Appendix A Soil Boring Logs, Geophysical Survey, Monitoring Sampling Forms Well Completion Diagrams, and Well Development Logs

Boring Logs

ch2m

PROJECT NUMBER: BORING NUMBER: 661508 EW-6U SHEET 1 OF 1

Soil Boring Log

PROJECT : UPRR Freeman

LOCATION : Freeman, WA

GROUND ELEVATION :

DRILLING CONTRACTOR : Environmental West Exploration, Inc

	COORDI	NATES:			DRILLING METHOD AND EQUIPMENT : Air Rotary						
	WATER	LEVEL :		STA	ART : 8	8/22/17 10:15 END : 8/22/17 14:20 LOGGER : S. D					
	ow ⊧ACE			STANDARD	g	SOIL DESCRIPTION	COMMENTS				
	DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (%)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SAMPLE TYPE, AIR MONITORING, PID (ppm)				
	DEP GROU	Z	RE	6"-6"-6" (N)	GR/		SOIL GAS MONITORING, FID (ppm)				
						See soil boring log for MW-6U.	1015 - Begin drilling				
	-						 1130 - 25 ft bgs				
	_						1330 - Cased to 47 ft bgs, switch bits to open				
	5						hole, manage IDW				
	-						[–] 1400 - Resume drilling open hole				
	-						[–] 1420 - 65 ft bgs				
	-										
	-										
	10										
	-										
	-										
	_										
	_										
	15										
	_										
	-										
	-										
7	-										
12/13/17	20										
	-										
CK.GI	-										
STO(_										
GPJ,	_										
LLT.	25										
OGS											
AAN L	-										
REEN	-										
UPRR 31ST, FREEMAN LOGS_LLT.GPJ, STOCK.GLB,	-										
RR 31	-										
₽	30										

ch2m

PROJECT NUMBER: BORING NUMBER: 661508 EW-9U SHEET 1 OF 1

Soil Boring Log

PROJECT : UPRR Freeman

LOCATION : Freeman, WA

PROJECT : UPRR Freem	nan		LOCATION : Freeman, WA	LOCATION : Freeman, WA			
GROUND ELEVATION :			DRILLING CONTRACTOR : Environment	ntal West Exploration, Inc			
COORDINATES:			DRILLING METHOD AND EQUIPMENT				
	et /						
WATER LEVEL :	517		3/24/17 08:00 END : 8/24/17 12:45 LOGGER : S. D				
DEPTH BELOW GROUND SURFACE (ft) (ft) (ft) (ft) (ft) (ft) (ft) (ft)	STANDARD PENETRATION TEST RESULTS 6"-6"-6"	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS SAMPLE TYPE, AIR MONITORING, PID (ppm) SOIL GAS MONITORING, FID (ppm)			
0	(N)		See soil boring log for MW-9U	0800 - Begin drilling			
	6"-6" (N)	GRA	See soil boring log for MW-9U.	SOIL GAS MONITORING, FID (ppm) 0800 - Begin drilling 1130 - 42 ft bgs, change bits to drill open hole 1245 - 72 ft bgs 			
_ 25				- - 			
				-			

ecol	ogy and ational Specialis	environme sts in the Environm	e nt, inc.	HA01
Drilling	g Log fo	er <u> </u>	A01	UPRR Railway Siding Grain Elevator
Project Na	ime: Fr	reeman Gro	und Wate	er Scale House
Site Locat		reeman, Wa	shington	
	ed/Finished:			- Io Sootana
Driller's N	lame: NA	eff Fetters		
	s Signature:			Siale
Rig Type(11	Auger		Siale Righway 27
Depth to V	Vater: NA			
Total Dep	th of Borehol	e: 13.5-fee	et bgs	GPS Coordinates:47.520438N, -117.193402W
Depth S	ample San	nple Core	Soil	Comments
(Feet) N		nes Recovery	and the second se	0-6" - Duff
1 <u> </u>	NA N	A NA		 6"-3' - SANDY GRAVEL with CLAY (GW-GC) - Gravel: rounded to sub-rounded, >3 cm; Sand: medium to fine, angular to sub-angular; Silt: tan, slightly moist, trace light tan clay, high mica content 3-10' - CLAY (CL) - bluish gray, moist, stiff, trace fine sand
5 <u> </u> 6 <u> </u> 7 <u> </u> 8 <u> </u>	NA N	A NA		
9 <u> </u>	NA N	IA NA		10-10.5' - CLAY with SILT with (CL-ML) - dark yellowish brown, moist, soft 10.5-13' - CLAY (CL) - bluish gray, moist, stiff, trace fine sand

Depth (Feet)	Sample Number	Sample Times	Core Recovery	Soil Type	Comments
12 13 14	HA01SB13.5	0930	NA		13-13.5' - CLAY with SILT with (CL-ML) - dark yellowish brown, moist, soft
15					
17 ——					
18					
20					
21 —		I			
22					
24 —					
25 —					
26 — 27 —					
28 —					
29 — 30 —	-				
31 —					Total depth = 13.5-feet bgs Receively abandoned with Reptonite Chips from Total Pepth to surface
32 —				-	Borehole abandoned with Bentonite Chips from Total Depth to surface.

ec Inte	ology : emational S	and cny pecialists in t	r ironme he Environme	ent, inc.		Borehole Location Sketch
Drilli	ng Lo	g for	H	A02		UPRR Railway Siding Grain Elevator
Site Loo Date Sta Driller's Geologi Geologi Rig Typ Depth to	arted/Finis s Name: ist's Name ist's Signa be(s):h o Water:	Freen shed: 4/3 NA :: Jeff F dure:	Fetters ger	shingtor)	Scale House
Concernance I	Contract of the		4-feet bg	<u> </u>		GPS Coordinates:47.520392N, -117.193272W
	Sample Number	Sample Times	Core Recovery	Soil Type	North Party	Comments
1 2 3	HA02SB2.5	1135	NA		sub Silt 1.5-2.5' - S/ sub 2.5-4' - SAM sub ang	NDY GRAVEL with CLAY (GW-GC) - Gravel: rounded to -rounded, >3 cm; Sand: medium to fine, angular to sub-angular : tan, slightly moist, trace light tan clay, high mica content AND with SILT (SW-SM) - medium to fine, angular to -angular; Silt: light gray, moist NDY GRAVEL with CLAY (GW-GC) - Gravel: rounded to -rounded, >3 cm; Sand: medium to fine, angular to sub- gular; Silt: tan, slightly moist, trace light tan clay, high mica itent
<u>-</u>						
6						
8						
9 —						
10						
11						
12						= 4-feet bgs bandoned with cuttings Total Depth to surface.

	and env						
Drilling Lo	g for	H	A03	UPRR Railway Siding Grain Elevator			
Project Name: Site Location: Date Started Fin Drifler's Name: Geologist's Nan Geologist's Sigr Rig Type(s):	Freen ished: 4/2 NA he: Jeff F ature: Hand Aug	23/14 Fetters	shington				
Depth to Water: Total Depth of I	Borehole:	9-feet bo	js	GPS Coordinates: <u>47.520425N, -117.193224W</u>			
Depth Sample (Feet) Number		Core Recovery	Soil Type	Comments			
1 ·	NA	NA		 0-4" - Duff 4"-2' - SANDY GRAVEL with CLAY (GW-GC) - Gravel: rounded to sub-rounded, >3 cm; Sand: medium to fine, angular to sub- angular; Silt: tan, slightly moist, trace light tan clay, high mica content 2-2.5' - CLAY with SILT (CL-ML) - light gray, moist, soft, trace fine sand 2.5-8' - CLAY (CL) - bluish gray, moist, stiff, trace fine sand 			
5 6 NA 7	NA	NA					
9	1135	NA		8-9' - SAND with SILT (SW-SM) - medium to fine, angular to sub-angular; Silt: dark yellowish brown, moist, trace clay, high mica content			
11				Total depth = 9-feet bgs Borehole abandoned with cuttings from Total Depth to surface.			



DRILLING METHOD AND EQUIPMENT : 15k Speedstar, Sonic

BORING NUMBER: MW-1D

SHEET 1 OF 4

PROJECT : Grain Handling Facility at Freeman

LOCATION : 30' E Off RR, NE of Facility

ELEVATION : 2598.99 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES: 211096.785, 2539524.622 (ft NAVD88)

WATER LEVEL: START : 7/13/16 08:45 END: 7/14/16 16:40 LOGGER : Ruben Greer DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm SILT with SAND (ML) - brown and gray, dry, lightly cemented, hard... 5 0-2 #1 5'/7' Recovery Gray SILT/CLAY with light gray mottling (ML/CL) - pale fine sand, moist, slightly cohesive, with increasing CLAY in depth. 10_ SAME AS ABOVE - increasing orange oxidation. Gray and oxidized: SILTY CLAY (ML/CL) - increasing oxidation, slight increase in moisture with depth, increasing tan wring (sp?). 15 7-17 #2 11'/10' Recovery SAME AS ABOVE - moist CLAY (CL). 20 FAT CLAY (CH), Moist, with white mottling and trace oxidation... 25 Sharp transition to orange/brown SILT with fine SAND (ML) decreasing moisture, lightly cemented, non-plastic, increasing sand with depth ... 17-27 #3 12'/10' Recovery SAME AS ABOVE - SILT with fine Sand (ML). Increasing gray fat CLAY (CH) - with white mottling and oxidation, increasing gray clay with depth, moist, very stiff. 30



DRILLING METHOD AND EQUIPMENT : 15k Speedstar, Sonic

BORING NUMBER:

MW-1D

SHEET 2 OF 4

PROJECT : Grain Handling Facility at Freeman

LOCATION : 30' E Off RR, NE of Facility

ELEVATION : 2598.99 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 211096.785, 2539524.622 (ft NAVD88)

WATER	LEVEL:				START : 7/13/16 08:45 END : 7/	14/16 16:40		LOGGER : Ruben (Greer
DEPTH E	BELOW SU	JRFACE (I	=T)	U	SOIL DESCRIPTION			COMMENTS	
	INTERV		ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	F	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
					Increasing gray fat CLAY (CH) - with white mottling and	PID (ppn	n)	Breathing Zone	FID (ppm
-					oxidation, increasing gray clay with depth, moist, very stiff.	-			-
-					Gray CLAY, fat (CH) - with white, orange, and black mottling, decreasing moisture, stiff.	-			-
35					Reddish brown CLAY/SILT with fine SAND (CL/ML) - with mica, _ moist, hard. Increasing gray sandy silt at 37' bgs	-			
-					Sandy SILT (ML) - 25% fine sand, moist, gray plus orangish/brown coloring, very stiff.	27-37 Core	: #4 9'/10)' Recovery	-
40	-				Increasing white mottling.	-			
-					Gray sandy SILT (ML) - very hard, slight moisture, increasing mica, decreasing orange/brown coloring.	- └ Very hard d -	drilling		-
-					Increasing CLAY (CL) - gray with fine sand.				-
45					White, brown and gray SILT/CLAY (ML/CL) - possible decomposed granite,.	_ _ Hard drilling	g		
-					Decomposed GRANITE - significant mica, gray and white, very hard, moist. Transition to decomposed sandstone, decreasing oxidation,	37-47 Core TD @ 47 -)' Recovery	-
50					fine, with fine mica sand observed moist.	-			-
-					SAME AS ABOVE - moist.	-			_
-						-			-
55					SAME AS ABOVE - with thin granite intrusions and trace oxidation, moist.	-			
-	57.0				SAME AS ABOVE - decomposed sandstone, gray with veins of granite (decomposed) and localized oxidation, moist.	-			-
60						-			-



DRILLING METHOD AND EQUIPMENT : 15k Speedstar, Sonic

BORING NUMBER:

MW-1D

SHEET 3 OF 4

PROJECT : Grain Handling Facility at Freeman

LOCATION : 30' E Off RR, NE of Facility

ELEVATION : 2598.99 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 211096.785, 2539524.622 (ft NAVD88)

WATER					START : 7/13/16 08:45 END : 7/1	END : 7/14/16 16:40 LOGGER : Ruben Greer			
DEPTH E	BELOW SU	JRFACE (I	-T)	g	SOIL DESCRIPTION		COMMENTS		
	INTERV		ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE	H OF CASING, DRILLING , DRILLING FLUID LOSS, S, & INSTRUMENTATION	,	
				_		PID (ppm)	Breathing Zone	FID (ppm	
-		11.5			Decomposed sandstone, gray with mica, moist.	-		-	
_ 65					Sharp transition to decomposed granite, significant mica, oxidized, white and light gray, moist.	-		-	
_	67.0				Transition to gray decomposed sandstone, moist.	-		-	
- - 70						-		-	
- 10					SAME AS ABOVE.	-			
-		9.0				-		-	
75					-	-			
-	77.0					-		-	
_ 80					Transition to decomposed granite, white and gray mica flakes up to 1" diameter, moist, easily crumbled.	-		-	
-		6.0				-			
 85					Transition to decomposed granite, decreasing mica, trace oxidation, more cohesive, moist.	-			
_	87.0				Transition to gray decomposed sandstone, easily crumbled, decreasing mica and oxidation, moist.	_			
90					Decomposed sandstone/trace mica, moist, hard but crumbly, veins of oxidation throughout, gray, light gray, white.	-		-	



DRILLING METHOD AND EQUIPMENT : 15k Speedstar, Sonic

BORING NUMBER: MW-1D

SHEET 4 OF 4

PROJECT : Grain Handling Facility at Freeman

LOCATION : 30' E Off RR, NE of Facility

ELEVATION : 2598.99 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES: 211096.785, 2539524.622 (ft NAVD88)

WATER LEVEL: START : 7/13/16 08:45 END: 7/14/16 16:40 LOGGER : Ruben Greer DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Transition to gray decomposed sandstone, easily crumbled, decreasing mica and oxidation, moist. SAME AS ABOVE - becoming more gray and oxidized, moist. 95 Decomposed granite, white, black and gray with mica flakes, becoming more oxidized with depth, moist. Sandstone/decomposed sandstone, gray, trace oxidation, decreasing with depth, fine sand, moist. 100 Becoming darker gray, decomposed sandstone, fine, moist, loose, cemented sandstone, easily crumbled, slight increase in mica. 105 Transition to decomposed granite with sandstone, increase in oxidation, moderately cemented, but able to be crumbled.. Bottom of borehole at 107 ft bgs. 110 115 120



SHEET 1 OF 2

SOIL BORING LOG

BORING NUMBER:

MW-1S

PROJECT : Grain Handling Facility at Freeman

LOCATION : E of RR Tracks, NE Area of UPRR Freeman RI

DRILLING METHOD AND EQUIPMENT : Speedstar, Sonic

DRILLING CONTRACTOR : Environmental West Exploration, Inc ELEVATION: 2598.85 ft mslft NAVD88 (ground surface)

PROJECT NUMBER:

661508

COORDINATES : 211100.555, 2539516.893 (ft NAVD88)

	LEVEL:				START : 7/1/16 08:55 END : 7/1/	16 10:30	LOGGER : Ruben (Greer
DEPTH E	BELOW SU		T)	g	SOIL DESCRIPTION		COMMENTS	
	INTERVA	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE TEST	H OF CASING, DRILLING , DRILLING FLUID LOSS, S, & INSTRUMENTATION	
					SILT with SAND (ML) - brown and gray, dry, lightly cemented,	PID (ppm)	Breathing Zone	FID (ppm
-					hard,.			-
5								
-					-			-
-					Gray SILT/CLAY with light gray mottling (ML/CL) - pale fine sand, moist, slightly cohesive, with increasing CLAY in depth.	0-2 #1 5'/7' Reco	overy	-
10 - -					SAME AS ABOVE - increasing orange oxidation.			
- - 15					Gray and oxidized: SILTY CLAY (ML/CL) - increasing oxidation, slight increase in moisture with depth, increasing tan wring (sp?).			-
-					- SAME AS ABOVE - moist CLAY (CL).	7-17 #2 11'/10' F	Recovery	-
20								
- - 25_					FAT CLAY (CH), Moist, with white mottling and trace oxidation			-
					Sharp transition to orange/brown SILT with fine SAND (ML) - decreasing moisture, lightly cemented, non-plastic, increasing sand with depth			
-					SAME AS ABOVE - SILT with fine Sand (ML).	17-27 #3 12'/10'	Recovery	-
30					Increasing gray fat CLAY (CH) - with white mottling and oxidation, increasing gray clay with depth, moist, very stiff.			



BORING NUMBER: MW-1S

SHEET 2 OF 2

PROJECT : Grain Handling Facility at Freeman

LOCATION : E of RR Tracks, NE Area of UPRR Freeman RI

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Speedstar, Sonic

ELEVATION : 2598.85 ft mslft NAVD88 (ground surface) COORDINATES : 211100.555, 2539516.893 (ft NAVD88)

END: 7/1/16 10:30 WATER LEVEL: START : 7/1/16 08:55 LOGGER : Ruben Greer DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Increasing gray fat CLAY (CH) - with white mottling and oxidation, increasing gray clay with depth, moist, very stiff. Gray CLAY, fat (CH) - with white, orange, and black mottling, decreasing moisture, stiff. Reddish brown CLAY/SILT with fine SAND (CL/ML) - with mica, 35 moist, hard. Increasing gray sandy silt at 37' bgs.. Sandy SILT (ML) - 25% fine sand, moist, gray plus orangish/brown coloring, very stiff. 27-37 Core #4 9'/10' Recovery 40 Increasing white mottling. Gray sandy SILT (ML) - very hard, slight moisture, increasing mica, decreasing orange/brown coloring. Very hard drilling Increasing CLAY (CL) - gray with fine sand. White, brown and gray SILT/CLAY (ML/CL) - possible 45 decomposed granite,. Hard drilling Bottom of borehole at 47 ft bgs. 50 55 60



DRILLING METHOD AND EQUIPMENT : 15k Speedstar, Sonic

BORING NUMBER: MW-2D

SHEET 1 OF 5

PROJECT : Grain Handling Facility at Freeman

LOCATION : SE of Facility 30' NE of RR

ELEVATION : 2598.09 ft msfft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 210893.631, 2539795.088 (ft NAVD88)

END: 7/12/16 11:50 WATER LEVEL: START : 7/1/16 09:15 LOGGER : Nicole Badon/ DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Silty CLAY (CL) - light brown, some fine to coarse sand, trace 0.0 fine to coarse sub angular gravel, hard, dry. #1 2.8 5 5.0 SILT (ML) and fine to coarse SAND - trace fine to coarse angular gravel/rock fragments (weak/breakable), yellowish #2 25 orange changing to light gray at 6.5', loose, dry. 7.0 SILT (ML) and very fine SAND - trace clay, decomposed rock fragments (basalt?) throughout, weak/breakable, light brown to grayish brown with some oxidation, trace greenish yellow mottling, slightly moist, loose. 10 #3 77 15 17.0 SILT (ML) - very fine Sand and decomposed rock (basalt?), trace coarse gravel-sized anular basalt fragments from 26' to 27', grayish brown with some light gray and greenish yellow mottling, very moist, color change at \sim 24' to blue gray with reddish brown oxidation, loose to medium dense. 20 8.7 #4 25 27.0 SILT (ML) - little Clay, and decomposed basalt (weathered to Silt but structure present), dark brown with reddish brown oxidation and white mottling, soft, very moist/wet, trace hard basalt fragments. 30



DRILLING METHOD AND EQUIPMENT : 15k Speedstar, Sonic

BORING NUMBER: MW-2D

SHEET 2 OF 5

PROJECT : Grain Handling Facility at Freeman

LOCATION : SE of Facility 30' NE of RR

ELEVATION : 2598.09 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 210893.631, 2539795.088 (ft NAVD88)

WATER LEVEL: START : 7/1/16 09:15 END: 7/12/16 11:50 LOGGER : Nicole Badon/ DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm SILT (ML) - little Clay, and decomposed basalt (weathered to Silt but structure present), dark brown with reddish brown oxidation and white mottling, soft, very moist/wet, trace hard basalt fragments. 10.8 #5 35 37.0 SILT (ML) and very fine SAND - little Clay, trace fine to coarse gravel-sized basalt fragments, light brown and gray with reddish brown oxidation, trace yellow and white mottling, medium dense, wet. 40 11.9 #6 45 47.0 SILT (ML) - very fine Sand and highly weathered rock, dark gray, yellowish green, with reddish brown oxidation, medium dense, wet, weathered rock fragments are fine to coarse gravel-sized and easily breakable. 50 11.9 #7 55 57.0 SILT (ML) and highly weathered basalt, some very fine sand, medium gray with reddish brown oxidation throughout, some fine to coarse fravel-sized basalt fragments throughout (hand breakable), wet, medium dense, trace clay (slight plasticity). 60



DRILLING METHOD AND EQUIPMENT : 15k Speedstar, Sonic

BORING NUMBER:

MW-2D

PROJECT : Grain Handling Facility at Freeman

LOCATION : SE of Facility 30' NE of RR

ELEVATION : 2598.09 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 210893.631, 2539795.088 (ft NAVD88)

			<u></u>	00010	5.088 (ft NAVD88) DRILLING METHOD AND EQUIPMEN	
r	LEVEL:		· T \		START : 7/1/16 09:15 END : 7/12	
DEPTHE	BELOW SU		1)	g	SOIL DESCRIPTION	COMMENTS
	INTERVA			GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL,	DEPTH OF CASING, DRILLING
		RECOVE	RY (FT)	APH	COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	RATE, DRILLING FLUID LOSS,
			#TYPE	В	STRUCTURE, MINERALOGY	TESTS, & INSTRUMENTATION
					SILT (ML) and highly weathered basalt, some very fine sand, medium gray with reddish brown oxidation throughout, some fine to coarse fravel-sized basalt fragments throughout (hand breakable), wet, medium dense, trace clay (slight plasticity).	PID (ppm) Breathing Zone FID (ppm
_		10.0	#8			-
65						_
-	07.0				-	-
	67.0				Clayey SILT (ML) and highly decomposed basalt, some very	-
-					fine sand, ~ 15% fine gravel-sized basalt fragments, grayish brown with white mottling 67' to 71.5', blue/gray with white mottling and oxidation 71.5' to 75', reddish brown mottled white	-
70					75' to 77', medium dense, very moist/wet.	
_					-	-
_		11.3	#9		-	
=					-	
- 75					-	
						_
_	77.0					
_					Sandy CLAY (CL) - fine to medium sand, yellowish orange oxidated with light gray mottling, medium plasticity, trace (~ 15%) fine sub angular gravel, abundant muscovite mica from 84' to 87', hard, moist.	
80						
-					-	quartzrich
_		8.8	#10		-	
-					-	
 85						
-					-	
-	87.0				Very fine to fine SAND (SP) - little Clay, abundant muscovite	
-		2.4	#11		mica, light gray with yellowish orange oxidation, slightly moist, dense to very dense	
-	89.0					
90				/////		Refusal @ 89'

SHEET 3 OF 5



DRILLING METHOD AND EQUIPMENT : 15k Speedstar, Sonic

BORING NUMBER:

MW-2D

SHEET 4 OF 5

PROJECT : Grain Handling Facility at Freeman

LOCATION : SE of Facility 30' NE of RR

ELEVATION : 2598.09 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 210893.631, 2539795.088 (ft NAVD88)

	LEVEL:				START : 7/1/16 09:15 END : 7/12	2/16 11:50	LOGGER : Nicole B	adon/
		JRFACE (F	T)			2/10/11:50	COMMENTS	auuni
	INTERV		• /	00	SOIL DESCRIPTION			
	INTERV	RECOVE	RY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	RA	PTH OF CASING, DRILLING TE, DRILLING FLUID LOSS, STS, & INSTRUMENTATION	
			#ITPE	G	STRUCTURE, MINERALOGY	PID (ppm)	Breathing Zone	FID (ppm
- - - 95			#1-D		Sandy CLAY (CL) - fine to medium sand, yellowish orange, oxidized with light gray mottling, medium plasticity, fine sub angular quartz with gravel, abundant musovite mica, hard, moist.	Total Depth =		
					-			-
- 100_ - - 105_	97.0		#2-D		Sandy CLAY (CL) - fine to medium sand, yellowish orange oxidation, no gray mottling, significantly less muscovite mica than previous core. Slight plasticity transitions to fine sandy Clay and light brown color at ~ 104', moist.			-
-	107.0				-			_
- - 110					Sandy CLAY (CL) - fine sand, light brown with some oxidation, moist, increased silt content at 109', transitions to a silty Clay, damp, layering of medium brown and orange.			-
-			#3-D		GRUS - light gray to white, dry, decomposed granite, all minerals decomposed, fine grained, abundant muscovite mica.			-
- 115	117.0				SAME AS ABOVE - light tan. SAME AS ABOVE - with gravel up to 2" diameter. SAME AS ABOVE - all fine grained, light tan.			-
- - 120					GRUS - light gray to withe with some oxidation, dry, decomosed granit, mostly fine grained, abundant muscovite mica, up to 0.5", about 15%-20% coarse sand to fine gravel.			_



DRILLING METHOD AND EQUIPMENT : 15k Speedstar, Sonic

BORING NUMBER: MW-2D

SHEET 5 OF 5

PROJECT : Grain Handling Facility at Freeman

LOCATION : SE of Facility 30' NE of RR

ELEVATION : 2598.09 ft msfft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 210893.631, 2539795.088 (ft NAVD88)

WATER LEVEL: START : 7/1/16 09:15 END: 7/12/16 11:50 LOGGER : Nicole Badon/ DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm SILT (ML) - with very fine sand, abundant muscovite mica, dry, grayish brown to light brown. 6.1 #4-D 125 127.0 Sandy CLAY (CL) - heavily oxidated with some light gray mottling, damp, fine to medium sand. 130 10.0 #5-D Very fine SAND (SW) - well graded, damp, light brown to 135 oxidized. 137.0 GRUS - decomposed granite, dense, fine grained material, tan. Fine SAND with SILT (SM) - well graded, ~ 15% silt, damp but cuttings hot due to refusal encountered at 145'. Color ranges from oxidized to grayish tan to gray, abundant muscovite nica at 143' to 147' .. 140 9.9 #6-D 145 147.0 150

Bottom of borehole at 150 ft bgs.



SHEET 1 OF 7

SOIL BORING LOG

BORING NUMBER:

MW-3D

PROJECT : Grain Handling Facility at Freeman

LOCATION : N of Grain Facility, E of Hwy 27, N of Concrete Pad

ELEVATION : 2605.11 ft mslft NAVD88 (ground surface)

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc DRILLING METHOD AND EQUIPMENT : Speedstar, Sonic

COORDINATES : 210902.9, 2539415.035 (ft NAVD88)

WATER	LEVEL:				START : 5/10/16 10:00 END : 5/10/16 14:00 LOGGER : Ruben Greer					
DEPTH	BELOW SU	JRFACE (F	=T)	ğ	SOIL DESCRIPTION	COMMENTS				
	INTERV	. ,	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION				
-					Lean CLAY (CL) - medium plasticity, medium cohesive, trace fine sand, brown and gray, moist, stiff.	PID (ppm) Breathing Zone FID (ppm				
5					Lean CLAY (CL) - brown, medium plasticity, medium cohesiveness, trace to no fine sand, moist, stiff.	Sample: MW3-5S-5 @ 5 feet 10:25 am				
-					SAME AS ABOVE (CL).	0-7 (7'/7' Recovery)				
10					SAME AS ABOVE - trace coarse sand, less than 1% (CL), very stiff.	Sample: MW3-5S-5 @ 10:45 am				
15					Lean CLAY with GRAVEL (CL) - gravel/cobble well graded, trace coarse sand, granite, moist, clay is brown, very stiff.	Sample: MW3-SS-15 @ 10:50 am				
- - 20					Sandy SILT (ML) - very fine sand, gray and brown, very soft, possible increase in moisture.	7-17 approximately 7'/10' Recovery				
-					Sandy CLAY (CL) - trace olive/green decomposed rock, decreasing moisture, increasing stiffness, clay is brown.					
25					SAME AS ABOVE (CL) - becoming reddish brown, moist.	17-27 DTW 23.15 TOC TOC ~ 4.3' abs Allow boring to				
30					CLAY (CL) - reddish brown with yellow, olive and gray coloring, stiff, moist, trace coarse sand less than 1%.					



SHEET 2 OF 7

SOIL BORING LOG

BORING NUMBER:

MW-3D

PROJECT : Grain Handling Facility at Freeman

LOCATION : N of Grain Facility, E of Hwy 27, N of Concrete Pad

DRILLING METHOD AND EQUIPMENT : Speedstar, Sonic

ELEVATION : 2605.11 ft msfft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER: 661508

COORDINATES: 210902.9, 2539415.035 (ft NAVD88)

WATER LEVEL: START : 5/10/16 10:00 END: 5/10/16 14:00 LOGGER : Ruben Greer DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION Log INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPF STRUCTURE. MINERALOGY PID (ppm) Breathing Zone FID (ppm CLAY (CL) - reddish brown with yellow, olive and gray coloring, stiff, moist, trace coarse sand less than 1%. Sandy CLAY (CL) - very fine sand, with trace mica, very stiff, 35 moist. CLAY (CL) - with yellow, bronze mottling, stiff, becoming softer, dark reddish brown clay, moist. 27'-37' 10'/10' Recovery 40 CLAY (CL) - reddish brown, light gray, brown, moist, stiff, trace fine sand, trace mica. SAME AS ABOVE (CL) - becoming very stiff, decreasing mica, decreasing sand. 45 CLAY/SILT (CL/ML) - very stiff, non plastic, slightly cohesive, moist, reddish brown, light gray and brown color, trace fine 37'-47' - 10'/10' Recovery sand. Single BASALT clast - 2.5" diameter. 50 Clayey SILT (ML) - non plastic to slight plasticity, slightly cohesive, gray, hard to very stiff, moist, trace brown/reddish brown coloring, trace fine sand. 55 Increasing BASALT clasts. Hard drilling/advancement - rocks Gray gravelly CLAY (CL) - basalts clasts up to 3" diameter, sub angular, dark gray clay, increasing basalt with depth. Hard drilling BASALT - dry, fractured, with basaltic gravel/rubble and pulverized basaltic sand. BASALT - fractured with trace weathering, sub round to sub angular, consistent. 60



BORING NUMBER: MW-3D

SHEET 3 OF 7

PROJECT : Grain Handling Facility at Freeman

LOCATION : N of Grain Facility, E of Hwy 27, N of Concrete Pad

DRILLING METHOD AND EQUIPMENT : Speedstar, Sonic

ELEVATION : 2605.11 ft msfft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES: 210902.9, 2539415.035 (ft NAVD88)

END: 5/10/16 14:00 WATER LEVEL: START : 5/10/16 10:00 LOGGER : Ruben Greer DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT - fractured with trace weathering, sub round to sub 60.0 61.0 GB TD @ 58.5' bgs @ 14:00 (Sonic) Resume 5/16/16 with Air Rotary angular, consistent. 62.0 BASALT - with SAND, with SILT, moist. GB 63.0 65 Decreasing SAND, possible increase in moisture. BASALT, 66.0 angular to sub angular, 1/4" to 1/2" diameter, becoming fine GB with depth. 67.0 70 CLAY. Driller indicates CLAY - 1055 75 Start 8:44 am No conveyance of cuttings, "Sticky" material -Hose (logged) probably clay zone No cuttings - clogging 80 8:51 - 9:20 85 90



BORING NUMBER:

MW-3D

SHEET 4 OF 7

PROJECT : Grain Handling Facility at Freeman

LOCATION : N of Grain Facility, E of Hwy 27, N of Concrete Pad

DRILLING METHOD AND EQUIPMENT : Speedstar, Sonic

ELEVATION : 2605.11 ft mslft NAVD88 (ground surface)

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210902.9, 2539415.035 (ft NAVD88)

WATER LEVEL:	START : 5/10/16 10:00 END : 5/1	0/16 14:00 LOGGER : Ruben Greer			
DEPTH BELOW SURFACE (FT)	SOIL DESCRIPTION	COMMENTS			
INTERVAL (FT) RECOVERY (FT) #TYPE	SOIL DESCRIPTION SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION			
	CLAY.	PID (ppm) Breathing Zone FID (ppm			
	SILT.				
95					
_	-				
100	_				
	-	-			
105		-			
	Sand with some Gravel.	Driller indicates "Gravel." Appears to be possible granite/sandstone, gray			
110	-				
_					
-		-			
115		-			
		Drinner indicates color change and indicates presence of sand. Becoming more light tan than brown.			
120					



BORING NUMBER:

MW-3D

SHEET 5 OF 7

PROJECT : Grain Handling Facility at Freeman

LOCATION : N of Grain Facility, E of Hwy 27, N of Concrete Pad

ELEVATION: 2605.11 ft mslft NAVD88 (ground surface)

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc DRILLING METHOD AND EQUIPMENT : Speedstar, Sonic

COORDINATES: 210902.9, 2539415.035 (ft NAVD88)

WATER LEVEL:					START : 5/10/16 10:00 END : 5/10/16 14:00 LOGGER : Ruben G			Greer	
DEPTH I	DEPTH BELOW SURFACE (FT) ග				SOIL DESCRIPTION		COMMENTS		
	INTERV	AL (FT) RECOVERY (FT) #TYPE		GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			H OF CASING, DRILLING , DRILLING FLUID LOSS, S, & INSTRUMENTATION	
					Sand with some Gravel.		PID (ppm)	Breathing Zone	FID (ppm
					Sand with some Graver.	_			_
-	-					-			-
-	-			· · · · ·		-			-
-	-					-			-
125_	-								_
				· · · ·					
-						_			-
-	-					-			-
-	-					-			-
-	-			· · · · ·		_			_
130									
-	-			· · · · ·		-			-
-	-					-			-
-	-					-			_
-	-			· · · ·		_			-
135									
-	-			· · · · ·		-			-
-	-					-			-
-	-					-			_
-	-			· · · · ·		_			_
140									
-	-					-			_
	-					-			_
-						-			-
_				· · · ·					_
145									
	1				Fine Sand.				
-	-					-			_
	-					-			-
- 1						_			_
150						1			-
100	I								



661508

SOIL BORING LOG

BORING NUMBER: MW-3D

SHEET 6 OF 7

PROJECT : Grain Handling Facility at Freeman

LOCATION : N of Grain Facility, E of Hwy 27, N of Concrete Pad

ELEVATION : 2605.11 ft mslft NAVD88 (ground surface)

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Speedstar, Sonic

COORDINATES : 210902.9, 2539415.035 (ft NAVD88)

WATER LEVEL: START : 5/10/16 10:00 END: 5/10/16 14:00 LOGGER : Ruben Greer DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL **GRAPHICI** DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Clay with some gravel. Clay. 155 160 165 Silty Sand. 170 Fine Sand. 175 Water generated when air applied. Driller indicates sand zone from 168-170 contained Silty Sand. water Cuttings becoming dryer. 180



BORING NUMBER:

MW-3D

SHEET 7 OF 7

PROJECT : Grain Handling Facility at Freeman

LOCATION : N of Grain Facility, E of Hwy 27, N of Concrete Pad

ELEVATION : 2605.11 ft mslft NAVD88 (ground surface)

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc DRILLING METHOD AND EQUIPMENT : Speedstar, Sonic

COORDINATES: 210902.9, 2539415.035 (ft NAVD88)

WATER LEVEL: START : 5/10/16 10:00					START : 5/10/16 10:00 END : 5/10	/16 14:00 LOGGER : Ruben Greer		
DEPTH BELOW SURFACE (FT)			T)	U	SOIL DESCRIPTION	COMMENTS		
	INTERV	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
						PID (ppm) Breathing Zone FID (ppm		
-					Silty Sand. - -	9:32 Small quantity of water generated. - -		
185						- 		
-					-	-		
190 <u></u>								
- - - 195						-		
-						 - -		
_ 200					Bottom of borehole at 200 ft bgs.	-		
					-	-		
205					 - -			
- - 210					-	-		



BORING NUMBER: MW-4D (SB-16) SHI

6) SHEET 1 OF 7

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic/Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : School fields, South of School

ELEVATION : 2576.44 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 209664.124, 2539671.043 (ft NAVD88)

WATER LEVEL: END : 7/15/16 15:00 START : 6/27/16 09:15 LOGGER : Nicole Badon/ DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Clayey SILT (ML) - medium brown, stiff to loose, some fine 0.0 sand, trace organics, moist to dry. 7.0 5 7.0 Clayey SILT/Silty CLAY (ML/CL) - medium brown, stiff to very stiff, trace fine to medium sand, moist. 10 7.0 15 17.0 Silty CLAY/Clayey SILT (ML/CL) - SAME AS ABOVE. 20 Sandy CLAY (SC) - fine to medium sand, ~ 50% nica flaces thoughout, moist to wet at ~ 23 feet, reddish brown. 11.7 25 Sandy CLAY (SC) - at 26' bgs. Some fine to coarse sub rounded gravel, stiff to very stiff, grades back to medium brown 27.0 and moist. Clayey, fine to coarse SAND (SC) - medium brown with some light gray. 30



BORING NUMBER: MW-4D (SB-16) SH

WW-4D (SB-16) SHEET 2 OF 7

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic/Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : School fields, South of School

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 209664.124, 2539671.043 (ft NAVD88)

ELEVATION: 2576.44 ft mslft NAVD88 (ground surface)

WATER LEVEL:					START : 6/27/16 09:15 END : 7/1	5/16 15:00 LOGGER : Nicole Badon/				
DEPTH E	BELOW SU		-T)	υ	SOIL DESCRIPTION	COMMENTS				
	INTERVA	VAL (FT) RECOVERY (FT) #TYPE		RECOVERY (FT)		GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE TEST	TH OF CASING, DRILLING E, DRILLING FLUID LOSS, S, & INSTRUMENTATION	
					Clayey, fine to coarse SAND (SC) - medium brown with some	PID (ppm)	Breathing Zone	FID (ppm		
-		10.1			light gray.			-		
35				X	SILT and weathered BASALT - dark gray, loose, dry, fine gravel to cobble sized clasts.					
_	37.0			X	-	Driller notes roc	k at 34.5 bgs during drillir	ng 		
_	57.0			Ř	Weathered BASALT - with coarse sand and medium gravel, angular to sub angular.			-		
-					BASALT - decreasing weathering, decreasing fine sand and basaltic gravel.	Increase in wate	er production	-		
40										
-					-			-		
_ 45					-			-		
-								-		
					- SAME AS ABOVE - abundant vesicles in basalt.			-		
_					-			-		
 55					Fractured/weathered BASALT - angular to sub angular up to 1" diameter.			-		
-					Competent BASALT - angular to sub angular up to 1/2" diameter.	Harder drilling		-		
- 60				æ	-			-		



BORING NUMBER: **WW-4D (SB-16)** SHEET 3 OF 7

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic/Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : School fields, South of School

DRILLING CONTRACTOR : Environmental West Exploration, Inc ELEVATION: 2576.44 ft mslft NAVD88 (ground surface)

COORDINATES : 209664.124, 2539671.043 (ft NAVD88)

WATER LEVEL:					START : 6/27/16 09:15 END : 7/1			
DEPTH E		JRFACE (I	=T)	GRAPHIC LOG	SOIL DESCRIPTION	COMMENTS		
	INTERV	TERVAL (FT) RECOVERY (FT) #TYPE			SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
						PID (ppm)	Breathing Zone	FID (ppm
-					Competent BASALT - angular to sub angular up to 1/2" diameter.	Bentonite seal i water infiltratior	nstalled at 60 feet bgs to	prevent _ -
65 _					SAME AS ABOVE - Competent BASALT.			
-					-			-
70								-
-					-			-
					SAME AS ABOVE - Competent BASALT.			-
_					BASALT - cuttings up to 1", sub angular with oxidation observed. Competent BASALT - angular and elongated, up to 1/2"	Easiser drilling	at 76 feet bgs	_
80				×	diameter.	Hard drilling at	78 feet bgs	-
-								-
 85					- SAME AS ABOVE.	•		-
-					-			-
90				X				_



BORING NUMBER: **MW-4D (SB-16)** SHEET 4 OF 7

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic/Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : School fields, South of School

ELEVATION: 2576.44 ft mslft NAVD88 (ground surface)

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES: 209664.124, 2539671.043 (ft NAVD88)

			+.124, 2	55907	1.043 (ft NAVD88) DRILLING METHOD AND EQUIPMEN			
WATER LEVEL: DEPTH BELOW SURFACE (FT)						15/16 15:00 LOGGER : Nicole Badon/ COMMENTS		
			• 1	90	SOIL DESCRIPTION	CONNELLI	-	
	INTERVAL (FT)			GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE	DEPTH OF CASING,	DRILLING	
		RECOVE		RAPI	DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE, DRILLING FLU TESTS, & INSTRUME	JID LOSS,	
			#TYPE	Ū	STRUCTURE, MINERALOGY	PID (ppm) Breathing 2		
				\mathbb{X}	Competent BASALT - angular and elongated, up to 1/2"			
-	-			KЖ	diameter.		-	
				\mathbb{H}				
				KX				
-	-			RR	SAME AS ABOVE.		-	
_				KX	-	Hard drilling	_	
95				KX				
				\mathbb{X}				
-	-			KЖ	-		-	
				\mathbb{H}				
				KX	-		-	
				RR	-		-	
_	-			KX	-		_	
100				KX				
100_				\mathbb{X}	_			
-	-			KX	-		-	
				\mathbb{R}				
				KX			_	
-	-			RR	-		-	
	-			\mathbb{H}	-		-	
105				KЖ				
100				\mathbb{H}	SAME AS ABOVE - Competent BASALT 1/4" to 1/2" cuttings.			
-	-			KX	-		-	
				\mathbb{R}				
				RY				
-	-			KX	-		-	
-	-			\mathbb{X}	-		-	
110				KX				
				\mathbb{R}				
-	-			KX	-		-	
_				RR	_		_	
				\mathbb{H}				
-				KЖ	-		-	
	-			\mathbb{H}	-		-	
115				KX				
				\mathbb{R}	SAME AS ABOVE.			
-	-			KX	-		-	
				RX				
				KX	-		-	
	-			\mathbb{R}	-		-	
-				KΧ	-		_	
120				КX				
120				$\nu \searrow$				



BORING NUMBER: **WW-4D (SB-16)** SHEET 5 OF 7

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic/Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : School fields, South of School

ELEVATION: 2576.44 ft mslft NAVD88 (ground surface)

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 209664.124, 2539671.043 (ft NAVD88)

WATER			<u></u>	00001			I : Schramm T300 Rotodrill, Sonic/Air Rotary 5/16 15:00 LOGGER : Nicole Badon/
DEPTH BELOW SURFACE (ET)					SOIL DESCRIPTION		COMMENTS
	INTERV	/AL (FT) RECOVERY (FT) #TYPE		GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#111 E	0			PID (ppm) Breathing Zone FID (ppm
					Competent BASALT - angular and elongated, up to 1/2" diameter. SAME AS ABOVE.		
- - 135_ - - - - 140							Continued hard drilling
140 145 					SAME AS ABOVE - Competent BASALT.		Easier drilling
- 150				Æ	BASALT and Basalt SAND - fractured basalt, trace oxidatio with yellow weathered basalt.	on	



BORING NUMBER: **WW-4D (SB-16)** SHEET 6 OF 7

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : School fields, South of School

DRILLING CONTRACTOR : Environmental West Exploration, Inc ELEVATION: 2576.44 ft mslft NAVD88 (ground surface)

COORDINATES : 209664.124, 2539671.043 (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic/Air Rotary

WATER LEVEL:					START : 6/27/16 09:15	END : 7/15/				
	BELOW SU		FT)	(J)	SOIL DESCRIPTION		COMMENTS			
	INTERV	r	ERY (FT)	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS,			
		#TYPE 8		GRA	DENSITY OR CONSISTENCY, SOIL STRUCTURE MINERALOGY		TESTS, & INSTRUMENTATION			
				-			PID (ppm)	Breathing Zone	FID (ppm	
-				X	Fractured BASALT and Basalt SAND - becoming sub rou vesicled.	inded, -			-	
-	-			K		-	Steady, but slow	drillina	-	
-	-			K		_	, ,	5	-	
_				K	> >	_			_	
155				R8						
				ŔX						
-				KΧ		-			-	
-	-			X	2 2	-			-	
-	-			K	>	_			-	
_				K2	>				_	
160				KX	SAME AS ABOVE.					
				KR						
-	-			KX		-			-	
-	-			KΧ		-			-	
-	-			X	2 2	_			-	
				K	>				_	
165				K	>					
				B8						
-	-			ŔŔ		-			-	
-	-			KΧ		-			-	
-	-			X	>	_			-	
_				Æ	> >	_			_	
170				K	>					
				KX	> >					
-	-			R3		-			-	
-	-			Æ	Competent BASALT - angular, decreasing sand.				-	
-				K3		-			=	
_				ŔX		_	Harder drilling		_	
175				КX	>		Fracture zone			
	1			Æ	Competent BASALT - angular cuttings.		Hard drilling			
-	-			KX	,	-			-	
-				KX	2 2	-			-	
-				KX	1	_			-	
 				K3	×				-	
180				K3	×					



