidated micro zero-valent iron mixture (PlumeStop and S-MicroZVI) to create a passive treatment zone of chemical reduction and bioremediation in the Shallow WBZ and the addition of an enriched natural microbial consortium (BDI Plus) to stimulate rapid dichlorination of TCE.
- Parcel boundaries obtained from King County Geographic Information Systems Center, 2011. Lot lines are approximate. Not for legal use.
- Orthoimagery obtained from Nearmap, 2018.

Abbreviations:

TCE = Trichloroethene
 WBZ = Water-bearing zone

0 7.5 15 30
 Scale in Feet

Appendix K

Product Data Sheets



SAFETY DATA SHEET

LONG DURATION FOAM AC-645

Section 1. Identification

GHS product identifier : LONG DURATION FOAM AC-645
Chemical name : Proprietary Surfactant.
Other means of identification : Aqueous anionic surfactant mixture.
Product type : Liquid.

Relevant identified uses of the substance or mixture and uses advised against

Product use : Aqueous Surfactant. Spray application for VOC and Odor control.
Area of application : Industrial applications.

Supplier/Manufacturer : Rusmar, Inc.
216 Garfield Avenue
West Chester, PA 19380
Phone: 610-436-4314
Fax: 610-436-8436

e-mail address of person responsible for this SDS : info@rusmarinc.com
Website: www.rusmarinc.com

Emergency telephone number (with hours of operation) : 888 488 8044 or 212 682 1200
CHEMTREC 800 424 9300

Section 2. Hazards identification

OSHA/HCS status : While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this SDS contains valuable information critical to the safe handling and proper use of the product. This SDS should be retained and available for employees and other users of this product.

Classification of the substance or mixture : Not classified.

GHS label elements

Signal word : No signal word.
Hazard statements : No known significant effects or critical hazards.

Precautionary statements

Prevention : Not applicable.
Response : Not applicable.
Storage : Not applicable.
Disposal : Not applicable.

Hazards not otherwise classified : None known.

Date of issue/Date of revision : 05/28/2015 **Date of previous issue** : No previous validation **Version** : 1 1/11

Section 3. Composition/information on ingredients

Substance/mixture : Substance
Chemical name : Proprietary Surfactant.
Other means of identification : Aqueous anionic surfactant mixture.

CAS number/other identifiers

CAS number : Not available.
Product code : Not available.

Ingredient name	Other names	%	CAS number
Proprietary Surfactant.	-	100	-

Any concentration shown as a range is to protect confidentiality or is due to batch variation.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health and hence require reporting in this section.

Section 4. First aid measures

Description of necessary first aid measures

Eye contact : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Get medical attention if irritation occurs.

Inhalation : Remove victim to fresh air and keep at rest in a position comfortable for breathing. Get medical attention if symptoms occur.

Skin contact : Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if symptoms occur.

Ingestion : Wash out mouth with water. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Do not induce vomiting unless directed to do so by medical personnel. Get medical attention if symptoms occur.

Most important symptoms/effects, acute and delayed

Potential acute health effects

Eye contact : No known significant effects or critical hazards.
Inhalation : No known significant effects or critical hazards.
Skin contact : No known significant effects or critical hazards.
Ingestion : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Eye contact : No specific data.
Inhalation : No specific data.
Skin contact : No specific data.
Ingestion : No specific data.

Indication of immediate medical attention and special treatment needed, if necessary

Notes to physician : Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

Specific treatments : No specific treatment.

Section 4. First aid measures

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

See toxicological information (Section 11)

Section 5. Fire-fighting measures

Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

Specific hazards arising from the chemical : In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
sulfur oxides

Special protective actions for fire-fighters : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

Section 6. Accidental release measures

Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also the information in "For non-emergency personnel".

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods and materials for containment and cleaning up

Small spill : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

Section 6. Accidental release measures

- Large spill** : Stop leak if without risk. Move containers from spill area. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

Section 7. Handling and storage

Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8).
- Advice on general occupational hygiene** : Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. See also Section 8 for additional information on hygiene measures.

- Conditions for safe storage, including any incompatibilities** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

Section 8. Exposure controls/personal protection

Control parameters

Occupational exposure limits

None.

