



July 17, 2017

CH2M HILL Plateau Remediation Company
2420 Stevens Center Place
P.O. Box 1600
Richland, WA 99354
Attn.: Tracey A. Burch

Subject: Geotechnical Laboratory Testing Services, Data Deliverable for SDG # W706002, Rev. 0

Enclosed is the final report on geotechnical analyses performed by RJ Lee Group in conjunction with PBS Engineering and Environmental, Inc. (PBS) for Sample Delivery Group number (SDG #) W706002.

General Set Comments

RJ Lee Group received from CH2M-Hill Plateau Remediation Company (CHPRC) 1 sample to be tested for geotechnical analysis at the Columbia Basin Analytical Laboratories. There is one (1) SIR associated with this SDG.

The CHPRC sample, in SDG # W706002, has been assigned a PBS Geotechnical Lab Sample number per the below table.

CHPRC Sample #	SDG #	Geotechnical Lab Sample #	Date Processed
B39K44	W706002	H-0160	07/14/2017

This project deliverable, provided in Attachment 1, contains the reports of the requested analytical results and a copy of the associated chain of custody for the sample listed above.

The analytical results provided in this deliverable relate only to the items tested. The sample was received in acceptable condition unless otherwise noted in the attached report(s).

I certify that this analytical report is in compliance with the Hanford SOW, both technically and for completeness. Release of the data contained in this hard copy report has been authorized by the Laboratory Director or a designee as verified by the following signature.

Donald Smith
Laboratory Director, Columbia Basin Analytical Laboratories

07/17/2017

Date

If you have any questions, please feel free to contact us at 509-545-4989 or email at don.smith@rjleegroup.com.

Attachment 1

PBS Geotechnical Laboratory Testing Results, SDG # W706002,
Dated July 17, 2017



July 14, 2017

Mr. Larry Lockrem
RJ Lee Group, Inc.
2710 North 20th Avenue
Pasco, Washington 99301

Via email: llockrem@rjleegroup.com

Regarding: Geotechnical Laboratory Testing Results
CH2M HILL Plateau Remediation
Sample Delivery Group No. W706002
PBS Project No. 63797.000

Dear Mr. Lockrem:

PBS Engineering and Environmental Inc. (PBS) is pleased to present the results of our recent geotechnical laboratory testing in accordance with the request provided with Sample Delivery Group (SDG) number W706002.

PBS performed the following tests in general accordance with the relevant ASTM Standards:

- Grain Size Analysis (ASTM D422)
- Permeability of Granular Soils–Constant Head (ASTM D2434)

We trust this letter meets your current needs. If you have any questions, or wish to further discuss our observations, conclusions, and recommendations, please contact us at 509.942.1600.

Sincerely,



07/14/2017

Adam M. Swenson, PE
Project Geotechnical Engineer

Attachment(s): Report of Laboratory Testing – Grain-size Analysis
Report of Laboratory Testing – Permeability of Granular Soils–Constant Head
Chain of Custody



REPORT OF LABORATORY TESTING

Report to: CH2M-Hill - Plateau Remediation 2420 Stevens Center Place PO Box 1600 Richland, WA 99354	Date: 7/14/2017
	Sample Delivery Group No.: W706002
	Sample Authorization No.: F16-037

Project: CHPRC Laboratory	Project No.: 63797.000
Report of: Grain Size Analysis - Hydrometer (ASTM D422)	Lab Technician: P. Brice

Items Received:

One sample was provided to us containing soil material obtained by you, the client. PBS performed the following test:

Particle/Grain Size Analysis - Hydrometer (ASTM D422):

Mechanical Grain Size Analyses (wet sieve) were conducted on each of the soil samples to determine their grain size distribution. In addition, hydrometer tests were conducted on portions of the soil samples passing the No. 10 sieve. The results of the mechanical grain size analyses and hydrometer testing are plotted on the attached Figure (Particle Size Analysis Test Results - Hydrometer, pages 1 through 3).