BORING NUMBER: MW-4D (SB-16) s⊦

6) SHEET 7 OF 7

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic/Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : School fields, South of School

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 209664.124, 2539671.043 (ft NAVD88)

ELEVATION: 2576.44 ft mslft NAVD88 (ground surface)

END: 7/15/16 15:00 WATER LEVEL: START : 6/27/16 09:15 LOGGER : Nicole Badon/ DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm SAME AS ABOVE. BASALT - becoming fractured, increasing diameter and less angular with depth. Slightly easier drilling 185 BASALT - fractured with brown sand, yellow mineralization, sub Easier drilling - fast advancement angular, water is brown. Bottom of borehole at 188.5 ft bgs. TD 188.5 feet bgs - hole collapsing 190 195 200 205 210



DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

BORING NUMBER: MW-5D

SHEET 1 OF 6

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, Washington

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION : 2627.62 ft mslft NAVD88 (ground surface) COORDINATES : 210981.24, 2538577.23 (ft NAVD88)

WATER LEVEL: START : 6/20/16 09:31 END: 6/21/16 13:54 LOGGER : J Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Asphalt for ~ 0.2 feet. 0.2 - 2 feet is well graded gravel (road base). Fat CLAY (CH), brown, dry. 5 10_ 11.0 Silty SAND (SM) - poorly graded, brown, predominately fine sand, approximately 25% silt, trace fine gravel. GB 12.0 13.0 Sandy SILT (ML) - approximately 40% sand, well graded, GB 14.0 brown, dry. 15 16.0 GB 17.0 Fat CLAY (CH) - brown, moist. Wet at 19 feet 20 Moist at 21 feet 25 Dry at 25 feet 29.0 Poorly graded SAND with Gravel (SP) - brown, dry, predominately fine sand, approximately 15% gravel, upt to 1/2" GB 30



DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

BORING NUMBER: MW-5D

SHEET 2 OF 6

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, Washington

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2627.62 ft mslft NAVD88 (ground surface) COORDINATES: 210981.24, 2538577.23 (ft NAVD88)

WATER LEVEL: END: 6/21/16 13:54 START : 6/20/16 09:31 LOGGER : J Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm diameter. 30.0 31.0 GB Moist at 30-32 feet Well graded SAND with Gravel (SW) - brown, moist, approximately 25% to 30% gravel, up to 1/2", rounded to sub 32.0 angular. Poorly graded SAND (SP) - light gray, very fine sand, GB predominately high mica content, trace gravel sized particles 33.0 up 1/4", rounded. 34.0 GB Very soft, smooth cuttings 35 36.0 Well graded SAND (SW) - predominately coarse, light gray. GB 37.0 40 42.0 Poorly graded SAND (SP) - dry, light gray, very fine sand, light GB mica content. 43.0 45 47.0 Silty SAND (SM) - predominately fine sand, moist, light brown, approximately 30% to 40% silt. GB 48.0 Fat CLAY (CH) - very light gray, moist. GB 49.0 50 50.0 Poorly graded SAND with SILT (SP-SM) - predominately fine, GB light tan, approximately 10% to 15% silt, moist. 51.0 Poorly graded SAND with SILT (SP-SM) - gray, moist, very fine GB 52.0 sand, approximately 10% to 15% silt. 55 60



BORING NUMBER: MW-5D

SHEET 3 OF 6

DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, Washington

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2627.62 ft mslft NAVD88 (ground surface) COORDINATES: 210981.24, 2538577.23 (ft NAVD88)

END: 6/21/16 13:54 WATER LEVEL: START : 6/20/16 09:31 LOGGER : J Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm 60.0 61.0 SAME AS ABOVE. GB approximately 64 feet bgs approximate WL - measured following 3 hour shutdown due to broken shoe at 9:15 65 65.0 SAME AS ABOVE. GB 66.0 70 71.0 Poorly graded SAND (SP) - predominately fine, red, trace fine GB gravel, sub rounded, high mica content. 72.0 75 76.0 Poorly graded SAND (SP) - fine, moist, light gray, well sorted, GB less than 10% silt. 77.0 80 Becomes light tan 83.0 Poorly graded SAND with SILT (SP-SM) - moist, medium gray, GB predominately very fine sand, pulverized mica, approximately Increasing moisture (slightly), becomes medium 84.0 10% to 15% silt sized particles. gray 85 Becomes dark gray 90



DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

BORING NUMBER:

MW-5D

SHEET 4 OF 6

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, Washington

PROJECT NUMBER:

661508

ELEVATION : 2627.62 ft msift NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES: 210981.24, 2538577.23 (ft NAVD88)

END: 6/21/16 13:54 WATER LEVEL: START : 6/20/16 09:31 LOGGER : J Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Poorly graded SAND with SILT (SP-SM) - moist, medium gray, predominately very fine sand, pulverized mica, approximately 10% to 15% silt sized particles. Shoe broke at 91 feet shortly after drilling resumed. Contine from 91 feet 6/21/16 at 9:14 am Water accumulated to approximately 64 feet (TO = 76 feet due to caving/slaughing) 95 95.0 Silty SAND(SM) - wet, light gray, very fine sand, approximately GB Soft, putty-like consistency 96.0 30% silt, soft. Note: Discharge hose plugged. Water/clay causing issues. 100 Note: Wet from 95 to 96 feet, decreasing water content to 100 feet. 102.0 SAME AS ABOVE - increasing sand grain size, decreasing GB moisture, wet. Very clumpy, putty-like cuttings 103.0 105 105.0 Silty SAND (ML) - wet, light gray, very fine sand, approximately GB 20% to 35% silt, soft, firm. Increase in water content at 105 feet, 106.0 Poorly graded SAND with SILT (SP-SM) - very light gray, wet, decreasing silt content GB Note: wet from 105 to 108 feet, very 100k loose, very fine sand, approximately 10% to 15% silt. 107.0 cuttings (soupy) Decreasing water at 108 feet 110 110.0 Silty SAND (SM) - wet, very fine sand, very light gray, GB approximately 30% to 40% silt, increasing firmness with depth. Note: Drillers allowed time for settling at 110 111.0 feet and cleared the air lines, no water observed at surface while at 110 feet 115 115.0 SAME AS ABOVE. GB 116.0 120



DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

SHEET 5 OF 6

BORING NUMBER: MW-5D

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, Washington

ELEVATION : 2627.62 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 210981.24, 2538577.23 (ft NAVD88)

WATER LEVEL: END: 6/21/16 13:54 START : 6/20/16 09:31 LOGGER : J Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm 120.0 121.0 SAME AS ABOVE. GB Note: Water/much surfaces at start of drilling approximately 120-121 feet 125 SAME AS ABOVE. Water/much at surface when air engaged, approximately 125 to 126 feet 130 130.0 GB 131.0 Note: water at surface when air engaged, approximately 130 to 131 feet 135 Note: water not observed at surface at start of drilling 140 Decreasing silt at approximately 139 feet 140.0 Poorly graded SAND (SP) - wet, very fine grained to fine GB grained, medium gray, clean. 10-20 gallons gushes out at start of drilling 141.0 145 145.0 Poorly graded SAND (SP) - wet, fine grained, medium gray, less than 10% silt. GB 2-5 gallons of wather gushes out at start of 146.0 drilling 150



DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

BORING NUMBER: MW-5D

SHEET 6 OF 6

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, Washington

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION : 2627.62 ft mslft NAVD88 (ground surface) COORDINATES : 210981.24, 2538577.23 (ft NAVD88)

END: 6/21/16 13:54 WATER LEVEL: START : 6/20/16 09:31 LOGGER : J Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Poorly graded SAND (SP) - wet, fine grained, medium gray, Approximately 10 gallons of water at surface at start of drilling, less than previous depth (145) less than 10% silt. Water at top of casing during drilling Well graded SAND with SILT (SW-SM) - wet, medium gray, soft, approximately 10% to 15% silt, sand particles are Note: increasing sand grain size - possible 155 155.0 predominately coarse, angular clasts comprised primarily of decomposed granite interface GB quartz, calcite, feldspar, and mica, possible decomposed 156.0 granite interface. TD at 155 feet at 13:54 pm WL = 104.04 feet bgs 160 Bottom of borehole at 160 ft bgs. 165 170 175 180

ch2m:

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2627.62 ft NAVD88

LOCATION : 25' NE of Maintenance Shop

DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 210992.76, 2538574.852 State Plane (ft)

END : 5/20/16 18:00 WATER LEVEL: START : 5/20/16 15:50 LOGGER : Ruben Greer DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) ASPHALT. Sandy Gravel Road Base. Sharp transition to Brown Fat CLAY (CL) - medium to high cohesiveness, medium plasticity, moist, trace coarse sand, very stiff. 5 Brown lean CLAY (CL) - medium to low plasticity, medium to low cohesiveness, moist, very stiff. 0-8 Recovery 6'/8' 10_ 15 SAME AS ABOVE (CL). 8-18 Recovery 10'/10' 20 25 3" Clayey GRAVEL zone (GC) - poorly graded, fine sub angular, brown clay, moist possible wet zone.. Sharp transition to lean CLAY (CL) - brown with 10% coarse sub angular gravel, very stiff, decreasing moisture. 18-28 Recovery 11'/10' Sandy CLAY (CL) - up to 20% very fine sand, moist, stiff, brown, 30 low plasticity. low cohesiveness



PROJECT NUMBER:

SHEET 1 OF 2

BORING NUMBER:

MW-5S

ch2m:

SOIL BORING LOG

BORING NUMBER:

MW-5S

SHEET 2 OF 2

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2627.62 ft NAVD88

LOCATION : 25' NE of Maintenance Shop

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

COORDINATES : 210992.76, 2538574.852 State Plane (ft)

	LEVEL:				START : 5/20/16 15:50 END : 5/20	0/16 18:00	LOGGER : Ruber	n Greer
DEPTH E	BELOW SU		T)	g	SOIL DESCRIPTION		COMMENTS	
	INTERVA	r	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RAT TES	TH OF CASING, DRILLIN E, DRILLING FLUID LOSS TS, & INSTRUMENTATIO	6, N
				(////		PID (ppm)	Breathing Zone	FID (ppm)
-					Clayey GRAVEL (GC) - well graded, 30% clay and brown clay, coarse sand, possible broken/weathered granite, up to 3" diameter clasts, sub angular to sub rounded.	-		-
_					Lean CLAY (CL) - gray with black and brown, with trace mica (black), moist, hard.			_
35 					Fat CLAY (CL) - white with trace brown coloring, medium to high plasticity, medium to high cohesiveness, moist, very stiff to hard.	-		
-					SAME AS ABOVE (CL).	28-38 Recovery	11'/10'	_
40					Gray and brown lean CLAY (CL) - low plasticity, low cohesiveness, moist, medium stiff.			
-					SAME AS ABOVE (CL) - increasing plasticity, increasing mica.	-		-
- 45					Sharp transition to gray fine SAND, poorly graded (SP) - with possible trace sandstone, lightly cemented, moist, decreasing mica.	-		-
-					Gray lean CLAY (CL) - moist, medium stiff, with black mica and increasing brown clay with 5" fine sand.	38-48 Recovery	11'/10'	-
50 - -					White CLAY with mica (CL) - medium plasticity, medium cohesive, moist, medium stiff.			-
55					Transition to gray SAND, poorly graded, fine (SP) - with trace	-		
-					mica-flakes up to 1/2" diameter, moist, appears loose.	-		-
60					Boring terminated at 60 ft bos	48-58 Recovery TD @ 58 @ 180	11'/10')0 on 5-20-16	_

ch2m.

BORING NUMBER: MW-6D

SHEET 1 OF 8

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION :

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2590.03 ft mslft NAVD88 (ground surface) COORDINATES: 209427.864, 2539181.874 (ft NAVD88)

	LEVEL:	. 200421	.004, 20	50010	1.874 (ft NAVD88) DRILLING ME I HOD AND EQUIPMEN START : 7/11/2016 END : 7/1	
	BELOW SL	JRFACE (F	T)		SOIL DESCRIPTION	COMMENTS
	INTERVA			GRAPHIC LOG		
		RECOVE	ERY (FT)	ніс	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS,
			#TYPE	GRAF	DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	TESTS, & INSTRUMENTATION
						PID (ppm) Breathing Zone FID (ppm)
					SILTY CLAY (CL) with little fine to coarse sand, loose 0' to 6' then very stiff, dry to moist ~6', dark brown, trace organics.	
-						-
					-	-
_					-	-
					-	-
5						
-					-	-
					SILTY CLAY (CL) some fine to coarse sand throughout, little fine coarse subrounded gravel, reddish brown (oxidized)	
					slightly moist, hard.	-
					-	-
10						_
-					-	1
					SANDY CLAY (CL) grading to fine to medium sand, w/little	-
					silt/clay. Reddish brown Sandy Clay (CL), hard, some fine to coarse sand, little fine gravel, slightly moist	-
					Coarse sand, nue nne graver, signity moist	
15						-
15					Fine to medium sand, little silt, abundant muscovite mica,	
					moist, hard/dense.	-
_						
					Fine to medium sand with some fine to coarse angular gravel (SW) light gray with reddish brown oxidation, moist to wet,	
-					medium dense, abundant mica flakes, trace silt.	-
					-	-
20				· · · ·	_	_
				· · · ·		
-				· · · ·	-	-
					-	-
					-	-
_]
25						
23_					Silty Clay (CL), yellowish orange, moist, very stiff, trace dark	1 -
					gray mottling.	
_						4 -
					CLAY (ML) Blue gray with yellowish orange mottling, medium stiff, wet.	
-					-	1 -
-					-	
30						1



PROJECT NUMBER:	BORING NUMBER:	
661508	MW-6D	SHEE

SHEET 2 OF 8

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION :

ELEVATION : 2590.03 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES: 209427.864, 2539181.874 (ft NAVD88)

	LEVEL:		7.004, 2	00010	1.874 (ft NAVD88) DRILLING METHOD AND EQUIPMEN START : 7/11/2016 END : 7/17	
		JRFACE (F	-T)		SOIL DESCRIPTION	COMMENTS
	INTERV		•	LOG		
			ERY (FT)	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#11FE	G	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm
-					CLAYEY SILT (ML) with some fine to medium sand and trace weathered basalt fragments/fine to coarse gravel sized, yellowish orange and dark brown (oxidized), very moist to wet, medium stiff.	
35					-	
-					CLAYEY SILT (ML), slightly plastic, some very fine to medium sand (30-40%) throughout, trace fine subangular to subrounded gravel, trace weathered basalt fragments, medium brown with oxidation, wet, soft to medium stiff.	
40					-	
_					-	
45						·
-					- CLAYEY SILT (ML), with some very fine to medium sand, same	·
-					as above, decreasing moisture from wet to slightly moist, medium stiff to dense, increasing weathered basalt fragments with depth	·
50 						
-				X	BASALT, dark gray and oxidized, dry, coarse gravel sized clasts, some silt.	·
55					Become more competent, decreasing sand.	
-					-	
- 60				Æ	-	-



PROJECT NUMBER:	BORING NUMBER:	
661508	MW-6D	SHEET

3 OF 8

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION :

PROJECT

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2590.03 ft mslft NAVD88 (ground surface) COORDINATES : 209427.864, 2539181.874 (ft NAVD88)

WATER LEVEL: START : 7/11/2016 END: 7/11/2016 LOGGER : DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Competent BASALT, dry, angular, up to 1/2" diameter. 65 70_ Same as above. Fracture zone, wet, angular clasts up to 1" diameter. 75 Competent, angular, up to 1/2" diameter, water from above. 80 Same as above. 85 90



ELEVATION: 2590.03 ft mslft NAVD88 (ground surface)

PROJECT NUMBER: BORING NUMBER: MW-6D

SHEET 4 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

120

LOCATION :

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 209427.864, 2539181.874 (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Air Rotary WATER LEVEL: START : 7/11/2016 END: 7/11/2016 LOGGER : DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm 95 100 105 110 Same as above, water produced constantly. 115



ELEVATION: 2590.03 ft mslft NAVD88 (ground surface)

PROJECT NUMBER: BORING NUMBER: MW-6D

SHEET 5 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

150

LOCATION :

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 209427.864, 2539181.874 (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Air Rotary WATER LEVEL: START : 7/11/2016 END: 7/11/2016 LOGGER : DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY GRAPHIC DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE PID (ppm) Breathing Zone FID (ppm 125_ 130 135 140 145



PROJECT NUMBER: BORING NUMBER: MW-6D 661508

SHEET 6 OF 8

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION :

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2590.03 ft mslft NAVD88 (ground surface) COORDINATES : 209427.864, 2539181.874 (ft NAVD88)

START : 7/11/2016 END: 7/11/2016 WATER LEVEL: LOGGER DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm 155 Same as above. 160 Competent basalt, more subrounded, not as flake shaped. Same as above, increase in diameter, water. Subrounded BASALT, up to 1/3" diameter, as gravel, with tan 165 and brown siltstone,. 170 Same as above. Competent BASALT, more competent, less mineralization, more angular, harder drilling, thin fracture zones 172-175'. 175 BASALT, more competent, decreasing tan mineralization/weathering, up to 1/2" diameter angular to subangular cuttings .. 180



PROJECT NUMBER:	BORING NUMBER
661508	MW-6D

SHEET 7 OF 8

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION :

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2590.03 ft mslft NAVD88 (ground surface) COORDINATES : 209427.864, 2539181.874 (ft NAVD88)

WATER LEVEL: START : 7/11/2016 END: 7/11/2016 LOGGER DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT, more competent, decreasing tan mineralization/weathering, up to 1/2" diameter angular to subangular cuttings .. 185 190 195 200 205 210



PROJECT NUMBER:	BORING NUMB
661508	MW-6D

Bottom of borehole at 234 ft bgs.

MBER:

SHEET 8 OF 8

SOIL BORING LOG

235

240

PROJECT : Grain Handling Facility at Freeman LOCATION : ELEVATION: 2590.03 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc COORDINATES : 209427.864, 2539181.874 (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Air Rotary WATER LEVEL: START : 7/11/2016 END: 7/11/2016 LOGGER DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT, more competent, decreasing tan mineralization/weathering, up to 1/2" diameter angular to subangular cuttings .. 215 220 225 230



DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

BORING NUMBER:

MW-6S

SHEET 1 OF 2

PROJECT : Grain Handling Facility at Freeman

LOCATION : near school tennis courts

PROJECT NUMBER:

661508

ELEVATION : 2590.45 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 209430.793, 2539171.036 (ft NAVD88)

WATER LEVEL:				START : 6/27/16 00:25 END : 6/27	/16 14:30		LOGGER : Nicole B	adon
DEPTH BELOW S		-T)	g	SOIL DESCRIPTION		COI	MMENTS	
INTER	AL (FT)	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	R TI	ATE, DRILL ESTS, & INS	ASING, DRILLING ING FLUID LOSS, STRUMENTATION	
0.0				SILTY CLAY (CL) with little fine to coarse sand, loose 0' to 6' then very stiff, dry to moist ~6', dark brown, trace organics.	PID (ppm)) Br	eathing Zone	FID (ppm
-	33.0			-				-
5 7.0								
				SILTY CLAY (CL) some fine to coarse sand throughout, little fine coarse subrounded gravel, reddish brown (oxidized) slightly moist, hard.				-
10	96.0							
	5.0			SANDY CLAY (CL) grading to fine to medium sand, w/little silt/clay. Reddish brown Sandy Clay (CL), hard, some fine to coarse sand, little fine gravel, slightly moist.				-
15 17.0	5.0			Fine to medium sand, little silt, abundant muscovite mica, moist, hard/dense.				
-				Fine to medium sand with some fine to coarse angular gravel (SW) light gray with reddish brown oxidation, moist to wet, medium dense, abundant mica flakes, trace silt.				-
20								
	7.0							-
25				Silty Clay (CL), yellowish orange, moist, very stiff, trace dark gray mottling.				-
				CLAY (ML) Blue gray with yellowish orange mottling, medium stiff, wet.				-
30								



DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

BORING NUMBER: MW-6S

SHEET 2 OF 2

PROJECT : Grain Handling Facility at Freeman

LOCATION : near school tennis courts

PROJECT NUMBER:

661508

ELEVATION : 2590.45 ft ms/ft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 209430.793, 2539171.036 (ft NAVD88)

END: 6/27/16 14:30 WATER LEVEL: START : 6/27/16 00:25 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm CLAYEY SILT (ML) with some fine to medium sand and trace weathered basalt fragments/fine to coarse gravel sized, yellowish orange and dark brown (oxidized), very moist to wet, medium stiff. 120.0 35 37.0 CLAYEY SILT (ML), slightly plastic, some very fine to medium sand (30-40%) throughout, trace fine subangular to subrounded gravel, trace weathered basalt fragments, medium brown with oxidation, wet, soft to medium stiff... 40 113.0 45 47.0 $\mbox{CLAYEY SILT (ML)},$ with some very fine to medium sand, same as above, decreasing moisture from wet to slightly moist, medium stiff to dense, increasing weathered basalt fragments with depth.. 50 146.0 BASALT, dark gray and oxidized, dry, coarse gravel sized clasts, some silt. 54.0 Bottom of borehole at 54 ft bgs. 55 60

ch2m.

Soil Boring Log

BORING NUMBER:

MW-6U

SHEET 1 OF 4

PROJECT : UPRR Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

GROUND ELEVATION : DRILLING CONTRACTOR : Environmental West Exploration, Inc COORDINATES DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVEL START : 8/15/17 14:00 LOGGER : S. Demus END: 8/16/17 10:30 Reviewed By : DEPTH BELOW GROUND SURFACE (ft) SOIL DESCRIPTION COMMENTS STANDARD PENETRATION TEST RESULTS ГОG RECOVERY (%) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, SAMPLE TYPE, GRAPHIC COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL AIR MONITORING, PID (ppm) SOIL GAS MONITORING, FID (ppm) STRUCTURE, MINERALOGY 6"-6"-6" (N) 1400 - Begin drilling 0.0 CLAY (CL), medium brown, dry, very firm, medium plasticity. 5 5.0 10.0 10 POORLY GRADED SAND (SP), with trace fines, sand up to 3mm in diameter, rounded, trace calcite and mica, medium brown. SAND WITH CLAY, predominantly fine micaceous and, 15 15.0 white/light gray clay, dry, brittle clasts, grades with increased clay content, cuttings consisted of 1/2-1" clods, abundant mica. SAND WITH CLAY, predominantly fine micaceous and, white/light gray clay, dry, brittle clasts, grades with increased clay content, cuttings consisted of 1/2-1" clods, abundant mica UPRR 31ST, FREEMAN LOGS_LLT.GPJ, STOCK.GLB, 12/13/17 20 20.0 CLAY (CL), with trace fine to medium micaceous sand, orange brown, dry, medium plasticity. 25 25.0 CLAY (CL), lean, tan, plastic dry. CLAY (CL), lean, tan, plastic dry. 30

Ch2m

Soil Boring Log

BORING NUMBER:

MW-6U

SHEET 2 OF 4

PROJECT : UPRR Freeman

60

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

GROUND ELEVATION : DRILLING CONTRACTOR : Environmental West Exploration, Inc COORDINATES DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVEL START : 8/15/17 14:00 LOGGER : S. Demus END: 8/16/17 10:30 Reviewed By : DEPTH BELOW GROUND SURFACE SOIL DESCRIPTION COMMENTS STANDARD PENETRATION TEST RESULTS ГOG RECOVERY (%) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL SAMPLE TYPE, GRAPHIC ŧ COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY AIR MONITORING, PID (ppm) SOIL GAS MONITORING, FID (ppm) 6"-6"-6" (N) 30.0 SILTY CLAY (CL), damp, gray, slight plasticity. CLAY (CL), trace medium to fine sand, slight plasticity, damp, medium brown, iron oxide deposits. 35 35.0 1600 CLAY (CL), with trace fine sand, medium brown, slight plasticity, damp, iron oxide deposits. 40 40.0 CLAY (CL), with trace fine sand, medium brown, slight plasticity, damp, iron oxide deposits. 45 45.0 CLAY (CL), with sand and gravel, fine basalt gravel, fine to coarse sand, iron oxide deposits, wet. UPRR 31ST, FREEMAN LOGS_LLT.GPJ, STOCK.GLB, 12/13/17 50 50.0 8/16/17, 0745 WEATHERED BASALT, angular fragments up to 1/2", heavily oxidized, platy, gray, wet. 55 55.0 WEATHERED BASALT, poorly graded, gray with heavy Soft drilling oxidation, subrounded, wet.

ch2m.

PROJECT NUMBER: 661508 BORING NUMBER: MW-6U SHEET 3 OF 4

Soil Boring Log

PROJECT : UPRR Freeman

LOCATION : Freeman, WA

GROUND ELEVATION : DRILLING CONTRACTOR : Environmental West Exploration, Inc COORDINATES DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVEL START : 8/15/17 14:00 LOGGER : S. Demus END: 8/16/17 10:30 Reviewed By : DEPTH BELOW GROUND SURFACE SOIL DESCRIPTION COMMENTS STANDARD PENETRATION TEST RESULTS ГOG RECOVERY (%) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL SAMPLE TYPE, GRAPHIC ŧ COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY AIR MONITORING, PID (ppm) SOIL GAS MONITORING, FID (ppm) 6"-6"-6" (N) 60.0 BASALT, vesicular, angular fragments up to 1/2", somewhat platy, wet. Hard drilling 65 65.0 Driller set seal around outer casing, drilling open BASALT, vesicular, angular fragments up to 1/2", platy, hole wet. 70.0 70 BASALT, vesicular, angular fragments up to 1/2", platy, wet. 75 75.0 BASALT, less vesicles, up to 1/4" platy rock fragments, dry, black. UPRR 31ST, FREEMAN LOGS_LLT.GPJ, STOCK.GLB, 12/13/17 80 80.0 Hard drilling BASALT, no vesicles, platy rock fragments up to 1/4", dry, black. 85 85.0 BASALT, no vesicles, platy rock fragments up to 1/4", dry, black. BASALT, vesicular, subangular rock fragments up to 1/4", predominantly coarse sand sized, dry.

ch2m.

MW-6U SHEET 4 OF 4 Soil Boring Log

BORING NUMBER:

PROJECT : UPRR Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

GROUND ELEVATION : DRILLING CONTRACTOR : Environmental West Exploration, Inc COORDINATES DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVEL START : 8/15/17 14:00 LOGGER : S. Demus END: 8/16/17 10:30 Reviewed By : DEPTH BELOW GROUND SURFACE (ft) SOIL DESCRIPTION COMMENTS STANDARD PENETRATION TEST RESULTS ГOG RECOVERY (%) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, **GRAPHIC** SAMPLE TYPE, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY AIR MONITORING, PID (ppm) SOIL GAS MONITORING, FID (ppm) 6"-6"-6" (N) Soft drilling 90.0 BASALT, vesicular, subangular rock fragments up to 1/4", predominantly coarse sand sized, dry. BASALT, same as above, predominately fine gravel, up to 1/2". 95 95.0 BASALT, trace vesicles, dry, black, predominately fine gravel up to 1/2", angular. - no vesicles. BASALT, trace vesicles, dry, black, predominately fine gravel up to 1/2", angular, no vesicles. 100 100.0 BASALT, vesicular: subangular to angular, predominantly fine gravel fragments up to 1/2", dry, black. 105 BASALT, no vesicles, subangular to angular, predominantly fine gravel fragments up to 1/2", dry, black. 106.0 TD at 1030 Boring terminated at 106 ft bgs. UPRR 31ST, FREEMAN LOGS_LLT.GPJ, STOCK.GLB, 12/13/17 110 115 120



BORING NUMBER: WW-7S (SB-03) SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : E. of Silos, Just east of RR spur, 70 feet south of SB 01

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

ELEVATION: 2597.29 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210943.125, 2539559.497 (ft NAVD88)

	LEVEL:		<u></u>	00000	9.497 (ft NAVD88) DRILLING ME I HOD AND EQUIPMEN START : 5/13/16 13:15 END : 5/13		LOGGER : RSG	
		JRFACE (F	-T)		SOIL DESCRIPTION	»10 15.15	COMMENTS	
	INTERV		,	GRAPHIC LOG				
		RECOVE		HC	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE	DEF	TH OF CASING, DRILLING	
		INECCVI	#TYPE	RAP	DENSITY OR CONSISTENCY, SOIL		TE, DRILLING FLUID LOSS, STS, & INSTRUMENTATION	
			#ITPE	G	STRUCTURE, MINERALOGY	PID (ppm)	Breathing Zone	FID (ppm
	0.0				Well graded sand w/gravel + silt, (SW), wet, topsoil.			
-				· · · · ·	Brown lean clay (CL), moist, stiff, medium plasticity, medium			-
					cohesive, trace mica + F. Sand.			
					-			-
_		100.0			_			_
5		100.0						
5_								
					-			_
-					Brown + gray lean clay (CL) w/ trace cementation, gray			-
	8.0				intermixed, moist, med plasticity, med cohesive, stiff.			-
					Same as above.			_
10					_			
I _								_
					Sandy Clay (CL) gray, very fine, increase in moisture, soft, medium cohesive, med plasticity.			
								_
-		85.0						_
					Transition to brown, olive/yellow+gray clay (CL) intermixed, weathered, moist, very stiff, some cementation decrease in			
					moisture.			
15								
					Reddish brown clay (CL), trace fine sand, trace cementation,			
-					low plasticity, low cohesiveness, moist.			-
_	18.0				-			_
					Reddish brown clay (CL) with gray + olive/yellow intermixed			-
20					coloring, low plasticity, low cohesiveness, moist, stiff.			
-					-			-
-					Same as above, decreasing olive/yellow + gray coloring, stiff.			-
		120.0			Came as above, decreasing onveryence + gray coloring, suit.			
		120.0						
-					Gray clay with yellow mottling, moist, very stiff, low plasticity,			-
25					low cohesiveness.			
				////				
-					Same as above with decreasing to trace yellow monitoring.			-
-				////	-			-
	28.0			////				
-	-			V///	Gray reddish brown, brown clay (CL) w/ trace cemented clay,			-
-					moist, low plasticity, low cohesive, stiff to very stiff.			-
30				V///				



BORING NUMBER: MW-7S (SB-03)

SHEET 2 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : E. of Silos, Just east of RR spur, 70 feet south of SB 01

ELEVATION: 2597.29 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210943.125, 2539559.497 (ft NAVD88)

END : 5/13/16 15:15 WATER LEVEL: START : 5/13/16 13:15 LOGGER : RSG DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Gray reddish brown, brown clay (CL) w/ trace cemented clay, moist, low plasticity, low cohesive, stiff to very stiff. Same as above. 100.0 35 Tannish brown + reddish brown clay (CL) with clay stone clasts, moderately cemented up to 1/2" diameter, moist, low plasticity. Gray clay (CL) with trace brown/reddish brown mottling, med 38.0 plasticity, med cohesive, stiff, moist. 40 Gray clay with gravel (CL) and basalt clasts, clasts up to 2" diameter, rounded to sub rounded, clay is low plasticity, low cohesive, moist. Basalt, fractured, clasts up to 3" diameter, angular to Hard Drilling subrounded, from 1/8" to 3" diameter, dry... 45 Harder Drilling Bottom of borehole at 48.5 ft bgs. 50 55 60



BORING NUMBER: WW-8S (SB-05) SHEET 1 OF 2

LOCATION : SE from MWS. S of garage door near chute

ELEVATION: 2603.66 ft mslft NAVD88 (ground surface)

PROJECT : Grain Handling Facility at Freeman

DRILLING CONTRACTOR : Environmental West Exploration, Inc DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

SOIL BORING LOG

COORDINATES : 210890.721, 2539492.176 (ft NAVD88)

	LEVEL:		5.721, 2	00040	2.176 (ft NAVD88) DRILLING ME I HOD AND EQUIPMEN START : 5/17/16 11:00 END : 5/1	7/16 14:00 LOGGER :	PSC
	BELOW SU		-T)		SOIL DESCRIPTION	COMMENTS	Köö
	INTERV		•	LOG	SOIL DESORIF HON		
		· · ·	ERY (FT)	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DR RATE, DRILLING FLUID TESTS, & INSTRUMENT	LOSS,
						PID (ppm) Breathing Zor	ne FID (ppm
					Gravels. Disturbed backfill clay, dark gray to gray, moist.		- - -
-					Transition to native brown clay, lean, stiff, med plastic, med cohesive, moist.	0-8' recovery 7'/8'	-
10 					Same as above (CL), moist, brown.		
- 15 -					Increasing orange brown coloring (CL) same as above.		- -
20					Tan sandy clay (CL), moist, soft, low plasticity, low cohesiveness. Gravelly clay (CL), angular to subangular, up to 7 dia. possible increase in moisture. Brown sandy clay, very fine sand moist, soft.	8-18 11'/10' recovery	_
- - 25					Dark brown clay, with some cemented clay, trace olive yellow, low plastic, low cohesiveness, decreasig moisture.		
					Brown clay (CL), trace fine sand, trace gray clay medium plastic, med cohesiveness. Dark brown clay (CL) w/ orange/brown coloring intermixed moist.	18-28 recovery 9'/10'	-



BORING NUMBER: WW-8S (SB-05) SHEET 2 OF 2

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : SE from MWS. S of garage door near chute

DRILLING CONTRACTOR : Environmental West Exploration, Inc ELEVATION: 2603.66 ft mslft NAVD88 (ground surface)

COORDINATES : 210890.721, 2539492.176 (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

r	LEVEL:			1	START : 5/17/16 11:00 END : 5/1	7/16 14:00	LOGGER : RSG	
DEPTH E	BELOW SUF		T)	Ŋ	SOIL DESCRIPTION		COMMENTS	
	INTERVA	L (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE TEST	TH OF CASING, DRILLING , DRILLING FLUID LOSS, S, & INSTRUMENTATION	
				(////	Dark brown clay (CL) w/ orange/brown coloring intermixed	PID (ppm)	Breathing Zone	FID (ppm
-					Dark brown clay, moist, w/ yellow mottling, low plasticity, low	-		-
- 35					cohesiveness.	-		-
-					Clay, gray, yellow and reddish brown moist, stiff, low plasticity, low cohesiveness, some lightly cemented clay intermixed.	-		-
 40					Clay (CL), brown with reddish brown and gray clay intermixed, low plasticity, low cohessiveness, moist.	28-38 recovery	12'/10'	-
-					Sandy/Clay (CL), moist, soft, very fine sand, med plasticity, med cohesiveness, gray, 40-41' bgp. Clay (CL), gray with reddish brown coloring intermixed soft,	-		-
 					med plastic, med cohesive.	-		- - -
-					Gray and brown clay (CL), stiff, most, low plasticity, low cohesiveness, becoming siffer with depth.	-		-
_ 50					Same as above (CL).	30-48 11'/10' re-	covery	-
-				X	Clay/silt, very stiff, no plasticity, low cohession. Clayey gravel, basalt, angular, gray stiff clay fractured basalt, clasts up to 4 dia. moist, angular.	Hard drilling slo	w advancement	-
_ 55					Bottom of borehole at 53 ft bgs.	-		-
-						-		-
- 60						-		-



BORING NUMBER: MW-9D

SHEET 1 OF 4

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90, 5" hammer (7 1/2" hole)

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION : 2599.24 ft mslft NAVD88 (ground surface) COORDINATES : 210758.768, 2539617.725 (ft NAVD88)

WATER LEVEL: START : 12/12/16 07:30 END : LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm LEAN CLAY (CL), dark reddish-gray (5YR 4/2), medium 0.0 plasticity, moist, soft. Background PID = 0.0 ppm Drilling starts at 0935 Sample for lithology taken every 5' or noticeable change in drilling character Breathing Zone = 0.1 ppm 5.0 5 LEAN CLAY (CL), brown (7.5YR 4/4), medium plasticity, moist, 5-10' - Breathing Zone = 0.1-0.2 ppm soft. 10 10.0 LEAN CLAY (CL), brown (7.5YR 4/4), low plasticity, moist, soft; quartzitic sand, angular, with gray (7.5YR 4/1) silt/clay (ML/CL) then interbeds/laminae. 1005 - 10' bgs Breathing Zone = 0.1-0.2 ppm 15 15.0 LEAN CLAY (CL), brown (7.5YR 4/4), low to medium plasticity, most, soft, trace sand. Breathing Zone = 0.1-0.2 ppm 20 20.0 LEAN CLAY (CL), strong brown (7.5YR 4/6), low to medium At ~ 23', driller notes change in drilling characteristics "hard clay" and starts injecting water, water noted in borehole after drilling started at 20' (driller did not inject at that point) plasticity, moist to wet, soft; trace fine sand and silt. 25 25.0 30



BORING NUMBER: MW-9D

SHEET 2 OF 4

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90, 5" hammer (7 1/2" hole)

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION : 2599.24 ft mslft NAVD88 (ground surface) COORDINATES : 210758.768, 2539617.725 (ft NAVD88)

WATER LEVEL: START : 12/12/16 07:30 END : LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm LEAN CLAY (CL), strong brown (7.5YR 4/6), wet, very soft. 30.0 35 35.0 LEAN CLAY (CL), as above but with some coarse rock fragments (basaltic). 40 LEAN CLAY (CL), as above, increase in percentage coarse sand-sized grains (basaltic rock fragments) - black, angular. Very little returns at 40', drilling chatter changes at 41-42' to heavy chatter, top basalt - 41-42 possibly 45 45.0 45' - COARSE SAND - Basaltic Rock Fragments with some Breathing Zone = 0.6 ppm - Background Weathered/Oxidized Rock Fragments 45-50' - BASALT, olive gray (5Y 3/2), angular to rounded fine sand to fine gravel; hard. 50 BASALT, as 45-50' with some light brown (5YR 5/6) rock fragment (oxidized). 50-55' Basalt is fractured and water bearing, driller adding no extra water 55 55.0 BASALT, same as -50-55' with some trace metallic sulfides (pyrite-like minerals). 0936 at 55 50-55' - borehole reaches abundant water DTW = 33' bgs at 58' depth (1015) MW9D-GW-58-121316 collected DTW = 33' bgs (1105) 60



BORING NUMBER: MW-9D

SHEET 3 OF 4

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90, 5" hammer (7 1/2" hole)

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2599.24 ft mslft NAVD88 (ground surface) COORDINATES: 210758.768, 2539617.725 (ft NAVD88)

			<u>5.700, 2</u>	53901		T : Mobile B-90, 5" hammer (7 1/2" hole)
-	LEVEL: BELOW SU		T)		START : 12/12/16 07:30 END :	LOGGER : R. McComb COMMENTS
DEPIRE	1		1)	00	SOIL DESCRIPTION	
	INTERV	RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#11FE	G	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm
-					BASALT, olive gray (5Y 3/2) up to coarse gravel-sized rock fragments; angular, little oxidation; trace pyrite-like metallic minerals.	60-70' - borehole produces abundant water - -
65	65.0			\mathbb{K}		
	75.0				BASALT, olive gray (5Y 3/2) up to coarse gravel-sized rock fragments; angular, little oxidation; trace pyrite-like metallic minerals.	Borehole continues to produce water while drilling from 70-75' (driller estimates 10-15 gpm and notes volume of water has increased with depth)
-					BASALT, same as 60-70'; pyrite-like materials, more abundant (20-25%); some coarse gravel-sized rock fragments.	
80 - - -					BASALT, same as 75-80'. - - -	
85 - - - 90	85.0				BASALT, olive gray (5Y 3/2) to dark yellowish-brown (10YR 4/2); pyrite absent; some vesicular basalt rock fragments; perhaps lightly oxidized grains.	At 85' - borehole continues water production Borehole produces water from 85-90'



SHEET 4 OF 4

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90, 5" hammer (7 1/2" hole)

BORING NUMBER:

MW-9D

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION : 2599.24 ft mslft NAVD88 (ground surface) COORDINATES : 210758.768, 2539617.725 (ft NAVD88)

WATER LEVEL: START : 12/12/16 07:30 END : LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LoG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT, as 80-85' with some pyrite. BASALT, (weathered) dark yellow brown; similar in angularity and grain size to the above basalt but with definite color Driller says color change in water at ~92' and drilling becomes "softer" change (oxidation). Abundant water from 92-95' 95 95.0 BASALT, (weathered) olive gray (5Y 3/2) and dusky yellow brown (10YR 2/2) rock fragments; with weak weathered 95-100' - borehole continues to make water basaltic rock fragments easily broken, platy, clayey (dense), clay to fine/medium gravel sized grains. 100 WEATHERED BASALTIC ROCK FRAGMENTS, dark yellowish-brown (10YR 4/2) to grayish green (5Y 3/2), clayey to Borehole continues to make water from 100medium gravel sized, weak, clayey with trace serpentine-like 105' bgs (screen from 85-95', 10 slot - 10' of screen), with 10-20, centralizer around screen sand-sized grains. 105 105.0 Bottom of borehole at 105 ft bgs. 110 115 120



BORING NUMBER: WW-9S (SB-04) SHEET 1 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : SW of silds near Hwy 27 Row

DRILLING CONTRACTOR : Environmental West Exploration, Inc ELEVATION: 2599.83 ft mslft NAVD88 (ground surface)

COORDINATES : 210768.127, 2539599.562 (ft NAVD88)

WATER LEVEL:					START : 5/16/16 12:45 END : 5/1	6/16 14:30		
DEPTH E	DEPTH BELOW SURFACE (FT)				SOIL DESCRIPTION		COMMENTS	
	INTERV		FT) ECOVERY (FT) #TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
<u> </u>				(////	Gravelly clay (CL), moist, gray, gravel poorly graded, fine.	PID (ppm)	Breathing Zone	FID (ppm
								_
					Transition to CL, (CL), lean, med plasticity, med cohesiveness brown, moist very stiff.			
-								-
-					Same as above (CL).	-		-
-					-	-		-
5								
-					-			-
-					Same as above (CL).	-		-
								-
						0.8' recovery 6.5	5'/8.0'	
10					-	1		-
10					—			
-					-			-
_								-
					2 Zone - clayey gravel (GC) rounded, poorly graded-coarse, brown, clay, moist, stiff.			
-					Clayey gravel (CL), most, poorly graded, coarse, subangular,			-
-					clsts up to 3'.			-
15					Reddish brown clay w/fine sand (CL), no cohesion, low	-		
					plasticity, moist.			_
-					-	-		-
-					Brown clay with sand (CL), med sand, brown, no cohesiveness,	-		-
_					low plasticity, moist decreasing sand with depth, stiff.	8-18 recovery 9-	-5/10'	-
20								
					_			
-					-	1		-
-					Brown, orange brown clay (CL), w/trace fine gravel, trace gray	1		-
_					clay, non plastic, non cohesive, moist, stiff.			-
]		
25					-]		-
25					—	1		_
-					Same as above.	4		-
								-
					Brown, gray, reddish-brown clay (CL) stiff, moist, low plasticity,			-
-					low cohesivenes, moderately to light cemented clay intermixed withing, stiff.	18-28 10'/10' red	covery	-
30					1			



BORING NUMBER:

WW-9S (SB-04) SHEET 2 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : SW of silds near Hwy 27 Row

ELEVATION : 2599.83 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210768.127, 2539599.562 (ft NAVD88)

	LEVEL:					5/16 14:30	LOGGER : RSG	
DEPIRE				g	SOIL DESCRIPTION		COMMENTS	
	INTERV	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
			#TYPE	G	STRUCTURE, MINERALOGY	PID (ppm)	Breathing Zone	FID (ppm
-					Brown, gray, reddish-brown clay (CL) stiff, moist, low plasticity, low cohesivenes, moderately to light cemented clay intermixed withing, stiff. Same as above (CL) increasing yellow mottling intermixed.		breating 20ne	
35					Reddish brown and gray clay (CL) stiff, moist, low plasticity, low cohesiveness, decreasing gray clay with depth.			-
- - 40					Gray sandy clay (CL), v fine sand, moist, stiff, low plasticity low cohesiveness.	28-38 10'/10' re	covery	-
-					Basalt-fractured and rubble w/powered basaltic gravel and sand, dry clasts up to 3-4 dia. ????. Bottom of borehole at 43 ft bgs.	Hard drilling		
45 - -					-			-
- 50 -					-			
- - 55					-			-
- - 60					-			-

ch2m

PROJECT NUMBER: BORING NUMBER: 661508 **MW-9U** SHEET 1 OF 3

Soil Boring Log

PROJECT : UPRR Freeman

LOCATION : Freeman, WA

|--|

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDI	NATES:				DRILLING METHOD AND EQUIPMENT	: Air Rotary
WATER	LEVEL :		STA	ART : 8	8/24/17 08:00 END : 8/24/17 12:45 LOGGER : S. D	emus Reviewed By :
ACE				U	SOIL DESCRIPTION	COMMENTS
DEPTH BELOW GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (%)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL,	SAMPLE TYPE,
PTH BE JND SL (ft)	NTER (ft.	ECOVE (%)		APHI	COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	AIR MONITORING, PID (ppm) SOIL GAS MONITORING, FID (ppm)
DEI	=	R	6"-6"-6" (N)	GR	STRUCTURE, MINERALOGY	
	0.0		()			Background BZ = 0.0 ppm Begin drilling at 1015
-						
-						
_						
_						
5	5.0				LEAN CLAY (CL), medium plasticity, damp, hard,	
-					reddish-brown.	
_						
-						Breathing zone = 0.1 ppm
-						
10	10.0				LEAN CLAY (CL) modium plasticity down hard	
_					LEAN CLAY (CL), medium plasticity, damp, hard.	
-						-
-						
_						
15	15.0					
					CLAYEY SAND (SC), trace gravel, medium to coarse rounded/subrounded sand, abundant mica, fine rounded	
-					gravel, reddish-brown, damp.	
-						
-					LEAN CLAY (CL), medium plasticity, damp, soft, brown.	
_					LEAN GLAT (CL), medium plasticity, damp, son, brown.	
20	20.0					
20	_0.0			////	- low plasticity, orange-brown, damp medium plasticity,	
<u> </u>				////	olive, moist.	Noticeable water content increase
5 -				////		
01444 0191, FREEMAN LOOS_LLLI, 674, 9100, 6416 00						
					LEAN CLAY (CL), medium plasticity, orange-brown, moist.	
	05.0			V///		-
25	25.0				LEAN CLAY (CL), medium plasticity, orange-brown, soft,	Breathing zone = 0.1 ppm
				////	moist.	
				////		
Ĕ				////		
				////		-
				////		
30				V////		

UPRR 31ST, FREEMAN LOGS_LLT.GPJ, STOCK.GLB, 12/13/17

ch2m.