- Appropriate engineering controls** : Good general ventilation should be sufficient to control worker exposure to airborne contaminants.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Individual protection measures

- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Eye/face protection** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: safety glasses with side-shields.

Skin protection

Section 8. Exposure controls/personal protection

- Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
- Body protection** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Other skin protection** : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Section 9. Physical and chemical properties

Appearance

- Physical state** : Liquid. [Clear viscous liquid.]
- Color** : Translucent. White.
- Odor** : Odorless.
- Odor threshold** : Not available.
- pH** : Not available.
- Melting point** : Not available.
- Boiling point** : 99°C (210.2°F)
- Flash point** : Not applicable.
- Evaporation rate** : Not available.
- Flammability (solid, gas)** : Not applicable.
- Lower and upper explosive (flammable) limits** : Not available.
- Vapor pressure** : 3.3 kPa (25 mm Hg) [room temperature]
- Vapor density** : Not available.
- Relative density** : 1.01 to 1.06
- Solubility** : Easily soluble in the following materials: cold water and hot water.
- Solubility in water** : Easily soluble.
- Partition coefficient: n-octanol/water** : Not available.
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : Not available.
- SADT** : Not available.
- Viscosity** : Not available.

Section 10. Stability and reactivity

Reactivity	: No specific test data related to reactivity available for this product or its ingredients.
Chemical stability	: The product is stable.
Possibility of hazardous reactions	: Under normal conditions of storage and use, hazardous reactions will not occur. Under normal conditions of storage and use, hazardous polymerization will not occur.
Conditions to avoid	: Keep away from heat.
Incompatible materials	: No specific data.
Hazardous decomposition products	: Low levels of sulfur oxides on exposure to high temperatures (concentrate).

Section 11. Toxicological information

Information on toxicological effects

Acute toxicity

Not available.

Conclusion/Summary : Not expected.

Irritation/Corrosion

Not available.

Sensitization

Not available.

Mutagenicity

Conclusion/Summary : Not available.

Carcinogenicity

Conclusion/Summary : Not available.

Reproductive toxicity

Conclusion/Summary : Not available.

Teratogenicity

Conclusion/Summary : Not available.

Specific target organ toxicity (single exposure)

Not available.

Specific target organ toxicity (repeated exposure)

Not available.

Aspiration hazard

Not available.

Information on the likely routes of exposure : Not available.

Section 11. Toxicological information

Potential acute health effects

Eye contact	: No known significant effects or critical hazards.
Inhalation	: No known significant effects or critical hazards.
Skin contact	: No known significant effects or critical hazards.
Ingestion	: No known significant effects or critical hazards.

Symptoms related to the physical, chemical and toxicological characteristics

Eye contact	: No specific data.
Inhalation	: No specific data.
Skin contact	: No specific data.
Ingestion	: No specific data.

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Long term exposure

Potential immediate effects	: Not available.
Potential delayed effects	: Not available.

Potential chronic health effects

Not available.

General	: No known significant effects or critical hazards.
Carcinogenicity	: No known significant effects or critical hazards.
Mutagenicity	: No known significant effects or critical hazards.
Teratogenicity	: No known significant effects or critical hazards.
Developmental effects	: No known significant effects or critical hazards.
Fertility effects	: No known significant effects or critical hazards.

Numerical measures of toxicity

Acute toxicity estimates

Not available.

Section 12. Ecological information

Toxicity

Not available.

Persistence and degradability

Not available.

Section 12. Ecological information

Bioaccumulative potential

Not available.

Mobility in soil

Soil/water partition coefficient (K_{oc}) : Not available.

Other adverse effects : No known significant effects or critical hazards.

Section 13. Disposal considerations

Disposal methods : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Section 14. Transport information

	DOT Classification	IMDG	IATA
UN number	Not regulated.	Not regulated.	Not regulated.
UN proper shipping name	-	-	-
Transport hazard class(es)	-	-	-
Packing group	-	-	-
Environmental hazards	No.	No.	No.
Additional information	-	-	-

Special precautions for user : **Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not available.