LABORATORY TEST RESULTS

Particle Grain Size Analysis - Hydrometer (ASTM D422) - Sieve Portion

Customer Sample Number	Laboratory Sample Number	Percent Passing by Sieve Size											
		3-in.	1½-in.	¾-in.	½-in.	No. 4	No. 10	No. 20	No. 40	No. 60	No. 100	No. 140	No. 200
B39K44	H-0160	100	100	83.1	62.0	40.8	24.4	10.6	9.7	8.1	5.0	3.8	3.1



REPORT OF LABORATORY TESTING

Report to: CH2M-Hill - Plateau Remediation 2420 Stevens Center Place PO Box 1600 Richland, WA 99354	Date: 7/14/2017
	Sample Delivery Group No.: W706002
	Sample Authorization No.: F16-037

Project: CHPRC Laboratory	Project No.: 63797.000
Report of: Grain Size Analysis - Hydrometer (ASTM D422)	Lab Technician: P. Brice

Particle/Grain Size Analysis - Hydrometer (ASTM D422):
See page 1 of 3

LABORATORY TEST RESULTS

Particle Grain Size Analysis - Hydrometer (ASTM D422) - Hydrometer Portion

Laboratory Sample Number	Hydrometer Readings													
	2 min		5min		15 min		30 min		60 min		250 min		1440 min	
	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)	Dia. (mm)	Finer (%)
H-0160	0.035	2.9	0.022	2.7	0.013	2.2	0.009	2.0	0.007	1.8	0.003	1.5	0.001	1.2