Soil Boring Log

BORING NUMBER:

MW-9U

SHEET 2 OF 3

PROJECT : UPRR Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

GROUND ELEVATION : DRILLING CONTRACTOR : Environmental West Exploration, Inc COORDINATES DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVEL START : 8/24/17 08:00 LOGGER : S. Demus END: 8/24/17 12:45 Reviewed By : DEPTH BELOW GROUND SURFACE SOIL DESCRIPTION COMMENTS STANDARD PENETRATION TEST RESULTS ГOG RECOVERY (%) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, SAMPLE TYPE, GRAPHIC ŧ COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL AIR MONITORING, PID (ppm) SOIL GAS MONITORING, FID (ppm) STRUCTURE, MINERALOGY 6"-6"-6" (N) Breathing zone = 0.1 ppm 30.0 LEAN CLAY (CL), medium plasticity, orange-brown, soft, moist. 35 35.0 1200 - discharge hose clogged with clay, drillers LEAN CLAY (CL), medium plasticity, orange-brown, resolve sand-sized oxidized clods, wet, very soft. 40 40.0 COARSE SAND, basaltic, trace fine gravel fragments, angular, dark gray/black with oxidation. Breathing zone = 0.0 ppm 45 45.0 WEATHERED BASALT, predominately fine angular gravel rock fragment to 1/4" with larger weathered/oxidized rock. UPRR 31ST, FREEMAN LOGS_LLT.GPJ, STOCK.GLB, 12/13/17 50 50.0 WEATHERED BASALT, predominately coarse sand and fine gravel sized, angular, black, trace weathering, black, dry. BASALT, angular rock fragments up to 1/4", black, somewhat platy, dry. 55 55.0 60

ch2m

90

PROJECT NUMBER: BORING NUMBER: 661508 **MW-9U** SHEET 3 OF 3

Soil Boring Log

LOCATION : Freeman, WA **PROJECT : UPRR Freeman** DRILLING CONTRACTOR : Environmental West Exploration, Inc **GROUND ELEVATION :** COORDINATES: DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVEL START : 8/24/17 08:00 LOGGER : S. Demus END: 8/24/17 12:45 Reviewed By : DEPTH BELOW GROUND SURFACE (ft) SOIL DESCRIPTION COMMENTS STANDARD PENETRATION TEST RESULTS ГOG RECOVERY (%) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, SAMPLE TYPE, AIR MONITORING, PID (ppm) GRAPHIC COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SOIL GAS MONITORING, FID (ppm) 6"-6"-6" (N) 60.0 WEATHERED BASALT, predominately coarse sand sized angular rock fragments, some fine gravel size, trace oxidation, dry, black. 62' = abundant water Beginning at fracture zone, abundant water BASALT, predominantly coarse sand with some fine grained, angular, wet, black heavy oxidation. Breathing zone = 0.0 ppm 65 65.0 70 70.0 75 75.0 Breathing zone = 0.0 ppm UPRR 31ST, FREEMAN LOGS_LLT.GPJ, STOCK.GLB, 12/13/17 80_ 80.0 TD at 1430 Boring terminated at 80 ft bgs. 85



BORING NUMBER: MW-10S (SB-07) SHEET 1 OF 3

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : N side of bus road

DRILLING CONTRACTOR : Environmental West Exploration, Inc ELEVATION: 2615.77 ft mslft NAVD88 (ground surface)

COORDINATES: 210659.14, 2539516.673 (ft NAVD88)

END: 5/20/16 12:30 WATER LEVEL: START : 5/20/16 09:10 LOGGER : D. Butler DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Lean clay (CL), dark brown, low to med plasticity, moist, soft, roots. 5 Fat clay (CH), light brown, med to high plasticity, damp, stiff. 0-8' recovery 8/8', some wire in core hard drilling Fat clay (CH), gray, med plasticity, damp, stiff to very stiff. 10 Lean clay (CL), reddish brown, low plasticity, dry to damp, very soft, trace silt and sand. Lean clay (CL), gray w/reddish brown, med, plasticity, soft, moist, trace sand. 15 Lean clay w/sand (CL), gray to reddish brown, low plast., firm, dry to damp. Lean clay w/sand (CL), reddish brown, non-plastic, firm to hard, dry, subangular to subrounded, mod. cementation. Lean clay w/sand (CL), reddish brown, non-plastic, soft, damp, weak cementation, subang to subrounded. 8-18' recovery 9/10' 20 Lean clay (CL), reddish brown, low to med. plastic, soft, moist, trace sand. 25 Same as above. Same as above. 18-28' recovery 10/10' 30



BORING NUMBER: MW-10S (SB-07) SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : N side of bus road

ELEVATION: 2615.77 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES: 210659.14. 2539516.673 (ft NAVD88)

DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

COORDINATES : 210659.14, 25	39516	S.673 (ft NAVD88) DRILLING METHOD AND EQUIPMEN	NT : Schramm T30	0, Sonic	
WATER LEVEL:	1	START : 5/20/16 09:10 END : 5/2	/16 12:30 LOGGER : D. Butler		ler
DEPTH BELOW SURFACE (FT)	ğ	SOIL DESCRIPTION	COMMENTS		
INTERVAL (FT) RECOVERY (FT)	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
#TYPE	G	STRUCTURE, MINERALOGY	PID (ppm)	Breathing Zone	FID (ppi
		Lean clay (CL), reddish brown, low to med. plastic, soft, moist, trace sand.	-		
35		SA to SR.	-		-
		Same as above, (CL), reddish brown, yellow weathering/oxidation?/patches.	_ 28-38' recovery	/ 11/10'	
40		Lean clay (CL), reddish brown some gray, low to med. plast., firm, med. cementation, trace sand SA to SR, damp, green weathering intermittent.	-		_
45			-		
-			-		
50		Same as above.	38-48 recovery	11/10'	
		Lean clay (CL), reddish brow to gray, med. plastic, firm, moist.			
55		Lean clay (CL), black to dark gray, med. plast., firm, moist, some yellow to red weathering, trace sand.	-		
60		Same as above (CL), gray.	_ _ 48-58' recovery	/ 11/10'	



BORING NUMBER: MW-10S (SB-07) SHEET 3 OF 3

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : N side of bus road

DRILLING CONTRACTOR : Environmental West Exploration, Inc ELEVATION : 2615.77 ft mslft NAVD88 (ground surface)

COORDINATES : 210659.14, 2539516.673 (ft NAVD88)

			9.14, 25	39516	.673 (ft NAVD88) DRILLING METHOD AND EQUIPMEN			
r	LEVEL:			1	START : 5/20/16 09:10 END : 5/2	0/16 12:30	LOGGER : D. Butler	
DEPTH BELOW SURFACE (FT)				g	SOIL DESCRIPTION	COMMENTS		
	INTERV		ERY (FT)	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	
						PID (pp	m) Breathing Zone	FID (ppm
-					Lean clay (CL), black to dark gray, med. plast., firm, moist, some yellow to red weathering, trace sand.	-		-
65 - -	-				Same as above (CL), some mod. cementation.	-		-
- - 70	-				Lean clay (CL), gray med. plast, very soft, moist.	58-68' reco	overy 10/10'	-
-								-
- 75	-				Weathered rock, reddish brown, med. cement (1/2 ft zone), Basalt cobbles w/ lean clay, black 3 in drain, ang. clasts. Transitioning to weathered basalt with lean clay, moist.			
-	-				Fractured basalt, 3 in diam. max, lack of sand, angular, a light oxid. in some fracs., damp. Bottom of borehole at 78 ft bgs.		nin water boring zone, hard drilli	
80	-					-		_
-						-		
85					_	-		_
-						-		
90								



BORING NUMBER: MW-11S (SB-17) SHEET 1 OF 3

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Rotosonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : Bus parking area at school

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2623.90 ft mslft NAVD88 (ground surface) COORDINATES: 210221.495, 2539509.983 (ft NAVD88)

END: 6/28/16 15:05 WATER LEVEL: START : 6/28/16 11:23 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Silt (ML) with fine to coarse sand and fine angular gravel, loose, dry, medium brown, trace organics. Silty clay (CL), slightly platic, medium brown, moist, very stiff to hard. 5 Silty clay (CL), same as 2' to 7' slightly moist, trace coarse sand. 10 Silty clay (CL), slightly plastic, medium brown, trace coarse sand, very stiff to hard, moist, very moist but no free water from ~ 13' to 15'. 15 Silty clay (CL), same as 12' to 17', hard, moist. 20 25 Silty clay (CL), slightly plastic, medium brown, hard, trace medium to coarse sand, moist. 30



BORING NUMBER: MW-11S (SB-17) SHEET 2 OF 3

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Rotosonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : Bus parking area at school

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2623.90 ft mslft NAVD88 (ground surface) COORDINATES: 210221.495, 2539509.983 (ft NAVD88)

END: 6/28/16 15:05 WATER LEVEL: START : 6/28/16 11:23 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Silty clay (CL), slightly plastic, medium brown, hard, trace medium to coarse sand, moist. 35 Silty clay (CL), same as above, trace fine to coarse subrounded to subangular gravel from 43'-45', oxidixed sand and gravel clasts present. 40 45 Clay (CL), reddish brown (oxidized) with trace blue/gray mottling, trace medium sand, trace oxidized gravel, basalt fragments near 55' to 57', moist, very stiff to hard. 50 55 Silt (ML), slight plasticity, medium brown with blue/gray and white mottling, some decompossed basalt (~50%) throughout (black oxidized and soft), little very fine sand, trace clay, very moist/wet throughout. 60



BORING NUMBER: MW-11S (SB-17) SHEET 3 OF 3

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Rotosonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : Bus parking area at school

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2623.90 ft mslft NAVD88 (ground surface) COORDINATES: 210221.495, 2539509.983 (ft NAVD88)

END: 6/28/16 15:05 WATER LEVEL: START : 6/28/16 11:23 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Silt (ML), slight plasticity, medium brown with blue/gray and white mottling, some decompossed basalt (~50%) throughout (black oxidized and soft), little very fine sand, trace clay, very moist/wet throughout. 65 Silt (ML), same as above with trace weathered basalt gravel (fine gravel sized), very moist/wet. 70 75 Silt (ML), reddish brown with light gray mottling, little very fine sand, some fine to coarse gravel, angular, black (weathered basalt), very moist to wet. 80 Silt and decomposed basalt (weak), meduim gray with light brown oxidation, dry, little very fine sand. Drilliner Notes rock @ 83'bgs Silt and fine to coarse gravel-sized and cobble sized basalt, dark gray with some reddish brown oxidation, basalt is hard, 85 little very fine sand, dry. Bottom of borehole at 87 ft bgs. 90



BORING NUMBER:

MW-12S (SB-24) SHEET 1 OF 2

SOIL BORING LOG

Hard drilling

PROJECT : Grain Handling Facility at Freeman

30

LOCATION :

ELEVATION: 2621.48 ft mslft NAVD88 (ground surface)	DRILLING CONTRACTOR : Environmental West Exploration. Inc
ELEVATION . 2021.40 It IIIsiit NAVDoo (ground sunace)	DRILLING CONTRACTOR . Environmental west exploration, inc

COORDINATES: 211036.523, 2538995.318 (ft NAVD88) DRILLING METHOD AND EQUIPMENT WATER LEVEL: START : 7/20/2016 END: 7/20/16 11:20 LOGGER DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm TOPSOIL. 0.0 Brown lean CLAY (CL) - with trace medium sand, very hard, lightly moist. 3.0 5 7.0 Tan-brown lean CLAY (CL) - with trace medium sand, hard, moist. 10 6.0 AS ABOVE - CLAY (CL) - becoming very hard. 15 17.0 AS ABOVE. 20 5.0 Sharp transition to decomposed GRANITE, significant MICA and oxidized medium SAND, becoming light gray granite with highly cemented granite gravel, moist, very hard. Hard drilling 23.0 Highly weathered GRANITE to decomposing MICA, moist, firm, increasing oxidation. 25 6.0 Gray weathered SAND/SILTSTONE, decreasing oxidation, very Hard drilling fine sand, gray, decreasing mica, moist. Increasing oxidation - dark brownish red color. 27.0 Weathered GRANITE mixed with very fine SAND/SILTSTONE, very hard, oxidized, dark red coloring with orange and gray, granite clasts up to 2" diameter with mica.



ELEVATION: 2621.48 ft mslft NAVD88 (ground surface)

PROJECT NUMBER: 661508

BORING NUMBER:

MW-12S (SB-24) SHEET 2 OF 2

SOIL BORING LOG

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT : Grain Handling Facility at Freeman

LOCATION :

COORD	INATES	: 211036	6.523, 2	53899	5.318 (ft NAVD88) DRILLING METHOD AND EQUIPMEN	IT :
WATER	LEVEL:				START : 7/20/2016 END : 7/20	0/16 11:20 LOGGER :
DEPTH E	BELOW SU	JRFACE (F	T)	ø	SOIL DESCRIPTION	COMMENTS
	INTERV	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
						PID (ppm) Breathing Zone FID (ppm
-		8.5			Becoming gray SANDSTONE/SILTSTONE - weathered, with oxidation, mica observed with trace granite gravel throughout.	
35						
-	37.0				Transition to very hard mica SANDSTONE - weathered, light	
-					SANDSTONE - weathered, light gray with trace SILT content, very hard, moist, with mica.	
40					Transition to decomposed SANDSTONE - fine, light gray, loose, moist, trace to no mica, possible increase in moisture with depth.	
-					SAME AS ABOVE - increasing moisture, increasing mica.	
45					SAME AS ABOVE - becoming more hard, decreasing moisture.	
-	47.0				SAME AS ABOVE.	Allow boring to rearrange - 15 minutes - no water
50					Decomposed gray SANDSTONE, loose, probable increase in moisture, possibly wet, trace mica.	
						Easier advancement
-		9.5			Gray decomposed/weathered SANDSTONE, fine, firm, increase in mica, decrease in moisture.	
55					Sharp transition to weathered/decomposed GRANITE - gray and orange brown, with sand with mica, moist, some oxidation. Soft decomposed GRANITE, oxidized with mica, probable increase in moisture, gray and orange-brown. Decomposed SANDSTONE - gray, decreasing mica, increasing	
- - 60	57.0				hardness, decreasing moisture, decreasing oxidation. Bottom of borehole at 57 ft bgs.	



BORING NUMBER: MW-13S (SB-41) SHEET 1 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 4" x 6", Sonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

ELEVATION: 2580.43 ft mslft NAVD88 (ground surface) COORDINATES : 210219.558, 2540408.479 (ft NAVD88)

WATER LEVEL:					START : 2/14/2017 END : 2/14	4/2017	LOGGER :	
DEPTH E	BELOW SU	JRFACE (I	- T)	ŋ	SOIL DESCRIPTION		COMMENTS	
	INTERV	· · ·	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE TEST	TH OF CASING, DRILLING E, DRILLING FLUID LOSS, S, & INSTRUMENTATION	
	0.0			/////	LEAN CLAY (CL), very dark brown (7.5YR 2.5/2) to (7.5YR	PID (ppm)	Breathing Zone	FID (ppm
-	0.0	6.0			2.5/3), moist; soft with root material, medium plasticity.	Drilling without u	using water	-
5					SILT (ML), strong brown (7.5YR 4/6), moist to dry, cohesive,			
<u> </u>					stiff.			
-	6.0				SILT (ML), strong brown (7.5YR 4/6), moist to dry, cohesive, stiff.	SB41-SS-05		-
-					-			-
10					_			_
_		6.5				SB41-SS-10		-
-					SILT (ML)/WELL GRADED SAND WITH SILT AND SAND (SW-SC), variegated strong brown to very dark gray (7.5YR 4/6) to (7.5YR 3/1), moist to slightly wet, cohesive, soft to slightly stiff, some gravel (weathered basalt).		n was corresponded to (s e 6.5 length of core estim	
15	16.0					SB41-SS-15		
_ _20					WELL GRADED SAND WITH SILT AND CLAY (SW-SC), variegated very dark gray (7.5YR 3/1) to (2.5Y 3/1) with depth; some strong brown layer/veins; with relic phenocrysts of yellow clay-rich material (2.5Y 8/6 to 2.5Y 7/8); moist, becoming wet with depth at ~25-26', trace well indurated/very hard siltstone-like rock fragment, possibly weathered basaltic rock fragments; fine to very fine grained sand material, cohesive, soft.			-
-		10.0		//// //// //// //// ////	-	SB41-SS-20		-
-				 	-			-
25	26.0			/ / / / . / / / . / / / . / / / .		SB41-SS-25		-
-				//// //// //// //// //// ////	variegated very dark gray (7.5YR 3/1); black (7.5YR 2.5/1), strong brown (7.5YR 5/8), with veins/discontinuous thin laminae of silt/clay, yellow (2.5Y 8/6 to 2.5Y 7/8); wet at 26', moist with depth.			-
30				, , , , , , , , , , , , , , ,				



BORING NUMBER: MW-13S (SB-41) SHEET 2 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 4" x 6", Sonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

ELEVATION: 2580.43 ft mslft NAVD88 (ground surface) COORDINATES : 210219.558, 2540408.479 (ft NAVD88)

WATER LEVEL: START : 2/14/2017 END: 2/14/2017 LOGGER DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm WELL GRADED SAND WITH SILT AND CLAY (SW-SC), variegated very dark gray (7.5YR 3/1); black (7.5YR 2.5/1), strong brown (7.5YR 5/8), with veins/discontinuous thin laminae of silt/clay, yellow (2.5Y 8/6 to 2.5Y 7/8); wet at 26', moist with SB41-SS-30 10.0 depth. 35 36.0 WEATHERED BASALT, silty to clayey, soft to very hard; with gravel up to 2-3" in length; black (10YR 2/1), mottled dark to Slower/harder drilling from 36-46' bgs slightly most. SB41-SS-37 Collected (grap sample with bonifide oopen from 0-37') DTW at time of sampling was 26' bgs 40 SB41-SS-40 45 COMPETENT BASALT, greenish-gray to dark greenish gray SB41-SS-45 46.0 (5G 6/1) to (5GY 4/1), dry, hard. Bottom of borehole at 46 ft bgs. 50 55 60



BORING NUMBER: MW-14D

SHEET 1 OF 5

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90 Air Rotary, 6"

PROJECT : Grain Handling Facility at Freeman

30

LOCATION : Freeman, WA

ELEVATION : 2579.96 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210437.694, 2540106.311 (ft NAVD88)

WATER LEVEL: START : 1/25/17 09:00 END: 1/26/17 15:17 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LoG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE. MINERALOGY PID (ppm) Breathing Zone FID (ppm LEAN CLAY (CL), dark brown to very dark brown (7.5YR 3/3 to 0.0 7.5YR 2.5/3), moist, soft, medium plasticity. 0-7' - little resistance, soft quick drilling Breathing Zone = 0 ppm VOCs 5 5.0 LEAN CLAY (CL), brown (7.5YR 4/3), moist, soft, medium plasticity; with interlayered SILT (ML), brown (7.5YR 5/3), Hard surface at ~7' bgs cohesive, soft, 10 10.0 LEAN CLAY (CL), brown (7.5YR 4/3), moist, soft, medium plasticity; with interlayered SILT (ML), brown (7.5YR 5/3), Breathing Zone = 0.0 ppm VOCs cohesive, soft. LEAN CLAY (CL), very dark grayish brown (10YR 3/2) mottled brownish yellow (10YR 6/8) to yellow (10YR 7/8) silty inclusion; moist, soft, moderate plasticity; inclusions silty, stiff/medium dense, cohesive; trace black (10YR 2/1) silty inclusions, inclusion up to 1/8". 15 15.0 0925-0931 = 10-20' 20 20.0 LEAN CLAY (CL), dark gray (10YR 4/1), soft, wet, medium plasticity with brownish-yellow (10YR 6/8) to yellow (10YR 7/8) Breathing Zone = 0 ppm VOCs silty inclusions, few to little weakly indurated very dark gray Water at 20'; observed after rod connection (10YR 3/1) rock fragments and silty reddish brown to yellowish red (5YR 4/4 to 5YR 4/6) rock fragments. made at 20-30' 0954-1005 = 20-28' Drilling paved at 10:05, drillers to use water to facilitate cuttings removal 25 25.0



BORING NUMBER: MW-14D

SHEET 2 OF 5

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90 Air Rotary, 6"

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION : 2579.96 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210437.694, 2540106.311 (ft NAVD88)

DEPTH BELOW SURFACE (FT) SOIL DESCRIPTION COMMENTS INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY DEPTH OF CASINC, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION 30.0 WEATHERED BASALT WITH CLAY, basalt is greenish black (SGV 21 with strong brown (7.5YR 5/8), day; trace yellowish-green secondary minerals; few dark reddish-brown rock fragments; fine sand to fine gravel-sized rock fragments, wet. Breathing Zone = 0 ppm 1247 - MW14D-30-012517 3 x 40 ml vials (HCI) for 8260 35 35.0 LEAN CLAY (CL), with weathered rock fragments; clay very dark gray (10YR 3/1) to dark yellowish-brown rock fragments, fine sand to fine gravel-sized rock fragments, dark greenish-gray, few yellowish red rock fragments, dark greenish-gray, few yellowish red rock fragments, dark greenish-gray, few yellowish red rock fragments, (10YR 7/8); trace white/light gray clay. Breathing Zone = 0.0 ppm 1226 - 1300 - 30-35' 32-33 1/2 - dniller reports firmer material 1310-1314 - 35-40' 40 40.0 CLAY (CL), with weathered basaltic rock fragments, dark greenish-gray, few yellowish-red tock fragments, dark preenish-gray, few yellowish-red tock fragments, dark pasticity, with weathered basaltic rock fragments, dark plasticity, with weathered basaltic rock fragments, dark plasticity, with weathered basaltic rock fragments, dark plasticity, with weathered basaltic rock fragments, dark preenish gray (5G 4/1), moderate greenish-yellow (10Y 7/9) to moderate yellow green (5GY 7/4) fine to coarse sand sized rock fragments; trace dark reddish brown (10YR 3/4) rock fragments; trace dark reddish brown (10YR 3/4) rock Breathing Zone =			. 210-01	.034, 2	34010	6.311 (ft NAVD88) DRILLING METHOD AND EQUIPMEN	
INTERVAL (FT) Out_COURT Final BITERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, INSTRUCTURE, MINERPALOS' TESTS, INSTRUCTURE	r			· T \			
40 WEATHERED BASALT WITH CLAY, basalt is greenish black (GSY 2/1 with strong brown (7.5YK 5/8) clay; trace yellowish green secondary minerais; free dark reddish-brown (7.5YK 5/8) clay; trace yellowish green secondary minerais (100 dark reddish-brown (100 H 200-012517) 3 x 40 m vital (HO) for 2800 35 35.0 36 35.0 37 35.0 38 40 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 40 CLAY (CL), with weathered rock fragments; clay very dark gray (10/R 3/1) to dark yellowish-brown (10/R 3/8), mashine; sort, tork for conderate prediction; subcornd to mashine; sort, tork for conderate prediction; subcornd to mashine; sort, tork fragments; (10/R 7/8); trace while/light gray clay. 40 40.0 41 CLAY (CL), olive gray (FV 5/6), molstivet, sort, tork fragments (10/R 7/8); trace while/light gray clay. 45 45.0 45 45.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 CLAY (DEPTH		,	1)	g	SOIL DESCRIPTION	COMMENTS
Image: Construction of the second s		INTERV		. ,	RAPHIC L	COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	RATE, DRILLING FLUID LOSS,
30.0 20.0				#11FE	U U	STRUCTURE, MINERALOGY	
35 35.0 36 35.0 37 35.0 38 35.0 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 40 40.0 41 40.0 42 CLAY (CL), with weathered rock fragments, clay were transplance took fragments, dark gray (10YR 3/1) to dark yellowish rock fragments, dark gray to facilitate cuttings removal 45 45.0 46 40.0 47 45.0 48 1310-1314 - 3540' 49 1310-1314 - 3540' 40 40.0 45 45.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0	_	30.0			X	(5GY 2/1 with strong brown (7.5YR 5/8) clay; trace	
35 35.0 35.0 32-33 1/2 - driller reports firmer material 36 35.0 33.0 32-33 1/2 - driller reports firmer material 40 40 40.0 LEAN CLAY (CL), with weathered rock fragments, day very dark grav (10/R 3/1) to dark yellowish-brown (10/R 3/6), moistwet; soft, low to moderate plasticity; subrounded to subangular weathered basaltic rock fragments (10/R 7/8); trace withelight gray clay. Breathing Zone = 0.0 ppm 1322-1326 - 40-45' 40 40.0 CLAY (CL), same as 40-45' but more dark reddish-brown (10/R 3/4) rock fragments, dark greenish gray (5G 4/1), moderate greenish-yellow (10/Y 7/8) to moderate yellow greenish gray (5G 4/1), moderate greenish-yellow (10/Y 7/8) to moderate yellow greenish gray (5G 4/1), moderate greenish-yellow (10/Y 8/3/4) rock fragments. Driller says borehole is producing water from 40-45' abundant greenish-cock fragment 45 45.0 CLAY (CL), same as 40-45' but more dark reddish-brown (10R 7/4) in the produced fragment fragments and less greenish/yellowish rock fragment Driller says borehole is producing water from 40-45' abundant greenish-rock fragment 50 50.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10/R 7/4) in the sand to fine gravel-sized rock fragments, trace greenish/yellowish ?/clay. Breathing Zone = 0.0 ppm 55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10/R 7/4) in the sand to fine gravel-sized rock fragments, trace Breathing Zone = 0.0 ppm 56 55.0 CLAY WITH WEATHERED ROCK F	-				X	rock fragments; fine sand to fine gravel-sized rock fragments,	
35 35.0 130-1314 - 35-40' 40 40.0 LEAN CLAY (CL), with weathered rock fragments: clay very dark gray (10YR 3/1) to dark yellowish-brow (10YR 3/6), molective tasking injected into borehole below 30 bgs to facilitate cuttings removal 40 40.0 CLAY (CL), with weathered basallic rock fragments; dark greenish/gray, few yeathered basallic rock fragments, dark greenish/gray, few yeathered basallic rock fragments, dark greenish/gray, few yeathered basallic rock fragments, fark greenish/gray, few yeathered basallic rock fragments, fark greenish/gray faw yeathered basallic rock fragments, fark greenish, fargments, fark fragments, fark fark fark fragments, fark fark fragments, fark	-					-	
40 40.0 LEAN CLAY (CL), with weathered rock fragments: clay very submitted to subangular weathered basalitor, soft, sof	35	35.0			X	_	_
40 LEAN CLAY (CL), with weathered rock fragments; Clay very display to facilitate cuttings removal bgs to facilitate cuttings removal 40 40.0 CLAY (CL), olive gray (5Y 5/6), moist/wet, soft, low to moderate plasticity; subrounded to sankin cock fragments, dark gree whitelight gray clay. Breathing Zone = 0.0 ppm 1 CLAY (CL), olive gray (5Y 5/6), moist/wet, soft, low to moderate plasticity; with weathered basaltic cock fragments, dark gree whitelight gray clay. Breathing Zone = 0.0 ppm 1 CLAY (CL), some as 40-45' but more dark reddish-brown (10Y 79) to moderate greenish-gray (6C Y 7/4) fine to coarse sand sized nock fragments, trace dark reddish-brown (10R 3/4) rock fragments, trace dark reddish-brown (10R 3/4) rock fragments, light brown (5Y 8/6) to dark reddish-brown (10R 3/4) rock fragments. Driller says borehole is producing water from 40-45' (and possibly some from 35-40') 45 45.0 CLAY (CL), same as 40-45' but more dark reddish-brown (10R 3/4) rock fragments and less greenish/yellowish rock fragments and less greenish/yellowish rock fragments. Driller says borehole is producing water from 40-45' (and possibly some from 35-40') 50 50.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10R 3/4) rock fragments, light brown (5N K 5/6) to dark reddish-brown (10R 3/4) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5N K 5/6) to dark reddish-brown (10R 3/4) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5N K 5/6) to dark reddish-brown (10R 3/4), line sand to fine gravel-sized rock fragments; trace greentiny-gelowish ?/clay. Chan	-				Ø	-	-
40 40.0 Frace while/light gray clay. 40 40.0 CLAY (CL), olive gray (SY 5/6), moistwet, soft, low to moderate plasticly; with weathered basatic rock fragments, dark greenish-yellow (107 7/9) to moderate yellow green (SCY 7/4) fine to coarse sand sized rock fragments; trace dark reddish brown (107R 3/4) rock fragments. Breathing Zone = 0.0 ppm 1322-1326 - 40-45' 45 45.0 CLAY (CL), same as 40-45' but more dark reddish-brown (107R 3/4) rock fragments. Driller says borehole is producing water from 40-45' (and possibly some from 35-40') 45 45.0 CLAY (CL), same as 40-45' but more dark reddish-brown (10R 3/4) rock fragments and less greenish/yellowish rock fragments. Driller says borehole is producing water from 40-45' abundant greenish rock fragments fragments. 50 50.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10R 3/4) to evry dark gray (10VR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine grave-sized rock fragments; trace greenish/yellowish ?/clay. Breathing Zone = 0.0 ppm 55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine grave-sized rock fragments; trace Change to brown color in water 55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine san	-					dark gray (10YR 3/1) to dark yellowish-brown (10YR 3/6), moist/wet; soft; low to moderate plasticity; subrounded to subangular weathered basaltic rock fragments, dark	
45 45.0 CLAY (CL), same as 40.45' but more dark reddish-brown (10YR 3/4) rock fragments. Driller says borehole is producing water from 40-45' (and possibly some from 35-40') 45 45.0 CLAY (CL), same as 40.45' but more dark reddish-brown (10R 3/4) rock fragments. Driller says borehole is producing water from 40-45' (and possibly some from 35-40') 50 50.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10R 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (SYR 5/6) to dark reddish-brown (10R 3/4), fine saulo to fine gravel-sized rock fragments; trace greenish/yellowish ?/clay. Breathing Zone = 0.0 ppm 55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10R 3/4) for a system of the gravel-sized rock fragments; trace greenish/yellowish ?/clay. Breathing Zone = 0.0 ppm 55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10R 3/4), fine saulo to fine gravel-sized rock fragments; trace greenish/yellowish ?/clay. H20 at 55' 56 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10R 3/4) fine saulo to fine gravel-sized rock fragments; trace greenish/yellowish ?/clay. H20 at 55' 57 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10R 3/4) fine saulo to fine gravel-sized rock fragments; trace greenish/yellowish ?/clay. H20 at 55' 58 59.50 CLAY WITH WEATHERED ROCK fragments; trace greenish-brown (10R 3/4) fine saulo to fine gravel-sized rock fragments, ight brown (5YR 5/6) to dark reddish-brown	40	40.0				trace white/light gray clay. CLAY (CL), olive gray (5Y 5/6), moist/wet, soft, low to moderate	Breathing Zone = 0.0 ppm
45 45.0 45 45.0 45 45.0 45 45.0 40-45' (and possibly some from 35-40') Note: 40-45' abundant greenish rock fragmer Water produced from 40-45' 1337-1346 - 45-50' 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 51 50.0 52 55.0 55 55 - significant drop in water production (casing is being advanced while drilling)	-					greenish gray (5G 4/1), moderate greenish-yellow (10Y 7/9) to moderate yellow green (5GY 7/4) fine to coarse sand sized rock fragments; trace dark reddish brown (10YR 3/4) rock	
50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 50 50.0 51 55.0 55 55.0 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace greenish/yellowish ?/clay. 55 55.0 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace 56 0 0 57 55.5 58 0 clark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace 50 <td>-</td> <td>45.0</td> <td></td> <td></td> <td></td> <td>-</td> <td></td>	-	45.0				-	
50 50.0 50 50.0 1337-1346 - 45-50' 1337-1346 - 45-50' 1337-1346 - 45-50' 50 50.0 10 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace greenish/yellowish ?/clay. Breathing Zone = 0.0 ppm 55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10R 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace 3/4), fine sand to fine gravel-sized rock fragments; trace 1420 at 55' 50-55' - significant drop in water production (casing is being advanced while drilling)	45	45.0				3/4) rock fragments and less greenish/yellowish rock	Note: 40-45' abundant greenish rock fragments — Water produced from 40-45'
55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace greenish/yellowish ?/clay. Breathing Zone = 0.0 ppm 55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace 1420 at 55' 50-55' - significant drop in water production (casing is being advanced while drilling)	-						1337-1346 - 45-50' _ _
55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace greenish/yellowish ?/clay. Breathing Zone = 0.0 ppm 55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace 1420 at 55' 50-55' - significant drop in water production (casing is being advanced while drilling)	- 50	50.0				-	-
55 55.0 CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace 1420 at 55' 50-55' - significant drop in water production (casing is being advanced while drilling)	-					4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace	Breathing Zone = 0.0 ppm
CLAY WITH WEATHERED ROCK FRAGMENTS, brown (10YR 4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace (casing is being advanced while drilling)	- 55	55.0				-	Change to brown color in water
	-					4/3) to very dark gray (10YR 3/1) clay; soft, low plasticity; rock fragments, light brown (5YR 5/6) to dark reddish-brown (10R 3/4), fine sand to fine gravel-sized rock fragments; trace	50-55' - significant drop in water production (casing is being advanced while drilling)
	- 60					-	-



BORING NUMBER: MW-14D

SHEET 3 OF 5

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90 Air Rotary, 6"

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION : 2579.96 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210437.694, 2540106.311 (ft NAVD88)

WATER LEVEL: START : 1/25/17 09:00 END: 1/26/17 15:17 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION Log INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Predominately yellowish-brown (10YR 5/8) ROCK FRAGMENTS WITH CLAY, dark to olive gray (5Y 4/1 to 5Y 60.0 1443-1452 - 60-65' Breathing Zone = 0.0 ppm At 55-60' - little to no water being produced 4/2). 60-65' - very little water evacuated from 65 65.0 As 60-65' with trace white/light gray clay (10YR 8/1 to 10YR borehole while drilling through interval 7/1). 70 70.0 CLAY (CL), light gray (10YR 7/1) silty with trace coarse sand/fine gravel rock fragments, moist/wet. End at 71' on 1/25/17 Begin at 71' on 1/26/17 Water in borehole initially; dissipated below 71' CLAY (CL), yellowish red to reddish yellow (5YR 5/8 to 5YR 6/8), moist/wet, silty. 75 75.0 CLAY (CL), light gray (10YR 7/1) silty with trace coarse 1536 -NA - 75 sand/fine gravel rock fragments, moist/wet. SILT (ML), yellow to brownish yellow (10YR 7/8 to 10YR 6/8). moist to dry, slightly cohesive; clayey. 80 80.0 SILT (ML), yellow to brownish yellow (10YR 7/8 to 10YR 6/8), wet, slightly cohesive; clayey, trace/few fine sand grains. 0900 - 80' bgs Breathing Zone = 0.0 ppm 85 85.0 SILT (ML), as above (80-85'), little/no returns to base lithology, color change to predominately yellowish-brown (10YR 5/8) to 0913 - 85' bgs brownish yellow (10YR 6/8). Breathing Zone = 0.0 ppm Connection at 85-90' - No water was evacuated At 86' - driller needs to add water in order to get cuttings out of hole At 88 1/2' - driller says there was a change in drilling characteristics 90



BORING NUMBER: MW-14D

SHEET 4 OF 5

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90 Air Rotary, 6"

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION : 2579.96 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES: 210437.694, 2540106.311 (ft NAVD88)

WATER LEVEL: START : 1/25/17 09:00 END: 1/26/17 15:17 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LoG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm SILT (ML), same as 85-90', yellowish brown to brownish yellow 90.0 (10YR 5/8 to 6/8) silty sandy. 0931-0942 - 85-90' Breathing Zone = 0.0 ppm 85-90' - little cuttings returned, no water either 0952-1001 - 90-95' 1016-1029 - 95-100 Breathing Zone = 0.0 ppm 95 95.0 SILT (ML), same as 90-95', trace coarse sand material. Driller continues to periodically add water to get cuttings out of hole 100 100.0 SILT (ML), same as 95-100', trace coarse sand material, micaceous 1037-1157 - 100-105' 105 105.0 WELL GRADED SAND WITH SILT AND CLAY (SW), gray 1159-1207 - 105-110' (10YR 6/1) to light gray (10YR 7/1), wet, medium to coarse Breathing Zone = 0.0 ppm VOC grained, angular; quartzitic with mica; feldspathic. 105' - Washed away abundant fine grained interval in cuttings in order to see granular material At 105.5 - driller reports hearing granular material in discharge piping 110 110.0 WELL GRADED SAND WITH SILT AND CLAY (SW), gray (10YR 6/1) to light gray (10YR 7/1), wet, medium to coarse 1216-1255 - 110-115' grained, angular; quartzitic with mica; feldspathic. (paused at 114' to drain borehole with project management) Breathing Zone = 0.0 ppm VOCs 115 115.0 WELL GRADED SAND WITH SILT AND CLAY (SW), gray (10YR 6/1) to light gray (10YR 7/1), wet, medium to coarse 1320-1338 - 115-20' Paused at ~119' for 10 minutes - blew water grained, angular; quartzitic with mica; feldspathic. (borehole produced water) 120



BORING NUMBER: MW-14D

SHEET 5 OF 5

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90 Air Rotary, 6"

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION : 2579.96 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES: 210437.694, 2540106.311 (ft NAVD88)

WATER LEVEL: START : 1/25/17 09:00 END: 1/26/17 15:17 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm WELL GRADED SAND WITH SILT AND CLAY (SW), gray 120.0 (10YR 6/1) to light gray (10YR 7/1), wet, medium to coarse grained, angular; quartzitic with mica; feldspathic. 1347-1352 - 120-125' Breathing Zone = 0.0 ppm VOC 125 125.0 WELL GRADED SAND WITH SILT AND CLAY (SW), gray (10YR 6/1) to light gray (10YR 7/1), wet, medium to coarse grained, angular; quartzitic with mica; feldspathic. 130 130.0 WELL GRADED SAND WITH SILT AND CLAY (SW), gray (10YR 6/1) to light gray (10YR 7/1), wet, medium to coarse grained, angular; quartzitic with mica; feldspathic. 1400-1407 - 130' Breathing Zone = 0.0 ppm VOC Borehole producing water 135 135.0 WELL GRADED SAND WITH SILT AND CLAY (SW), same as 130-135' with abundant coarse sand/fine gravel white feldspar 1412-1416 - 135' grains, quartzitic, micaceous. Borehole produces water 130-135' - perhaps more water made in this interval Breathing Zone = 0.0 ppm VOC 140 140.0 WELL GRADED SAND WITH SILT AND CLAY (SW), same as above, with less coarse sand/fine gravel-sized feldspar. 1425-1431 - 140' Breathing Zone = 0.0 ppm VOC 135-140' - borehole produces abundant water 145 1510-1517 - 145' 145.0 Breathing Zone = 0.0 ppm VOC Bottom of borehole at 145 ft bgs. 140-145' - abundant water 150

Ch2m.

DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES: 209006.34898, 2539355.881931 (ft NAVD88)

END: 6/27/17 12:52 WATER LEVEL: START : 6/26/17 11:02 LOGGER : J. Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 00 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) CUTTINGS: SILT (ML), dark brown, moist, soft, non-plastic and 0.0 massive. 1102 GB 5 5.0 CUTTINGS: FAT CLAY (CH), olive-tan, moist, stiff, high plasticity, increasing stiffness with depth, massive. 1105 1115 *Note: Issue with cuttings hose, crew replaced connecting end. GB 10 10.0 1118 1125 GB CUTTINGS: WELL GRADED SAND (SW), brown, moist, medium dense, possible transition zone 13-15' from clay to sand, subangular, up to 1/4" clasts, <15% pea-sized gravel. *Minor amounts of pea-sized basalt clasts. 15 15.0 BASALT, gray, vesicular, 1/8" to 3/4" angular to sub-rounded rubble, possible weathered basalt, horizon, wet. 1130 - *Water present at start f drilling. CUTTINGS: BASALT, gray/bluish-gray, 1/8-1/4" subangular clasts, massive, competent, wet to ~21.5' bgs where becomes dry, GB becomes black at ~24.5' bgs. Hard drilling, increasing with depth. 20 20.0 1453 1534 Collected GW sample (grab) - WL = 16.5' bgs (rising) MW15U-GW-2D-062617 @ 1515 GB Note: Driller tripped out at 20' bgs & converted to open-hole. 25 25.0 1542 1550 *Water pressure at start of drilling GB *Cuttings do not appear to be competent basalt based on physical appearance. 30

SHEET 1 OF 5

SOIL BORING LOG

BORING NUMBER:

MW-15D

ELEVATION: 2551.70 ft mslft NAVD88 (ground surface)

PROJECT NUMBER:

661508

ch2m

SOIL BORING LOG

BORING NUMBER:

MW-15D

SHEET 2 OF 5

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

ELEVATION : 2551.70 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 209006.34898, 2539355.881931 (ft NAVD88)

DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

PROJECT NUMBER:

661508

					START : 6/26/17 11:02 END : 6/27		LOGGER : J. Freed
	<u>LEVEL:</u>	RFACE (F1	Г)			117 12.52	COMMENTS
	r		• /	ő	SOIL DESCRIPTION		
	INTERV	AL (FT) RECOVE	RY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE	TH OF CASING, DRILLING E, DRILLING FLUID LOSS, S, & INSTRUMENTATION
				-		PID (ppm)	Breathing Zone FID (ppm)
-	30.0		GB		CUTTINGS: BASALT, gray/bluish-gray, 1/8-1/4" subangular clasts, massive, competent, wet to ~21.5' bgs where becomes dry, becomes black at ~24.5' bgs.		- - -
35	35.0			×	flat, sub-angular, black.		4-36', possible increase in water.
-			GB	æ	CUTTINGS: BASALT, as above, clast size decreased to 1/8-1/4".	1602 1613 *Water present a	- at start-up, dries out after 1 ft or so. _ -
40	40.0			\mathbb{X}			
- - - 45	45.0		GB		CUTTINGS: BASALT, as above.		- - -
- - - 50	50.0		GB		- CUTTINGS: BASALT, as above. -	1626 1629 *Water present a	- at start-up, dries out after 1 ft or so. _ -
- - - 55	55.0		GB		- CUTTINGS: BASALT, as above. -		- - -
- - - - 60			GB		-	1645 *Water present a	- and start-up, dries out after ~1 ft. - -

Ch2m.