Section 15. Regulatory information

U.S. Federal regulations : **United States inventory (TSCA 8b):** Not determined.

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

SARA 302/304

Composition/information on ingredients

No products were found.

SARA 304 RQ : Not applicable.

SARA 311/312

Classification : Not applicable.

Composition/information on ingredients

No products were found.

SARA 313

Not applicable.

State regulations

Massachusetts : This material is not listed.

New York : This material is not listed.

New Jersey : This material is not listed.

Pennsylvania : This material is not listed.

California Prop. 65

None of the components are listed.

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol (Annexes A, B, C, E)

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Inform Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

Section 16. Other information

Hazardous Material Information System (U.S.A.)

Health	0
Flammability	0
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on SDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.)



Reprinted with permission from NFPA 704-2001, Identification of the Hazards of Materials for Emergency Response Copyright ©1997, National Fire Protection Association, Quincy, MA 02269. This reprinted material is not the complete and official position of the National Fire Protection Association, on the referenced subject which is represented only by the standard in its entirety.

Copyright ©2001, National Fire Protection Association, Quincy, MA 02269. This warning system is intended to be interpreted and applied only by properly trained individuals to identify fire, health and reactivity hazards of chemicals. The user is referred to certain limited number of chemicals with recommended classifications in NFPA 49 and NFPA 325, which would be used as a guideline only. Whether the chemicals are classified by NFPA or not, anyone using the 704 systems to classify chemicals does so at their own risk.

Procedure used to derive the classification

Classification	Justification
Not classified.	

History

Date of issue/Date of revision	: 05/28/2015
Date of previous issue	: No previous validation
Version	: 1
Prepared by	: IHS
Key to abbreviations	: ATE = Acute Toxicity Estimate BCF = Bioconcentration Factor GHS = Globally Harmonized System of Classification and Labelling of Chemicals IATA = International Air Transport Association IBC = Intermediate Bulk Container IMDG = International Maritime Dangerous Goods LogPow = logarithm of the octanol/water partition coefficient MARPOL 73/78 = International Convention for the Prevention of Pollution From Ships, 1973 as modified by the Protocol of 1978. ("Marpol" = marine pollution) UN = United Nations

Section 16. Other information

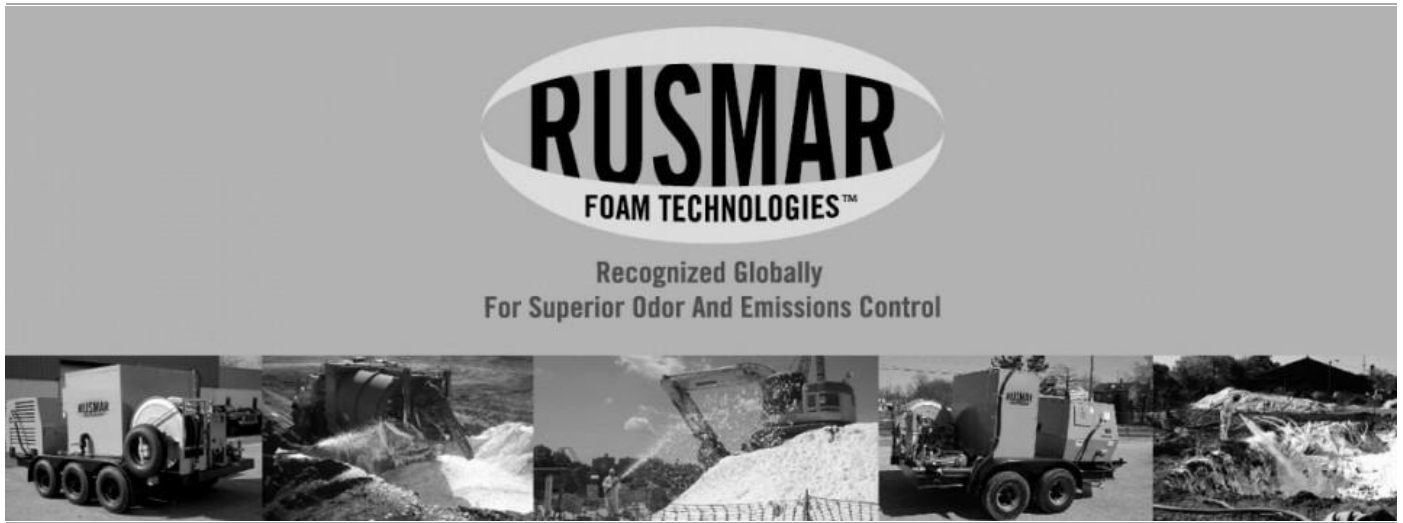
References : HCS (U.S.A.)- Hazard Communication Standard
International transport regulations