PARTICLE-SIZE ANALYSIS TEST RESULTS

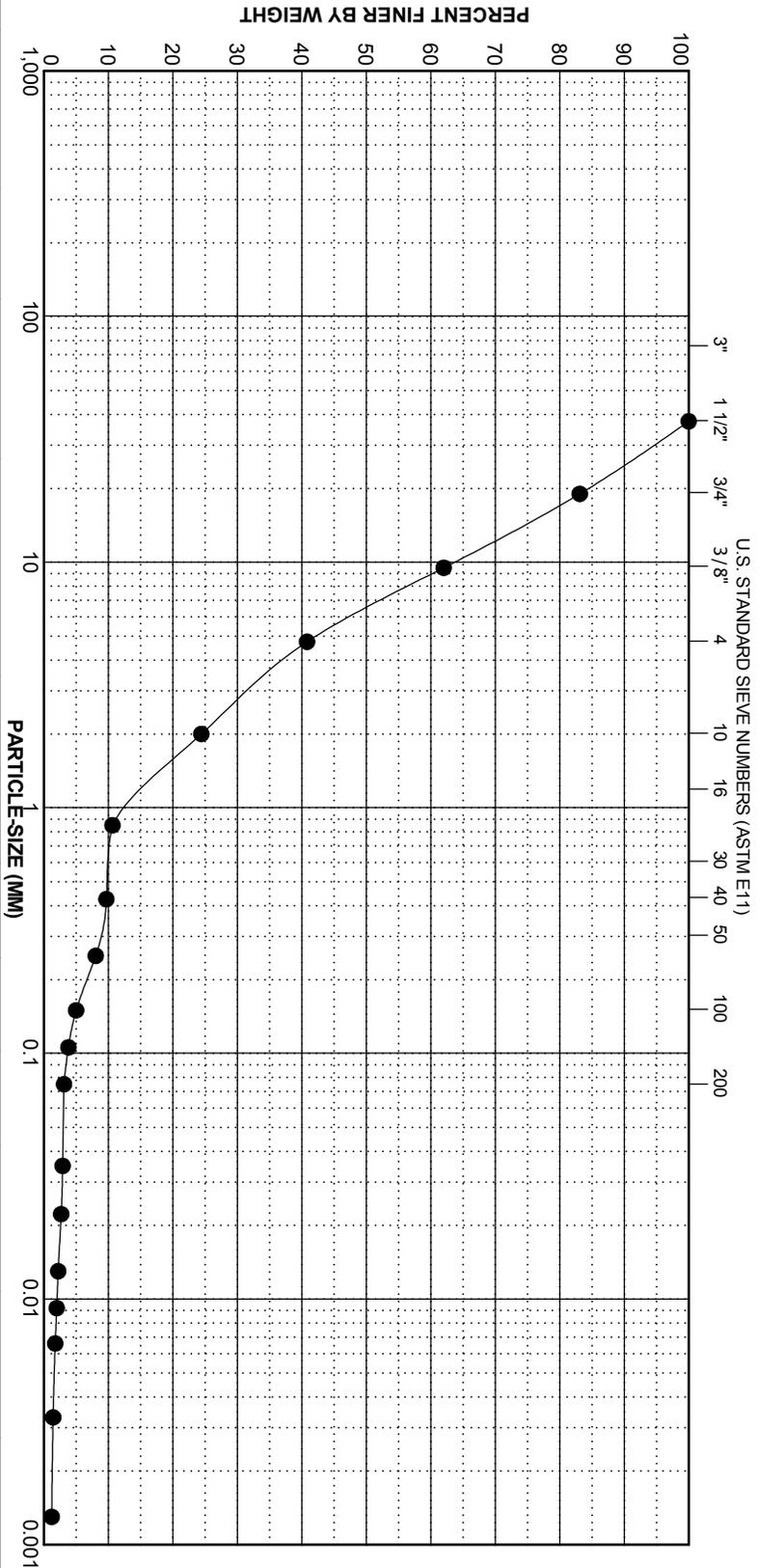
CHPRC - GEOTECHNICAL LABORATORY

PBS PROJECT NUMBER:
63797

PARTICLE-SIZE ANALYSIS-RJ LEE GRP 63797 RESULTS.GPJ PBS DATA\TPL_GEO.GDT PRINT DATE: 7/14/17.RPG

TEST METHOD: ASTM D422

BOULDERS	COBBLES	GRAVEL				SAND			FINES		
		COARSE	FINE	COARSE	MEDIUM	FINE	SILT	CLAY			



KEY	EXPLORATION NUMBER	SAMPLE NUMBER	SAMPLE DEPTH (FEET)	MOISTURE CONTENT (PERCENT)	D60 (MM)	D50 (MM)	D30 (MM)	D10 (MM)	D5 (MM)	GRAVEL (PERCENT)	SAND (PERCENT)	FINES (PERCENT)
●	H-160	B39K44	130.6	5	8.9	6.4	2.7	0.5	0.1	59	38	3

Columbia Basin Analytical Laboratories | 2710 North 20th Avenue, Pasco, WA 99301 | 509.545.4989

WWW.RJLEEGROUP.COM


REPORT OF LABORATORY TESTING

Report to: CH2M-Hill - Plateau Remediation 2420 Stevens Center Place PO Box 1600 Richland, WA 99354	Date: 7/14/2017 Sample Delivery Group No.: W706002 Sample Authorization No.: F16-037
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Project: CHPRC Laboratory	Project No.: 63797.000
Report of: Permeability of Granular Soils - Constant Head (ASTM D2434)	Lab Tech: P. Brice

Items Received:

One sample was provided to us containing soil material obtained by you, the client.
PBS performed the following test:

Permeability of Granular Soils - Constant Head (ASTM D2434).

The permeability of the representative soil was determined in the laboratory using the above referenced samples. The samples were prepared for the permeameter and all the required measures were taken. Air was evacuated from the samples and were then saturated with low mineral content water. The manometer system was attached and a stable head condition was attained. The quantity of flow, water temperature, water head and time were measured. This was repeated, if necessary, to establish an accurate region of laminar flow with velocity.

LABORATORY TEST RESULTS
Permeability of Granular Soils - Constant Head (ASTM D2434)

Customer Sample Number	Laboratory Sample Number	Date of Analysis	Quantity of flow discharged (cm ³)	Dist. between manometers, L (cm)	Specimen area, A (cm ²)	Total discharge time, t (sec)	Head diff. betw. manometers, h (cm)	Avg. Hydraulic Conductivity, k (cm/s)
B39K44	H-0160	7/13/2017	86	6.35	31.48	420	30.9	1.52E-03

SHEET 1 OF 1

REVIEWED BY: A. Swenson, P.E.