ELEVATION: 2551.70 ft mslft NAVD88 (ground surface)

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

BORING NUMBER:

MW-15D

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 209006.34898, 2539355.881931 (ft NAVD88)

END : 6/27/17 12:52 WATER LEVEL: START : 6/26/17 11:02 LOGGER : J. Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION СОС INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) 60.0 GB 65 65.0 1705 - DTW = 64.95 ft btc at 1730 0910 - Drilling resumes (pre DTW = 18.45 bgs) GB CUTTINGS: BASALT, dark gray, pulverized fine to 1/2" clast, sub-angular, wet. 70 70.0 GB 75 75.0 CUTTINGS: BASALT, as above, minor amounts of mineralization on random clasts, <5%, dry. 925 929 GB 80 80.0 CUTTINGS: BASALT, dark gray, 1/8-1/2" clasts, sub-angular, dry, GB no sign of oxidation or mineralization. 85 85.0 CUTTINGS: BASALT, dark gray, oxidation present on approximately 45% of hard sample, 1/8-1/4" clasts, angular, dry. 945 950 GB 90

SHEET 3 OF 5

Ch2m.

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

BORING NUMBER: **MW-15D**

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

ELEVATION: 2551.70 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES: 209006.34898, 2539355.881931 (ft NAVD88)

WATER LEVEL: START : 6/26/17 11:02 END: 6/27/17 12:52 LOGGER : J. Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION g INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) CUTTINGS: BASALT, gray/bluish-gray, 1/8-1/4" subangular clasts, massive, competent, wet to ~21.5' bgs where becomes dry, 90.0 Oxidation present ~90-95' becomes black at ~24.5' bgs. GB CUTTINGS: BASALT, dark gray, 1/8-1/4" angular to sub-angular clasts, no oxidation or mineralization present, dry. 95 95.0 [no oxidation ~94-100'] 1002 1005 GB 100 100.0 CUTTINGS: BASALT, dark gray, 1/8" sized clasts predominately, oxidation present on the majority of hard sample, dry. Oxidation present at 101 ft [no oxidation ~102-105'] GB 105 105.0 CUTTINGS: BASALT, as above, wet (driller assumes water is form above - sat for 13 minutes). 1017 1030 GB Oxidation present at 106' Note: Possible fracture at 107'. loss of drilling dust at surface and softer drilling conditions, oxidized cuttings. 110 110.0 [less oxidized 110-112'] GB 115 115.0 Softer drilling 115-116', possible fracture. CUTTINGS: BASALT, dark gray to rust-orange oxidized clasts (50%), 1/8-1/2", angular to sub-angular, wet (water bearing zone), 1038 vesicular. 1040 GB *Increased water at start of drilling, and throughout drilling CUTTINGS: BASALT, as above with smaller sized oxidized clasts. 120

SHEET 4 OF 5

661508

PROJECT NUMBER:

ch2m.

ELEVATION: 2551.70 ft mslft NAVD88 (ground surface)

SOIL BORING LOG

BORING NUMBER: MW-15D

SHEET 5 OF 5

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES: 209006.34898, 2539355.881931 (ft NAVD88)

DRILLING METHOD AND EQUIPMENT : Schramm T300, Air Rotary

WATER LEVEL: START : 6/26/17 11:02 END: 6/27/17 12:52 LOGGER : J. Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 00 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) CUTTINGS: BASALT, dark gray, 1/16-1/8" vesicular clasts, 120.0 angular to sub-angular, 15-20% oxidation. Decreased clast size and oxidized particles. 'Saturated 116-126' CUTTINGS: BASALT with gouge and oxidized particles, GB gouge/clay up to 1" clasts, easily breaks with light hand pressure, vesicular, basalt, clasts up to 1/4", possible water bearing fracture Softer drilling at 122' zone. CUTTINGS: BASALT, dark gray, 1/8-1/2", sub-angular, vesicular, white mineralization present on approximately 30% of clasts in 125 125.0 hand sample, wet. 1048 1230 *Out of rods, drilling will resume when supplies are obtain. GB 1230 - Drilling resumes at 126' 130 130.0 CUTTINGS: BASALT, dark gray, vesicular, oxidized clasts GB approximately 50% in hard sample, rust-orange to tan/white particles up to 1/2" diameter, angular, wet. 135 135.0 1240 1242 GB Decreasing oxidation with depth. 140 140.0 *Harder drilling at 141' bgs. CUTTINGS: BASALT, dark gray, 1/8-1/4" angular clasts, massive, minor oxidized particles, <5%, wet, no vesicles observed. GB 145 CUTTINGS: BASALT, dark gray, 1/16-1/4" angular chips, very minor oxidized particles present (<5%), wet, no vesicles observed. 146.0 Boring terminated at 146 ft bgs. 150



DRILLING METHOD AND EQUIPMENT : Schramm T300 6"

SHEET 1 OF 4

BORING NUMBER: **MW-16D**

PROJECT : Grain Handling Facility at Freeman

LOCATION : Steve Ashur Property

ELEVATION: 2566.45 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

PROJECT NUMBER:

661508

COORDINATES : 206442.299, 2536284.241 (ft NAVD88)

WATER LEVEL: START : 12/20/16 13:10 END: 12/28/16 11:15 LOGGER : S. Demus/R. Greer DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm LEAN CLAY (CL), orange-brown, medium plasticity, moist, soft. Background VOC - 0.0 ppm <u>5.</u>0 5 Breathing zone (BZ) = 0.0 ppm 10_ 15 1340 BZ = 0.0 ppm 17.0 SANDY LEAN CLAY (CL), 10-15% fine sand, low plasticity, moist, soft. 20 23.0 LEAN CLAY (CL), orange-brown, medium plasticity, wet, soft. 1510 BZ = 0.1 ppm 25 No cuttings generated, limited air return, wet soil surfacing beneath rear of drill rig 30



DRILLING METHOD AND EQUIPMENT : Schramm T300 6"

BORING NUMBER: MW-16D

SHEET 2 OF 4

PROJECT : Grain Handling Facility at Freeman

LOCATION : Steve Ashur Property

PROJECT NUMBER:

661508

ELEVATION : 2566.45 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 206442.299, 2536284.241 (ft NAVD88)

END: 12/28/16 11:15 WATER LEVEL: START : 12/20/16 13:10 LOGGER : S. Demus/R. Greer DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm LEAN CLAY (CL), orange-brown, medium plasticity, wet, soft. 35 40 1545 1635 - resume at 0820 12/21/16 No circulation - no cuttings, very slow No cuttings. advancement PID at 41' bgs = NDS, O_z = 20.9 0930 = PID ~ 43' = NDS, O_z = 20.9 44.0 CUTTINGS: BROWN LEAN CLAY (CL), moist, appears very stiff, trace fine sand, trace biotite (limited cuttings produced). 45 Easier drilling 48.0 CUTTINGS: BROWN LEAN CLAY WITH BASALTIC GRAVEL/CLASTS, highly weathered, moist. 50 50.0 CUTTINGS: BASALT CLASTS, subrounded to subangular, some vesicles with clay, 1/4" to 1/2" diameter. 55 56.0 Transitioning to BASALT, rounded to subrounded, 1/16" to 1/4" diameter, weathered with sand and brown clay. Easy advancement 60



DRILLING METHOD AND EQUIPMENT : Schramm T300 6"

BORING NUMBER:

MW-16D

SHEET 3 OF 4

PROJECT : Grain Handling Facility at Freeman

LOCATION : Steve Ashur Property

PROJECT NUMBER:

661508

ELEVATION : 2566.45 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 206442.299, 2536284.241 (ft NAVD88)

END: 12/28/16 11:15 WATER LEVEL: START : 12/20/16 13:10 LOGGER : S. Demus/R. Greer DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LoG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE. MINERALOGY PID (ppm) Breathing Zone FID (ppm Transitioning to BASALT, rounded to subrounded, 1/16" to 1/4" diameter, weathered with sand and brown clay. 64.0 BASALT, becoming more fine basaltic sand and gravel <1/4" diameter, subrounded to rounded, weathered. 65 Easy advancement 70 70.0 BASALT, 1/16" to 1/4" diameter, weathered, increasing diameter, subrounded. 75 75.0 Increasing diameter - BASALT, BASALT GRAVEL, subrounded, coarse - 3/8" diameter with fine to coarse sand. Driller indicates gravelly conditions, cyclone getting clogged muffled drill action 80 80.0 BASALT, BASALT GRAVEL, subrounded, coarse - 3/8" diameter with fine to coarse sand. Steady advancement 85 85.0 BASALT, 1/8" to 3/8" diameter, becoming more angular, subangular to angular, fractured, weathered. 87.0 BASALT, angular, more competent, 1/8" to 3/8" diameter, with Harder drilling - slower, hard material increase fine sand decreasing. in water - mud 89.0 Breakthrough - fracture/rubble conditions BASALT, more weathered, subrounded, up to 1/2" diameter. 90



DRILLING METHOD AND EQUIPMENT : Schramm T300 6"

SHEET 4 OF 4

SOIL BORING LOG

BORING NUMBER: **MW-16D**

PROJECT : Grain Handling Facility at Freeman

LOCATION : Steve Ashur Property

PROJECT NUMBER:

661508

ELEVATION: 2566.45 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 206442.299, 2536284.241 (ft NAVD88)

END: 12/28/16 11:15 WATER LEVEL: START : 12/20/16 13:10 LOGGER : S. Demus/R. Green DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LoG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPF STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT, more weathered, subrounded, up to 1/2" diameter. 91.0 Water generated when air applied 1503 BASALT, subangular to subrounded, 1/8" to 1/2" diameter, oxidation observed. Hard drilling Water constantly generated Increasing water production BASALT, becoming more fine, angular, decreasing oxidation, 1/8" to 3/8" diameter. Easier drilling fracture area 95 Harder drilling Harder drilling 98.0 BASALT, angular, "flakes" of BASALT trace oxidation 1/8" to 1/4" diameter. 100 1605 Hard drilling CUTTINGS: Same as above. 105 Fracture zone - easy advancement Increase in water at 106' fracture zone 107.0 BASALT, angular to subangular, ~1/4" diameter, trace oxidation, more competent at 109'. Harder drilling - slower rate at 107' 109.0 CUTTINGS: BASALT, trace oxidation, 1/8" to 1/4" diameter, 110 subangular to angular, "flakes", increasing competent. 110.5 Bottom of borehole at 110.5 ft bgs. Terminated drilling at 110' at 1625 12/22/16 12/17/16 at 1047 DTW = 96.9' bgs TD = 110.5' bgs PID in BZ, HS = 0.0 ppm Installed a 2" schedule 40 PVC monitoring well with 0.010" slotted screen from 105' to 90' bgs, see UPRR Freeman field notebook for 115 installation details 120



SHEET 1 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

ELEVA	TION :				ental West Explora	tion, Inc.		
COORD	INATES	: (ft NAV	/D88)		DRILLING METHOD AND EQUIPMEN	NT : Air Rotary, Han	nmer Bit	
WATER	LEVEL:				START : 4/3/17 10:10 END : 4/3	/2017	LOGGER : R. McC	Comb
DEPTH I	BELOW SL	JRFACE (F	-T)	(7)	SOIL DESCRIPTION		COMMENTS	
	INTERVA		ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE TEST	TH OF CASING, DRILLING E, DRILLING FLUID LOSS 'S, & INSTRUMENTATION	, N
5	5.0				LEAN CLAY (CL), brown (2.5YR 4/3), moist, soft, low to medium plasticity. SILT (ML), brown (7.5YR 4/3), moist, medium stiff, little clay; with trace very fine quartzite sand, become strong brown (7.5YR 4/6) with depth.	PID (ppm) Drilling with no outer casing	Breathing Zone water being added, adva	<u>FID (ppm</u>
10 - - 15	10.0				LEAN CLAY (CL), gray to dark gray (7.5YR 5/1) to 7.5YR 4/1), dry, stiff, low plasticity; with gravel up to 1/2-3/4", low to angular quartzite. LEAN CLAY (CL), as 12-13' (quartzite absent), becoming grayish brown (10YR 5/2) to brown (10YR 5/3) with depth (> .5').	10:31 at 10' BZ = 0.0 ppm 10:38 - resume Role of penetra decrease below	tion increase from 12-13	
- - 20 -	20.0				brown (7.5YR 5/6), dry, stiff, low plasticity clay; thinly laminated with gray clay. LEAN CLAY (CL), grayish brown to dark brown (10YR 5/2 to 10YR 5/3), dry, stiff to very stiff, nonplastic. LEAN CLAY (CL), grayish to dark gray (10YR 5/1 to 10YR 4/1), moist, soft, low plasticity, trace/few silt. LEAN CLAY (CL) with SILT (ML), mottled brown (10YR 5/3) to light brownish gray (10YR 6/2), moist, soft, nonplastic.	Moist cuttings 1 11:36 at 20' 11:47 - resume moist cuttings	9-20' drilling - no water in bore	- - - ehole
- 25 - - - 30	25.0				SILT (ML), reddish brown (5YR 5/4)) to yellowish red (10YR 5/6), moist, slightly cohesive, trace clay.	-		



BORING NUMBER: **MW-17D**

SHEET 2 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION :

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : (ft NAVD88)					DRILLING METHOD AND EQUIPMEN	IT : Air Rotary, Ham	nmer Bit	
1	LEVEL:				START : 4/3/17 10:10 END : 4/3/	/2017	LOGGER : R. Mc	Comb
DEPTH	BELOW SU		T)	Ŋ	SOIL DESCRIPTION	COMMENTS		
	INTERV	· · ·	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE TEST	TH OF CASING, DRILLIN E, DRILLING FLUID LOSS S, & INSTRUMENTATIO	S, N
<u> </u>	30.0				SILT (ML), reddish brown (5YR 5/4)) to dark reddish brown	PID (ppm)	Breathing Zone	FID (ppm
-					(5YR 3/4), moist, soft, slightly cohesive, some clay with depth.	cuttings	oid drilling from 20-30'), drilling - no visible wate	_
	05.0				-	-		-
35	35.0				SILT (ML), as above with dark brown (7.5YR 3/2) clayey silt from ~35-36', few little coarse sand-sized, angular rock fragments.	12:09 at 35' (5' s 12:15 - resume	section of rock) drilling - no visible wate	
40	40.0				SILT (ML), brown (7.5YR 4/4) to dark brown (7.5YR 3/4), moist, cohesive, soft with few trace medium sand-sized lithic	12:20 at 40' ; 2 f	full drums of IDW produ	uct _
	45.0				fragments, reddish yellow (7.5YR 6/6 to 7.5YR 6/8).	12:30 - resume	drilling, no visible water	
-					SILT (ML), as above co-mingled with gray (5Y 5/1) clay, trace quartzite sand-sized lithic fragments.	12:35 at 45' 12:49 - resume	drilling - no visible wate	 97
50	50.0							
	55.0				SANDSTONE, light olive brown (2.5Y 5/4 to 2.5Y 5/6), weakly indurated, fine grained. CLAY (CL), light olive brown (2.5Y 5/4) to 2.5Y 5/6), wet, soft; silty, low plasticity.			< - trace - - -
					GRAVELLY LEAN CLAY (CL), olive (5Y 4/3), wet, silty/sandy, with moderate reddish brown (10R 4/6) and dark reddish-brown (10YR 3/4), lithic fragments up to 1/2", angular, trace to few black rock fragments (weathered basalt).	14:15 collected 3-40 ml vials for	drilling - water blown fro	-



BORING NUMBER: MW-17D

SHEET 3 OF 8

SOIL BORING LOG

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

PROJECT : Grain Handling Facility at Freeman

ELEVATION :

LOCATION : Freeman, WA

COORDINATES : (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Air Rotary, Hammer Bit WATER LEVEL: START: 4/3/17 10:10 END: 4/3/2017 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 00 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPF STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm WELL GRADED GRAVEL WITH CLAY AND SAND (GW/GC), 60.0 1.1.9.9.9.9. variegated moderate reddish brown (10R 4/6) to dark reddish Driller injects water in order to facilitate returns brown (10R 3/4) to pale yellowish-brown (10YR 6/2) and pale greenish yellow (10Y 8/2); trace silt; angular gravel up to 15:15 at 60' 1/4-1/2" with some mudstone. 65 65.0 WELL GRADED GRAVEL WITH CLAY AND SAND (GW/GC), as above 60-65' but with some black (N1) coarse sand-sized 15:28 at 65' rock fragments (basaltic?), wet. 15:43 - resume drilling, not injecting water for this run 70 70.0 WEATHERED BASALT, black (N1) with abundant weathered rock fragments, variegated pale yellowish-brown (10YR 6/2), 15:55 at 70', few returns from 65-70' reddish brown (10R 4/6) to dark reddish brown (10R 3/4), wet. 16:04 - resume drilling at 72', driller adds little water to clear hole 72-75' - driller adds no water, water is blown from hole while drilling 72-75' (formation water) 75 75.0 Resuming drill mode, will get water level - check BASALT, black (N1) angular rock fragments up to 1", generally on AM on 4/41/4" or less, somewhat platy, with trace to few red to reddish brown (2.5Y 4/6 to 2.5Y 4/4) sand-sized rock fragments; wet, ?? at 75' - DTW moderate weathered to fresh basalt. Start 75' on 4/4/17 MW17D-GW75-040417 for 8260B; 3-40 ML vials 80 80.0 BASALT, black (N1) angular rock fragments up to 1", generally 1/4" or less, somewhat platy, with trace to few red to reddish 08:42 at 80' brown (2.5Y 4/6 to 2.5Y 4/4) sand-sized rock fragments; wet, 75-80' - water bearing, still advancing outer moderate weathered to fresh basalt. casing 08:52 - resume drilling 85 85.0 BASALT, same as 75-80', basalt rock fragments generally less than 1/8", platy, with trace quartz coating/variegated filling, trace to few poorly indurated stiff clay grain, yellow (2.5Y 7/8) to 09:00 at 85' 80-85' - water bearing olive yellow (2.5Y 6/8); wet (fracture fill material?). 09:08 - resume drilling 85-90' - water bearing, perhaps more so than above 85' 90



BORING NUMBER: **MW-17D**

SHEET 4 OF 8

SOIL BORING LOG

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

PROJECT : Grain Handling Facility at Freeman

ELEVATION :

LOCATION : Freeman, WA

661508

COORDINATES : (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Air Rotary, Hammer Bit WATER LEVEL: START: 4/3/17 10:10 END: 4/3/2017 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION Log INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT, same as 85-90' with trace light olive brown clay from 90.0 08:18 at 90' - water bearing 09:30 - resume drilling 90-95' ~94.5-95'; wet, soft. 95 95.0 BASALT, black (N1), angular platy rock fragment generally 1/8-1/16" length, trace to no accessory/secondary 10:27 - resume drilling 95-100' 10:37 - pause drilling to empty - 500 gallon poly mineralization; water bearing zone, some rock fragments with grainy texture; brittle. tank at 100' 95-100' - prolific (?) water bearing zone 100 100.0 BASALT, same as 95-100', platy fragments up to 3/4", brittle (easily broken) water bearing interval, trace pyrite/metallic 11:07 - return to drilling 100-105' - intense start - abundant water secondary mineralization. evaluated through borehole BASALT, as 95-100', perhaps not as brittle (more difficult to break), dry, no secondary mineralization observed. Collected MW17D-GW104-040417 in 3-40 ml 105 vials for 9260B Driller decided to seal off upper zoe above 104' because of quantity of water produced (~500 gallon/5' interval) Poured 1 bucket of time release bentonite pellets and allow to hydrate, will set p 11:27 at 105' - another 500 gallon poly tank filled 110 110.0 104-106' - very little water returned 1322 - drilling resumes (106-116') 115 13:50 at 116' 13:53 - resume drilling (116-126'), no water ~117' - dust cut 120 119' - heavy dusting



SHEET 5 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

ELEVATION :	DRILLING CONTRACTOR : Enviornm	nental West Exploration, Inc.
COORDINATES : (ft NAVD88)		NT : Air Rotary, Hammer Bit
WATER LEVEL:	START : 4/3/17 10:10 END : 4/3	3/2017 LOGGER : R. McComb
DEPTH BELOW SURFACE (FT)	o SOIL DESCRIPTION	COMMENTS
INTERVAL (FT) RECOVERY (FT) #TYPE	SOIL DESCRIPTION SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
120.0 - - 125_ -	BASALT, as 95-100', perhaps not as brittle (more difficult to break), dry, no secondary mineralization observed.	PID (ppm) Breathing Zone FID (ppm)
130 <u>130.0</u> - - - - - - - - - - - - - - - - - - -	break), dry, no secondary mineralization observed.	1420 at 126' 14:22 - resume drilling (127-136') (no water observed after connection)
	BASALT, as 104-126', perhaps not as brittle (more difficult to break), dry, no secondary mineralization observed.	14:50 at 136' 14:53 - resume drilling 136-146' 15:19 at 146' - dust cut continued below 138' 15:19 at 146' - dust cut continued below 138' 15:19 at 146' - dust cut continued below 138' 15:19 at 146' - dust cut continued below 138' 15:19 at 146' - dust cut continued below 138' 15:19 at 146' - dust cut continued below 138' 15:19 at 146' - dust cut continued below 138' 15:19 at 146' - dust cut continued below 138' 14:10 - dust cut continued below 138' 14:10 - dust cuttings 14:10 - water from borehole



SHEET 6 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

ELEVATION : DRILLING CONTRACTOR : Enviornmental West Exploration, Inc. DRILLING METHOD AND EQUIPMENT : Air Rotary, Hammer Bit COORDINATES : (ft NAVD88) END: 4/3/2017 WATER LEVEL: START: 4/3/17 10:10 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT, black (N1), angular platy rock fragments, somewhat blochy at 150', generally 1/8-1/16" in length, none to trace secondary mineralization. 150.0 150-151' - less water produced, drying as advanced deeper 155 155' - no visible water being blown from hole 15:53 - at 156' - diverter pipe, perhaps cyclone becoming closed with cuttings wet cuttings at 157' - still BASALT, but drying up wit depth. 16:07 - resume drilling 156-166' - no water blown from hole; however first cuttings were wet trace water at 158'. 160 160.0 160' - dusting very slightly; water absent from cuttings 163' - dusting increases 165 BASALT, as 150-166'. 16:45 at 166' 170 170.0 07:20 - resume drilling on 4/5/17 - very little water evacuated upon start of drilling Little to no free water below ~170-171' Dusting at 172' 07:50 at 176'; 07:54 - resume (drilling 176-186', no water after connection) 175 cuttings are wet from 177-178'. a "deeper" black color of basalt being cut at 178-179 (smoother texture). Very wet cuttings from 178' - but no water dripping from cyclone, few return below 180' moisture dissipates below 182' 180



9455T 7

SHEET 7 OF 8

SOIL BORING LOG

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

PROJECT : Grain Handling Facility at Freeman

ELEVATION :

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

COORDINATES : (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Air Rotary, Hammer Bit WATER LEVEL: START: 4/3/17 10:10 END: 4/3/2017 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION Log INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPF STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT, as 150-166'. 180.0 185 cuttings wet at 186'. 08:18 at 186' - no water after connection 1870190' - driller reports very soft zone WEATHERED BASALT WITH CLAY, variegated olive gray, moderate yellow-brown (10YR 5/4) weathered and basaltic rock fragments, grainy in texture. 190 190.0 - rapid drip from 188-190'. - hard bottom - very few to no returns at 191'. at 192', driller reports softer/ ?? of hammer on bottom. CLAY (CL), yellowish-brown (10YR 5/8) to brownish-yellow (10YR 6/6), wet, soft to stiff, with few weathered black/dark 09:55 at 193'; after trying to get circulation without injecting water, driller proceeds to inject gray basaltic rock fragments. water to get circulation back 195 CLAY (CL), WITH SILT (ML) and GRAVEL, variegated light olive brown (2.5Y 5/6) to red (2.5YR 4/6 to 2.5YR 4/8), soft to 10:17 - drilling begins 196-206', water in hole, stiff, with weathered basaltic rock fragments, wet. driller not injecting any water, needed very little to regain circulation 197' - Driller injects again to get circulation 10:28 - injecting water at 197 200 200.0 Soft at 201' - not injecting at this point 203' - few returns, driller injects at ?? 205 10:54 - drilling 206-216' - water turns as brownish yellow color WELL GRADED SAND (SW) WITH TRACE CLAY, pale brown to light yellowish-brown (10YR 6/3 to 10YR 6/4), micaceous, First mica/sand quartzitic, medium to fine grained, angular to subangular quartz, wet. 210



DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

SHEET 8 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

ELEVATION :

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

COORDIN	EVEL:				DRILLING METHOD AND EQUIPMEN START : 4/3/17 10:10 END : 4/3/	
DEPTH BEL	LOW SU	RFACE (F	· - \		START : 4/3/17 10:10 END : 4/3/	2017 LOGGER : R. McComb
		RFACE (F	- - \			
11	INTERVA		·1)	(1)	SOIL DESCRIPTION	COMMENTS
		L (FT) RECOVE	RY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
						PID (ppm) Breathing Zone FID (ppm
	210.0				CLAY (CL) WITH FINE SAND AND SILT, red (10R 4/6), moist, soft to medium.	
215						
-					WELL GRADED SAND (SW) WITH TRACE CLAY, as 208-210', wet.	At 216' - abundant quartz sand and mica 11:55 - begin drilling 216-226' - little amount of water being produced
220 5	220.0			· · · ·	-	-
220 2	220.0				CLAY (CL)/SILT (ML) and LITTLE SAND, pale yellow (2.5Y 8/2), (on Munsel white scale), fine sand, trace/few mica.	Clay-like - white - little to no water 221' - water changes to milky white/yellow color 221-231' - very little returns, driller injects periodically to get returns to surface
2	231.0					
235	201.0				Bottom of borehole at 231 ft bgs.	- - - - - - - -
240					-	-



DRILLING METHOD AND EQUIPMENT : B-90 6", Air Rotary

SHEET 1 OF 6

SOIL BORING LOG

BORING NUMBER: **MW-18D**

PROJECT : Grain Handling Facility at Freeman

LOCATION : Duane Lashaw Property

PROJECT NUMBER:

661508

ELEVATION: 2513.40 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 206366.217, 2538415.462 (ft NAVD88)

WATER LEVEL: START : 1/4/17 10:27 END: 1/9/17 15:15 LOGGER : H. Endo DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm CLAYEY SILT (ML), dark brown (10YR 3/3), moist, very soft, no 0.0 odor, low plasticity. Original soils, sparse grass - agricultural field at surface Background VOC = 0.0 ppm Begin drilling on 1/4/17 at 1027 5 1/2" drill head with ~6" ream, drive casing with advance 5 5.0 CLAYEY SILT (ML), same as 0' to 5' but very dark grayish brown (10YR 3/2), trace coarse sand. 10 10.0 WELL GRADED SAND WITH SILT (SW-SM), very dark gray (5Y 3/1), medium dense, oily, no odor, fine to coarse sand, low to nonplastic silt. Driller: Hard drilling at 12' - 1100 15 15.0 POORLY GRADED SAND WITH SILT AND BASALTIC FINE GRAVEL (SP-SM), very dark gray (5Y 3/1), dense, dry, no odor, fine to medium sand, nonplastic silt, 50% rounded to slightly angular basaltic gravel/clasts 1/16" to 3/16", basalt clasts 1/4" to 1/2" diameter. 1130 Driller: Water bearing fracture at 17.5' 20 20.0 Driller: Cuttings water bearing, fractures, faster Transition to WEATHERED BASALT, greenish black (10Y 2.5/1), coarse sand to fine gravel size fragments (1/16" to 1/2") drilling with medium to coarse sand sized quartz or feldspar/calcite. 1140 Stop drilling at 22' to pull rods for groundwater grab sample. DTW = 4.8' bgs At 1320, resume drilling 25 25.0 Driller: Harder drilling, less fracture, still water WEATHERED BASALT, greenish black (10Y 2.5/1), 1/8" to 1/2" bearing at 22' to 25' diameter fragments. 1355 Driller: continued hard drilling, more competent, less fractured, unknown if water bearing or residual water in casing at 25' bgs to 30' bgs 30



DRILLING METHOD AND EQUIPMENT : B-90 6", Air Rotary

SHEET 2 OF 6

BORING NUMBER: **MW-18D**

PROJECT : Grain Handling Facility at Freeman

LOCATION : Duane Lashaw Property

ELEVATION: 2513.40 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

PROJECT NUMBER:

661508

COORDINATES: 206366.217, 2538415.462 (ft NAVD88)

WATER LEVEL: START : 1/4/17 10:27 END: 1/9/17 15:15 LOGGER : H. Endo DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm WEATHERED BASALT, greenish black (10Y 2.5/1), 3/4' 30.0 diameter fragments, transitioning to competent basalt. 1445 Driller: Same hard, slow drilling, either water bearing or residual water in casing, possible flow down casing, stop drilling 35 35.0 COMPETENT BASALT, greenish black to black (10Y 2.5/1), 1/16" to 1/4" diameter subangular fragments. 1/6/17 - resume drilling at 0908, air comp. on and water flowing up Driller: Hard drilling 40 40.0 COMPETENT BASALT, greenish black to black (10Y 2.5/1), up to 3/8" diameter subangular fragments with trace pale green to 0935 grayish green (olivine), with trace pyrite - like metallic minerals. Driller: At ~40', moderately easier drilling 1005 45 45.0 Driller: At 44', set casing and proceed with open COMPETENT BASALT, greenish black to black (10Y 2.5/1), up hole drilling, 490 gal of formation water from 34' to 3/8" diameter subangular fragments with trace pale green to to 44' (no driller water), most likely water grayish green (olivine), with trace pyrite - like metallic minerals. cascading down casing. Pull casing up 2' and pour pellet bentonite to seal casing and borehole, pause at 1110 50 50.0 COMPETENT BASALT, greenish black to black (10Y 2.5/1), up to 3/8" diameter subangular fragments with trace pyrite - like 1215 metallic minerals. Driller: Hard drilling, little to no water 55 55.0 COMPETENT BASALT, greenish black (10Y 2.5/1), 1/16" to 1/4" diameter fragments, fine to coarse sand diameter, trace Driller: Blowing air comes up, mostly oily pyrite-like metallic minerals. 60



DRILLING METHOD AND EQUIPMENT : B-90 6", Air Rotary

BORING NUMBER: MW-18D

SHEET 3 OF 6

PROJECT : Grain Handling Facility at Freeman

LOCATION : Duane Lashaw Property

PROJECT NUMBER:

661508

ELEVATION : 2513.40 ft msfft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 206366.217, 2538415.462 (ft NAVD88)

WATER LEVEL: START : 1/4/17 10:27 END: 1/9/17 15:15 LOGGER : H. Endo DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LoG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm COMPETENT BASALT, greenish black (10Y 2.5/1), 1/16" to 60.0 1/4" diameter fragments. 11240 Driller: Hard drilling, fine particles are probably pulverized 65 65.0 COMPETENT BASALT, greenish black (10Y 2.5/1), 1/8" to 1/4" diameter fragments, fine to coarse sand diameter, trace 12:50 pyrite-like metallic minerals. Driller: Hard drilling 70 70.0 COMPETENT BASALT, greenish black (10Y 2.5/1), 1/8" to 1/4" diameter fragments, fine to coarse sand diameter, trace 1305 pyrite-like metallic minerals. Drilling: Hard drilling 75 75.0 COMPETENT BASALT, greenish black (10Y 2.5/1), 1/8" to 1/4" diameter fragments, fine to coarse sand diameter, trace 1320 Driller: Hard drilling, maybe fractures, some pyrite-like metallic minerals. water being produced, not enough to sample 80 80.0 COMPETENT BASALT, greenish black (10Y 2.5/1), 1/8" to 1/4" diameter fragments, fine to coarse sand diameter, trace pyrite-like metallic minerals. 85 85.0 COMPETENT BASALT, greenish black (10Y 2.5/1), 1/8" to 1/4" diameter fragments, fine to coarse sand diameter, trace 1356 Driller: Hard drilling, producing more water from 80' to 85', take grab water sample pyrite-like metallic minerals. TD = 85.0' bgs DTW = 59.1' bgs 90



DRILLING METHOD AND EQUIPMENT : B-90 6", Air Rotary

BORING NUMBER:

MW-18D

SHEET 4 OF 6

PROJECT : Grain Handling Facility at Freeman

LOCATION : Duane Lashaw Property

PROJECT NUMBER:

661508

ELEVATION : 2513.40 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 206366.217, 2538415.462 (ft NAVD88)

WATER LEVEL: START : 1/4/17 10:27 END: 1/9/17 15:15 LOGGER : H. Endo DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION Log INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPF STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm COMPETENT BASALT, greenish black (10Y 2.5/1), 1/8" to 1/4' 90.0 diameter fragments, fine to coarse sand diameter, trace pyrite-like metallic minerals. 1457 Driller: Same hard drilling 95 95.0 COMPETENT BASALT, grayish black to black (N2-N1), 1/16 1520 to 1/4" platy rock fragments, angular, no accessory minerals. Stop drilling, TD - 95' bgs Driller: Hard drilling, may have produced more water near TD 1010 Resume drilling on 1/9/17 at 95', borehole produces several gallons per minute water 100 100.0 COMPETENT BASALT, gravish black to black (N2-N1), 1/16" to 1/4" platy rock fragments, angular, with pale green non-metallic accessory minerals at ~102'. 1/9/17 Pale green accessory minerals at ~102' (nonmetallic), 100-105', no noticeable change in water volume from borehole 105 105.0 COMPETENT BASALT, grayish black to black (N2-N1), 1/16" 105' to 106' - Trace pyrite to 1/4" platy rock fragments, angular, no accessory minerals, trace pyrite at 105' to 106', 109.5' to 110' trace brown (5YR 6/4) Driller Reports - minor fractures, small (<1-2" drop) in drill from ~105' to 106' bgs rock fragments. 110 110.0 COMPETENT BASALT, gravish black to black (N2-N1), 1/16" 109.5' to 110' to 1/4" platy rock fragments, angular, no accessory minerals, Driller Reports: Soft drilling with little medium bluish gray (5B 5/1) ? fragments form 112' to 115' 110' to 115' - no change in water volume produced ~112 Color change (pale green?) (medium bluish gray 5B 5/1) grains 115 115.0 WEATHERED BASALT (?), grayish black to black (N2-N1) with abundant grayish green (5G 5/2) rock fragments, little clay, olive to olive gray (5Y 4/2 to 5Y 4/3), soft, with trace pale brown 115' to 116' Clay, volume of cutting greatly reduced, volume of water reduced somewhat from 115' to 120'; (weathered/oxidized) basaltic rock fragments. very few cuttings being removed from borehole 120



DRILLING METHOD AND EQUIPMENT : B-90 6", Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : Duane Lashaw Property

ELEVATION : 2513.40 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 206366.217, 2538415.462 (ft NAVD88)

WATER LEVEL: START : 1/4/17 10:27 END: 1/9/17 15:15 LOGGER : H. Endo DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 00 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm COMPETENT BASALT, black to gravish black (N1 to N2) 120.0 layered with some gravish green basaltic rock fragments, trace No noticeable increase in water from 120' to dense gray clay grains. 125 Driller says at 122' to 127', the drilling was softer 125 COMPETENT BASALT, black to grayish black (N1 to N2) layered with some grayish green basaltic rock fragments, trace dense olive to olive gray clay grains. 127.0 COMPETENT BASALT, black to grayish black (N1 to N2), 1/8" to 1/4" angular rock fragments, with trace very light gray to 127' - hard drilling - no noticeable difference in white secondary mineralization and trace brown-gray rock water volume fragments. 130 130.0 COMPETENT BASALT, black to gravish black (N1 to N2), 1/8" to 1/4" angular rock fragments, with trace very light gray to No change in volume of water from 130' to 135' white secondary mineralization. 135 135.0 COMPETENT BASALT, as 127' to 130' with trace brownish gray rock fragments and few medium bluish gray (5B 5/1) rock No change in water volume from 135' to 140' fragments. 140 140.0 COMPETENT BASALT, as 127' to 130' with trace brownish gray rock fragments and few medium bluish gray (5B 5/1) rock fragments. 145 145.0 COMPETENT BASALT, black to grayish black (N1 to N2), 1/8" to 1/4" length predominately, angular little greenish-black (5G 20' screen interval from ~145' to 165' (see field 2/1), dense, brittle (weak) weathered basaltic rock fragments log book for construction details) (148' to 150'). 148 - Soft No change in water volume from 145' to 150' 150

SHEET 5 OF 6

BORING NUMBER: MW-18D

661508

PROJECT NUMBER:



DRILLING METHOD AND EQUIPMENT : B-90 6", Air Rotary

BORING NUMBER:

MW-18D

SHEET 6 OF 6

PROJECT : Grain Handling Facility at Freeman

LOCATION : Duane Lashaw Property

 ELEVATION: 2513.40 ft msft NAVD88 (ground surface)
 DRILLING CONTRACTOR: Environmental West Exploration, Inc.

PROJECT NUMBER:

661508

COORDINATES : 206366.217, 2538415.462 (ft NAVD88)

	LEVEL:		.211, 2	000+1	5.462 (ft NAVD88) DRILLING METHOD AND EQUIPMEN START : 1/4/17 10:27 END : 1/9/	
		JRFACE (F	T)			COMMENTS
	INTERVA		,	GRAPHIC LOG	SOIL DESCRIPTION	
		RECOVE		HICT	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE	DEPTH OF CASING, DRILLING
		RECOVE	#TYPE	RAPI	DENSITY OR CONSISTENCY, SOIL	RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#TYPE	Ū	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm
	150.0			\mathcal{H}	COMPETENT BASALT, black to grayish black (N1 to N2), 1/8"	
-				KЖ	to 1/4" length predominately, angular little greenish-black (5G	Maybe a slight increase in volume 150' to 155'
				\mathbb{R}		
-				KЖ		-
-				Ŕ	_	-
_				KX	_	
155	155.0			RA		
155_	155.0			Æ	COMPETENT BASALT, black to grayish black (N1 to N2), 1/8"	-
_				RR	to 1/4" length predominately, angular little greenish-black (5G	155' to 158' - Soft drilling, harder at 158' to 160', perhaps an increase in volume of water from
				KX	2/1), dense.	155' to 160'
-				KX	-	-
-				БЩ	-	-
				KЖ		
160	160.0			\mathbb{R}		
160	160.0			\square	COMPETENT BASALT, black to grayish black (N1 to N2), with	—
_				RR	few greenish black (5G 2/1) weak (brittle) rock fragments.	_
				KX		
-				RR	-	-
-				KX	-	-
				KX		
-				БЩ	-	-
165	165.0			(\mathbf{X})	Bottom of borehole at 165 ft bgs.	
_						_
-					-	-
-					-	-
4-70					-	1
170					_	_
_					_	
					-	-
					-	-
					-	1
175						
1						
1						
-					-	-
_						_
1						
-					-	-
180						



MW-19D

DRILLING METHOD AND EQUIPMENT : B-90, 6", Air Rotary

BORING NUMBER: MW-19D SHEET

SHEET 1 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

ELEVATION : 2623.72 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210343.449, 2539718.491 (ft NAVD88)

			<u>5.449, 2</u>	5597	8.491 (ft NAVD88) DRILLING ME I HOD AND EQUIPMEN	
	LEVEL:	JRFACE (F	-T)		START : 1/17/17 09:10 END : 11/	17/2017 LOGGER : R. McComb COMMENTS
	INTERV		• /	GRAPHIC LOG	SOIL DESCRIPTION	COMMENTO
		RECOVE		HC L	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE	DEPTH OF CASING, DRILLING
		RECOVE		API	DENSITY OR CONSISTENCY, SOIL	RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#TYPE	ō	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm
	0.0				LEAN CLAY (CL), brown (7.5YR 4/3), moist, soft, medium	
-					plasticity.	Breathing Zone = 0 ppm Advancing outer casing while drilling
						Advariance outer basing while drining
-					-	_
-					-	-
					_	
5	5.0					
⁵	5.0				SILT (ML), strong brown (7.5YR 4/6), dry, medium consistency.	-
-						0930 at 5' bgs
-					-	-
-					SILTY SAND (SM), strong brown (7.5YR 4/6), dry, loose,	-
					well-graded, angular.	
10	10.0				SILT (ML), light brown (7.5YR 6/4), dry, loose to medium	
					dense, with little clay and rare angular quartz up to 1/4".	0945 at 10' bgs
-					-	-
_					-	
-					-	-
15	15.0					_
-					-	-
-					-	-
-					-	-
20	20.0			ЩЦ		_
					SILT (ML), light brown (7.5YR 6/4) to brown (7.5YR 5/4), dry to slightly moist, loose to medium dense, trace clay.	1005 at 20' bgs
-					-	4
-					-	1
-					-	-
25	25.0					
					_	Used a few gallons water at ~25' to help remove
-					-	cuttings
l _					-	Ť
-					-	4
-					-	
30						
		· · · · · ·			1	



DRILLING METHOD AND EQUIPMENT : B-90, 6", Air Rotary

SHEET 2 OF 8

SOIL BORING LOG

BORING NUMBER:

MW-19D

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION: 2623.72 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES: 210343.449, 2539718.491 (ft NAVD88)

			<u>).449, 2</u> ,	55971	8.491 (ft NAVD88) DRILLING METHOD AND EQUIPMEN	
	LEVEL:				START : 1/17/17 09:10 END : 11/7	
DEPTHE	BELOW SU		-1)	gc	SOIL DESCRIPTION	COMMENTS
	INTERVA	AL (FT) RECOVE	. ,	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#TYPE	ū	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm
-	30.0				SILT (ML) with few stringers/layers of LEAN CLAY (CL), brown (7.5YR 4/4) to (7.5YR 5/4), moist, medium dense to loose; with trace to few quartzite rock fragments, angular up to 1/16-1/4" in length.	_ 1035 at 30' bgs
- 35	35.0				-	At 33' - some lithic fragments in cuttings
-					-	
40 - -	40.0				SILT (ML) with few stringers/layers of LEAN CLAY (CL), as above with lithic fragments; few returns.	1100 at 40' bgs Driller injected some water at 40' bgs to facilitate cuttings removal
45 - -	45.0				-	40-50' - relatively rapid drilling, multiple "sot" interval, driller injects abundant water to remove cuttings
-					-	-
50 - -	50.0				CLAY (CL), olive (5Y 5/4 to 5Y 5/6); abundant weathered rock fragments up to 1/4", angular, wet.	1123 at 50' bgs 50-60 - Drill adds water to facilitate cuttings removal After lunch the driller said that ?? started drilling
_ 55	55.0					and added air, no water was blown from hole
-					-	
60					-	



PROJECT NUMBER: 661508

BORING NUMBER: MW-19D

SHEET 3 OF 8

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : B-90, 6", Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION : 2623.72 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210343.449, 2539718.491 (ft NAVD88)

WATER LEVEL:					START : 1/17/17 09:10 END : 11/	17/2017 LOGGER : R. McComb
DEPTH BELOW SURFACE (FT)				U	SOIL DESCRIPTION	COMMENTS
	INTERV	AL (FT) RECOVE	RY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	00.0					PID (ppm) Breathing Zone FID (pp
-	60.0				CLAY (CL), olive (5Y 5/4 to 5Y 5/6); abundant weathered rock fragments up to 1/4", angular, wet.	1230 at 60' bgs, little to no water made after connection at 60'
65	65.0					
	05.0				-	
70	70.0					
, 70 	75.0				CLAY (CL), as above; abundant weathered rock fragments, dark grayish-brown (10YR 4/2), light olive brown (5Y 5/6) and moderate brown (5YR 3/4).	Rapid drilling from 60-70' bgs Driller continues to add water to facilitate cuttings removal At 70' (1247), borehole allowed to rest to see if water is produced 1300, blew well - no water produced 1310 - after connection at 70' bgs, blew borehole - no water
	80.0				-	
-					SAND (SW) with SILT AND CLAY; wet; with few black (N1) to grayish black (N2) weathered basaltic rich fragments; predominately dark grayish brown (10YR 4/2), light olive brown (5YR 3/4) angular rock fragments 1/16-1/4" in length.	1520 at 80' bgs - Driller reports seeing no water being produced
-					-	Driller worked rods up and down multiple times, blowing air and no water was observed from borehole
85	85.0					82-83' - Rig chatter increases
-						- - Hard drilling
90				X	BASALT, black (N1) to grayish black (N2), fresh, fine to coarse sand-sized grains.	