✔ Indicates information that has changed from previously issued version.

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.

Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.



HOME » RUSMAR PRODUCTS » OC (AC645)

OC (AC645)

RUSMAR INCORPORATED
HEADQUARTERS

216 Garfield Avenue
West Chester, PA 19380
1-800-733-3626

Advertisements



RusFoam® OC (AC645)

The Odor-Control Foam

RusFoam® OC long duration foam produces a thick, long-lasting, viscous foam barrier for immediate control of dust, odors and volatile organic compounds (VOCs).

RusFoam® OC is recognized by the U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers, state agencies and major corporations as providing superior emission control for a period up to 17 hours. It has been specified for use at Superfund and other hazardous waste sites across the United States and Canada, and elsewhere in the world.

RusFoam® OC is designed for use with all Rusmar Pneumatic Foam Units.

FEATURES

- Biodegradable
- Non-hazardous
- Non-combustible
- Non-reactive

Privacy & Cookies: This site uses cookies. By continuing to use this website, you agree to their use.
To find out more, including how to control cookies, see here: [Cookie Policy](#)

Close and accept

BENEFITS

- Easy to use
- Safe for workers and environment
- Will not add to soil volume
- Will not add to treatment costs
- More effective than the competition

APPLICATIONS

The primary application for RusFoam® OC is control of odors, VOCs and dust during active excavation and for overnight coverage of contaminated soils at hazardous waste sites.

RusFoam® OC can also be applied on liquid surfaces, such as lagoons and retention ponds.

ODOR CONTROL FOR CHALLENGING PROBLEMS

The remediation of hazardous waste sites often includes excavation of soil contaminated with odorous compounds. RusFoam® OC has no odor itself, although a pleasant wintergreen or vanilla scent can be added. It forms a barrier between contaminants and the atmosphere and can be applied during active excavation to provide an immediate and effective barrier to minimize odors. It is completely biodegradable and poses no threat to workers, neighboring residents or ground water.

SOLVES TRANSPORTATION PROBLEMS

RusFoam® OC can also be applied on top of trucks, railcars and barges for odor and emission control during transport of materials such as contaminated soils or sewage sludge. Ammonia tests performed on trucks containing sewage sludge resulted in a drop of concentration levels from 170 ppm prior to foaming down to 6 ppm after coverage with RusFoam® OC.

- Minimizes worker exposure
- Maintains fence-line odor and VOC emission limits
- Effective on lagoon and pond closures
- Can be applied to near vertical or liquid surfaces

Advertisements



REPORT THIS AD

CONTROLS FUGITIVE DUST

At hazardous waste sites, fugitive dust can present a health hazard. RusFoam® OC can be applied on top of the dusty material to prevent any wind-borne emissions. There is no need to mobilize equipment to immediately cover with soil or tarps. The Pneumatic Foam Unit can be filled and placed at the site to be used at a moment's notice.

CLEANS UP EMERGENCY SPILLS

In emergency spills, odor and VOC control is often difficult because of the terrain and accident conditions. RusFoam® OC can be applied to any shaped object, as well as steep slopes, water, mud, snow and ice. It is non-flammable and non-reactive. Difficult spill problems can be accommodated.

METHOD OF APPLICATION

RusFoam® OC is supplied in either 450 pound (200L) drums or in bulk. Bulk shipments can be stored outside in a Rusmar Bulk Storage-Dilution System. The Bulk Storage and Dilution system is comprised of a 7000 gallon (26,500L) heated and stirred chemical storage tank with a microprocessor to