REV.0

CH2M Hill Plateau Remediation Company

CHAIN OF CUSTODY/SAMPLE ANALYSIS REQUEST

F16-037-105

PAGE 1 OF 1

COLLECTOR
Roger Friesz Jr.
/CHPRC

COMPANY CONTACT
TODAK, D

TELEPHONE NO.
376-6427

PROJECT COORDINATOR
TODAK, D

PRICE CODE
8H

DATA
TURNAROUND
30 Days / 30
Days

SAMPLING LOCATION
C9713, 1-004

PROJECT DESIGNATION
100-KR-4 Long Term & Interim Action Monitoring - Soil

SAF NO.
F16-037

AIR QUALITY

ORIGINAL

ICE CHEST NO.
NA

FIELD LOGBOOK NO.
HNE-N-645 7-51

ACTUAL SAMPLE DEPTH
130.6 - 131.1

COA
300085

METHOD OF SHIPMENT
GOVERNMENT VEHICLE

SHIPPED TO
RJ LEE - GEOTECHNICAL

OFFSITE PROPERTY NO.
NA

BILL OF LADING/AIR BILL NO.
NA

10.0°C

W706002

MATRIX*
A=Air
DL=Drum
L=Liquids
DS=Drum
Solids
L=Liquid
O=Oil
S=Soil
SE=Sediment
T=Tissue
V=Vegetation
W=Water
WI=Wipe
X=Other

POSSIBLE SAMPLE HAZARDS/ REMARKS
*Contains Radioactive Material at concentrations that are not be regulated for transportation per 49 CFR/LATA Dangerous Goods Regulations but are not releasable per DOE Order 458.1.

PRESERVATION
None

HOLDING TIME
6 Months

TYPE OF CONTAINER
Split Spoon
Liner

SPECIAL HANDLING AND/OR STORAGE
NA

NO. OF CONTAINER(S)
1

VOLUME
1000g

SEE ITEM (1)
IN SPECIAL
INSTRUCTIONS

SAMPLE NO.	MATRIX*	SAMPLE DATE	SAMPLE TIME
B39K44	SOIL	MAY 3 1 2017	0940

(A) liner

CHAIN OF POSSESSION

SIGN/ PRINT NAMES

SPECIAL INSTRUCTIONS

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Roger Friesz Jr. /CHPRC	MAY 3 1 2017 1345	SSU#1	MAY 3 1 2017 1345
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
SSU#1	JUN 0 1 2017 10:30	Janelle Zunker CHPRC	JUN 0 1 2017 0730
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
Janelle Zunker CHPRC	JUN 0 1 2017 10:45	Janelle Zunker CHPRC	JUN 0 1 2017 10:45

TRVL-17-103 ** All requests for Geotechnical Parameters will be given a unique HEIS sample number and be assigned to a separate COC. In addition, all split spoon sleeves will be properly stored until authorized for shipment. ** Laboratory shall perform the Particle Size (Dry Sieve) analysis to determine if they should proceed with Permeability by D2434 or Hydraulic Conductivity by D5084.
(1) D2434_PERMEABILITY: COMMON; D5084_HYDRRAULIC CONDUCTIVITY: COMMON;

RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME
RELINQUISHED BY/REMOVED FROM	DATE/TIME	RECEIVED BY/STORED IN	DATE/TIME

TITLE	DATE/TIME
LABORATORY SECTION	RECEIVED BY
FINAL SAMPLE DISPOSITION	DISPOSAL METHOD

PRINTED ON 4/26/2017

FSR ID = FSR43532

TRVL NUM = TRVL-17-103

A-6003-618 (REV 2)

SAMPLE ISSUE RESOLUTION (SIR) REPORT

SIR Number: SIR17-0821
Rev. Number: 0
Date Initiated: 07/17/2017

SAMPLE EVENT INFORMATION

SAF NUM(S): F16-037
LABORATORY: RJL-GT

SAMPLING INFORMATION

NUMBER OF SAMPLES: 1
SAMPLE NUMBERS: B39K44
SAMPLE MATRIX: SOIL
SDG NUM(S): W706002

ISSUE BACKGROUND

CLASS: General Laboratory Direction
TYPE: Addition of Analyses
DESCRIPTION: The COC special instructions states" Laboratory shall perform the Particle Size (dry Sieve) analysis to determine in they should proceed with permeability by D2434...." however the Particle Size test is not listed under the item 1 analytical list. The missing test should be added via this SIR

RESOLUTION

PROPOSED RESOLUTION: Document the Particle Size analysis request requirement via this SIR.
FINAL RESOLUTION: Accept proposed resolution.

SUBMITTED BY:

FITZGERALD, SL

07/11/2017

ACCEPTED BY:

FITZGERALD, SL

07/17/2017