DRILLING METHOD AND EQUIPMENT : B-90, 6", Air Rotary

SHEET 4 OF 8

SOIL BORING LOG

BORING NUMBER: MW-19D

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION : 2623.72 ft msift NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 210343.449, 2539718.491 (ft NAVD88)

WATER LEVEL: START : 1/17/17 09:10 END: 11/17/2017 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE. MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT, black (N1) to gravish-black (N2); 1/16-1/4" in length, 90.0 90' - Driller runs 5' rod to 98' bgs fresh. - advancer outer casing to 95' bgs also BASALT, black (N1) to grayish-black (N2) with abundant 92-95' - Driller reports hard drilling grayish-brown (5YR 3/2) to moderate brown (5YR 3/4) weathered basaltic rock fragments and trace moderate yellow green (5GY 7/4) secondary minerals. BASALT, black (N1) to grayish-black (N2), fresh, 1/16-1/4" in length. 95 95.0 BASALT, black (N1) to grayish-black (N2), fragments 1/16-1/4" strong/fresh, trace dark reddish brown oxidation. Drilling stops at 95' bgs Rods pulled, 2 buckets bentonite added to temporarily seal bottom of 6" casing, casing elevated 6' overnight to allow bentonite to hydrate casing at 89' bgs, tagged bottom of borehole at 94.8' bgs, tagged water at 80.75' bqs Advancing open borehole from 95' at 0918 100 100.0 97' - Water production occurred 105 105.0 Some brown staining at 107' bgs - trace grayish-brown (5YR 3/2) coated grains at 109'. 110 110.0 1000 at 110' bgs trace grayish brown (5YR 3/2) coated grains from 112-113'. 112-113' - some more oxidized rock fragments 115 115.0 BASALT, black (N1) to gravish-black (N2) fragments 1/32-1/4" fabular, angular with trace grayish-brown stained rock 1004 at 115' bgs fragments. 120



PROJECT NUMBER: 661508

BORING NUMBER: MW-19D

SHEET 5 OF 8

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : B-90, 6", Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION : 2623.72 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210343.449, 2539718.491 (ft NAVD88)

WATER LEVEL: START : 1/17/17 09:10 END: 11/17/2017 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT, black (N1) to gravish-black (N2) fragments 1/32-1/4" -120.0 1009 at 120' bgs, driller estimates 10-15 gpm 1118 - Drilling resumes at 120' bgs fabular, angular with trace grayish-brown stained rock fragments. 125 125.0 1123 at 125' bgs 130 130.0 1131 at 130' bgs - borehole continues to produce abundant water 131-132' - Some white fracture lining mineralization 135 1140 at 135' bgs - trace vesicular basalt fragments from 139-140'. 140 140.0 1154 at 140' bgs - white lean clay clasts observed at ~140.5'. 1308 - Drilling resumes at 140' bgs 145 BASALT, black (N1) to grayish-black (N2), fresh, trace to no secondary mineralization/oxidation. 1328 at 145' - Harder drilling from 140-145' bgs reports driller 150



BORING NUMBER: MW-19D

SHEET 6 OF 8

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : B-90, 6", Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION : 2623.72 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES: 210343.449, 2539718.491 (ft NAVD88)

WATER LEVEL: END: 11/17/2017 START : 1/17/17 09:10 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm BASALT, black (N1) to grayish-black (N2), fresh, trace to no 150.0 secondary mineralization/oxidation. 1337-1350 at 150' bgs 155 1435-1446 at 155' bgs - few little light brown to moderate (5YR 5/6 to 5YR 3/4) rock fragments at ~158'. 160 160.0 1447-1500 at 160' bgs 165 1501-1513 at 165' bgs - end 1/18/17 170 170.0 BASALT (as above) with 20-30% dark reddish-brown (10R 3/4) rock fragments (possibly weathered basalt). BASALT (as 145-173'). 175 0759-0815 at 175' bgs - begin 1/19/17 10' runs beginning 1/19/17 Change in color of water from gray to slight brownish tint at ~173-173.5' bgs Possible WEATHERED BASALT, moderate yellow (5Y 7/60 to pale yellowish orange (10YR 8/6) interbedded with fresh basalt, 0820-0942 at 175-185' bgs black (N1) to grayish-black (N2), stiff to hard/dense; fine to coarse sand-sized material, angular, trace dense clay. 180



PROJECT NUMBER: 661508

BORING NUMBER: MW-19D

SHEET 7 OF 8

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : B-90, 6", Air Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION : 2623.72 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210343.449, 2539718.491 (ft NAVD88)

			<u></u>	00071	8.491 (ft NAVD88) DRILLING ME I HOD AND EQUIPMEN			
WATER LEVEL: DEPTH BELOW SURFACE (FT)			T)		START : 1/17/17 09:10 END : 11/	17/2017 LOGGER : R. McComb COMMENTS		
		TERVAL (FT)			SOIL DESCRIPTION			
	INTERV	<u> </u>				GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL,	DEPTH OF CASING, DRILLING
		RECOVE		SAPI	COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
			#TYPE	5	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm)		
_	180.0			X	Possible WEATHERED BASALT, moderate yellow (5Y 7/60 to pale yellowish orange (10YR 8/6) interbedded with fresh basalt,	Noticeable increase in water production while		
-				Ħ	black (N1) to grayish-black (N2), stiff to hard/dense; fine to coarse sand-sized material, angular, trace dense clay.	drilling from 173-185' bgs Softer - quicker drilling 177-183' bgs		
_				\mathbb{K}	BASALT, fresh, as above (145-173').	-		
				K-X	DASALT, ITESH, as above (145-175).	183-195' - BASALT again		
-				\bowtie		(177-180' - Predominately weathered material 780-183 - interbedded with fresh basalt, 183-		
185				K¥	BASALT, black (N1) to gravish black (N2) with few weathered	185' bgs - fresh basalt)		
				ĮΗ	basaltic rock fragments, moderate yellow (5Y 7/6); weathered			
				KЖ	grains abundant at ~187'.	0930-0943' - 185-190' bgs 5' rod 185-190' bgs		
				\mathbb{R}	-	Abundant water production from borehole while -		
				ЮX	-	drilling 185-190' bgs		
				FA				
				ЮX	-	-		
190	190.0			\bowtie				
				KЖ	BASALT, black (N1) to grayish-black (N2), fresh, few to little weathered rock fragments from 193-195'.	1020-1058 - 195-200' bgs		
-				\mathbb{K}		Softer drilling from 195-200' bgs		
_				КX	-	10' rod from 200-210' bgs 1201-1218 - 200-210' bgs		
				$\vdash \!$		1201-1210 - 200-210 bg3		
-				KЖ	-	-		
_				\mathbb{R}	-	-		
195				KЖ				
				X	Same as 190-195' interspersed with weathered basalt rock			
_				KX	fragments.	-		
				RA				
				KX		_		
-				RA	-	-		
				KХ	-	_		
200	200.0			\mathbb{R}				
200	200.0			R	BASALT, fresh with trace to few weathered rock fragments.			
				RA		-		
				KX				
				RA	-	-		
				KX	-	-		
				КЯ				
				KX	-	-		
205				КA		Gray clay at 204-205' bgs, water turns brown,		
				K-X	WEATHERED ROCK FRAGMENTS, brown/yellows with gray clay and tan clay, few cuttings, no fresh basalt.	, , , , , , , , , , , , , , , , , , ,		
				KЯ		205-210' - Harder drilling than from 205-208'		
				KX	-	bgs Note: Not sure if weathered basalt or some		
				KЯ		other parent rock		
				KX	-			
-				КA	-	-		
210				KЖ				



DRILLING METHOD AND EQUIPMENT : B-90, 6", Air Rotary

SHEET 8 OF 8

SOIL BORING LOG

BORING NUMBER: **MW-19D**

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION: 2623.72 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 210343.449, 2539718.491 (ft NAVD88)

WATER LEVEL: START : 1/17/17 09:10 END: 11/17/2017 LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm WEATHERED ROCK FRAGMENTS, brown/yellows with gray 210.0 clay and tan clay, few cuttings, no fresh basalt, clayey light pink and white clay clasts, very few attempts returned to surface. 1225-1235 - 210-210' bgs - 5' rod Light pink/white clays at ~210-212' bgs 212.0 Bottom of borehole at 212 ft bgs. 215 220 225 230 235 240

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Hammer Bit, Air Rotary

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

ELEVATION : 2616.45 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

PROJECT NUMBER:

661508

COORDINATES : 209898.038157, 2538322.439851 (ft NAVD88)

END: 6/15/17 16:35 WATER LEVEL: START : 6/12/17 11:00 LOGGER : J. Ulrich DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 00 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) POORLY-GRADED GRAVEL (GP) FILL (?), sub-rounded, gray, 0.0 Drilling with no water; Lead rod is ~4.5' long - bit ~0.5' = 5' lead stick very loose, very coarse-grained, dry. LEAN CLAY (CL), dark brown, soft, low plasticity, moist. 5 5.0 SILT (ML), brown, medium stiff, dry, trace clay (<10%). PID at breathing zone = 0.0 ppm (VOCs) 10.0 10 LEAN CLAY (CL), reddish-brown, medium plasticity, moist. PID at breathing zone = 0.0 ppm (VOCs) 15 15.0 SILT (ML), brown, very soft, non-cohesive, stiff, trace clay. 20 20.0 LEAN CLAY (CL), brown, high plasticity, moist, trace silt, decrease in plasticity with depth. 25 25.0 PID at breathing zone = 0.0 ppm (VOCs) LEAN CLAY (CL), same as above; increase in plasticity, dry. WELL-SORTED GRAVEL (GW), reddish-orange, medium to coarse grained, sub-angular, dry. PID at breathing zone = 0.0 ppm (VOCs) 30

MW-20D

BORING NUMBER:

SHEET 1 OF 6

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Hammer Bit, Air Rotary

BORING NUMBER: MW-20D

SHEET 2 OF 6

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

ELEVATION : 2616.45 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

PROJECT NUMBER:

661508

COORDINATES : 209898.038157, 2538322.439851 (ft NAVD88)

WATER LEVEL:		START : 6/12/17 11:00 END : 6/15	5/17 16:35	LOGGER : J. Ulric	ch
DEPTH BELOW SURFACE (FT)		SOIL DESCRIPTION		COMMENTS	
INTERVAL (FT) RECOVERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE TEST	TH OF CASING, DRILLING E, DRILLING FLUID LOSS I'S, & INSTRUMENTATION	s, N
30.0	+	WELL-GRADED SAND (SW), light brown, medium to coarse	PID (ppm)	Breathing Zone	FID (ppm)
-		grained, sub-rounded, dry with gravel (max 3/8").			-
		WELL-GRADED SILTY GRAVEL (GW-GM), medium to coarse grained, sub-rounded, gray, dry (max particle size 1/2").			-
35		LEAN CLAY (CL), brown, low plasticity, dry, trace gravel (max			-
-		SILT (ML), reddish brown, soft, non-cohesive, dry, trace sand/gravel.	PID at breathing	zone = 0.0 ppm (VOCs)	-
-		LEAN CLAY (CL), brown, medium to high plasticity, dry, trace gravel at ~40' bgs. -			-
40					
45 <u>45.0</u>		- - - same as above with increase in gravel content (max 3/8") and			-
		trace mineralization (calcium sand-sized particles), decrease in plasticity with depth 			-
50					_
		SILT (ML), dark gray, soft, non-cohesive, dry.	1350: Troublesh	zone = 0.0 ppm (VOCs) noot issue with hydraulics, o. Stop at ~53' bgs, resun 7 at 1045.	, need to ne
55	-				
60		WELL-SORTED GRAVEL (GW), dark gray, sub-rounded, medium to coarse grained (max 1/2"), dry.	PID at breathing	zone = 0.0 ppm (VOCs)	_

SOIL BORING LOG

BORING NUMBER:

MW-20D

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES: 209898.038157, 2538322.439851 (ft NAVD88)

END: 6/15/17 16:35 WATER LEVEL: START : 6/12/17 11:00 LOGGER : J. Ulrich DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION СОС INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) SILT (ML), olive gray, very soft, dry. 60.0 PID at breathing zone = 0.0 ppm (VOCs) 65 65.0 WELL-GRADED SILTY GRAVEL (GW-GM), olive gray, sub-angular to angular, fine to coarse grained, dry. 70 70.0 WELL GRADED GRAVEL WITH CLAY (GW-GC), gravish brown, sub-rounded to sub-angular, coarse grained, low plasticity, moist, trace iron staining. PID at breathing zone = 0.0 ppm (VOCs) 75 75.0 - same as above; some calcium mineralization (~15%) observed at 75' bgs. 80 80.0 SILT (ML), grayish brown, very soft, dry. Driller indicates decrease in speed of drilling. 85 85.0 WELL GRADED GRAVEL (GW), olive gray, medium to coarse grained, sub-angular to sub-rounded, dry, some silt (very soft), begin to see WEATHERED BASALT at 88',. BASALT, black, sub-angular to sub-rounded rock fragments, trace mineralization (calcium?), dry. 90

SHEET 3 OF 6

ELEVATION : 2616.45 ft mslft NAVD88 (ground surface) DRILLING METHOD AND EQUIPMENT : Hammer Bit, Air Rotary

PROJECT NUMBER:

661508

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Hammer Bit, Air Rotary

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

ELEVATION : 2616.45 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

PROJECT NUMBER:

661508

COORDINATES: 209898.038157, 2538322.439851 (ft NAVD88)

WATER LEVEL: START : 6/12/17 11:00 END: 6/15/17 16:35 LOGGER : J. Ulrich DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 00 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) WEATHERED BASALT, black to mottled (orangish-red, yellow), 90.0 rock fragments (max 1/2"), increasing mineral content and silt with depth, dry. 1330: Rotation on drill rig fouls, need to bring rig into the shop to assess repair needs. 95 95.0 WELL-GRADED GRAVEL (GW), mottled (gray/olive/brown), fine to coarse grained, sub-rounded, trace mineral content, dry. 6/15/17 at 0935: Continue advancing borehole BASALT, black, sub-rounded to sub-angular, fine to coarse from 93'. grained, trace silt, mineralization absent, dry. Water level prior to advancing - dry. 100 100.0 WEATHERED BASALT, black to mottled gray/olive/brown/yellow, abundant mineralization, fine to coarse with rock fragments, dry. BASALT, somewhat platy, black, sub-angular to angular rock fragment (max 1/2 inch), trace mineralization (calcium), some PID at breathing zone = 0.0 ppm (VOCs) metallic secondary mineralization, dry. 105 105.0 BASALT, same as above, increase in silt content (<15%) with 1000: Moisture at 109; but dry immediately after. 110 depth, moist. 110.0 BASALT, same as above, dry, no mineralization apparent. Let stand at 111' to see if potential slow recharge, 1010 - no water, continue advance. 115 115.0 BASALT, same as above, decrease in silt content, dry. BASALT, same as above, moist, 120

SHEET 4 OF 6

MW-20D

BORING NUMBER:

DRILLING METHOD AND EQUIPMENT : Hammer Bit, Air Rotary

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc. ELEVATION : 2616.45 ft mslft NAVD88 (ground surface)

COORDINATES: 209898.038157, 2538322.439851 (ft NAVD88)

WATER LEVEL: START : 6/12/17 11:00 END: 6/15/17 16:35 LOGGER : J. Ulrich DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 00 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) 120.0 BASALT, same as above, moist. BASALT, same as above, increase in silt content (<10%), dry. 125 125.0 BASALT, same as above. 130 130.0 WEATHERED BASALT, mottled gray/yellow, orange, olive, brown 1046: First indication of water bearing unit. (highly weathered), coarse grained sand and rock fragments, sub-angular (max 1/4"), trace silt, wet. 1100: Have 139' total rod on hand, will advance to 139' and wait for additional 40' of rod to be delivered. Tag WL DTW: 94.51' bgs Collect grab GW sample from first ~2.5' of water column (see sample details at 94.5-97' interval log) 1325: resume drilling 135 135.0 BASALT, black, coarse grained/rock fragments, somewhat platy, trace metallic (pyrite?) mineralization, wet. Gray GW sample MW20U-GW-depth-061517 at 140 140.0 1215 (8W8260C) WEATHERED BASALT, black with calcium/iron staining, medium to coarse grained/rock fragment (max 1/8"), sub-angular to angular, trace clay and silt, wet. 145 145.0 WEATHERED BASALT, same as above, increase in silt content (<10%). WEATHERED BASALT, same as above, silt decreases to trace. 150 Driller notes change in hardness

SHEET 5 OF 6

SOIL BORING LOG

BORING NUMBER: **MW-20D**

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Hammer Bit, Air Rotary

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc. ELEVATION : 2616.45 ft mslft NAVD88 (ground surface)

COORDINATES: 209898.038157, 2538322.439851 (ft NAVD88)

END: 6/15/17 16:35 WATER LEVEL: START : 6/12/17 11:00 LOGGER : J. Ulrich DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) WEATHERED BASALT, same as above. 150.0 155 155.0 WEATHERED BASALT, black, platy, rounded to sub-rounded, no mineralization, wet. WEATHERED BASALT, same as above, transitioning into less platy, increasing mineralization and decreasing competent basalt, wet 160 160.0 BASALT, somewhat platy, sub-rounded, no clear mineralization, wet. 165 165.0 HIGHLY OR NEW FORMATION (?) WEATHERED BASALT WITH 1425: Driller indicates 167-169' very soft/fast drilling (feels like silt). Water in cuttings difficult to SILT (?), highly weathered, coarse grained sand particles/rock fragments, feldspars (?), quartz, iron staining, trace clay, wet. see % silt, but obviously present. 170 170.0 175 175.0 Very difficult drilling due to clay. CLAYEY WELL-GRADED GRAVEL (GW-GC), varied (pink, orange, gray, olive, white, brown), medium to coarse grained, sub-rounded to sub-angular. 178.0 <u>6 /6 /6.</u> Boring terminated at 178 ft bgs. 180

MW-20D

BORING NUMBER:

SHEET 6 OF 6

DRILLING METHOD AND EQUIPMENT : Schramm, Air Rotary

PROJECT : Freeman, Washington

30

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc. ELEVATION: 2523.07 ft mslft NAVD88 (ground surface)

COORDINATES: 208058.834473, 2535784.669781 (ft NAVD88)

END: 7/6/17 09:30 WATER LEVEL: START : 7/5/17 10:00 LOGGER : S. Davis DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 0 0 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) CLAYEY SILT (ML), brown, damp. slightly plastic. 0.0 1000 a.m. - Begin drilling, no water used. 5 5.0 LEAN CLAY (CL), brown, moist, medium plasticity. 10 10.0 LEAN CLAY (CL), brown, wet, medium plasticity. Water level prior to sampling SANDY CLAY (CL), brown clay, wet, poorly graded basalt and, 15 predominately coarse, trace fine basalt gravel. 15.0 SANDY GRAVEL, black oxidation, wet, well graded fine gravel, medium to coarse sand, basaltic, angular to sub-angular, weathered basalt. grades with increased gravel content and trace medium gravel. 1045 - Stop drilling to collect grab groundwater 20 20.0 WEATHERED BASALT, black, yellow brown to reddish brown, sample. wet, coarse sand to medium gravel up to 3/4", abundant weathered rock fragments. 1115 - Collect sample MW-21D-GW-20 Water level at 15' bgs 070517 BASALT, black, wet, platy rock fragments up to 5/8", trace 1125 - Resume drilling oxidation, angular, yellow brown to reddish brown trace sand particles. 25 25.0 BASALT, same as above, rock fragments up to 1/2". 1200 - Remove drill rod at 29.5' bgs to install bentonite seal to drill open hole.

SHEET 1 OF 5

SOIL BORING LOG

BORING NUMBER: **MW-21D**

PROJECT NUMBER:

661508

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm, Air Rotary

BORING NUMBER:

MW-21D

SHEET 2 OF 5

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

ELEVATION : 2523.07 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 208058.834473, 2535784.669781 (ft NAVD88)

END: 7/6/17 09:30 WATER LEVEL: START : 7/5/17 10:00 LOGGER : S. Davis DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) 30.0 BASALT, black, dry, angular rock fragments up to 1/2", 1325 - Resume drilling, seal successful, dry cuttings during open hole drilling. predominately less than 1/4", platy, no weathering observed. 35 35.0 BASALT, same as above, fragments up to 3/8". 40 40.0 BASALT, same as above, fragments up to 1/4". 1400 45 45.0 50 50.0 BASALT, black, dry, angular rock fragments up to 1/2", predominately less than 1/4", somewhat platy. 1420 Hard drilling 55 55.0 BASALT, same as above, increased moisture in cuttings but no evidence of fractures, likely due to bentonite seal failure. 60

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm, Air Rotary

BORING NUMBER:

MW-21D

SHEET 3 OF 5

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

ELEVATION : 2523.07 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 208058.834473, 2535784.669781 (ft NAVD88)

END: 7/6/17 09:30 WATER LEVEL: START : 7/5/17 10:00 LOGGER : S. Davis DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY FID (ppm) PID (ppm) Breathing Zone 60.0 BASALT, same as above, increased moisture in cuttings but no evidence of fractures, likely due to bentonite seal failure. 65 65.0 BASALT, black, dry, angular rock fragments up to 1/2", predominately less than 1/4", somewhat platy. > 70 70.0 BASALT, same as above. 1515 Hard drilling Add 10' drill rod 75 75.0 BASALT, black, dry, angular rock fragments up to 1/2", predominately less than 1/4", somewhat platy. Hard drilling 80 80.0 BASALT, same as above. 1535 - Add 10' drill rod 85 85.0 BASALT, same as above. 90

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm, Air Rotary

BORING NUMBER:

MW-21D

SHEET 4 OF 5

PROJECT : Freeman, Washington

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

ELEVATION : 2523.07 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES: 208058.834473, 2535784.669781 (ft NAVD88)

END: 7/6/17 09:30 WATER LEVEL: START : 7/5/17 10:00 LOGGER : S. Davis DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 00 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) BASALT, same as above. 90.0 1600 - add 10' drill rod Hard drilling 95 95.0 BASALT, same as above. 100 100.0 BASALT, black, dry, angular rock fragments up to 1/2", predominately less than 1/4", somewhat platy. 1620 - add 10' drill rod Hard drilling 105 105.0 BASALT, same as above. Hard drilling BASALT, black, dry, predominately coarse sand with some 1/4" gravel, trace vesicular basalt. BASALT, black, dry, predominately coarse sand with some 1/4" gravel, trace vesicular basalt. Soft drilling - 109' 110 110.0 BASALT, same as above, wet, increased vesicular. 1645 - End of day at 111' bgs 7-5-17, start drilling at 900 115 115.0 BASALT, black, wet, vesicular, sub-angular to angular rock fragments up to 1/2", predominately less tan 1/4". Soft drilling, abundant water 120 Soft drilling, abundant water

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm, Air Rotary

BORING NUMBER:

MW-21D

PROJECT : Freeman, Washington

150

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc. ELEVATION: 2523.07 ft mslft NAVD88 (ground surface)

COORDINATES: 208058.834473, 2535784.669781 (ft NAVD88)

END: 7/6/17 09:30 WATER LEVEL: START : 7/5/17 10:00 LOGGER : S. Davis DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 00 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) BASALT, black, wet, non-vesicular, sub-angular to angular rock 120.0 fragments up to 1/2", predominately less tan 1/4", trace mineralization. SILTY GRAVEL, gray wet, black vesicular basalt, sub-angular to angular rock fragments up to 1/4", predominately coarse sand, Soft drilling, abundant water increased mineralization, highly 125 125.0 *likely slug of rock power from cyclone*. BASALT, black, wet, sub-angular to angular rock fragments up to 1/2", non-vesicular, abundant mineralization. Soft drilling, abundant water BASALT, same as above, less mineralization. BASALT, same as above, trace mineralization. 130 130.0 BASALT, black, wet, vesicular, sub-angular to angular rock fragments up to 14", no mineralization. Alternating hard and soft drilling fro 130-141' bgs, no evidence of fractures. 135 135.0 140 141.0 Boring terminated at 141 ft bgs. 145

SHEET 5 OF 5

661508

PROJECT NUMBER:



 PROJECT NUMBER:
 BORING NUMBER:

 661508
 MW-22S
 SHEET
 1
 OF
 1

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Air Rotary, Fraste Track Rig, 6" diameter

PROJECT : UPRR Freeman, Freeman, Washington

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : (ft NAVD88)

ELEVATION :

END: 12/1/17 08:50 WATER LEVEL: START : 12/1/17 07:40 LOGGER : S. Demus DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) 0.0 Begin drilling at 0740 5.0 5 CLAYEY SILT, medium brown, medium plasticity, moist. 10_ 10.0 CLAY, medium brown with some olive, plastic, moist. SANDY GRAVEL, moist, poorly graded micaceous sand, wet, quartz gravel up to 1/2", subangular to subrounded. $\overline{}$ WEATHERED BASALT, black with mineralization and oxidation, wet, subangular gravel to 3/4". 13.0 BASALT, black, dry, hard drilling, competent rock. Boring terminated at 13 ft bgs. 15 20 25 30



 PROJECT NUMBER:
 BORING NUMBER:

 661508
 MW-23S
 SHEET
 1
 OF
 1

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Air Rotary, Fraste Track Rig, 6" diameter

PROJECT : UPRR Freeman, Freeman, Washington

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : (ft NAVD88)

ELEVATION :

END: 12/1/17 14:00 WATER LEVEL: START : 12/1/17 12:40 LOGGER : S. Demus DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) 0.0 Begin drilling at 1240 5.0 5 CLAY, light brown, medium plasticity, damp. CLAY, medium brown, moist, medium plasticity, trace fine micaceous sand. 10_ 10.0 CLAY WITH TRACE FINE TO MEDIUM QUARTZ SAND, micaceous, slightly plastic, damp. CLAYEY SAND, medium brown, trace quartz gravel, abundant mica, wet. SANDY CLAY, medium brown, slightly plastic, quartz sand with 15 15.0 abundant mica. wet. WEATHERED BASALT, predominately heavily oxidized gravel with sand, subrounded to subangular gravel to 1". 18.0 BASALT, black, competent. Boring terminated at 18 ft bgs. 20 25 30



 PROJECT NUMBER:
 BORING NUMBER:

 661508
 MW-24S
 SHEET
 1
 OF
 2

SOIL BORING LOG

PROJECT : UPRR Freeman				LOCATION : Freeman, WA					
ELEVATION : ft NAVD88				DRILLING CONTRACTOR : Environmental West Exploration, Inc					
COORDINATES:				DRILLING METHOD AND EQUIPMENT : 6" diameter, Sonic					
WATER					/11/18 12:00 LOGGER : J. E.				
DEPTH E	-	RFACE (FT)	- v	SOIL DESCRIPTION	COMMENTS				
	INTERV	AL (FT) RECOVERY (%) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION				
-	0.0			CLAY, brown, v. stiff, wet.	_ Flush Mount				
-					- _ Bentonite (2 - 38 ft bgs)				
5	5.0			-					
-									
10	10.0			-					
-				CLAY, brown/tan, hard, lots of gravel, wet. CLAY, brown/tan, soft, wet, little plasticity.	-				
-					-				
15	15.0			CLAY, brown/tan, soft, some medium/fine sand.					
-				CLAY, brown/tan, soft, some medium/fine sand. CLAY, tan, soft, some fine sand, low plasticity, wet.	-				
20	20.0			-					
-									
25	25.0			-					
-				CLAY, brown, medium, some find sand, low plasticity.					
-				CLAY, brown, medium, medium plasticity, red/tan silt inclusions.	- · ·				
30									



 PROJECT NUMBER:
 BORING NUMBER:

 661508
 MW-24S
 SHEET
 2
 OF
 2

SOIL BORING LOG

PROJEC	T : UPRI	R Freema	an		LOCATION : Freeman, WA			
ELEVAT	ION: ft I	NAVD88			ntal West Exploration, Inc			
COORD	INATES:				DRILLING METHOD AND E	EQUIPMENT	: 6" diameter, Sonic	
WATER					START : 12/11/18 09:45	END : 12/1	11/18 12:00 LOGGER : J. E.	
DEPTH E		RFACE (F	T)	g	SOIL DESCRIPTION		COMMENTS	
	INTERV	AL (FT) RECOVE	ERY (%) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION	
	30.0				CLAY, brown, medium, mottled.		TESTS, & INSTRUMENTATION	
-	00.0					-	-	
						-	-	
-						_	4	
_						_		
35_	35.0						-	_
_								
					CLAY, reddish brown, medium, low plasticity, mottled.			
_						_	Bentonite (2 - 38 ft bgs)	
40	40.0					_	Sand Pack (10/20) (38 - 46 ft bgs)	
40	40.0							_
-						-	- Screen (2" Sch. 40 PVC 10-Slot) (41 - 46 ft bg	
-						-		JS)
-						-		
-						-	-	
45	45.0				CLAY, gray/brown, medium, low plasticity, mottled, some		-	_
	46.0				weathered basalt gravel/cobbles. Boring terminated at 46 ft bgs.			
-						-	-	
_						-	-	
-						_	4	
50							4	_
-						_		
_						_		
55						-		
								_
-						-	1	
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PROJECT NUMBER: BORING NUMBER: 661508 MW-25S SHEET 1 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman LOCATION : Freeman, WA ELEVATION : ft NAVD88 DRILLING CONTRACTOR : Environmental West Exploration, Inc DRILLING METHOD AND EQUIPMENT : 6" diameter, Sonic COORDINATES: WATER LEVEL: START : 12/11/18 15:30 END: 12/12/18 11:50 LOGGER : S. D. DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC RECOVERY (%) DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY CLAY, light brown, dense, plastic (presence of quartz gravel at 17 ft bgs.). 0.0 Flush Mount Concrete (0 - 2 ft bgs) Bentonite (2 - 39 ft bgs) 5.0 5 10_ 10.0 15 15.0 CLAY, orange/yellow/brown, some sand and gravel, soft, plastic, Ś wet. 20 20.0 25 25.0 CLAYEY SAND, some gravel, oxidized. CLAY, orange/brown/olive, dense, plastic. 30



PROJECT NUMBER: BORING NUMBER: MW-25S SHEET 2 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman ELEVATION : ft NAVD88 LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES:

DRILLING METHOD AND EQUIPMENT : 6" diameter, Sonic

COORD	INATES.				DRILLING METHOD AND EQUI	PIVIEINI .	
WATER	LEVEL:				START : 12/11/18 15:30 EN	ND : 12/12	2/18 11:50 LOGGER : S. D.
DEPTH E	BELOW SU	RFACE (F1	Г)	(1)	SOIL DESCRIPTION		COMMENTS
	INTERV	AL (FT)		GRAPHIC LOG			
			D)((0()	₽	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE		
		RECOVE		AP!	DENSITY OR CONSISTENCY, SOIL		DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS,
			#TYPE	ъ	STRUCTURE, MINERALOGY		TESTS, & INSTRUMENTATION
	00.0				CLAY, orange/brown/olive, dense, plastic.		
	30.0				CLAT, Orange/brown/onve, dense, plastic.		
						-	-
-						-	-
						-	-
35	35.0						
				V///			
						_	-
						-	-
						_	-
40	40.0						Bentonite (2 - 39 ft bgs)
							Sand Pack (10/20) (39 - 47.5 ft bgs)
-						-	
_						_	-
							Screen (2" Sch. 40 PVC) (42 - 47 ft bgs)
						-	Screen (2 Sch. 40 PVC) (42 - 47 ht bys)
	1					- 1	-
45	45.0				CLAVEY SAND alive some group evidined		_
					CLAYEY SAND, olive, some gravel, oxidized.		
-						-	-
_							
				\mathbb{K}	BASALT, weathered/fractured, intermixed with clay.		
-				КЖ		-	-
				БYZ			
50	50.0			ŔŔ	BASALT, weathered/fractured.		-
³⁰ _	00.0			$ \rightarrow $	Boring terminated at 50 ft bgs.		
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BORING NUMBER:
MW-26

SHEET 1 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : RC-03 boring (209814.4 N, 2539649.3 E)

ELEVATION: 2585.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

DRILLING METHOD AND EQUIPMENT : Air Rotary, 6" boring diameter

WATER LEVELS : 21.2 ft bas	START : 5/16/2019 END : 5/1			9	LOGGER : J. Espinoza	
DEPTH BELOW EXISTING GRADE (ft)	SOIL DESCRIPTION		SYMBOLLIC LOG			
INTERVAL (ft) RECOVERY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY			PID (ppm)	COMMENTS	
2585.1					-	
	See RC-03 boring for lithology. Well con RC-03 boring.	structed in				
		-			-	
5 2580.1 						
		_				
10 2575.1						
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15		-			-	
2570.1		-				
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20 2565.1_						
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30 -		-			-	



BORING NUMBER:
MW-26

SHEET 2 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : RC-03 boring (209814.4 N, 2539649.3 E)

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2585.1 ft

DRILLING METHOD AND EQUIPMENT : Air Rotary, 6" boring diameter

PROJECT NUMBER:

661508

WATER LEVELS : 21.2 ft bas	START : 5/16/2019 END : 5/1	6/201	9	LOGGER : J. Espinoza
DEPTH BELOW EXISTING GRADE (ft)	SOIL DESCRIPTION	ÿ		
INTERVAL (ft) RECOVERY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS
2555.1		-		
		-		
35 2550.1	-	-		
		-		
40	_	-		
2545.1 - -		-		
		-		
45 2540.1	_	-		
		-		
50 2535.1	_	-		
		-		
		-		
55 2530.1	-	-		
		-		
60				



BORING NUMBER:
MW-26

SHEET 3 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : RC-03 boring (209814.4 N, 2539649.3 E)

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2585.1 ft

DRILLING METHOD AND EQUIPMENT : Air Rotary, 6" boring diameter

PROJECT NUMBER:

661508

WATER LEVELS : 21.2 ft bas LOGGER : J. Espinoza START : 5/16/2019 END: 5/16/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) 2525.1 65 2520.1 70 2515.1 75 2510.1 80 2505.1 85 2500.1 90



BORING NUMBER:
MW-26

SHEET 4 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : RC-03 boring (209814.4 N, 2539649.3 E)

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2585.1 ft

DRILLING METHOD AND EQUIPMENT : Air Rotary, 6" boring diameter

PROJECT NUMBER:

661508

WATER LEVELS : 21.2 ft bas LOGGER : J. Espinoza START : 5/16/2019 END: 5/16/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) 2495.1 95_____ 2490.1 100 2485.1 105 2480.1 110 2475.1 115 2470.1 120



BORING NUMB
MW-26

PROJECT NUMBER:

661508

BER:

SHEET 5 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : RC-03 boring (209814.4 N, 2539649.3 E)

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2585.1 ft

DRILLING METHOD AND EQUIPMENT : Air Rotary, 6" boring diameter

WATER LEVELS : 21.2	? ft bas	START : 5/16/2019 END :	5/16	/201	9	LOGGER : J. Espinoza
DEPTH BELOW EXISTIN	G GRADE (ft)	SOIL DESCRIPTION		g		
INTERVAL (ft)	OVERY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		SYMBOLLIC LOG	PID (ppm)	COMMENTS
	SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMB	IId	
2465.1			-			-
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125 2460.1			_			
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130			-			-
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135 2450.1			_			
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2445.1			_			-
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BORING NUMB
MW-26

PROJECT NUMBER:

661508

IBER:

SHEET 6 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : RC-03 boring (209814.4 N, 2539649.3 E)

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2585.1 ft

DRILLING METHOD AND EQUIPMENT : Air Rotary, 6" boring diameter

WATER LEVELS : 21.2 ft l	as	START : 5/16/2019	END : 5/16	6/201	9	LOGGER : J. Espinoza
DEPTH BELOW EXISTING G	RADE (ft)	SOIL DESCRIPTION		g		
INTERVAL (ft)		SOIL DESCRIPTION		COMMENTS		
7//35 1	SAMPLE ID (TIME)			sγ		
2435.1			-			-
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155 2430.1						
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160			-			-
160 2425.1						
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			-			-
165			-			_
2420.1			-			-
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170 2415.1						
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175 2410.1_						—
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			-			-
180			-			-



BORING NUMBER:
MW-26

SHEET 7 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : RC-03 boring (209814.4 N, 2539649.3 E)

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2585.1 ft

DRILLING METHOD AND EQUIPMENT : Air Rotary, 6" boring diameter

PROJECT NUMBER:

661508

WATER LEVELS : 21.2 ft		START : 5/16/2019	END : 5/10	6/201	9	LOGGER : J. Espinoza
DEPTH BELOW EXISTING G	RADE (ft)	SOIL DESCRIPTION		g		
INTERVAL (ft)		SOIL NAME, USCS GROUP SYMBOL, COLO MOISTURE CONTENT, RELATIVE DENSITY		PID (ppm)		COMMENTS
	SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINE	RALOGY	SYME	Ē	
2405.1			-			
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BORING NUMBER:
MW-26

SHEET 8 OF 8

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : RC-03 boring (209814.4 N, 2539649.3 E)

ELEVATION: 2585.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

DRILLING METHOD AND EQUIPMENT : Air Rotary, 6" boring diameter

WATER LEVEL			START : 5/16/2019	END : 5/1	6/201	9	LOGGER : J. Espinoza
DEPTH BELOW	EXISTING GR	ADE (ft)	SOIL DESCRIPTION		g		
INTER	VAL (ft)		SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	COLOR, ISITY OR	PID (ppm)		COMMENTS
		SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MIN	ERALOGY	SYME		
2375.1		· · ·					
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215 2370.1							-
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220 2365.1							-
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225 2360.1			Bottom of Boring at 225.0 ft bgs on 5/16/2				
2000.1			Bollom of Bonng at 225.0 ft bgs of 5/10/2				
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				-			
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230				-			_
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-27/RC-02

SOIL BORING LOG

SHEET 1 OF

9

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 5/29/2019 LOGGER : JE END: 5/30/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) See RC-02 boring log for lithology 5 10 15 20 25 30



PROJECT NUMBER:	BORING NUMBER:
661508	MW-27/RC-02

SHEET 2 OF 9

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS :	START : 5/29/2019 END : 5	/30/20	19	LOGGER : JE
DEPTH BELOW EXISTING GRADE (ft)	SOIL DESCRIPTION	g		
INTERVAL (ft) RECOVERY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SOIL DESCRIPTION		COMMENTS
SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMI	_ ₽	
SAMPLE ID (TIME) 35 35 40 40 50 50	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	states and the states and the states are sta		
60 -		-		



PROJECT NUMBER:	BORING NUMBER:
661508	MW-27/RC-02

SHEET 3 OF 9

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS :					START : 5/29/2019	END : 5/3)/201	9	LOGGER : JE	
DEPTH BELOW EXISTING GRADE (ft)			RADE (ft)		SOIL DESCRIPTION		ğ			
					SOIL NAME, USCS GROUP SYMBOL, COLOR,		SYMBOLLIC LOG	PID (ppm)	COMMENTS	
	RECOVERY (ft)									
					SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		MBO	DIA		
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-27/RC-02

SHEET 4 OF 9

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

120

DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVELS : --START : 5/29/2019 LOGGER : JE END: 5/30/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) 95 100 105 110 115



PROJECT NUMBER:	BORING NUMBER:
661508	MW-27/RC-02

SHEET 5 OF 9

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 5/29/2019 LOGGER : JE END: 5/30/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) 125 130 135 140 145 150



PROJECT NUMBER:	BORING NUMBER:
661508	MW-27/RC-02

SHEET 6 OF 9

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

180

DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVELS : --START : 5/29/2019 LOGGER : JE END: 5/30/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) 155 160 165 170 175



PROJECT NUMBER:	BORING NUMBER:
661508	MW-27/RC-02

SOIL BORING LOG

SHEET 7 OF 9

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVELS			START : 5/29/2019	END : 5/30	0/201	9	LOGGER : JE
EPTH BELOW E	XISTING GR	ADE (ft)	SOIL DESCRIPTION		g		
INTERV	/AL (ft)				SYMBOLLIC LOG	Ê	
	RECOVERY (ft)		SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	COLOR,	LLI(PID (ppm)	COMMENTS
			MOISTURE CONTENT, RELATIVE DEN	SITY OR	ABO	E	
		SAMPLE ID (TIME)			SΥΛ	_	
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-27/RC-02

SHEET 8 OF 9

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

240

DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVELS : --START : 5/29/2019 LOGGER : JE END: 5/30/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) 215 220 225 230 235



661508	MW-27/RC-02	SHEET	9	OF
PROJECT NUMBER:	BORING NUMBER:			

SOIL BORING LOG

9

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

PROJECT

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 5/29/2019 LOGGER : JE END: 5/30/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) Bottom of Boring at 243.0 ft bgs on 245 250 255 260 265 270



PROJECT NUMBER:	BORING NUMBER:		
661508	MW-28	SHEET	1

SOIL BORING LOG

OF 7

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 5/31/2019 END : 6/3/2019 LOGGER : JE DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) See RC-02 boring log for lithology 5 10 15 20 25 30



PROJECT NUMBER:	BORING NUMBER:	
661508	MW-28	SHEET

SOIL BORING LOG

2 OF 7

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

TER LEVEL			START : 5/31/2019	END : 6/3	/2019		LOGGER : JE
	EXISTING GR	ADE (ft)	SOIL DESCRIPTION		ğ		
INTER	INTERVAL (ft) RECOVERY (ft)				SYMBOLLIC LOG	Ê	
			SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR,	LLIC	PID (ppm)	COMMENTS
			MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	ISITY OR IFRALOGY	MBO	DIA	
		SAMPLE ID (TIME)			SΥΙ		
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PROJECT NUMBER:	BORING NUMBER:	
661508	MW-28	SHEET

SOIL BORING LOG

3 OF 7

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

TER LEVEL			START : 5/31/2019	END : 6/3	/2019		LOGGER : JE
	EXISTING GR	ADE (ft)	SOIL DESCRIPTION		ŋ		
INTER	VAL (ft)					Ê	
	RECOVER	Y (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR,		udd)	COMMENTS
			MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	ISTLY OR	SYMBOLLIC LOG	PID (ppm)	
		SAMPLE ID (TIME)			SΥΙ		
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PROJECT NUMBER:	BORING NUMBER:	
661508	MW-28	SHEET

SOIL BORING LOG

4 OF 7

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

	ELS :		START : 5/31/2019	END : 6/3/2	2019		LOGGER : JE
EPTH BELOV	W EXISTING GR	RADE (ft)	SOIL DESCRIPTION		g		
INTE	RVAL (ft)				CLC	Ê	
	RECOVER	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOG	DR, OR	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			CONSISTENCY, SOIL STRUCTURE, MINERAL	.OGY	'MB(PIC	
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PROJECT NUMBER:	BORING NUMBER:	
661508	MW-28	SHEET

SOIL BORING LOG

5 OF 7

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

	S :		START : 5/31/2019	END : 6/3/	2019		LOGGER : JE
DEPTH BELOW E	EXISTING GR	RADE (ft)	SOIL DESCRIPTION		g		
INTERV	INTERVAL (ft)				SYMBOLLIC LOG	Ê	
	RECOVER	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE	OLOR,	JLLI	PID (ppm)	COMMENTS
			CONSISTENCY, SOIL STRUCTURE, MINE	RALOGY	MBC	DIA	
		SAMPLE ID (TIME)		_	sγ		
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PROJECT NUMBER:	BORING NUMBER:	
661508	MW-28	SHEET

SOIL BORING LOG

6 OF 7

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

VATER LEV			START : 5/31/2019	END : 6/3/	/2019		LOGGER : JE
DEPTH BELO	W EXISTING GF	RADE (ft)	SOIL DESCRIPTION		Ŋ		
INTERVAL (ft)						Ê	
	RECOVER	₹¥ (ft)	SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS	OLOR,	LLE	PID (ppm)	COMMENTS
			MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE		1BO	e	
		SAMPLE ID (TIME)	CONSISTENCE, SOIL STRUCTURE, MINE	RALUGI	SYMBOLLIC LOG		
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PROJECT NUMBER:	BORING NUMBER:				
661508	MW-28	SHEET	7	OF	7

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER L	VATER LEVELS :			START : 5/31/2019 END : 6/3/2019		2019 LOGGER : JE		
DEPTH BE			GRADE (ft)	SOIL DESCRIPTION				
	INTERVA	AL (ft) RECOVE	ERY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE	OLOR, BITY OR RALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS
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PROJECT NUMBER:	BORING NUMBER:		
661508	MW-29	SHEET	1

SOIL BORING LOG

OF 5

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 6/6/2019 END : 6/7/2019 LOGGER : JE DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) See RC-02 boring log for lithology 5 10 15 20 25 30



PROJECT NUMBER:	BORING NUMBER:	
661508	MW-29	SHEET

SOIL BORING LOG

2 OF 5

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVEL			START : 6/6/2019	END : 6/7	/2019		LOGGER : JE
EPTH BELOW		ADE (ft)	SOIL DESCRIPTION		ġ		
INTERVAL (ft)						Ê	
	RECOVER	Y (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	ISTLY OR	MBO	뎹립	
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PROJECT NUMBER:	BORING NUMBER:	
661508	MW-29	SHEET

SOIL BORING LOG

3 OF 5

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER I				START : 6/6/2019	END : 6/7/	2019		LOGGER : JE
		XISTING GI	RADE (ft)	SOIL DESCRIPTION		Ŋ		
Г	INTERV	AL (ft)				СГО	Ê	
		RECOVER	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS
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PROJECT NUMBER:	BORING NUMBER:	
661508	MW-29	SHEET

SOIL BORING LOG

4 OF 5

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEV			START : 6/6/2019	END : 6/7	/2019		LOGGER : JE
DEPTH BELOW EXISTING GRADE (ft)		RADE (ft)	SOIL DESCRIPTION		ğ		
INTE	ERVAL (ft)					Ê	
		2Y (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS
	RECOVERY (ft)		MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	SITY OR FRALOGY	ABO	DIA	
		SAMPLE ID (TIME)			SΥΝ	_	
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PROJECT NUMBER:	BORING NUMBER:	
661508	MW-29	SHEET

SOIL BORING LOG

5 OF 5

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

150

DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVELS : --START : 6/6/2019 END : 6/7/2019 LOGGER : JE DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) 125 130 135 140 Bottom of Boring at 140.0 ft bgs on 145



PROJECT NUMBER:	BORING NUMBER:		
661508	MW-30	SHEET	1

SOIL BORING LOG

OF 4

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 6/24/2019 LOGGER : JE END: 6/26/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) See RC-02 boring log for lithology 5 10 15 20 25 30



PROJECT NUMBER:	BORING NUMBER:	
661508	MW-30	SHEET

SOIL BORING LOG

2 OF 4

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

	S :		START : 6/24/2019	END : 6/2	6/201	9	LOGGER : JE
EPTH BELOW	EXISTING GR/	ADE (ft)	SOIL DESCRIPTION		ğ		
INTER	RVAL (ft)				SYMBOLLIC LOG	Ê	
	RECOVER	Y (ft)	SOIL NAME, USCS GROUP SYMBOL,	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR ONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS		
			CONSISTENCY, SOIL STRUCTURE, MIN	ERALOGY	MBC	DIA	
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PROJECT NUMBER:	BORING NUMBER:	
661508	MW-30	SHEET

SOIL BORING LOG

3 OF 4

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

	_S :		START : 6/24/2019	END : 6/26	/201	9	LOGGER : JE		
DEPTH BELOW EXISTING GRADE (ft)		RADE (ft)	SOIL DESCRIPTION		g				
INTER	RVAL (ft)				CLC	Ê			
	RECOVER	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, O	COLOR,	OLLI	PID (ppm)	COMMENTS		
			SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE	ERALOGY	SYMBOLLIC LOG	미			
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PROJECT NUMBER:	BORING NUMBER:				
661508	MW-30	SHEET	4	OF	4

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER LEVELS :			START : 6/24/2019 END : 6/26		3/201	9	LOGGER : JE	
			GRADE (ft)	SOIL DESCRIPTION				
	INTERV			SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE	XOLOR, SITY OR ERALOGY	SYMBOLLIC LOG	(mqq) UIA	COMMENTS
95_								
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SHEET 1 OF

13

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 6/28/2019 LOGGER : JE END: 7/1/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) See RC-04 boring log for lithology 5 10 15 20 25 30



PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SHEET 2 OF 13

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER LEVELS :		START : 6/28/2019	END : 7/1/2	2019		LOGGER : JE
DEPTH BELOW EXISTING	GRADE (ft)	SOIL DESCRIPTION		g		
INTERVAL (ft)	VERY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, O MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE	COLOR, BITY OR ERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SHEET 3 OF 13

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER LEVELS :	START : 6/28/2019	END : 7/1/2	2019		LOGGER : JE
DEPTH BELOW EXISTING GRADE (ft)	SOIL DESCRIPTION		g		
INTERVAL (ft) RECOVERY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLO MOISTURE CONTENT, RELATIVE DENSITY (SYMBOLLIC LOG	PID (ppm)	COMMENTS
SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERA	LOGY	SYMB	III	
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SOIL BORING LOG

SHEET 4 OF 13

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER LEVELS :	START : 6/28/2019 END : 7/1	/2019)	LOGGER : JE
DEPTH BELOW EXISTING GRADE (ft)	SOIL DESCRIPTION			
INTERVAL (ft)			(mq	
RECOVERY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	30LL	PID (ppm)	COMMENTS
SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	Ē	
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SOIL BORING LOG

SHEET 5 OF 13

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

	VELS :		START : 6/28/2019	END : 7/1/	2019		LOGGER : JE
	OW EXISTING G	GRADE (ft)	SOIL DESCRIPTION		Ŋ		
IN	ITERVAL (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		SYMBOLLIC LOG	Ê	
	RECOVE	ERY (ft)			OLLI	PID (ppm)	COMMENTS
			CONSISTENCY, SOIL STRUCTURE, MINE	ERALOGY	'MB(DIG	
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SHEET 6 OF 13

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER LEVELS	S :		START : 6/28/2019	END : 7/1/	2019		LOGGER : JE
DEPTH BELOW E		GRADE (ft)	SOIL DESCRIPTION		ģ		
INTERV	INTERVAL (ft) RECOVERY (ft)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMBOLLIC LOG	PID (ppm)	COMMENTS
		SAMPLE ID (TIME)		_	sΥ		
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SOIL BORING LOG

SHEET 7 OF 13

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

VATER LEVE			START : 6/28/2019	END : 7/1	/2019		LOGGER : JE
DEPTH BELOV	W EXISTING G	RADE (ft)	SOIL DESCRIPTION		ğ		
INTE	ERVAL (ft)				12	Ê	
	RECOVERY (ft)		SOIL NAME, USCS GROUP SYMBOL, O MOISTURE CONTENT, RELATIVE DEN	COLOR,	E	PID (ppm)	COMMENTS
	Г		MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MINI	SITY OR	ABO	<u> </u>	
		SAMPLE ID (TIME)	CONSISTENCE, SOIL STRUCTURE, MINI		SYMBOLLIC LOG		
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SHEET 8 OF

13

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

240

DRILLING METHOD AND EQUIPMENT : Air Rotary WATER LEVELS : --START : 6/28/2019 LOGGER : JE END: 7/1/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) 215 220 225 230 235



PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SHEET 9 OF 13

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 6/28/2019 LOGGER : JE END: 7/1/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) 245 250 255 260 265 270



PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SOIL BORING LOG

SHEET 10 OF

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER LE				START : 6/28/2019	END : 7/1	/2019)	LOGGER : JE
DEPTH BELOW EXISTING GRADE (ft)		RADE (ft)	SOIL DESCRIPTION		ğ			
INTERVAL (ft) RECOVERY (ft)					SYMBOLLIC LOG	Ê		
		RV (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR,	E	PID (ppm)	COMMENTS	
		INCOUVE		MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN		1BO	<u> </u>	
			SAMPLE ID (TIME)	CONSISTENCE, SOLE STRUCTURE, MIN	LINALOGI	SΥΛ		
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SOIL BORING LOG

SHEET 11 OF

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVE			START : 6/28/2019	END : 7/1	/2019		LOGGER : JE
EPTH BELOW EXISTING GRADE (ft)		ADE (ft)	SOIL DESCRIPTION				
INTERVAL (ft) RECOVERY (ft)						Ê	
		۲Y (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	COLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			CONSISTENCY, SOIL STRUCTURE, MIN	IERALOGY	MBC	DIA	
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SOIL BORING LOG

SHEET 12 OF

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVE			START : 6/28/2019	END : 7/1	/2019		LOGGER : JE
DEPTH BELOW EXISTING GRADE (ft)		ADE (ft)	SOIL DESCRIPTION				
INTERVAL (ft) RECOVERY (ft)					12	Ê	
		eY (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	NSITY OR	ABO	G	
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PROJECT NUMBER:	BORING NUMBER:
661508	MW-31/RC-04

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

VATER L				START : 6/28/2019	END : 7/1	/2019		LOGGER : JE
DEPTH BE	ELOW E	XISTING G	RADE (ft)	SOIL DESCRIPTION		ğ		
INTERVAL (ft)					C L C	Ê		
	RECOVERY (ft)		RY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		SYMBOLLIC LOG	PID (ppm)	COMMENTS
		1 1		CONSISTENCY, SOIL STRUCTURE, MIN	IERALOGY	MBC	DIA	
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SHEET 13 OF



PROJECT NUMBER:	BORING NUMBER:		
661508	MW-32	SHEET	1

SOIL BORING LOG

OF 10

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 7/3/2019 LOGGER : JE END: 7/8/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) See RC-04 boring log for lithology 5 10 15 20 25 30



661508	MW-32	SHEET	2	OF	10
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PROJECT NUMBER:	BORING NUMBER:				

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

TER LEVELS			START : 7/3/2019	END : 7/8	/2019		LOGGER : JE
PTH BELOW E	EXISTING GR	ADE (ft)	SOIL DESCRIPTION		ğ		
INTERVAL (ft) RECOVERY (ft)						Ê	
		Y (ft)	SOIL NAME, USCS GROUP SYMBOL,	COLOR,		(ppr	COMMENTS
			SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	ISH Y OR ERALOGY	SYMBOLLIC LOG	PID (ppm)	
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661508	MW-32	SHEET	3	OF	10
PROJECT NUMBER:	BORING NUMBER:				

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER LEVELS :				START : 7/3/2019 END : 7/3		/2019		LOGGER : JE
DEPTH BELOW EXISTING GRADE (ft)			RADE (ft)	SOIL DESCRIPTION		g		
INTERVAL (ft)						Ê		
	RECOVERY (ft)		RY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMBOLLIC LOG	PID (ppm)	COMMENTS
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PROJECT NUMBER:	BORING NUMBER:				
661508	MW-32	SHEET	4	OF	10

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

VATER LEVE			START : 7/3/2019	END : 7/8	/2019		LOGGER : JE
DEPTH BELOW	EXISTING GR	ADE (ft)	SOIL DESCRIPTION		ğ		
INTER	RVAL (ft)				12	Ê	
	RECOVER	?Y (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		SYMBOLLIC LOG	PID (ppm)	COMMENTS
			MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	ISITY OR IFRALOGY	ABO	DIA	
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PROJECT NUMBER:	BORING NUMBER:				
661508	MW-32	SHEET	5	OF	10

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

INTERVAL	L (ft) RECOVERY (ft) SAMPLE ID (TIME)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBO MOISTURE CONTENT, RELATIVE D CONSISTENCY, SOIL STRUCTURE, M	L, COLOR, ENSITY OR INERALOGY	PID (ppm)	COMMENTS
	RECOVERY (ft)	SOIL NAME, USCS GROUP SYMBO MOISTURE CONTENT, RELATIVE D CONSISTENCY, SOIL STRUCTURE, M	L, COLOR, ENSITY OR INERALOGY	PID (ppm)	COMMENTS
	RECOVERY (ft)	SOIL NAME, USCS GROUP SYMBO MOISTURE CONTENT, RELATIVE D CONSISTENCY, SOIL STRUCTURE, M	L, COLOR, ENSITY OR INERALOGY	PID (ppr	COMMENTS
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661508	MW-32	SHEET	6	OF	10
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PROJECT NUMBER:	BORING NUMBER:				

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVE		-	START : 7/3/2019	END : 7/8	/2019		LOGGER : JE
	EXISTING GR	ADE (ft)	SOIL DESCRIPTION		ŋ		
INTER	RVAL (ft)					Ê	
	RECOVER	Y (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR,		udd)	COMMENTS
			MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	ISHY OR IERALOGY	SYMBOLLIC LOG	PID (ppm)	
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PROJECT NUMBER:	BORING NUMBER:		
661508	MW-32	SHEET	7

SOIL BORING LOG

OF 10

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

VATER LEVE			START : 7/3/2019	END : 7/8/	/2019		LOGGER : JE
DEPTH BELOW	/ EXISTING GR	RADE (ft)	SOIL DESCRIPTION		Ŋ		
INTER	RVAL (ft)					Ê	
	RECOVER	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR,	DLLIG	PID (ppm)	COMMENTS
			CONSISTENCY, SOIL STRUCTURE, MIN	ERALOGY	SYMBOLLIC LOG	DIA	
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PROJECT NUMBER:	BORING NUMBER:		
661508	MW-32	SHEET	8

SOIL BORING LOG

OF 10

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

EPTH BELOW E		ADE (ft)	SOIL DESCRIPTION		1		
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	RECOVER	Y (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR,	JLLI,	PID (ppm)	COMMENTS
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661508	MW-32	OUEET	~	05	4.0
PROJECT NUMBER:	BORING NUMBER:				

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

	LEVELS			START : 7/3/2019	END : 7/8	/2019		LOGGER : JE
EPTH B	ELOW E	XISTING GR	RADE (ft)	SOIL DESCRIPTION		g		
Γ	INTERV	AL (ft)				SYMBOLLIC LOG	Ê	
		RECOVER	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	COLOR,		PID (ppm)	COMMENTS
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PROJECT NUMBER:	BORING NUMBER:			
661508	MW-32	SHEET	10	OF

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVEL			START : 7/3/2019	END : 7/8	3/2019		LOGGER : JE
EPTH BELOW E		ADE (ft)	SOIL DESCRIPTION		ğ	l T	
INTERV	/AL (ft)					Ê	
	RECOVER	Y (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN		JLLIG	PID (ppm)	COMMENTS
		SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MIN	IERALOGY	SYMBOLLIC LOG	DIA	
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PROJECT NUMBER:	BORING NUMBER:		
661508	MW-33	SHEET	1

SOIL BORING LOG

OF 10

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 7/10/2019 LOGGER : JE END: 7/12/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) See RC-04 boring log for lithology 5 10 15 20 25 30



001000	1111-55	SHEET	2	UF	
661508	MW-33	SHEET	2	OF	10
PROJECT NUMBER:	BORING NUMBER:				

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

	LEVELS			START : 7/10/2019	END : 7/1	2/201	9	LOGGER : JE	
ЕРТН В	ELOW E	XISTING GF	RADE (ft)	SOIL DESCRIPTION		ğ			
Γ	INTERV	NTERVAL (ft)				12	Ê		
		RECOVER	2Y (ft)	SOIL NAME, USCS GROUP SYMBOL, O	COLOR,	LE	PID (ppm)	COMMENTS	
				SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MINI		1BO			
			SAMPLE ID (TIME)			SYMBOLLIC LOG	_		
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001000	MW-33	SHEET	3	OF	10
661508	N// 22		•	~-	
PROJECT NUMBER:	BORING NUMBER:				

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

	LS :		START : 7/10/2019	END : 7/12	2/201	9	LOGGER : JE
PTH BELOW	/ EXISTING GF	RADE (ft)	SOIL DESCRIPTION		ğ		
INTER	RVAL (ft)				SYMBOLLIC LOG	÷	
			SOIL NAME, USCS GROUP SYMBOL, C	OLOR,	FIC	PID (ppm)	COMMENTS
	RECOVER		SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE	SITY OR	BOL) Q	
		SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINE	RALOGY	УM	٩.	
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PROJECT NUMBER:	BORING NUMBER:				
661508	MW-33	SHEET	4	OF	10

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVEL			START : 7/10/2019	END : 7/12	2/201	9	LOGGER : JE
EPTH BELOW	EXISTING GR	ADE (ft)	SOIL DESCRIPTION		Ŋ		
INTER	VAL (ft)				SYMBOLLIC LOG	Ê	
	RECOVER	tY (ft)	SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS	OLOR,	JLLI	PID (ppm)	COMMENTS
			CONSISTENCY, SOIL STRUCTURE, MINE	RALOGY	MBC	DIA	
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PROJECT NUMBER:	BORING NUMBER:				
661508	MW-33	SHEET	5	OF	10

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVE			START : 7/10/2019	END : 7/12	2/201	9	LOGGER : JE
	W EXISTING GR	RADE (ft)	SOIL DESCRIPTION		Ŋ		
INTE	RVAL (ft)				CL	Ê	
	RECOVER	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, (COLOR,	OLLI	PID (ppm)	COMMENTS
			SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MINI	ERALOGY	SYMBOLLIC LOG	DIA	
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661508	10100-33	SHEET	6	OF	10
661508	MW-33	QUEET	6	OF	40
PROJECT NUMBER:	BORING NUMBER:				

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVEL			START : 7/10/2019	END : 7/1	2/201	9	LOGGER : JE
EPTH BELOW	EXISTING GR	ADE (ft)	SOIL DESCRIPTION		g		
	VAL (ft)				12	Ê	
		N (4)	SOIL NAME, USCS GROUP SYMBOL,	COLOR,	TIC	PID (ppm)	COMMENTS
	RECOVER		SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	ISITY OR	BOI		
		SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MIN	ERALUGY	SYMBOLLIC LOG	ш	
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661508 MW-33 SHEET 7 OF 1

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER LEVEL	.S :		START : 7/10/2019	END : 7/12	2/201	9	LOGGER : JE
DEPTH BELOW	EXISTING G	RADE (ft)	SOIL DESCRIPTION		Ŋ		
INTER	VAL (ft)				CLC	Ê	
	RECOVER	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS	OLOR,	OLLI		COMMENTS
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PROJECT NUMBER:	BORING NUMBER:				
661508	MW-33	SHEET	8	OF	10

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

TER LEVEL			START : 7/10/2019	END : 7/12	/201	9	LOGGER : JE
PTH BELOW E	EXISTING GR	ADE (ft)	SOIL DESCRIPTION		g		
INTER\	VAL (ft)				SYMBOLLIC LOG	Ê	
	RECOVER	tY (ft)	SOIL NAME, USCS GROUP SYMBOL, CO	LOR,	DLLI	PID (ppm)	COMMENTS
			SOIL NAME, USCS GROUP SYMBOL, COI MOISTURE CONTENT, RELATIVE DENSIT CONSISTENCY, SOIL STRUCTURE, MINER/	ALOGY	MBC	DIA	
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001500	10100-33	SHEET	9	OF	10
661508	MW-33	OUFFT	•	0 F	4.0
PROJECT NUMBER:	BORING NUMBER:				

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

VATER LEVE		-	START : 7/10/2019	END : 7/12	2/201	9	LOGGER : JE	
DEPTH BELOV	N EXISTING GF	RADE (ft)	SOIL DESCRIPTION		ğ			
INTE	INTERVAL (ft)				SYMBOLLIC LOG	Ê		
	RECOVER	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, (MOISTURE CONTENT, RELATIVE DEN: CONSISTENCY, SOIL STRUCTURE, MINI	COLOR,	DLLI(PID (ppm)	idd) (COMMENTS
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PROJECT NUMBER:	BORING NUMBER:		
661508	MW-33	SHEET	10

SOIL BORING LOG

OF

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATER	LEVELS	:		START : 7/10/2019	END : 7/12	2/201	9	LOGGER : JE
			GRADE (ft)	SOIL DESCRIPTION				
	INTERV			SOIL NAME, USCS GROUP SYMBOL	COLOR	SYMBOLLIC LOG	PID (ppm)	COMMENTS
		RECOVE		SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	SITY OR	BOL	D (L	COMMENTO
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINI	ERALUGY	SYM	ш	_
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BORING NUMBER:
MW-34

SHEET 1 OF 7

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near RC-04 (209442.1 N, 2539177.8 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary with 6" boring diameter

PROJECT NUMBER: 661508

WATER LEVELS : 12	25.0 ft bas	START : 7/15/2019 END : 7/1	7/201	9	LOGGER : J. Espinoza
DEPTH BELOW EXIST		SOIL DESCRIPTION			
INTERVAL (f	t) COVERY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS
2589.3	SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYME	Ē	
-		See RC-04 boring log for lithology	-		Well screened at 165 - 185'
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BORING NUMBER:
MW-34

PROJECT NUMBER:

661508

SHEET 2 OF 7

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near RC-04 (209442.1 N, 2539177.8 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary with 6" boring diameter

	WATER LEVEL	S : 125.0 ft bas	START : 7/15/2019	END : 7/17	/201	9	LOGGER : J. Espinoza
	DEPTH BELOW	EXISTING GRADE (ft)	SOIL DESCRIPTION		g		
	INTER		SOIL NAME, USCS GROUP SYMBOL, C	OLOR,	DLLIC LO	(mqq)	COMMENTS
			CONSISTENCY, SOIL STRUCTURE, MINE	RALOGY	SYMBC	OIA	
2543 445 2544.3 2593.3 259.4 259	2559.3						-
2543 445 2544.3 2593.3 259.4 259	-			_			-
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BORING NUMBER:
MW-34

SHEET 3 OF 7

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near RC-04 (209442.1 N, 2539177.8 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary with 6" boring diameter

PROJECT NUMBER:

661508

WATER LEVE	LS : 125.0 ft b	oas	START : 7/15/2019 END :	7/17	/201	9	LOGGER : J. Espinoza
DEPTH BELOW	EXISTING GR	ADE (ft)	SOIL DESCRIPTION		g		
INTER	RECOVER	Y (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		SYMBOLLIC LOG	PID (ppm)	COMMENTS
		SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMB	PIC	_
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BORING NUMBER:
MW-34

PROJECT NUMBER:

661508

SHEET 4 OF 7

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near RC-04 (209442.1 N, 2539177.8 E)

DRILLING CONTRACTOR : Environmental West Exploration, Inc ELEVATION: 2589.3 ft DRILLING METHOD AND EQUIPMENT : Air Rotary with 6" boring diameter WATER LEVELS : 125.0 ft bas LOGGER : J. Espinoza START : 7/15/2019 END: 7/17/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2499.3 95 2494.3 100 2489.3 105 2484.3 110 2479.3 115 2474.3 120



BORING NUMBER:
MW-34

SHEET 5 OF 7

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near RC-04 (209442.1 N, 2539177.8 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

DRILLING METHOD AND EQUIPMENT : Air Rotary with 6" boring diameter

WATER LEVELS : 125.0 ft bas LOGGER : J. Espinoza START : 7/15/2019 END: 7/17/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2469.3 125 ⁻ 2464.3 130 2459.3 135 2454.3 140 2449.3 145 2444.3 150



BORING NUMBER:
MW-34

SHEET 6 OF 7

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near RC-04 (209442.1 N, 2539177.8 E)

ELEVATION: 2589.3 ft

2589.3 ft DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

DRILLING METHOD AND EQUIPMENT : Air Rotary with 6" boring diameter WATER LEVELS : 125.0 ft bas LOGGER : J. Espinoza START : 7/15/2019 END: 7/17/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2439.3 155 2434.3 160 2429.3 165 2424.3 170 2419.3 175 2414.3 180



BORING NUMBER:
MW-34

SHEET 7 OF 7

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near RC-04 (209442.1 N, 2539177.8 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary with 6" boring diameter

PROJECT NUMBER: 661508

WATER	LEVELS	: 125.0 f	ft bas	START : 7/15/2019	END : 7/17	/201	9	LOGGER : J. Espinoza
DEPTH 8	BELOW EX	XISTING O	GRADE (ft)	SOIL DESCRIPTION		Ċ		
	INTERV	AL (ft) RECOVE	ERY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE	SITY OR	SYMBOLLIC LOG	PID (ppm)	COMMENTS
-2409.3 								
185				Bottom of Boring at 185.0 ft bgs on 7/17/2	- 019 - - - - -			
190					- - - - - - - - - - -			- - - - - - - - -
195								- - - - - - - - - - - - - - - - - - -
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661508	MW-35	SHEET	1
PROJECT NUMBER:	BORING NUMBER:		

SOIL BORING LOG

OF 6

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 7/24/2019 END: 8/7/2019 LOGGER : JE DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) See RC-03 boring log for lithology 5 10 15 20 25 30



661508	MW-35	SHEET	2	OF	6
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PROJECT NUMBER:	BORING NUMBER:				

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

	VELS :		START : 7/24/2019	END : 8/7/	/2019		LOGGER : JE
EPTH BELC	OW EXISTING	GRADE (ft)	SOIL DESCRIPTION		g		
INT	TERVAL (ft)				12	Ê	
		/ERY (ft)	SOIL NAME, USCS GROUP SYMBOL,	COLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS
	1.2001		SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	ISTLY OR ERALOGY	MBO	DIA	
		SAMPLE ID (TIME)			sΥ		
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661508 MW-35 SHEET 3 OF 6	661508	MW-35	SHEET	3	OF	6
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SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

VATER LEV			START : 7/24/2019	END : 8/7/	2019		LOGGER : JE
DEPTH BELO	W EXISTING GF	RADE (ft)	SOIL DESCRIPTION		ğ		
INT	ERVAL (ft)				CC	Ê	
	RECOVER	2V (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		E	PID (ppm)	COMMENTS
	RECOVER		MOISTURE CONTENT, RELATIVE DENS		1BO	0	
		SAMPLE ID (TIME)	CONSISTENCE, SOIL STRUCTURE, MINE	RALUGI	SYMBOLLIC LOG		
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PROJECT NUMBER:	BORING NUMBER:				
661508	MW-35	SHEET	4	OF	6

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVELS			START : 7/24/2019	END : 8/7/	2019		LOGGER : JE
EPTH BELOW E	XISTING GF	RADE (ft)	SOIL DESCRIPTION		ğ		
INTERVAL (ft)					C C	Ê	
	RECOVER	QV (ft)	SOIL NAME, USCS GROUP SYMBOL, C	OLOR,	F	udd	COMMENTS
	RECOVER		SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE	SITY OR	SYMBOLLIC LOG	PID (ppm)	
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PROJECT NUMBER:	BORING NUMBER:		
661508	MW-35	SHEET	5

SOIL BORING LOG

OF 6

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

ATER LEVELS			START : 7/24/2019	END : 8/7/	2019		LOGGER : JE
EPTH BELOW E	XISTING GR	ADE (ft)	SOIL DESCRIPTION		ğ		
INTERV	AL (ft)				0 LC	Ê	
	RECOVERY (ft)		SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MINI	COLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS
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PROJECT NUMBER:	BORING NUMBER:		
661508	MW-35	SHEET	6

SOIL BORING LOG

OF 6

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

WATERI	LEVELS	3 :		START : 7/24/2019	END : 8/7	/2019)	LOGGER : JE
DEPTH B	ELOW E		GRADE (ft)	SOIL DESCRIPTION		Ŋ		
Г	INTERV	AL (ft)				SYMBOLLIC LOG	Ê	
	RECOVERY (ft)		RY (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN	COLOR, SITY OR	OLLI	PID (ppm)	COMMENTS
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MIN	ERALOGY	ΥMB	ЫЧ	
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180				Bottom of Boring at 179.0 ft bgs on	-	$\left \right $		
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661508	MW-36	SHEET	1
PROJECT NUMBER:	BORING NUMBER:		

SOIL BORING LOG

OF 3

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 8/8/2019 LOGGER : JE END: 8/15/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) See RC-03 boring log for lithology 5 10 15 20 25 30



PROJECT NUMBER:	BORING NUMBER:	
661508	MW-36	SHEET

SOIL BORING LOG

2 OF 3

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

	LEVELS			START : 8/8/2019	END : 8/1	5/201	9	LOGGER : JE
ЕРТН В	ELOW E	XISTING GI	RADE (ft)	SOIL DESCRIPTION		ğ		
ſ	INTERVAL (ft) RECOVERY (ft) SAMPLE ID					SYMBOLLIC LOG	Ê	
			RY (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEM	COLOR,		PID (ppm)	COMMENTS
				CONSISTENCY, SOIL STRUCTURE, MIN	ISITY OR IERALOGY	MBC	DIA	
			SAMPLE ID (TIME)	,		SΥI		
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PROJECT NUMBER:	BORING NUMBER:	
661508	MW-36	SHEET

SOIL BORING LOG

3 OF

3

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

90

DRILLING METHOD AND EQUIPMENT : Air Rotary

WATER LEVELS : --START : 8/8/2019 LOGGER : JE END: 8/15/2019 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) 65 70 75 Bottom of Boring at 79.0 ft bgs on 80 85



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-01	SHEET	1	OF	3

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-9 Cluster (210748.8 N, 2539627.7 E)

ELEVATION: 2599.2 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Sonic, 8" boring diameter

WATER LEVELS : 44.6 ft bas			Das	START : 11/8/2018 END : 11/			3	LOGGER : J. Espinoza	
DEPTH I	DEPTH BELOW EXISTING GRADE (ft)		RADE (ft)	SOIL DESCRIPTION					
						ŏ			
	INTERV	AL (ft)				SYMBOLLIC LOG	PID (ppm)		
	RECOVERY (ft)		RY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		L	dd)	COMMENTS	
				CONSISTENCY, SOIL STRUCTURE, MINERA		₿0	e		
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2594.2				CLAY (CL)	-	///		Picture taken at 5'	
-				5.0' - brown, dry, very soft, high plasticity	-			-	
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10	10.0								
2589.2				CLAY (CL)	_	///		Picture taken at 10'	
-				10.0' - same as above	-			-	
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15	15.0				-	///		_	
2584.2				SAND (SP)	-			Picture taken at 15'	
_				15.0' - brown, dry, medium grained, some plas	tic clay _			_	
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2579.2				CLAY (CL)	-			Picture taken at 20'	
-				20.0' - tan, dry, medium density, high plasticity	-	V///		-	
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2574.2				CLAY (CL)		V//		Picture taken at 25'	
-	-			25.0' - brown, dry, very soft to soft, high plastic	ity _	V///		-	
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PROJECT NUMBER:	BORING NUMBER:			
661508	RC-01	SHEET	2	OF

3

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-9 Cluster (210748.8 N, 2539627.7 E)

ELEVATION: 2599.2 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Sonic, 8" boring diameter

WATER LEVELS : 44.6 ft bas				START : 11/8/2018 END : 11				LOGGER : J. Espinoza		
DEPTH BELOW EXISTING GRADE (ft)				SOIL DESCRIPTION		Ŋ				
	INTERVAL (ft) RECOVERY (ft) SAMPLE ID		SAMPLE ID	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMBOLLIC LOG	PID (ppm)	COMMENTS		
2569.2	20.0		(TIME)	CLAY (CL)	_	ن ريز		Picture taken at 30'		
	30.0			30.0' - same as above, wet						
35_ 2564.2	35.0			CLAY (CL) 35.0' - same as above	-			Picture taken at 35'		
- - - - - - - - - - - - - - - - - - -	40.0									
40 2559.2 - - -				CLAY (CL) 40.0' - brown, wet, soft, medium plasticity	- - - -			Picture taken at 40'		
- - 45	45.0			BASALT 43.0' - 45.0' - black, small angular chips, weathe some clay, some larger chips	ered, _	X		-		
2554.2	47.0			BASALT 45.0' - 47.0' - black, small angular chips, some la chips	arge _ -	X		Picture taken at 45' - -		
	-			BASALT 47.0 - 52.0' - very dark gray with brown/orange i staining, strong, aphanitic, massive, moderately decomposed, intensely fractured, fractures horiz and vertical, no cementation, but iron staining or surfaces, RQD = 0%	ontal			Picture taken at 47'. Rock begins at 47.5'		
2549.2	52.0				-	X				
	-			BASALT 52.0 - 57.0' - same as above, slightly decreased weathering and decreased fracture density. RQI 28%	- - - -	Ø				
55_ 2544.2 -						X		Driller loses water to the formation, rods stuck in hole at approximated 55-60'		
- - - - 60	57.0			BASALT 57.0 - 62.0' - medium to dark gray, strong aphar with some porphyritic weathered plagioclase cry intervals. Massive, moderately decomposed, inte fractured (RQO = 44%). No discernable fracture pattern in core, iron staining	stals in _ ensely					



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-01	SHEET	3	OF	3

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-9 Cluster (210748.8 N, 2539627.7 E)

ELEVATION: 2599.2 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Sonic, 8" boring diameter

WATER	LEVELS	: 44.6 ft l	bas	START : 11/8/2018 END : 11/8/20				LOGGER : J. Espinoza
DEPTH BELOW EXISTING GRADE (ft)			SOIL DESCRIPTION					
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	INTERVA	TERVAL (ft)				Ω	PID (ppm)	
		RECOVE	ERY (ft)	SOIL NAME, USCS GROUP SYMBOL,	COLOR,		d)	COMMENTS
				SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN		ЩЩ Ш	e.	
			SAMPLE ID (TIME)			SYMBOLLIC LOG	-	
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-				Bottom of Boring at 62.0 ft bgs on 11/8/20)18	~_7		
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PROJECT NUMBER:	BORING NUMBER:				
661508	RC-02	SHEET	1	OF	8

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-19D (210375.0 N, 2539671.7 E)

ELEVATION: 2625.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS : 59.8 ft bas	START : 11/14/2018 END : 3/2	1/201	9	LOGGER : J. Espinoza
DEPTH BELOW EXISTING GRADE (ft)	SOIL DESCRIPTION	g		
INTERVAL (ft) RECOVERY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS
2625.1 0.0 5 5.0 2620.1 - 10 10.0 2615.1 - 15 15.0 2610.1 - 2610.1 - 20 20.0 2605.1 - 25 25.0 2600.1 - - - - - - - - - 25 25.0	CLAY (CL) 5.0' - brown, dry, stiff, medium plasticity CLAY (CL) 8.0' - brown, dry, hard, low plasticity CLAY (CL) 10.0' - brown, dry, hard, no plasticity CLAY (CL) 15.0' - same as above CLAY (CL) 20.0' - brown, soft, dry, medium plasticity CLAY (CL) 20.0' - brown, soft to very soft, dry, medium to high plasticity		а 0 0 0 0 0	
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PROJECT NUMBER:	BORING NUMBER:				
661508	RC-02	SHEET	2	OF	8

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-19D (210375.0 N, 2539671.7 E)

ELEVATION: 2625.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS : 59.8 ft bas	START : 11/14/2018	END : 3/21/20	19	LOGGER : J. Espinoza
DEPTH BELOW EXISTING GRADE (ft)	SOIL DESCRIPTION	g		
INTERVAL (ft) RECOVERY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLC MOISTURE CONTENT, RELATIVE DENSITY CONSISTENCY, SOIL STRUCTURE, MINERAL	OR 0	PID (ppm)	COMMENTS
	CLAY (CL) 30.0' - same as above CLAY (CL)		0	
35 35.0 2590.1 	34.0 - tan, dry, stiff to hard, low plasticity CLAY (CL) 35.0' - gray, dry, very soft, high plasticity CLAY (CL) 36.0' - brown, dry, very soft, medium plasticity		0	
40 40.0 2585.1 - - - 45 45.0	CLAY (CL) 40.0' - brown, dry, very soft, high plasticity		0	
	CLAY (CL) 45.0' - same as above		0	
	CLAY (CL) 50.0' - gray, dry, medium density, medium plast	icity	0	
55 55.0 2570.1 - - - - - - - - - - - - - - - - - - -	SAND (SP) 55.0' - brown, dry, medium to fine sand, some c	slay	0	



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-02	SHEET	3	OF	8

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-19D (210375.0 N, 2539671.7 E)

ELEVATION: 2625.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS : 59.8 ft bas	START : 11/14/2018 END : 3/2	1/2019)	LOGGER : J. Espinoza
DEPTH BELOW EXISTING GRADE (ft)	SOIL DESCRIPTION	g		
INTERVAL (ft) RECOVERY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYMBOLLIC LOG	PID (ppm)	COMMENTS
	CLAY (CL) 60.0' - gray, dry, very soft, high plasticity		0	
65 2560.1 	CLAY (CL) 65.0' - same as above		0	- - - - - - - - - - - - - - - - - - -
70 <u>70.0</u> 2555.1	CLAY (CL) 70.0' - brown, dry, very soft, high plasticity			
75 75.0 2550.1	CLAY (CL) 75.0' - brown, moist, very soft, high plasticity		0	- - - - - - - - - - - - - - - - - - -
80 80.0 2545.1	CLAY (CL) 80.0' - brown, saturated, very soft, plastic, some highly		0	- - - - - - - -
85 85.0	weathered basalt chips		0	- - - - - - - - - - - - - - - - - - -
	BASALT 85.0' - brown/red, wet, oxidized, variable sizes, rounded, weathered		0	
90		×		



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-02	SHEET	4	OF	8

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-19D (210375.0 N, 2539671.7 E)

ELEVATION: 2625.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS : 59.8 ft bas	START : 11/14/2018	END : 3/21/2019	LOGGEF	R : J. Espinoza
DEPTH BELOW EXISTING GRADE (ft)	SOIL DESCRIPTION	g		
INTERVAL (ft) RECOVERY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSIT CONSISTENCY, SOIL STRUCTURE, MINERA	YOR 👮	(îudd) COMM	IENTS
	BASALT 90.0 - 94.0'		0	
9595.0 2530.1	BASALT 94.0 - 96.0' - black, angular chips, decreasing oxidation, similar size			-
100 100.0 2525.1	BASALT 97.0' - black, saturated, angular chips, similar BASALT 97.7 - 100.7' - medium dark gray, very strong, light disintegration, moderately fractured, trace oxidation, pyrite, fractures very narrow to narro some surface oxidation, undulating fracture su	fresh,	⁰ Rock begins at 97. leakage noted	7', heavy water
RC-02-GWA-100101.5	BASALT 100.7 - 105.7' - medium dark gray with some of brown iron staining, strong, aphanitic, massive moderately to slightly decomposed, slight disintegration, fractured, RQD = 0%	orange	Quick release jamm removed and trippe casing to continue Groundwater grab GWA-100101.5 co 12/19/18	ed back in with - coring - sample RC-02
	BASALT 105.7 - 110.7' - dark gray with orange brown oxidation, weak, weathered, aphanitic, massiv moderately dcomposed, moderately disntegra intensely fractured and 80-90% vesicular, part greenish colored silica cementation, RQD = 14	ted, very	0	
110 110.0 2515.1 - - - - - - - - - - - - - - - - - - -	BASALT 111.0 - 121.0' - black with some red oxidation aphanitic, massive, slightly to moderately decomposed, wet		Driller estimates flu formation at 500 - 1 100.7 to 110.7. Producing water at	600 gallons from -
115 115.0 2510.1 - - - - - - - - - - - - - - - - - - -			0	



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-02	SHEET	5	OF	8

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-19D (210375.0 N, 2539671.7 E)

ELEVATION: 2625.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

<u>WATER</u>		: 59.8 ft b	DQS	START : 11/14/2018	END : 3/2	1/201	9	LOGGER : J. Espinoza
DEPTH	BELOW EX	(ISTING GI		SOIL DESCRIPTION		(1)		
	-					SYMBOLLIC LOG		
	INTERVA	AL (ft)						
		RECOVE		SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENSIT	LOR,	Ē	PID (ppm)	COMMENTS
		RECOVE		MOISTURE CONTENT, RELATIVE DENSIT	TY OR	B	₽	
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINER	ALOGY	Σ		
			(TIME)			Ś		
2505.1	120.0					K		
						\mathbb{Z}		
				No Recovery				
_						_		_
_						_		_
-						_	0	
-	-					_		5.5" boring hole diameter air rotary
-	-					_		rig used for drilling
105 -	105.0					-		-
125 2500.1	125.0			-	_	-		
2500.1	-					-		-
-	-					-		-
-						-		=
						-		-
-						-	0	-
	1					1		-
	1					1		-
-	1					1		-
130	130.0					1		-
2495.1				BASALT		Ж		
				130.0 - 143.0' - black with some reddish color	r due to	$]$ \times		
_				possible oxidation, aphanitic, slightly to moder	rately	\vdash		Picture taken at 131'
_				decomposed, wet		\mathbb{X}		_
_						\mathbb{X}		_
-						Ю	0	_
-						\mathbb{K}		_
-								_
105 -	105.0					-17-7		-
135 2490.1	135.0			-	_	-17-(
2490.1	-					-2		-
	-					+		Picture taken at 136'
-						╉		
-						Ю		-
-						₭∠	0	-
-						₩∠		=
-	1					ТX		=
]					\mathbb{I}		_
140	140.0			_	_	$1 \times$		
2485.1	1					₽₩		Picture taken at 140'
-	4					-K⇒		-
- 1	-					-K>		-
-	-					┺╱		-
-	1					-#≻∕	0	-
-	1			BASALT		₩	U	Color obongo in water black/grou
-	1			143.0 - 177.0' - black to dark gray, med to str	ona	╊		Color change in water, black/gray, picture taken at 143'
-	1			aphanitic, massive, wet	ong,	⊀ ≿		
145	145.0					t ≻`		-
2480.1	1.10.0			1	-	1X		_
<u> </u>	1					1X		-
- 1	1					1)∕∕		-
	1					┨╎┤		-
	1					₽⇒		-
-	1					₽⇒	0	-
-]					ightarrow		-
						ightarrow		-
	1					₽≻∕	1	
150						\vdash		



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-02	SHEET	6	OF	8

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-19D (210375.0 N, 2539671.7 E)

ELEVATION: 2625.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS : 59.8 ft bas			ogs	START : 11/14/2018	END : 3/21	/2019)	LOGGER : J. Espinoza
DEPTH E	BELOW EX	(ISTING G	RADE (ft)	SOIL DESCRIPTION		с		
	INTERV			SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSIT	LOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERA	ALOGY	SYMBC	DID	
2475.1	150.0					χŢ		Picture taken at 150'
-					-	X		Harder drilling at 151'
	1				-	Ж		-
_					_	Ю	0	
-					-	\succ		Color change in water to brown at 153'. Softer drilling
-					-	Ж		
155	155.0				-	Ю		
2470.1					_	\searrow		
-					-	\bowtie		
-					-	Ж		Color change in water to gray at 156'
-					-	\bigtriangledown		-
	1				_	\succ	0	
-					-	Ж		-
-					-	\bigtriangledown		Harder drilling at 159'
160	160.0				-	\bowtie		
2465.1						Ж		Picture taken at 160'
-					-	\bigtriangledown		-
-					-	Ж		-
					_	Ж		-
_]				-		0	
					-	\succ		-
-					-	Ж		-
165 -	165.0				-	\bigtriangledown		-
2460.1					_	\mathcal{H}		Picture taken at 165'
-					-	Ж		-
-					-			-
					-	\mathbb{X}		-
-					-	Ж	0	_
-					-	\bigtriangledown		-
-					-	\succ		-
170	170.0					Ж		-
2455.1					_	ΧЖ		Picture taken at 170'
-					-	Ю		-
-					-	Ж		-
	1				_	\bigtriangledown		
-					-	\bowtie	0	-
-					-	КЧ		-
-	1				-	ЮH		-
175	175.0					ЮĽ		
2450.1					-	Ж		Picture taken at 175'
-	1				-	KЖ		-
-	1					Ж		-
-				BASALT	_	R		Picture taken at 177', softer drilling
-				177.0 - 185.0' - black with some reddish brown moderate strength, possible oxidation, aphenit	n, _	ΚX	0	-
-				massive, wet		КX		-
					-	Ж		-
180						ĽУ		



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-02	SHEET	7	OF	8

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-19D (210375.0 N, 2539671.7 E)

ELEVATION : 2625.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER	LEVELS	: 59.8 ft t	as	START : 11/14/2018 END : 3/21/2019 LOGGER : J.			LOGGER : J. Espinoza	
DEPTH E	ELOW EX	(ISTING GI	RADE (ft)	SOIL DESCRIPTION		ŋ		
	INTERVA	AL (ft) RECOVE	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSITY	.OR, Y OR	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERA	LOGY	SYMB	ЫI	
	180.0				= - - - - - - - - - - - - 		0	
185 2440.1 	185.0			BASALT 185.0 - 201.0' - black, moderate to strong, aph massive, slightly decomposed, slightly disintegr wet			0	Picture taken at 185', very soft drilling
190 2435.1 - - - - -	190.0						0	Picture taken at 190' Firmer drilling at 191'
195 2430.1	195.0				- - -			Picture taken at 195'
-							0	Very soft drilling at 197'
200 2425.1 - - - - - - - - - - - - - - - - - - -	200.0			BASALT 201.0 - 207.0' - black with some reddish brown moderate, aphanitic, massive, slightly decompo slightly disintegrated, wet	n, osed,		0	Picture taken at 200'
205 2420.1_ - - - - - - -	205.0			CLAY 207.0 - 215.0' - brown, wet, very soft, medium plasticity, little recovery			0	Picture taken at 205', color change in water to brown Picture taken at 207', little recovery
210								



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-02	SHEET	8	OF	8

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-19D (210375.0 N, 2539671.7 E)

ELEVATION: 2625.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS : 59.8 ft bas			bas	START : 11/14/2018	END : 3/21	/2019)	LOGGER : J. Espinoza
DEPTH	BELOW EX	(ISTING GI	RADE (ft)	SOIL DESCRIPTION		ő		
	INTERVAL (ft) RECOVERY (ft) SAMPLE ID		RY (ft)	SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENSI CONSISTENCY, SOIL STRUCTURE, MINER	TYOR	SYMBOLLIC LOG	PID (ppm)	COMMENTS
_			(TIME)			, sγ		_
2415.T - - - - - -	210.0						0	Picture taken at 210', lots of water - - - - - - - - - - - -
215	215.0				-			-
2410.1 - - - -				BASALT 215.0 - 220.0' - green, some red and brown, moderate, aphanitic, massive, moderately to decomposed, wet	- highly - - - - -		0	Picture taken at 215', driller notes loss of circulation in hole
220	220.0				-	X		-
2405.1 - - - - - -				CLAY 220.0 - 225.0' - very soft, brown, wet, low pla some rock fragments	sticity, _ _ _ _ _ _ _ _ _ _ _ _ _		0	Picture taken at 220'
225	225.0							
2400 <u>.1</u> - - - - -				CLAY 225.0 - 230.0' - soft to very soft, brown, wet, plasticity, some rock fragments and weathere	low – ed basalt – – – –		0	Picture taken at 225' - - - - - - - - - - - -
230 2395.1	230.0			Bottom of Boring at 230.0 ft bgs on 3/21/201				Picture taken at 230', hole is
235					•			collapsing
240								



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-03	SHEET	1	OF	9

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-4D (209814.4 N, 2539649.3 E)

ELEVATION: 2585.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary, 5.5" boring diameter

WATER LEVELS : 21.2 ft bas START : 11/16/2018 END: 4/15/2019 LOGGER : J. Espinoza DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2585.1 0.0 0 5 5.0 2580.1 CLAY (CL) 5.0' - brown, moist, soft, high plasticity 0 10 10.0 CLAY (CL) 10.0' - brown, wet, soft, medium plasticity 2575.1 0 15 15.0 2570.1 CLAY (CL 15.0' - brown, wet, soft, plastic 0 20 20.0 2565.1 CLAY (CL) 20.0' - same as above ∇ 0 25 25.0 2560.1 CLAY (CL) 25.0' - same as above 0 30



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-03	SHEET	2	OF	9

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-4D (209814.4 N, 2539649.3 E)

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2585.1 ft

DRILLING METHOD AND EQUIPMENT : Air Rotary, 5.5" boring diameter

WATER LEVELS : 21.2 ft bas START : 11/16/2018 END: 4/15/2019 LOGGER : J. Espinoza DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2555.1 CLAY (CL) 30.0 30.0' - same as above, some rock fragments 0 35 35.0 2550.1 CLAY (CL) 35.0' - same as above 0 40 40.0 CLAY (CL) 40.0' - same as above 2545.1 0 45 45.0 2540.1 CLAY (CL) 45.0' - same as above 0 50 50.0 2535.1 BASALT 50.0' - low recovery, highly weathered, variable sizes, BASALT 52.0' - same as above, good recovery 0 55 55.0 2530.1 0 56.0 BASALT 56.0' - black, trace oxidation, sharp chips, similar size 60



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-03	SHEET	3	OF	9

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-4D (209814.4 N, 2539649.3 E)

ELEVATION: 2585.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary, 5.5" boring diameter

WATER	VATER LEVELS : 21.2 ft bgs		gs START : 11/16/2018 ENI		END : 4/15	/2019)	LOGGER : J. Espinoza		
DEPTH E	BELOW EX	KISTING GR	RADE (ft)	SOIL DESCRIPTION		Ŋ				
	INTERVA	AL (ft) RECOVE	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENSI	LOR, IY OR	SYMBOLLIC LOG	PID (ppm)	COMMENTS		
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINER	ALOGY	SYME	Ē			
2525.1	60.0		RC-03-GW-A-60-62		-			Grab groundwater sample RC-03- GW-A-60-62 collected on 12/20/18		
_	62.0				-			-		
-					-			-		
-					-			-		
65 2520.1					-					
2020.1					-			-		
-					-			-		
-					-			-		
_					-			-		
70					-			-		
2515.1					-			-		
-					-			=		
-					-			-		
-					-			-		
75					-			-		
2510.1					-					
-					-			-		
					-			-		
-					-			-		
- 80					-			-		
2505.1										
-					-			-		
_					-			-		
-					-			-		
-					-			-		
85_ 2500.1_	85.0			BASALT		\succ		Rock begins at 85', Picture taken at		
_				85.0 - 115.0' - gray, dry, very weak, aphanitic massive, highly decomposed	· _	X		85'		
-					-	\boxtimes		-		
-					-	\boxtimes		-		
-					-	X		-		
90					-	\boxtimes				



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-03	SHEET	4	OF	9

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-4D (209814.4 N, 2539649.3 E)

ELEVATION: 2585.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary, 5.5" boring diameter

WATER LEVELS : 21.2 ft bas START : 11/16/2018 END: 4/15/2019 LOGGER : J. Espinoza DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2495.1 Picture taken at 90' 90.0 95 95.0 2490.1 Picture taken at 95' 100 100.0 2485.1 Picture taken at 100' 105 105.0 2480.1 Picture taken at 105' 110⁻<u>110.0</u> 2475.1 Picture taken at 110' 115 2470.1 115.0 BASALT Picture taken at 115' 115.0 - 145.0' - black to dark gray, some red oxidation, dry, moderate strength, aphanitic, massive, slighty decomposed 120



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-03	SHEET	5	OF	9

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-4D (209814.4 N, 2539649.3 E)

ELEVATION: 2585.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary, 5.5" boring diameter

WATER LEVELS : 21.2 ft bas START : 11/16/2018 END: 4/15/2019 LOGGER : J. Espinoza DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2465.1 Picture taken at 120 120.0 125 125.0 2460.1 Picture taken at 125' 130 130.0 2455.1 Water in cuttings 135 135.0 2450.1 Picture taken at 135' 140 140.0 2445.1 Picture taken at 140' 145^{__} 2440.1 145.0 BASALT Picture taken at 145' 145.0 - 155.0' - gray, wet, moderate strength, aphanitic, massive, moderately decomposed 150



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-03	SHEET	6	OF	9

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-4D (209814.4 N, 2539649.3 E)

ELEVATION: 2585.1 ft

180

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary, 5.5" boring diameter

WATER LEVELS : 21.2 ft bas			bas	START : 11/16/2018	END : 4/	15/201	9	LOGGER : J. Espinoza		
DEPTH	BELOW E	XISTING G	RADE (ft)	SOIL DESCRIPTION		б				
	INTERV			SOIL NAME, USCS GROUP SYMBOL, CO	OLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS		
		RECOVE		SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENS	ITY OR	BOL				
_			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINEI	RALOGY	SYM	£.			
2435.1	150.0					$+\!$		Picture taken at 150'		
-						1X				
						1				
-	-					+				
-	-					+				
	1					1				
155	155.0					-KX				
2430.1	155.0			BASALT		Ť		Picture taken at 155', cuttings		
				155.0 - 165.0' - gray, wet, moderate/weak, a	aphanitic,	\mathbb{R}		clogging cyclone		
-	-			massive, decomposed, trace/few brown clay plasticity	, IOW	+				
				pieceieity						
						\mathbb{R}				
-	-					+				
-						1				
160 2425.1	160.0			_	-	-KX		Disturs taken at 1001 auttings		
2425.1	-					+		Picture taken at 160', cuttings clogging cyclone		
	1					1				
-	-					+				
-	-					-₩Ż-				
						1				
-	-					+				
165	165.0					-tX				
2420.1	-			BASALT		+		Picture taken at 165'		
-	-			165.0 - 170.0' - gray with some red/white, w moderate/weak, aphanitic, massive, mod.	et,	+				
-				decomposed						
-	-					-K>				
-	-					+				
						1				
170 -	170.0					+				
2415.1	170.0			BASALT		ŤŔ		Picture taken at 170'		
				170.0 - 175.0' - brown with red/white, wet, w	veak,	\rightarrow				
-	-			aphanitic, massive, highly decomposed		+				
-						\mathbb{H}				
-	-					-K>				
-	1					+				
	1					1				
175 2410.1	175.0			BASALT				Picture taken at 175'		
	1			175.0 - 180.0' - some white, wet, weak/mod	erate,	±∕≺				
	4			aphanitic, massive, moderately decomposed	ł	X				
-	-					+				
	1					1				



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-03	SHEET	7	OF	9

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-4D (209814.4 N, 2539649.3 E)

ELEVATION: 2585.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc DRILLING METHOD AND EQUIPMENT : Air Rotary, 5.5" boring diameter

WATER	WATER LEVELS : 21.2 ft bas		Das	START : 11/16/2018	END : 4/1	5/2019		LOGGER : J. Espinoza
DEPTH E	BELOW EX	(ISTING GF	RADE (ft)	SOIL DESCRIPTION		g		
	INTERVA	AL (ft) RECOVE	RY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DEN: CONSISTENCY, SOIL STRUCTURE, MINE	SITY OR	SYMBOLLIC LOG	PID (ppm)	COMMENTS
2405.1	180.0		(1102)	BASALT		Ř		Picture taken at 180'
				180.0 - 185.0' - gray with white/red, wet, ap massive, highly decomposed	hanitic,			
185 2400.1 - - - - - - - - -	185.0			BASALT 185.0 - 205.0' - red with some white/black, aphanitic, massive, highly decomposed, tra soft plastic clay	wet, weak, ce white			Picture taken at 185'
190 2395.1_ - - - - - - - - - -	190.0							Picture taken at 190'
195_ 2390.1_ - - - - - - -	195.0				- - - - - - - - - - - - - - - - - - -			Picture taken at 195'
200 2385.1 - - - - - - - - - - - - - - - - - - -	200.0				- - - - - - - - - - - - - - - - 			Picture taken at 200'
205 2380.1 - - - - - - - - - - - - - - - - - - -	205.0			BASALT 205.0 - 245.0' - black/gray with some red/w weak, aphanitic, massive, decomposed, litt white/tan plastic clay, increasing at bottom	/hite, wet,			Picture taken at 205'



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-03	SHEET	8	OF	9

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-4D (209814.4 N, 2539649.3 E)

ELEVATION: 2585.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary, 5.5" boring diameter

WATER LEVELS : 21.2 ft bas START : 11/16/2018 END: 4/15/2019 LOGGER : J. Espinoza DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) PID (ppm) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2375.1 210.0 Picture taken at 210' 215 2370.1 215.0 Picture taken at 215' 220 220.0 2365.1 Picture taken at 220' 225 225.0 2360.1 Picture taken at 225' 230⁻ 2355.1 230.0 Picture taken at 230' 235 2350.1 235.0 Picture taken at 235' 240



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-03	SHEET	9	OF	9

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-4D (209814.4 N, 2539649.3 E)

ELEVATION: 2585.1 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary, 5.5" boring diameter

WATER	VATER LEVELS : 21.2 ft bgs			START : 11/16/2018	END : 4/15	/2019	9	LOGGER : J. Espinoza
DEPTH	BELOW EX	KISTING GF	RADE (ft)	SOIL DESCRIPTION		(1)		
						ŏ		
	INTERV	AL (ft) RECOVE	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINEI	OLOR, ITY OR	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINEI	RALOGY	SYMB	PIC	
2345.1	240.0					\varkappa		Picture taken at 240'
-	-							
-	-				-	\bowtie		-
245	245.0				-	\succ		-
2340.1 - - - - - -				GRANITIC GNEISS 245.0 - 250.0' - clear to white, wet, strong, n massive, slightly decomposed, few black/rec decomposed basalt, lots of quartz and musc	onfoliated, l - covite - - -			Picture taken at 245'
250 2335.1	250.0			Bottom of Boring at 250.0 ft bgs on 11/17/2	~ 10	\searrow		D' the taken at 0501 halo colleged
255								Picture taken at 250', hole collapsed to 240.5' depth
260								
265								
270								



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-04	SHEET	1	OF	13

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER	LEVELS	S :		START : 11/9/2018	END : 4/4/	/2019		LOGGER : J. Espinoza
		XISTING GF	RADE (ft)	SOIL DESCRIPTION				
	INTERV	AL (ft) RECOVE	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEM		SYMBOLLIC LOG	PID (ppm)	COMMENTS
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MIN	IERALOGY	SYMBC	DIA	
-2589.3 - - - - -	0.0				-	-	0	
5 2584.3_ - - -	5.0			CLAY (CL) 5.0' - brown, dry, stiff, low to medium plas	ticity		0	-
- - 10 2579.3_ -	10.0			CLAY (CL) 10.0' - same as above	-			
- - - - - - - - - -	15.0				-		0	
2574 <u>.3</u> - - - - -				CLAY (CL 15.0' - same as above, wet			0	
20 2569.3_ - - -	20.0			CLAY (CL) 20.0' - brown, wet, soft, red/orange mottlin plasticity	ng, high		0	- - - - - - - -
 25 2564.3	25.0			CLAY (CL) 25.0' - brown, wet, very soft, some orange some fine sand, plastic	mottline,			- - - - - - - - - -
- - - - 30					-		0	



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-04	SHEET	2	OF	13

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER L	EVELS	:		START : 11/9/2018	END : 4/4	1/2019		LOGGER : J. Espinoza
DEPTH BE	PTH BELOW EXISTING GRADE (ft)			SOIL DESCRIPTION		U		
	INTERVA	L (ft) RECOVER		SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MIN	COLOR, NSITY OR	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			SAMPLE ID (TIME)			SYA		
2559.3 - - - - - - - -	30.0			CLAY (CL) 30.0' - brown, wet, very soft, plastic, some fragments	erock		0	
35 2554.3_ - - - - -	35.0			CLAY (CL) 35.0' - same as above			0	- - - - - - - - - - - - - -
40 2549.3	40.0			_	-			
- - - 45_ 2544.3_	45.0			CLAY (CL) 42.0' - brown, saturated, very soft, plastic, fragments BASALT 43.0' - black angular chips, varying sizes,	/		0	- - - - - - - -
- - - - 50	50.0						0	
2539.3 - - - - - - - -				BASALT 50.0' - black, varying sizes, some oxidized clay BASALT 52.0' - same as above	, little to no		0	
55 2534.3_ - - - - - - - - - - - - -	55.0			BASALT 55.0' - black, sharp, angular chips, low oxi BASALT 57.0' - same as above	idation		0	-
60						<u>}</u>		



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-04	SHEET	3	OF	13

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS :		START : 11/9/2018	END : 4/4/2019		LOGGER : J. Espinoza			
DEPTH BELOW EXISTING GR	ADE (ft)	SOIL DESCRIPTION	ŋ					
INTERVAL (ft)	ξΥ (ft)	SOIL NAME, USCS GROUP SYMBOL, COLC MOISTURE CONTENT, RELATIVE DENSITY	OR Ō	PID (ppm)	COMMENTS			
	SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERAL	₋OGY ₩	P				
2529.3 60.0	()		X		Rock begins at 60.1'.			
		BASALT 61.1 - 66.1' - medium bluish gray, very strong,			-			
		aphanitic (vesicular), massive, fresh, competent, unfractured, RQD = 100%			-			
65 2524.3					-			
		BASALT 66.1 - 70.1' - same as above, one fracture at 68 silica cementation, stopped fracture surface, su	s' with b		-			
-		horizontal, constant fluid return, no loss to the formation, RQD = 100%			-			
70		BASALT			_			
		70.1 - 75.1' - same as above, hairline fractures provide the second state of the se	present					
-				0	-			
75_ 2514.3		BASALT			-			
-		75.1 - 80.1' - same as above			-			
80 2509.3					Borehole diameter changed to 5.5"			
-			-					
			-		-			
85 85.0			-					
2504.3		BASALT 85.0 - 150.0' - black, dry, very strong, aphanitic,	, fresh		Picture taken at 85'			
					-			
- - 90 -								
30								



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-04	SHEET	4	OF	13

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS :				START : 11/9/2018	END : 4/4/201)	LOGGER : J. Espinoza
DEPTH	BELOW EX	KISTING G	RADE (ft)	SOIL DESCRIPTION	g		
	INTERV	AL (ft) RECOVE		SOIL NAME, USCS GROUP SYMBOL, CO	DLOR, ITY OR RALOGY	PID (ppm)	COMMENTS
		RECOVE	SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENSI CONSISTENCY, SOIL STRUCTURE, MINEF	ITY OR OR RALOGY 문) OId	
2499.3	90.0		(TIME)		<u>م</u>		Picture taken at 90'
_ 100.0	90.0				1	1	
-						1	-
_						1	-
-						1	-
-						-	-
95 -	95.0						-
2494.3	00.0					-	Picture taken at 95'
-						1	-
					15		-
-						-	-
-					¥≓		-
-						-	-
100	100.0					1	
2489.3							Picture taken at 100'
_					- R	-	-
-							-
-						1	-
							-
105	105.0						-
2484.3	105.0			-		-	
-						1	-
-					- IA	-	-
-					+		-
-					X⊣		-
-						-	-
110 2479.3	110.0					1	
2479.3							Picture taken at 110'
-						-	=
-						1	-
-						-	-
-							-
-	1450						-
115 2474.3	115.0					-	
-					-		-
-						1	-
-					\mathbb{R}	-	-
-					X⊢	1	-
-						1	-
120							
L						I	



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-04	SHEET	5	OF	1

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary, 8" boring diameter to 80', 5.5" boring diameter to 390'

WATER LEVELS : -START : 11/9/2018 END: 4/4/2019 LOGGER : J. Espinoza DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) PID (ppm) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2469.3 Picture taken at 120 120.0 125 125.0 2464.3 130 130.0 2459.3 Picture taken at 130' 135 2454.3 135.0 140 <u>140.0</u> 2449.3 Picture taken at 140' 145 2444.3 145.0 Picture taken at 145' 150



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-04	SHEET	6	OF	13

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS :			START : 11/9/2018	END : 4/4/	2019		LOGGER : J. Espinoza
	BELOW EXISTING	G GRADE (ft)	SOIL DESCRIPTION				
	INTERVAL (ft)	OVERY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		SYMBOLLIC LOG	PID (ppm)	COMMENTS
7/30 3	150.0	(TIME)	PASALT		ۍ ک		Picture taken at 160', hele producing
2439.3	150.0		BASALT 150.0 - 155.0' - very dark gray/black, wet, ve aphanitic, slightly disintegrated, slightly fractu totally healed	ry strong, _ red, _ - - - -			Picture taken at 150', hole producing some water - - - - - - -
155	155.0			-	КЯ		-
2434.3			BASALT 155.0 - 160.0' - very dark gray/black, wet, ver aphanitic, fresh	ry strong, - - - - - - -			hole producting lots of water, pump turned off
160 2429.3	160.0		BASALT		K)		Picture taken at 160', lots of water
			160.0 - 165.0' - black, wet, very strong, apha slightly disintegrated, slightly fractured, mode healed, pyrite mineralization	initic, rately - - - -			
165	165.0			-	КЯ		-
2424.3			BASALT 165.0 - 170.0' - black, wet, very strong, apha some weathered green/red chips, slightly decomposed, slightly disintegrated, slightly fr contains some silt, green paleosol				Picture taken at 165', difficult to keep hole open
170_ 2419.3 - -	170.0		BASALT 170.0 - 188.0' - black, wet, very strong, some weathered green, aphanitic				Picture taken at 170', difficult to keep hole open
175	175.0			-			
2414.3 - - - - - - - - - - - - - - - - - - -				-			Picture taken at 175', alternating hard/soft drilling to 180' - - - - - - - - - - - - - - - - - - -
L			Į		Ц		



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-04	SHEET	7	OF	13

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS :				START : 11/9/2018	END : 4/4/	2019		LOGGER : J. Espinoza	
		KISTING GI	RADE (ft)	SOIL DESCRIPTION		U			
	INTERV	AL (ft)				SYMBOLLIC LOG	Ê		
		RECOVE	-RY (ft)	SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENSI	DLOR,	Ē	PID (ppm)	COMMENTS	
				MOISTURE CONTENT, RELATIVE DENSI CONSISTENCY, SOIL STRUCTURE, MINER	TY OR RALOGY	ABO	DID		
			SAMPLE ID (TIME)			γ			
2409.3	180.0					X		Picture taken at 180'	-
_					-	Ж			-
-					-	K-X			-
						Ж			
_					-	R			-
-					-	КЯ			-
405	105.0				-	\bigotimes			_
185 2404.3	185.0			-		Ж		Picture taken at 185'	
					-	Ŕ			-
-					-	Ж			_
-					-	ЮX			-
						$\left(\left\langle \cdot \right\rangle \right)$			
_				BASALT 188.0 - 245.0' - black with some red/white, w	-	КЖ		Picture taken at 188'	-
-				strong, aphanitic, massive, moderately decon	nposed	\bowtie			-
190	190.0					Ю			
2399.3					-	$\left(\times \right)$		Picture taken at 190', very soft drilling	-
						КЯ		Griming	-
_					-	\bigotimes			_
					-	Ж			-
					_	Ŕ			_
-					-	Ж			-
195 -	195.0				-	ΚX			-
2394.3						Ж		Picture taken at 195', very soft	_
					-	ΚX		drilling	-
-					-	\bowtie			_
-					-	X			-
-					-	\bowtie			-
					-	Ю			_
200 -	200.0				-	X			-
2389.3	200.0					Ж		Picture taken at 200'	
					-	КX			-
					-	КЯ			-
					-	Ŕ			_
-					-	Ж			-
					-	Ŕ			-
205 -	205.0				-	Ж			_
205 2384.3	205.0					Ŕ		Picture taken at 205'	_
					_	Ж			
-					-	Ю			-
					-	$[\lambda]$			-
					-	ΚН			_
					-	КŻ			-
					-	Ж			-
210						ΚЪ			
			1						_



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-04	SHEET	8	OF	13

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary, 8" boring diameter to 80', 5.5" boring diameter to 390'

WATER LEVELS : -START : 11/9/2018 END: 4/4/2019 LOGGER : J. Espinoza DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) PID (ppm) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2379.3 210.0 Picture taken at 210' 215 2374.3 215.0 Picture taken at 215' 220 220.0 2369.3 Picture taken at 220' 225 225.0 2364.3 Picture taken at 225' 230⁻ 2359.3 230.0 Picture taken at 230' 235 2354.3 235.0 Picture taken at 235' 240



PROJECT NUMBER:	BORING NUMBER:				
661508	RC-04	SHEET	9	OF	13

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

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WATER LEVELS :			START : 11/9/2018	END : 4/4/	2019		LOGGER : J. Espinoza	
DEPTH	BELOW EX	KISTING G	RADE (ft)	SOIL DESCRIPTION		g		
	INTERV	AL (ft) RECOVE	ERY (ft)	SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS	OLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINE	RALOGY	SYMB0	DIG	
2349.3	240.0					ЖЯ		Picture taken at 240'
					- - - -			- - - - - - - - - - - - - - -
245	245.0				-	X		
245 2344.3 - - - -	245.0			BASALT 245.0 - 270.0' - black with some white, wet, weathered, aphanitic, massive, slightly deco	strong, _ mposed _ - -			Picture taken at 245'
250	250.0			_	-	Ŕ		
2339.3 - - - - - - - - - - - - - - - - - - -	255.0							Picture taken at 250'
2334.3 	260.0							Picture taken at 255'
2329.3 - - - - - - -								Picture taken at 260'
265_ 2324.3 - - -	265.0							Picture taken at 265'
-					-	\bigotimes		
270						Σ		



PROJECT NUMBER:	BORING NUMBER:			
661508	RC-04	SHEET	10	OF

13

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS :			START : 11/9/2018	END : 4/4/	2019		LOGGER : J. Espinoza	
DEPTH E	BELOW EX	KISTING GI	RADE (ft)	SOIL DESCRIPTION		ğ		
	INTERVA	AL (ft) RECOVE		SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS CONSISTENCY, SOIL STRUCTURE, MINE	SITY OR	SYMBOLLIC LOG		COMMENTS
			SAMPLE ID (TIME)			SYA		
-2319.3 - - - - - - -	270.0			BASALT 270.0 - 277.0' - black, wet, mod to strong, a massive, fresh, competent	- aphanitic, _ - - - - - -			Picture taken at 270', hard drilling continues
275 -	275.0				-	Ю		-
2314 <u>.3</u> -					-			Picture taken at 275'
	280.0			BASALT 277.0 - 278.0' - black with some weathered strong to moderate, aphanitic, massive, slig decomposed CLAY (CL)	htly			Picture taken at 277', soft drilling
2309.3	280.0			278.0 - 280.0' - brown, wet, some f sand, m plasticity CLAY (CL) 280.0 - 285.0' - gray, wet, fine sand, low pla cohesive, trace silt, contains wood debris	/ -			Picture taken at 280'
285 2304.3 - - - - - - - - - - - - - - - - - - -				BASALT 285.0 - 290.0' - gray, wet, weak, aphanitic, highly decomposed, disintegrated, contains pieces of wood				Picture taken at 285'
290 2299.3 - - - - - - - - - - - - -				BASALT 290.0 - 295.0' - black, wet, moderate, apha massive, slightly weathered, some wood de	nitic, - bris - - - - - -			Picture taken at 290'
295 2294.3_ 	295.0			BASALT 295.0 - 360.0' - black, wet, strong, aphanitic fresh	c, massive, - - - - - - - -			Picture taken at 295'
300 -						Ж		



PROJECT NUMBER:	BORING NUMBER:		
661508	RC-04	SHEET 11 O	F

13

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS :				START : 11/9/2018 END : 4/4/2		2019		LOGGER : J. Espinoza		
DEPTH BELOW EXISTING GRADE (ft)				SOIL DESCRIPTION		Ŋ				
	INTERVA	AL (ft) RECOVE	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, CO	OLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS		
			SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENSI CONSISTENCY, SOIL STRUCTURE, MINER	RALOGY	SYMBC	DIA			
2289.3	300.0				-	Χ		Picture taken at 300', approximately 1300 gal of water from 295 - 300'		
-					-	X				
-					-	Ŕ		_		
_					-	K				
-					-	X		-		
305	305.0				-	\bigotimes		-		
2284.3	0			_		X		Picture taken at 305', approximately		
-					-	\bigotimes		1200 gal of water		
-					-	\otimes		-		
-					-	X		-		
-					-	X		-		
-	010.0				-	X		-		
310 2279.3	310.0			_		\otimes		Picture taken at 310'		
-					-			-		
-					-	\boxtimes		-		
-					-	\bowtie		-		
-					-	X		-		
					-	X		-		
315 2274.3	315.0			-		\boxtimes		Picture taken at 315', approximately		
-					-	$\left \right\rangle$		1200 gal of water		
-					-	Ŕ		-		
-					-	X		-		
					-	Ю		-		
-					-	$\left(\right)$		-		
320 2269.3	320.0			_		Ŕ		Picture taken at 320'		
					-	X		-		
-					-	K		-		
-					-	$\left\{ \right\}$		_		
-					-	\bigotimes		-		
-					-	X		-		
325 2264.3	325.0			_	_	K		Picture taken at 325'		
-					-	R				
-					-	Ŕ		-		
-					-	КЯ		-		
_					-	K		-		
-					-	\boxtimes		-		
330						ΚŻ				
				-						



PROJECT NUMBER:	BORING NUMBER:	
661508	RC-04	SHEET 12 OF

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Air Rotary, 8" boring diameter to 80', 5.5" boring diameter to 390'

WATER LEVELS : -START : 11/9/2018 END: 4/4/2019 LOGGER : J. Espinoza DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) PID (ppm) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) 2259.3 Picture taken at 330 330.0 335 2254.3 335.0 Picture taken at 335' 340 340.0 2249.3 Picture taken at 340' 345 2244.3 345.0 Picture taken at 345' 350 <u>350.0</u> 2239.3 Picture taken at 350' 355 2234.3 355.0 Picture taken at 355' 360



PROJECT NUMBER:	BORING NUMBER:		
661508	RC-04	SHEET 13 O	F

PROJECT : Grain Handling Facility at Freeman, Washington

LOCATION : Near MW-6U (209424.1 N, 2539198.4 E)

ELEVATION: 2589.3 ft

DRILLING CONTRACTOR : Environmental West Exploration, Inc

WATER LEVELS :				START : 11/9/2018 E	ND : 4/4/	2019		LOGGER : J. Espinoza	
DEPTH BELOW EXISTING GRADE (ft)			SOIL DESCRIPTION		(1)				
							Ê		
	RECOVERY (ft)		ERY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR		SYMBOLLIC LOG	PID (ppm)	COMMENTS	
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERALC)GY	SYMB	Πd		
2229.3	000.0		()	BASALT	-	, , , , , , , , , , , , , , , , , , ,		- Distura takan at 260	
2229.5	360.0			360.0 - 372.0' - dark gray, wet, strong, aphanitic,	-	Ю		Picture taken at 360'	
-				massive, fresh	-	КX		-	
-				massive, mesm	-	К		-	
-					-	БЖ		-	
-					-	БЖ		-	
-					-	Ð		-	
-					-	\times		-	
-					-	КХ		-	
365	365.0				-	КЖ		-	
2224.3						Ю		Picture taken at 365'	
-	1				-	КД		-	
-	1				-	КХ		-	
]					КX			
						\mathbb{K}			
					_	\mathbb{D}		-	
						\mathbb{R}		-	
_					_	\mathbb{N}			
					-	\mathbb{R}		_	
370	370.0			4		ŁХ			
2219.3					-	КЖ		Picture taken at 370'	
-					-	Ю		-	
-					-	КД		-	
-						КY		-	
-				CLAY (CL)	-	V//		-	
-				372.0 - 375.0' - dark gray/gray, wet, medium/soft,	, _	<i>V//</i>		-	
-				medium plasticity, few basalt	-	V//		-	
-					-	V//		-	
375 -	375.0				-	V//		-	
2214.3	373.0			CLAY (CL)				Picture taken at 375'	
<u></u>				375.0 - 380.0' - dark gray/gray, wet, medium den	sitv _	V//			
-				med plasticity	Sity, _	////		-	
-					-	V///		-	
-					-	V//		-	
-					-	///		=	
-	1				-	V//		-	
-	1				-	V//		-	
]					V//			
380	380.0					V//			
2209.3				CLAY (CL)	_	V//		Picture taken at 380'	
_				380.0 - 381.0' - brown/tan, wet, soft, med to low	_	K//		_	
-	l			igcarrow plasticity, some weathered basalt, quartz, and	/_	\mathbb{N}			
-				\muscovite present	/ _	\mathbb{N}		Temporary well screen set 381.5 - 383.5 with bentonite plug and sand	
-				GRANITIC GNEISS		K		383.5 with bentonite plug and sand	
-				381.0 - 390.0' - white, wet, very weak, nonfoliated	1, _	\mathbb{N}		layer. End cap at 384'	
- 1				massive, highly decomposed, disintegrated, free quartz and muscovite, trace to few basalt and sof		\mathbb{V}/\mathbb{V}		-	
- 1				quartz and muscovite, trace to few basalt and sof	t clay _	\mathbb{K}		-	
	005.0				-	\mathbb{N}		-	
385 2204.3	385.0					K//		Disture taken at 295	
2204.3	1				-	\mathbb{N}		Picture taken at 385'	
-					-	$\langle \rangle / \rangle$		-	
					-	K		-	
- 1					-	Ň		-	
- 1					-	€ //		-	
- 1	1				-	\mathbb{N}		-	
-					-	$\langle \rangle \rangle$		-	
-					-	K		Picture taken at 390'	
390 -	390.0				-	\mathbb{N}			
000	000.0			Bottom of Boring at 390.0 ft bgs on 11/9/2018		14			
				Dottom of Doning at 390.0 it bys off 1 1/9/2016					
				l					

SOIL BORING LOG

BORING NUMBER:

SB-01

SHEET 1 OF 2

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : East of Silo, Near Sump Nose, East of RR

PROJECT NUMBER:

661508

ELEVATION : 2602 ft NAVD88

DRILLING CONTRACTOR : Environmental West Exploration, Inc DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

COORDINATES : 210972.9413, 2539474.133 State Plane (ft)

WATER LEVEL: START : 5/11/16 11:20 END: 5/11/16 13:50 LOGGER : RSG DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) Lean CLAY (CL) - brown, moist, stiff to very stiff, trace mica, medium cohesive, medium plastic. 5 Soil sample collected from 5 - 5.5 feet bgs SAME AS ABOVE - CLAY (CL), stiff. CLAY (CL) - with decomposed rock, olive/yellow and gray, decomposed SANDSTONE at 11.5' to 12' bgs, increasing 0-8 #1 10'/8' Recovery - stretched out reddish-brown coloring with depth, slightly cohesive, slight plasticity, moist. 10 Soil sample collected from 10 - 10.5 feet bgs 15 Soil sample collected from 15 - 15.5 feet bgs CLAY (CL) - reddish brown with trace black and gray intermixed mottling, moist, little to no cohesiveness, little to no plasticity, some cementation observed. 8-18 #2 10'/10' Recovery 20 CLAY (CL) - dark reddish brown and gray, low plasticity, low cohesivenéss, moist. Soil sample collected from 20 - 20.5 feet bgs Increasing dark gray clay. 25 CLAY (CL) - reddish brown, moist, trace mica, low plasticity, low Soil sample collected from 25 - 25.5 feet bgs cohesiveness CLAY (CL) - brown, moist, stiff, with reddish brown-yellow trace mottling, medium plasticity, medium cohesive. 18-28 #3 9'/10' Recovery 30

PROJECT NUMBER:BORING NUMBER:661508SB-01SHEET 2 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : East of Silo, Near Sump Nose, East of RR

ELEVATION : 2602 ft NAVD88

DRILLING CONTRACTOR : Environmental West Exploration, Inc DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

COORDINATES : 210972.9413, 2539474.133 State Plane (ft)

WATER LEVEL: START : 5/11/16 11:20 END : 5/11/16 13:50 LOGGER : RSG DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 0 0 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) Soil sample collected from 30 - 30.5 feet bgs Decomposing clast, ~2" diameter, GRANITIC. 35 Increasing gray CLAY, decreasing yellow and reddish brown Soil sample collected from 35 - 35.5 feet bgs coloring and mottling. 28-38 #4 14'/10' Recovery - core stretched during Brown CLAY (CL) - with gray and reddish brown coloring, stiff, extrusion 40 moist, low plasticity, low cohesive. Soil sample collected from 40 - 40.5 feet bgs Reddish brown CLAY (CL), with possible decomposing rock, moist, slightly plastic, slightly cohesive. CLAY (CL) - with trace oxidation and yellow mottling, hard, low plasticity, low cohesive, moist. 45 Soil sample collected from 45 - 45.5 feet bgs Sandy CLAY (CL), very fine sand, gray, trace reddish brown, clay appears very moist, soft. Weathered BASALT/BASALT clasts, up to 2" diameter, basalt hard Soil sample collected from 47 - 47.5 feet bgs t weathered, oxidation, reddish brown coloring, moist. 38-48 #4 10'/10' Recovery Hard drilling 47.5-49' Boring terminated at 49 ft bgs. 50 55 60

SOIL BORING LOG

BORING NUMBER:

SB-02

SHEET 1 OF 3

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : East of RR Spur, along N Line of NW Silo

ELEVATION : 2603 ft NAVD88

30

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

COORDINATES : 210998.9829, 2539415.973 State Plane (ft)

PROJECT NUMBER:

661508

WATER LEVEL: START : 5/10/16 09:10 END : 5/10/16 15:15 LOGGER : RSG DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 0 0 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) TOPSOIL, moist, well graded SAND with GRAVEL (SW) - gravel is fine, subrounded, trace clay, increasing with depth, gray. Transition to lean CLAY (CL) - brown, trace sand and gravel, decreasing with depth, moist, very stiff, medium plasticity, low cohesiveness. 5 Soil sample collected from 5 - 5.5 feet bgs SAME AS ABOVE - CLAY (CL). 0-8 #1 7.5'/8' Recovery Brown gray CLAY with trace fine GRAVEL (CL) with traces of 10 CLAY with GRAVEL (CL), gravel is fine, subrounded, moist, stiff, medium plasticity, medium cohesive. Soil sample collected from 10 - 10.5 feet bgs 7 clast at 11' bgs. CLAY (CL) - increasing reddish brown and gray, decreasing gravel, increasing stiffness, medium plasticity, medium cohesive, moist 15 Soil sample collected from 15 - 15.5 feet bgs SAME AS ABOVE - CLAY (CL). 8-18 #2 12'/10' Recovery - Sample stretched/expanded Brown CLAY (CL) - with gray with black mica coloring, fine 20 subangular gravel, moist, stiff. Brown CLAY with gray CLAY with white and yellow mottling Soil sample collected from 20 - 20.5 feet bgs (decomposed BASALT), moist, trace to no gravel, trace mica, medium soft. 25 Soil sample collected from 25 - 25.5 feet bgs SAME AS ABOVE - CLAY (CL) - increasing orange coloring/mottles. 18-28 #3 13.5'/10' Recovery - core stretched

SOIL BORING LOG

BORING NUMBER:

SB-02

SHEET 2 OF 3

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2603 ft NAVD88

LOCATION : East of RR Spur, along N Line of NW Silo

DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 210998.9829, 2539415.973 State Plane (ft)

	LEVEL:				START : 5/10/16 09:10 END : 5/1	0/16 15:15	LOGGER : RSG	
DEPTH BELOW SURFACE (FT)				g	SOIL DESCRIPTION		COMMENTS	
	INTERVA	ERVAL (FT) RECOVERY (FT) #TYPE		GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RAT	TH OF CASING, DRILLING E, DRILLING FLUID LOSS TS, & INSTRUMENTATION	,
				~		PID (ppm)	Breathing Zone	FID (ppm)
-					CLAY (CL) - intermixed gray, reddish brown, and orange/brown coloring, moist, trace mica, possible trace fine angular gravel, low plasticity, low cohesiveness.	Soil sample colle	ected from 30 - 30.5 feet b	gs _
_					Gray CLAY (CL) - with reddish brown coloring with yellow mottling, possible increasing silt, low plasticity, low cohesiveness, moist, stiff.	-		-
35	-				- 			
-						Soil sample colle	ected from 35 - 35.5 feet b	gs _
40					Gray, reddish brown CLAY (CL) - little to medium plasticity, trace yellow mottling, stiff, low cohesiveness, moist.	28-38 #4 12'/10'	Recovery	-
-					-	Soil sample colle	ected from 40 - 40.5 feet b	gs
- 45					CLAY (CL) - increasing gray coloring, little/no plasticity, little to no cohesiveness, moist, trace mica, possible increase in silt.	_ _ TD at 43.0' - Re	fusal at 14:30	-
-						Soil sample colle	ected from 45 - 45.5 feet b	
- - 50_					SAME AS ABOVE - CLAY (CL).	38-48 #4 10'/10'	Recovery	-
-						Soil sample colle	ected from 50 - 50.5 feet b	gs _
-						-		-
55					CLAY (CL) - reddish brown, medium plasticity, medium cohesiveness.	Soil sample colle	ected from 55 - 55.5 feet b	gs _
-					CLAY (CL) - gray with yellow intermixed and mottled, possible decomposed basalt?. Reddish brown CLAY (CL) - some yellow mottling, decreasing gray clay, medium plastic.	-		-
-					Black, gray, bronze with yellow/white mottling CLAY/decomposed BASALT, low plasticity, low cohesiveness, moist.	48-58 #5 9'/10'	Recovery	-
60				V////	1	I		

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SOIL BORING LOG

BORING NUMBER:

SB-02

SHEET 3 OF 3

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : East of RR Spur, along N Line of NW Silo

ELEVATION : 2603 ft NAVD88

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : Schramm T300, Sonic

COORDINATES: 210998.9829, 2539415.973 State Plane (ft)

WATER LEVEL: START : 5/10/16 09:10 END: 5/10/16 15:15 LOGGER : RSG DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 0 0 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, GRAPHIC RECOVERY (FT) **TESTS, & INSTRUMENTATION** #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) Soil sample collected from 60 - 60.5 feet bgs Olive yellow CLAY and SILT with cemented clasts with bronze oxidation (weathered). Gray with white mottling CLAY with intermixed reddish-brown CLAY, decreasing olive/yellow weathered material. 65 Soil sample collected from 65 - 65.5 feet bgs SAME AS ABOVE - possible increase in moisture. 58-68 #6 10'/10' Recovery SAME AS ABOVE - CLAY (CL) - moist. 70 Brown CLAY (CL) - reddish brown with gray intermixed, moist, very stiff. Soil sample collected from 70 - 70.5 feet bgs Clayey SAND (SC) - 20% clay, sand very fine, moist, increasing clay with depth. Sandy CLAY (CL) - 30% sand, fine, moist, hard. CLAY with mica at 73.5-73.75'. 75 SANDSTONE with fine clayey SAND, lightly to moderately cemented, moist, gray SANDSTONE clasts up to 3 diameter. Soil sample collected from 75 - 75.5 feet bgs No sample 75-77.5' - Sample fell out, 2nd attempt with basket, no sample, damaged basket. Hard drilling Hard drilling Boring terminated at 77.5 ft bgs. Very hard drilling at 77' Refusal at 77.5' 1515 80 85 90



PROJECT NUMBER:

661508

PROJECT NUMBER: BORING NUMBER: 661508 SB-06 SHEET 1 OF 3

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : E of Parking Lot, 25' E of Marlow Well in Grass

ELEVATION : 2635 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

DRILLING METHOD AND EQUIPMENT : Scuramm T300, Sonic

COORDINATES : 210704.7121, 2539349.133 State Plane (ft)

WATER LEVEL: START : 5/18/16 14:45 END: 5/19/16 09:30 LOGGER : RSG DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION 0 0 INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) FAT CLAY (CL), medium to high plasticity, medium to high 0.0 cohesiveness, moist, stiff. Hard drilling 22-22' - Recovery 7'/6' 9.0 5 Soil sample collected from 5 - 5.5 feet bgs LEAN CLAY (CL), low plasticity, low cohesiveness, moist, very stiff, brown. 8.0 Core damaged and dropped when extruding 10 LEAN CLAY (CL), same as above. Soil sample collected from 10 - 10.5 feet bgs GRAVELLY CLAY (CL), brown, stiff, gravel well graded, subangular to subrounded, trace fine sand, moist. 9.0 LAY (CL), low plasticity, low cohesiveness, moist, stiff to very stiff. 15 Soil sample collected from 15 - 15.5 feet bgs SANDY CLAY (CL), very fine sand with mica, moist, stiff, reddish brown. GRAY CLAY, FAT (CL), medium to few plasticity, medium to high 18.0 plasticity, very stiff, moist. Very difficult to extrude, hard drilling 20 2.0 LIGHT GRAY WITH REDDISH BROWN FAT CLAY (CL), hard, highly cohesive, medium plasticity, moist. Very stiff - unable to rotate core, very stiff, sampling very difficult 22.0 Soil sample collected from 21 - 21.5 feet bgs LIGHT GRAY WITH REDDISH BROWN FAT CLAY (CL), same as above, hard. 25 7.0 Soil sample collected from 25 - 25.5 feet bgs CLAY (CL), hard, gray with reddish brown. Hard drilling 28.0 CLAY (CL), same as above. 30

PROJECT NUMBER: BORING NUMBER: 661508 SB-06 SHEET 2 OF 3

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : E of Parking Lot, 25' E of Marlow Well in Grass

ELEVATION : 2635 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210704.7121, 2539349.133 State Plane (ft) DRILLING METHOD AND EQUIPMENT : Scuramm T300, Sonic

WATER			,		133 State Plane (π) DRILLING METHOD AND EQUIPMENT START : 5/18/16 14:45 END : 5/19	·
	BELOW SU	RFACE (F	T)		SOIL DESCRIPTION	COMMENTS
	INTERVA	L (FT)		GRAPHIC LOG		
		RECOVE	ERY (FT)	HIC	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE	DEPTH OF CASING, DRILLING
			#TYPE	RAP	DENSITY OR CONSISTENCY, SOIL	RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#ITPE	G	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm)
					CLAY (CL), hard, gray with reddish brown.	
-					-	Soil sample collected from 30 - 30.5 feet bgs
		9.0				
_					CLAY (CL), brown, gray and orange brown, stiff, medium plastic,	
-					medium cohesiveness, moist.	_
05					ORANGE REDDISH BROWN, AND GRAY CLAY WITH LIGHTLY	
35	35.0				CEMENTED CLAY (CL), moist, stiff. REDDISH BROWN AND GRAY CLAY (CL), low plasticity, low	
_					cohesiveness, moist, stiff.	Soil sample collected from 35 - 35.5 feet bgs
-					REDDISH BROWN AND GRAY CLAY (CL), same as above.	-
_						_
-					-	-
40						_
						Soil sample collected from 40 - 40.5 feet bgs
_					-	
					GRAY AND DARK GRAY CLAY (CL), stiff, low cohesiveness, low	-
					plasticity, moist, trace orange-brown clay.	
_						
-					-	-
45						_
						Soil sample collected from 45 - 45.5 feet bgs
-					-	Soli sample collected from 45 - 45.5 leet bgs
_						_
	48.0				GRAY AND DARK GRAY CLAY (CL), same as above.	
-	40.0				-	-
_						-
50					TRANSITION TO CLAYEY GRAVEL (CL), angular to subangular, coarse, up to 2 diameter, plastic, increasing basalt, moist.	
				(HA	FRACTURED BASALT WITH CLAY, trace oxidation/weathering,	
-				₩	moist, angular, clasts up to 3 diameter. BASALT COBBLE/FORMATION, fractured.	Soil sample collected from 50 - 50.5 feet bgs
				ĽΣ		
				RA	FRACTURED BASALT, ?? rubble with sand and fine gravel.	
		10.0		K₩	WEATHERED BASALT, reddish brown, orange brown, angular	-
				\mathbb{R}	clasts, up to 2 diameter.	
55				₩¥	BASALT CLASTS, up to 4 diameter, 1 wide.	
				K-X		
					TRANSITION TO GRAY CLAY (CL), decreasing basalt.	-
				V///	CLAY (CL), gray, brown, reddish brown, very stiff, moist, medium to low plasticity, medium to low cohesive.	Soil sample collected from 56 - 56.5 feet bgs
-	58.0			<i>{///</i>	-	4
				<i>\///</i>	REDDISH BROWN CLAY (CL), medium plasticity, moist, stiff,	TD at 58' at 1730
					trace gray clay.	Resume at 0840
60				V////		1

PROJECT NUMBER: BORING NUMBER: 661508 SB-06 SHEET 3 OF 3

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : E of Parking Lot, 25' E of Marlow Well in Grass

ELEVATION : 2635 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

DRILLING METHOD AND EQUIPMENT : Scuramm T300, Sonic

COORDINATES : 210704.7121, 2539349.133 State Plane (ft)

	R LEVEL:			START : 5/18/16 14:45 END : 5/19	0/16 09:30	LOGGER : RSG	
DEPTH	BELOW SU	T)	ğ	SOIL DESCRIPTION		COMMENTS	
	INTERV/	 ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE	H OF CASING, DRILLING DRILLING FLUID LOSS, S, & INSTRUMENTATION Breathing Zone	FID (ppm)
	-			REDDISH BROWN CLAY (CL), medium plasticity, moist, stiff, trace gray clay.		ted from 61 - 61.5 feet bg	-
65_	-			DARK BROWN CLAY (CL), with yellow-orange mottling, medium plasticity, medium cohesive, moist, stiff with increasing orange/brown clay with depth.	Soil sample collec	ted from 65 - 65.5 feet bg	- s
	68.0			Boring terminated at 68 ft bgs.			
70_	_			-			
	_			-			-
75_	-			-			
	-			-			-
80_	-						
				-			-
85_				-			
	-			-			-
90							

PROJECT NUMBER: BORING NUMBER: 661508 SB-08 SHEET 1 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : South of grain loading area

ELEVATION : 2608 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210886.1357, 2539459.376 State Plane (ft)

WATER LEVEL: START : 5/23/2016 END: 5/23/2016 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, GRAPHIC RECOVERY (FT) **TESTS, & INSTRUMENTATION** #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) 0.0 Asphalt and clay. CLAYEY SILT (ML), dark gray, medium stiff to stiff, trace mica, trace fine gravel, moist. CLAY (CL), light brown, trace light gray mottling, moist, very stiff. 7.5 5 Soil sample collected from 5 - 5.5 feet bgs 8.0 CLAY (CL), same as above. SILTY CLAY (CL), trace fine angular gravel, wet, stiff to very stiff, 10 light brown Soil sample collected from 10 - 10.5 feet bgs 11.8 15 Fine to coarse SILTLY SAND and fine to coarse subangular GRAVEL (GM), light brown to gravish brown, moist, dense, trace subangular cobbles. Soil sample collected from 15 - 15.5 feet bgs SANDY SILT, (ML), very fine sand, light brown and yellowish green decomposed rock, moist. 18.0 SILTY fine SAND, (SM), yellowish brown, mottled light gray, wet, medium dense. 20 SILTY CLAY to silty fine SAND, trace cobbles, (SC/SM), light Soil sample collected from 20 - 20.5 feet bgs brown/reddish brown with light gray mottling, moist. 11.2 25 Soil sample collected from 25 - 25.5 feet bgs 28.0 SILTY FINE SAND, (SM), trace CLAY, some decomposed basalt (dark reddish brown w/ white clasts), reddish brown, mottled dark gray, moist, dense ... 30

SOIL BORING LOG

BORING NUMBER:

SB-08

SHEET 2 OF 2

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2608 ft NAVD88

LOCATION : South of grain loading area

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

PROJECT NUMBER:

661508

COORDINATES : 210886.1357, 2539459.376 State Plane (ft) DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

WATER					START : 5/23/2016 END : 5/23			
DEPTH BE			T)	ğ	SOIL DESCRIPTION		COMMENTS	
	INTERVA	RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE	TH OF CASING, DRILLING E, DRILLING FLUID LOSS 'S, & INSTRUMENTATIOI	5,
				TIT		PID (ppm)	Breathing Zone	FID (ppm)
-		11.2			SILTY FINE SAND, (SM), trace CLAY, some decomposed basalt (dark reddish brown w/ white clasts), reddish brown, mottled dark gray, moist, dense	Soil sample colle	ected from 30 - 30.5 feet b	igs _ _ _
35					_	Soil sample colle	ected from 35 - 35.5 feet b	-
_	38.0				-			-
_ 40					Sandy SILT/Silty SAND, (ML/SM), light brown to brownish gray, mottled, dense, moist, trace fine gravvel, trace cobbles toward 48' (sandstone cobble).			-
_					-	Soil sample colle	ected from 40 - 40.5 feet b	ogs _
45		11.0			-			-
					-	Soil sample colle	ected from 45 - 45.5 feet b	
	48.0				Sandy SILT (ML), silty SAND (SM), dark gray, some coarse angular gravel, moist, dense			=
50		5.3		×	Weathered BASALT, dark gray with iron staining, coarse gravel to		ected from 50 - 50.5 feet b	
	52.0			X	cobble sized pieces, some silt, dry Boring terminated at 52 ft bgs.		der material at 50' bgs.	gs
-								-
55					_			
-					-			-
-					-			-
60						1		

PROJECT NUMBER: BORING NUMBER: 661508 SB-09 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2601 ft NAVD88

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210821.0315, 2539634.723 State Plane (ft) DRILLING METHOD AND EQUIPMENT : Scuramm T300, Sonic

	LEVEL:	. 21002	1.0010, 1		34.723 State Plane (tt) DRILLING ME I HOD AND EQUIPMEN START : 5/23/16 14:07 END : 5/23	
	BELOW SU	IRFACE (F	T)		SOIL DESCRIPTION	COMMENTS
	INTERVA		ERY (FT) #TYPE	GRAPHIC LOG	SOIL DECOMPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	0.0			XXX	SILTY CLAY AND FINE TO COARSE SUBROUNDED GRAVEL	PID (ppm) Breathing Zone FID (ppm)
	0.0	3.8			(FILL), dark gray, wet, medium dense. CLAY (CL), little silt, stiff to very stiff, light brown to grayish brown, moist.	Compacted sample
-	8.0				-	Soil sample collected from 5 - 5.5 feet bgs
_ 10					CLAY (CL), same as 0.5-8'. SANDY CLAY (SC), fine to coarse subangular to rounded gravel (SC/GC), wet, light medium gray, dense. SILTY CLAY (CL), very stiff, moist to wet at 16'.	- Soil sample collected from 10 - 10.5 feet bgs
 15		10.7			-	
-	18.0				SILT (ML) and decomposed rock (basalt?), some fine angular basalt gravel, light brown/oxidized brown, moist, dense.	Soil sample collected from 15 - 15.5 feet bgs
20					SANDY SILT (ML) and decomposed basalt, light brown to oxidized, some light gray mottling, stiff to medium stiff, moist to wet, basalt as fine subangular to angular gravel (in places), trace white clasts.	
		10.5				Soil sample collected from 20 - 20.5 feet bgs
	28.0					Soil sample collected from 25 - 25.5 feet bgs
30					SANDY SILT (ML), trace fine angular and subangular gravel (sandstone gravel), light brown, mottled light gray, moist, stiff to very stiff, trace white clasts.	

661508 SB-09 SHEET 2 OF 2

DRILLING METHOD AND EQUIPMENT : Scuramm T300, Sonic

SOIL BORING LOG

BORING NUMBER:

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : Freeman, WA

PROJECT NUMBER:

ELEVATION : 2601 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210821.0315, 2539634.723 State Plane (ft)

			.0313, 2		34.723 State Plane (tt) DRILLING ME I HOD AND EQUIPMENT	
	ELEVEL: BELOW SU		T)		START : 5/23/16 14:07 END : 5/23	COMMENTS
	INTERVA			LOG	SOIL DESCRIPTION	
		RECOVE		GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#TYPE	Ъ	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm)
-					SANDY SILT (ML), trace fine angular and subangular gravel (sandstone gravel), light brown, mottled light gray, moist, stiff to very stiff, trace white clasts.	Soil sample collected from 30 - 30.5 feet bgs
- 35		11.5			- - -	Soil sample collected from 35 - 35.5 feet bgs
-	38.0				SILTY VERY FINE SAND (SM), trace fine to coarse sandstone	-
40	41.0	3.0			gravel (subangular), dense, moist, dark gray (wet at 39 to 39.7'). WEATHERED BASALT, fine to coarse gravel-sized pieces, dark gray with some oxidation, dry, some silt, dense to very dense, some sandstone gravel.	- Soil sample collected from 39 - 39.5 feet bgs
-					Boring terminated at 41 ft bgs.	-
_ 45					-	-
-					-	-
-					-	-
50						
-					-	-
_ 55					-	
-					-	-
- - 60					-	
00	I					

PROJECT NUMBER: BORING NUMBER: 661508 SB-10 SHEET 1 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2601 ft NAVD88

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210914.7815, 2539626.911 State Plane (ft)

END: 6/27/16 09:30 WATER LEVEL: START : 5/24/16 07:54 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) Gravel and silt (fill) dark gray, some fine to coarse sand. 0.0 CLAY (CL), light brown, stiff, plastic, moist, little silt. 100.0 5 Soil sample collected from 5 - 5.5 feet bgs SILTY CLAY (CL) with little fine sub angular gravel, slightly plastic, light brown, moist. 8.0 SANDY SILT (ML), little clay, slightly plastic, very fine sand and trace fine sub angular gravel, light brown/oxidized with some intermittent brownish gray, moist to wet, trace white clasts. 10 Soil sample collected from 10 - 10.5 feet bgs 124.0 15 Soil sample collected from 15 - 15.5 feet bgs 18.0 SILTY CLAY (CL) w/ decomposed rock, stiff to moist, slightly plastic, dark gravish, brown with white clasts. SILTY CLAY (CL), slight plasticity, trace fine to coarse sub angular 20 gravel, light brown w/ trace white clasts intermittent gray, stiff, moist. Soil sample collected from 20 - 20.5 feet bgs 118.0 25 Soil sample collected from 25 - 25.5 feet bgs 28.0 SILTY CLAY (CL), with little fine sand, trace basalt gravel and sandstone gravel, little decomposed basalt @ ~30 bgs, light brown, oxidized, little gray coloring, slightly plastic, stiff, moist. 30

PROJECT NUMBER:BORING NUMBER:661508SB-10SHEET 2 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2601 ft NAVD88

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

COORDINATES : 210914.7815, 2539626.911 State Plane (ft)

					20.911 State Plane (π) DRILLING ME I HOD AND EQUIPMENT	
	ELOW SU		T)		START : 5/24/16 07:54 END : 6/27	/16 09:30 LOGGER : Nicole Badon COMMENTS
	INTERVA		• /	90	SOIL DESCRIPTION	COMMENTO
	INTERVA			GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL,	DEPTH OF CASING, DRILLING
		RECOVE		APF	COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	RATE, DRILLING FLUID LOSS.
			#TYPE	ЧĞ	STRUCTURE, MINERALOGY	TESTS, & INSTRUMENTATION
				/////	SILTY CLAY (CL), with little fine sand, trace basalt gravel and	PID (ppm) Breathing Zone FID (ppm)
_					sandstone gravel, little decomposed basalt @ \sim 30 bgs, light brown.	Soil sample collected from 30 - 30.5 feet bgs
					oxidized, little gray coloring, slightly plastic, stiff, moist.	
-					-	-
_					_	_
					-	-
35						
						Soil sample collected from 35 - 35.5 feet bgs
					-	
-					_	_
	38.0					
	00.0				SILTY CLAY (CL) trace fine sand, little fine to coarse rubrounded	-
					gravel (sandstone), medium gray with light brown oxidation in places, slight plasticity, stiff, moist.	-
40					places, signi plasticity, still, moist.	
					_	
					-	Soil sample collected from 40 - 40.5 feet bgs
					=	-
-		109.0			-	-
-					-	-
45					_	
						Soil sample collected from 45 - 45.5 feet bgs
-					-	
-					Silt and weathered Basalt and siltstone/sandstone gravel (GM), fine	_
	48.0				to coarse sized gravel, trace cobble-sized pieces, sub angular, dry,	
				Ň	medium gray, dense.	
-					Boring terminated at 48 ft bgs.	-
50						
					-	-
_						_
					-	-
					-	_
55						
00_					-	
-					-	-
-					-	-
-					-	-
					-	-
60						

PROJECT NUMBER: BORING NUMBER: 661508 SB-11 SHEET 1 OF 3

SOIL BORING LOG

END : 5/25/2016

LOGGER : Nicole Badon

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : NE of grain elevators

START : 5/25/2016

ELEVATION : 2602 ft NAVD88

WATER LEVEL:

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 211044.1218, 2539337.848 State Plane (ft)

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

DEPTH E	BELOW SU	RFACE (F	T)	. U	SOIL DESCRIPTION		COMMENTS		
	INTERVA	AL (FT)		GRAPHIC LOG					
				₽	SOIL NAME, USCS GROUP SYMBOL,	DEPTH	OF CASING, DRILLING		
		RECOVI	=RY (FT)	T T	COLOR, MOISTURE CONTENT, RELATIVE		DRILLING FLUID LOSS,		
			#TYPE	SR/	DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	TESTS	5, & INSTRUMENTATION		
				0	STRUCTURE, MINERALOGT	PID (ppm)	Breathing Zone	FID (ppm)	
	0.0			\times	Fine to coarse sand and fine to coarse subrounded gravel, medium		· · ·	11° 1°	
				\boxtimes	dense, black, moist, trace silt.				
-	1				CLAY (CL), plastic, cohesive, very stiff, light to medium brown.			-	
					trace mica flakes, trace silt, includes some fine to coarse sand and				
-				////	gravel, subrounded.			-	
					_			_	
- T	1								
_		9.4			_				
		9.4							
5				////					
L _				////	_	Soil sample collect	ted from 5 - 5.5 feet bgs		
I _								-	
I -				V///	Decomposed rock, silt to sand sized particles, abundant mica, light				
I _	8.0				brownish gray to yellowish orange, very stiff, moist.			-	
					Gravish blue, stiff to very stiff, cohesive, plastic CLAY (CL), some			-	
_				V///	white mottling and oxidation.			-	
				V///				_	
10	1			V///					
_					-	Soil sample collect	ted from 10 - 10.5 feet bgs	s	
				////					
_						First 1.5' appears	to be slough from above	-	
					CLAY, cohesive, plastic, white to yellowish orange, trace mica,				
		10.5			trace fine sand and fine gravel, very stiff, moist.			-	
					-			-	
L									
15	-								
								_	
					-	Soil sample collec	ted from 15 - 15.5 feet bgs	s _	
					-			-	
	40.0								
-	18.0				CILITY CLAY (CL) medium plasticity schedule vallewich erenze			-	
					SILTY CLAY, (CL), medium plasticity, cohesive, yellowish orange with some white mottling, abundant mica, little very fine sand, very				
-	-			V///	stiff to hard, slightly moist.			-	
20				V///					
20	1			V///				_	
1				V///		Soil sample collect	ted from 20 - 20.5 feet bg	s	
-	1			V///	-		20.0 1001 Dy	-	
1				Hit	VERY FINE SAND AND SILT (SM), decomposed rock, some				
-	1				minerals present, white with yellowish orange mottling, very stiff to			-	
1					hard, slightly cohesive, trace clay, slightly moist, abundant mica.				
I -	1	10.0			-			-	
1				团制					
-	1				-			-	
25				团計					
I [−] [−]	1			田臣	-				
				同時に		Soil sample collect	ted from 25 - 25.5 feet bgs	S	
I -	1			다타	-			-	
1				团乱					
I -	1			田田	-			-	
1	28.0								
-					SILTY VERY FINE SAND (SM), looks like decomposed rock, some			-	
1				[] []	decomposed materials present, abundant mica, very light gray with				
-	1			144	oxidation stringers, medium dense/stiff, moist.			-	
30									
				u et l	4				

SOIL BORING LOG

BORING NUMBER:

SB-11

SHEET 2 OF 3

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2602 ft NAVD88

LOCATION : NE of grain elevators

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

PROJECT NUMBER:

661508

COORDINATES: 211044.1218, 2539337.848 State Plane (ft) DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

WATER LEVEL: START : 5/25/2016 END: 5/25/2016 LOGGER : Nicole Badon COMMENTS DEPTH BELOW SURFACE (FT) SOIL DESCRIPTION g INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS **TESTS, & INSTRUMENTATION** #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) SILTY VERY FINE SAND (SM), looks like decomposed rock, some decomposed materials present, abundant mica, very light gray with Soil sample collected from 30 - 30.5 feet bgs oxidation stringers, medium dense/stiff, moist. 10.5 35 Soil sample collected from 35 - 35.5 feet bgs DECOMPOSED GRANITE/GRANODIORITE, light gray, white and 5 38.0 yellowish orange, abundant muscovite mica in sheets, some minerals present, moist, medium stiff. DECOMPOSED GRANITE/GRANODIORITE, as above, larger quartz gravel, more minerals in tact. 40 VERY FINE SAND TO FINE SAND (SW), trace silt, trace Soil sample collected from 40 - 40.5 feet bgs muscovite mica flakes throughout, light gray with yellowish orange oxidation, dense, to medium dense, moist, alternating very fine and fine sand layers. 11.3 45 Soil sample collected from 45 - 45.5 feet bgs 48.0 FINE TO COARSE SAND, LITTLE SILT (SW), trace clay, trace coarse sandstone gravel, light gray and yellowish orange medium dense, moist, trace white silt mottling. 50 Soil sample collected from 50 - 50.5 feet bgs CLAYEY SAND (SC), fine grained, cohesive, slightly to medium plasticity, white with yellowish orange oxidation, moist, very stiff. 11.7 DECOMPOSED ROCK (GRANITE OR SCHIST), abundant muscovite mica, some fine to coarse angular gravel, moist, dense, white and yellowish orange. 55 Changes back to CLAYEY SAND (SC) at 55' to 56'. Soil sample collected from 55 - 55.5 feet bgs FINE TO COARSE SAND (SW), same as 48' to 51' except no visible clay, trace sandstone cobbles/weathered sandstone (oxidized), dense, slightly moist, some mica flakes throughout. 58.0 DECOMPOSED ROCK (GRANITE OR SCHIST), same as 53' to 55', yellowish orange, moist. 60

PROJECT NUMBER: BORING NUMBER: 661508 SB-11 SHEET 3 OF 3

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2602 ft NAVD88

LOCATION : NE of grain elevators

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 211044.1218, 2539337.848 State Plane (ft)

END : 5/25/2016 WATER LEVEL: START : 5/25/2016 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) CLAYEY SAND (SC), same as 51' to 53'. Soil sample collected from 60 - 60.5 feet bgs FINE TO COARSE SAND, LITTLE SILT (SW), same as 48' to 51', no visible clay, some mica flakes, sandstone cobbles 62' to 63'. 11.5 65 Soil sample collected from 65 - 65.5 feet bgs 68.0 Boring terminated at 68 ft bgs. 70_ 75 80 85 90

PROJECT NUMBER: BORING NUMBER: 661508 SB-12 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2603 ft NAVD88

WATER LEVEL:

LOCATION : NE of grain elevators

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 211068.4274, 2539277.953 State Plane (ft)

 DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

 START : 5/25/2016
 END : 5/25/2016
 LOGGER : Nicole Badon

		_EVEL:			START: 5/25/2016 END: 5/25			
DEPTH B	ELOW SU	RFACE (F	T)	U	SOIL DESCRIPTION	COMMENTS		
	INTERVA	AL (FT) RECOVE		GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
			#TYPE	ц	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm)		
	0.0				SILTY FINE TO COARSE SAND AND FINE TO COARSE SUBANGULAR GRAVEL, wet, loose, brownish gray (fill).	Pib (ppin) Breating Zone Pib (ppin		
-		6.0			CLAY (CL), plastic, little very fine, micaceous sand and silt, moist, stiff to very stiff, moist, light brown, trace organics/wood.			
5		0.0			VERY FINE SAND/SILT (DECOMPOSED RODK), muscovite mica, hard, very light gray/white, moist.	Soil sample collected from 5 - 5.5 feet bgs		
 	8.0				VERY FINE SAND/SILT (DECOMPOSED RODK), same as 4' to 8', dense, wet from 8' to 9', some oxidation.			
_ _ 		8.9			-	Soil sample collected from 10 - 10.5 feet bgs		
-	18.0				DECOMPOSED GRAINITE?, wite with ~25% to 30% muscovite mica, trace oxidation, medium stiff, moist.	Soil sample collected from 15 - 15.5 feet bgs		
					DECOMPOSED ROCK GRANITE/GRANODIORITE, white with some oxidation, muscovite throughout and black clasts, stiff to medium stiff, moist.			
_ _ 		112.0				Soil sample collected from 20 - 20.5 feet bgs		
-	28.0				- 	Soil sample collected from 25 - 25.5 feet bgs		
30					white with some oxidation, mica throughout, stiff to very stiff, mostly weathered to silt/clay.			

PROJECT NUMBER: BORING NUMBER: 661508 SB-12 SHEET 2 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2603 ft NAVD88

LOCATION : NE of grain elevators

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 211068.4274, 2539277.953 State Plane (ft)

WATER LEVEL: START : 5/25/2016 END : 5/25/2016 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION g INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) DECOMPOSED GRANITE/GRANODIORITE, very light gray to white with some oxidation, mica throughout, stiff to very stiff, mostly Soil sample collected from 30 - 30.5 feet bgs weathered to silt/clay. 11.3 35 Soil sample collected from 35 - 35.5 feet bgs 38.0 DECOMPOSED GRANITE/GRANODIORITE, same as above. 40 Soil sample collected from 40 - 40.5 feet bgs 11.6 45 Soil sample collected from 45 - 45.5 feet bgs 48.0 POORLY GRADED SAND (SP), medium grained, little silt, trace mica flakes, medium dense, light gray and yellowish orange, moist. 50 DECOMPOSED GRANITE/GRANODIORITE, wite, dark gray, and yellowish orange, stiff, decomposed mostly to silt/sand/clay, mica Soil sample collected from 50 - 50.5 feet bgs flakes throughout, moist, some minerals still present. 11.4 55 Soil sample collected from 55 - 55.5 feet bgs VERY FINE SAND (SP), trace silt, dense, light gray and yellowish orange oxidation, trace mica flakes, moist. 58.0 Boring terminated at 58 ft bgs. 60

PROJECT NUMBER: BORING NUMBER: 661508 BORING NUMBER: 1 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2611 ft NAVD88

LOCATION : NW of Silos

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210935.6149, 2539379.515 State Plane (ft)

1	LEVEL:				START : 5/26/16 07:39 END : 5/26	5/16 10:00	LOGGER : Nicole	Badon	
DEPTH E	BELOW SU		T)	g	SOIL DESCRIPTION		COMMENTS		
	INTERVA		ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE TEST	TH OF CASING, DRILLING E, DRILLING FLUID LOSS I'S, & INSTRUMENTATION	s, N	
_	0.0				FILL, asphalt at top 1, silt, fine to coarse sand, and fine to coarse subangular gravel, very dark brown, slightly moist.	PID (ppm) First 1.5' compre	Breathing Zone essed in sample bag	FID (ppm)	
-		5.8			SANDY SILT (ML/SM), slightly plastic, slightly cohesive, dark gray with some white and yellowish orange mottling, stiff to very stiff, slightly moist, fine to coarse sand, ~30% trace fine subangular gravel, little clay.			-	
5	8.0					Soil sample colle	ected from 5 - 5.5 feet bgs		
 10	0.0				CLAY (CL), light brown, stiff to very stiff, trace silt, very cohesive, plastic (medium).			-	
- - - 15		10.6			-	Soil sample colle	ected from 10 - 10.5 feet b	ngs _ _ _ _	
-	18.0					SANDY CLAY (CL), yellowish orange, slight plasticity, cohesive, very stiff to stiff, moist, ~25% fine to coarse sand, trace coarse subrounded gravel, some gray mottling.	Soil sample colle	ected from 15 - 15.5 feet b	ngs _ _
20					SILTY CLAY (CL), ~15-20% silt, trace fine to coarse sand, cohesive, medium plasticity, light gray, mottled white, yellow, and yellowish orange, moist, medium stiff.	Soil sample colle	ected from 20 - 20.5 feet b	- 	
- 25 -		11.6			Yellowish orange/light brown SILTY CLAY (CL), little fine to coarse sand and fine gravel, very stiff to hard, moist, trace yellow mottling, trace claystone cobble (1).	Soil sample colle	ected from 25 - 25.5 feet b	- 	
	28.0				CLAYEY SILT (ML) TO SILTSTONE, little fine sand, siltstone fragments in fine to coarse gravel size, yellowish orange to light brown, some light gray and grayish blue mottling, slight plasticity, slightly cohesive, moist, wet at 34' to 34.5', very stiff to hard.			_	

PROJECT NUMBER: BORING NUMBER: 661508 SB-13 SHEET 2 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2611 ft NAVD88

LOCATION : NW of Silos

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

COORDINATES : 210935.6149, 2539379.515 State Plane (ft)

-					79.515 State Plane (tt) DRILLING METHOD AND EQUIPMENT	
	LEVEL: BELOW SU		Г)		START : 5/26/16 07:39 END : 5/26	V16 10:00 LOGGER : Nicole Badon COMMENTS
	INTERVA		• ,	90.	SOIL DESCRIPTION	COMMENTO
		RECOVE		GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE	DEPTH OF CASING, DRILLING
		ILL OUVE	#TYPE	RAP	DENSITY OR CONSISTENCY, SOIL	RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#117 -	G	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm)
-					CLAYEY SILT (ML) TO SILTSTONE, little fine sand, siltstone fragments in fine to coarse gravel size, yellowish orange to light brown, some light gray and grayish blue mottling, slight plasticity, slightly cohesive, moist, wet at 34' to 34.5', very stiff to hard.	Soil sample collected from 30 - 30.5 feet bgs
- - 35		11.3				- -
-	38.0					Soil sample collected from 35 - 35.5 feet bgs
40					SILT (ML), with siltstone fragments, yellowish orange with some light gray and white mottling, slight plasticity, little clay, ~30% very fine sand, very stiff to hard, moist.	-
					Boring terminated at 41 ft bgs.	Soil sample collected from 40 - 40.5 feet bgs
-						_
					-	
-					-	-
45					—	-
-					-	_
-					-	_
					-	-
-					-	-
50						
1						
					-	
-					-	-
					-	-
- 1					-	_
55						
					—	_
					-	-
-					-	-
- 1					-	_
60					-	-
00	I			I		

SB-14 SHEET 1 OF 2

SOIL BORING LOG

BORING NUMBER:

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : Freeman School Event Parking Lot

ELEVATION : 2637 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210815.8232, 2539246.703 State Plane (ft) DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT NUMBER:

661508

WATER					START : 5/26/16 12:18 END : 5/2	6/16 15:20	LOGGER : Nicole	Badon
DEPTH B	ELOW SU		T)	DG	SOIL DESCRIPTION		COMMENTS	
	INTERVA	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RAT TES	TH OF CASING, DRILLIN E, DRILLING FLUID LOSS TS, & INSTRUMENTATIO	S,
	0.0			(////	CLAY (CL), dark brown, medium stiff to hard, medium plasticity,	PID (ppm)	Breathing Zone	FID (ppm)
-	0.0				cohesive, little silt, moist.	-		-
5		5.0				Soil sample coll	ected from 5 - 5.5 feet bgs	
-	9.0				CLAY (CL), same as above, trace coarse sand throughout (~15%),			-
10 					Sandstone gravel at ~9.8 to 10', and sandy non-cohesive clay.	Soil sample coll	ected from 10 - 10.5 feet t	ogs _ - -
- 15 -		9.5				Soil sample coll	ected from 15 - 15.5 feet t	-
_	19.0							-
20	19.0				CLAY (CL), dark brown, same as 0' to 9'.	-		
		9.5			CLAYEY SAND CONGLOMERATE, partially cemented clay, fine to coarse sand, and fine to coarse subrounded gravel, reddish gray to yellowish orange, dense, dry.	Hard drilling Sample stick in through rods ab	ected from 20 - 20.5 feet b core rods, using water pre ove sample to try to extrac 7, sample out of rods 13:07	essure tit [–]
25					CLAY (CL), yellowish orange with some light gray mottling, little silt, hard, slightly moist, cohesive, medium plasticity.	-	ected from 25 - 25.5 feet t	
	28.0				CLAY (CL), mottled yellowish orange and light gray 28' to 31.5' then bluish gray with trace yellowish orange mottling, little silt, medium plastic, very cohesive, hard, trace yellowish white mottling in blue/gray section, slightly moist (yellowish orange 37.5' to 38').	-		-

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

BORING NUMBER:

SB-14

SHEET 2 OF 2

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2637 ft NAVD88

LOCATION : Freeman School Event Parking Lot

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210815.8232, 2539246.703 State Plane (ft)

	LEVEL:				START : 5/26/16 12:18 END : 5/26			
DEPTH E	BELOW SU		T)	Ŋ	SOIL DESCRIPTION		COMMENTS	
	INTERV <i>A</i>	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE	TH OF CASING, DRILLING E, DRILLING FLUID LOSS 'S, & INSTRUMENTATIO	6,
					,	PID (ppm)	Breathing Zone	FID (ppm)
-		10.0			CLAY (CL), mottled yellowish orange and light gray 28' to 31.5' then bluish gray with trace yellowish orange mottling, little silt, medium plastic, very cohesive, hard, trace yellowish white mottling in blue/gray section, slightly moist (yellowish orange 37.5' to 38').	Soil sample colle	ected from 30 - 30.5 feet b	ogs _ _ _
35					-			-
35_					—			
-	38.0				-	Soil sample colle	ected from 35 - 35.5 feet b	ogs _ _
-	30.0				CLAY (CL), yellowish orange, some yellowish white mottling,			-
40					broken up/crumbly, some silt, little fine sand, moist to slightly moist, non-cohesive			=
-		40 7			-	Soil sample colle	ected from 40 - 40.5 feet b	ogs _ -
- 45		10.7			SILT (ML) AND GRAVEL, with very fine sand, not cohesive, slightly moist to dry, some fine to coarse gravel ~40% (basalt gravel) subangular, medium gray, dense. Basalt gravel appears at ~43'.			-
-	47.0				-	Soil sample colle	ected from 45 - 45.5 feet b	ogs _
-					CLAY AND CLAYSTONE/SILTSTONE, with trace weathered basalt gravel near 47' (minerals weathered away) medium gray and light brown oxidation throughout, some dark brown clay, hard, slightly cohesive, clay is slightly plastic, some stiff, slightly moist.			-
50	-							
-	-	8.8			-	Soil sample colle	ected from 50 - 50.5 feet b	ogs _ _
-					-			-
55	55.0				Device to revise the dist CE the re-	Soil sample colle	ected from 54 - 54.5 feet b	ogs
-					Boring terminated at 55 ft bgs.			-
-					-			-
60								

PROJECT NUMBER: BORING NUMBER: 661508 SB-15 SHEET 1 OF 4

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2618 ft NAVD88

LOCATION : Side of Hwy 27

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210835.7885, 2539380.383 State Plane (ft)

WATER LEVEL: START : 6/30/16 07:25 END: 6/30/16 10:00 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) ROAD FILL, asphalt, silt and fine to coarse subangular gravel, 0.0 moist, dark brown. CLAY (CL), some silt, little medium to coarse sand, very stiff, moist, grayish brown. 5.0 5 Soil sample collected from 5 - 5.5 feet bgs 7.0 SILTY CLAY (CL), yellowish and orange to light brown with some light gray mottling, little medium sand, trace fie to coarse gravel from 13' to 14', slightly moist, soft to very stiff. 10 Soil sample collected from 10 - 10.5 feet bgs 13.0 15 Soil sample collected from 15 - 15.5 feet bgs 17.0 SILT AND VERY FINE SAND (ML), trace clay, slight plasticity, light gray with heavy yellowish orange oxidation, very moist/wet from 21' to 27'. 20 Soil sample collected from 20 - 20.5 feet bgs 11.0 25 Soil sample collected from 25 - 25.5 feet bgs 27.0 SILT (ML) AND VERY FINE SAND, trace fine angular gravel (decomposed basalt), reddish brown with light gray mottling, very moist/wet, from 35' to 37', dark brown with white and yellowish orange oxidation, soft to medium stiff throughout (decomposed basalt), trace clay throughout, slight plasticity. 30

PROJECT : UPRR Freeman RI, Freeman, WA

SB-15 SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

BORING NUMBER:

PROJECT NUMBER:

661508

LOCATION : Side of Hwy 27

ELEVATION : 2618 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210835.7885, 2539380.383 State Plane (ft)

					START : 6/30/16 07:25 END : 6/30	·
	LEVEL: BELOW SU	REACE (E	T)			0/16 10:00 LOGGER : Nicole Badon COMMENTS
			• /	90	SOIL DESCRIPTION	
	INTERVA	, <i>,</i>	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			=	0	STRUCTURE, MINERALOGI	PID (ppm) Breathing Zone FID (ppm)
-		11.8			SILT (ML) AND VERY FINE SAND, trace fine angular gravel (decomposed basalt), reddish brown with light gray mottling, very moist/wet, from 35' to 37', dark brown with white and yellowish orange oxidation, soft to medium stiff throughout (decomposed basalt), trace clay throughout, slight plasticity.	Soil sample collected from 30 - 30.5 feet bgs - -
35	37.0					 Soil sample collected from 35 - 35.5 feet bgs
 40					SILT (ML), trace clay, some very fine sand (~90%) throughout, little decomposed basalt fragments throughout, medium dense, very moist, dark brown with blue/gray, yellow, and yellowish orange mottling.	- - -
-		10.9				Soil sample collected from 40 - 40.5 feet bgs - -
45 -	47.0					- Soil sample collected from 45 - 45.5 feet bgs
- 50					SILT (ML) with very fine sand and trace decomposed rock fragments (fine gravel-sized, angular), medium brown with yellowish orange oxidation throughout and some white mottling, very moist/wet, medium dense, slight plasticity.	- Soil sample collected from 50 - 50.5 feet bgs
- - 55		14.5				- - Soil sample collected from 55 - 55.5 feet bgs
-	57.0				SILT (ML) and very fine sand, medium gray with heavy yellowish orange oxidation, some decomposed basalt fragments throughout, from 60' to 61' - highly weathered basalt, weak, fine gravel sized fragments, reddish brown, very moist/wet medium dense, slight	
60					plasticity.	

SHEET 2 OF 4

PROJECT NUMBER:BORING NUMBER:661508SB-15SHEET 3 OF 4

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2618 ft NAVD88

LOCATION : Side of Hwy 27

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210835.7885, 2539380.383 State Plane (ft)

	R LEVEL:				START : 6/30/16 07:25 END : 6/30)/16 10:00	LOGGER : Nicole	Badon
DEPTH E	BELOW SU	-	T)	g	SOIL DESCRIPTION		COMMENTS	
	INTERV <i>A</i>		ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE	TH OF CASING, DRILLIN E, DRILLING FLUID LOSS 'S, & INSTRUMENTATIO	S,
				-		PID (ppm)	Breathing Zone	FID (ppm)
-	-	9.9			SILT (ML) and very fine sand, medium gray with heavy yellowish orange oxidation, some decomposed basalt fragments throughout, from 60' to 61' - highly weathered basalt, weak, fine gravel sized fragments, reddish brown, very moist/wet medium dense, slight plasticity.	Soil sample colle	ected from 60 - 60.5 feet l	bgs _ - -
65	_				_			
-	67.0				-	Soil sample colle	ected from 65 - 65.5 feet l	ogs _
- - 70	-				SILT (ML) and very fine sand, trace clay (slightly plastic), some decomposed basalt (weak) fragments to fine gravel size throughout, medium dense, very moist/wet, mottled yellowish orange and blue/gray, some basalt fragments are bluish red, trace white and yellow mottling.			-
-	-	11.0				Soil sample colle	ected from 70 - 70.5 feet l	
- - 75					-			_
-	77.0				-	Soil sample colle	ected from 75 - 75.5 feet l	ogs _
- - 80	-				SILT (ML) and very fine sand, trace decomposed rock fragments (fine gravel sized), slight plasticity, light gray with yellowish orange oxidation, trace white and yellow mottling, blue from 86' to 87' with white mottling, medium dense, very moist.			-
-	-					Soil sample colle	ected from 80 - 80.5 feet l	 ogs
- 								-
-	-				- SILT AND FINE TO MEDIUM SAND (SM), little fine to coarse	Soil sample colle	ected from 85 - 85.5 feet l	bgs _
-	-				subangular gravel, abundant muscovite mica, trace clay, slightly plastic, dense, moist, yellowish orange with light gray and white mottling.			-
90								

PROJECT NUMBER: BORING NUMBER: 661508 SB-15 SHEET 4 OF 4

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2618 ft NAVD88

LOCATION : Side of Hwy 27

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210835.7885, 2539380.383 State Plane (ft)

					BU.383 State Plane (IT) DRILLING METHOD AND EQUIPMENT	
	<u>LEVEL:</u>	IRFACE (F	Г)		START : 6/30/16 07:25 END : 6/30	/16 10:00 LOGGER : Nicole Badon COMMENTS
	INTERV		• ,	00	SOIL DESCRIPTION	COMMENTO
	INTERV	RECOVE		GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#TYPE	5	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm)
					SILT AND FINE TO MEDIUM SAND (SM), little fine to coarse subangular gravel, abundant muscovite mica, trace clay, slightly plastic, dense, moist, yellowish orange with light gray and white mottling.	Soil sample collected from 90 - 90.5 feet bgs
_ 95					-	- Soil sample collected from 95 - 95.5 feet bgs
-					Boring terminated at 97 ft bgs.	
100					_	_
-					-	-
-					-	-
-					-	-
105						
-					-	-
-					-	-
110	-				-	-
-					-	-
					-	
-					-	-
115						-
					-	
-					-	-
- 120					-	-

PROJECT NUMBER: BORING NUMBER: 661508 SB-16 SHEET 1 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2576 ft NAVD88

LOCATION : School play field

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 209676.669, 2539669.9 State Plane (ft)

WATER	LEVEL:				START : 6/27/16 09:15 END : 6/27	7/16 10:25	LOGGER : Nicole	Badon	
DEPTH E		IRFACE (F	T)	ŋ	SOIL DESCRIPTION		COMMENTS		
	INTERV	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
				-		PID (ppm)	Breathing Zone	FID (ppm)	
	0.0	100.0			CLAYEY SILT (ML), medium brown, stiff to loose, some fine sand, trace organics, moist to dry.			-	
5						Soil sample colle	cted from 5 - 5.5 feet bgs		
	7.0								
- - 10					CLAYET SILY/SILTY CLAY (ML/CL) medium brown, stiff to very stiff, trace fine to medium sand, moist.				
- - - 15		70.0			-	Soil sample colle	cted from 10 - 10.5 feet b	ngs _ _ _ 	
_	17.0				-	Soil sample colle	cted from 15 - 15.5 feet b	ogs _	
20					SILTY CLAY/CLAYEY SILT (ML/CL) as above; 20'-27' SANDY CLAY (SC), fine to medium sand ~50%, mica flakes throughout, moist to wet at ~23 ft., reddish brown, at 26' bgs some fine to coarse sub rounded gravel, stiff to very stiff graderback to med brown and moist.			-	
-		117.0			-	Soil sample colle	cted from 20 - 20.5 feet b	ngs	
25	27.0				CLAYEY FINE TO COARSE SAND (SC) medium to brown with	Soil sample colle	cted from 25 - 25.5 feet b		
-					some light gray mottling, little silt, wet, medium stiff to stiff, trace fine to coarse sub angular to subrounded gravel.			-	
30	I	l	I	/////	1				

PROJECT NUMBER: BORING NUMBER: 661508 SB-16 SHEET 2 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : School play field

ELEVATION : 2576 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 209676.669, 2539669.9 State Plane (ft)

	LEVEL:				START : 6/27/16 09:15 END : 6/27	/16 10:25	LOGGER : Nicole E	Badon
DEPTH E		RFACE (F	T)	g	SOIL DESCRIPTION		COMMENTS	
	INTERVA	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RAT TES	TH OF CASING, DRILLING E, DRILLING FLUID LOSS, TS, & INSTRUMENTATION	
<u> </u>					CLAYEY FINE TO COARSE SAND (SC) medium to brown with	PID (ppm)	Breathing Zone	FID (ppm)
-		101.0			some light gray mottling, little silt, wet, medium stiff to stiff, trace fine to coarse sub angular to subrounded gravel.	Soil sample coll	ected from 30 - 30.5 feet bg	S _ - -
35					Silt and weathered Basalt, dark gray, loose, dry, fine gravel to cobble sized clasts.	driller notes roc	k at 34.5 bgs during drilling	
-	37.0				-			-
-	37.0				Boring terminated at 37 ft bgs.			
-					-			=
40								
-					-			_
-					-			_
					-			-
45					_			
-					-			-
-					-			-
-								-
50								
-					-			-
-					-			-
					-			_
55					_			
-					-			-
-					-			-
-					-			-
60								

PROJECT NUMBER: BORING NUMBER: 661508 SB-18 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2609 ft NAVD88

LOCATION : W. Side Hwy 27

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

COORDINATES : 210725.9733, 2539539.585 State Plane (ft)

WATER LEVEL: START : 6/30/2016 END: 6/30/2016 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) Dark gray asphalt and fine angular gravel. 0.0 SILTY CLAY (CL), medium plasticity, some fine to coarse sand, trace fine subangular gravel, moist, very stiff, light brown. 4.3 5 Soil sample collected from 5 - 5.5 feet bgs 7.0 SILTY CLAY (CL), some medium to coarse sand from 16-17', decomposed rock fragments, light brown with yellowish orange and white mottling from 15-17', moist, medium stiff. 10 Soil sample collected from 10 - 10.5 feet bgs 94 15 Soil sample collected from 15 - 15.5 feet bgs 17.0 SILT (ML), and very fine sand, trace decomposed rock fragments throughout (basalt), light brown with yellowish orange and light gray mottling, very moist/wet, loose to med. dense. 20 Soil sample collected from 20 - 20.5 feet bgs 10.8 25 Soil sample collected from 25 - 25.5 feet bgs 27.0 SILT (ML), slight plasticity, some very fine sand throughout, decomposed basalt fragments throughout, fine gravel sized fragments - weak/breakable w/ fingers, medium dense, very moist/wet, light brown with white and yellowish orange mottling. Decomposed basalt from 25-27, soft, dark brown with white mottling (weathered to silt but structure present). 30

SOIL BORING LOG

BORING NUMBER:

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2609 ft NAVD88

LOCATION : W. Side Hwy 27

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

COORDINATES : 210725.9733, 2539539.585 State Plane (ft)

WATER LEVEL: START : 6/30/2016 END: 6/30/2016 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) SILT (ML), slight plasticity, some very fine sand throughout, decomposed basalt fragments throughout, fine gravel sized fragments - weak/breakable w/ fingers, medium dense, very Soil sample collected from 30 - 30.5 feet bgs moist/wet, light brown with white and yellowish orange mottling. 10.0 Decomposed basalt from 25-27, soft, dark brown with white mottling (weathered to silt but structure present). 35 Soil sample collected from 35 - 35.5 feet bgs 37.0 SILT (ML), slight plasticity, some very fine sand, little weathered/weak fine gravel-sized basalt fragments throughout, light brown with oxidation and white mottling, medium dense, wet, trace medium gray mottling. 40 Soil sample collected from 40 - 40.5 feet bgs 10.7 45 Soil sample collected from 45 - 45.5 feet bgs 47.0 SILT (ML), same as above, no white mottling, wet, soft color change to dark gray at 49'. 50 9.5 Soil sample collected from 50 - 50.5 feet bgs BASALT with silt, dark gray, dry, basalt fragments from fine gravel to cobble sized, hard, dry, wet at 57'. Hard drilling 54.0 Boring terminated at 54 ft bgs. 55 60

PROJECT NUMBER: BORING NUMBER: 661508 SB-19 SHEET 1 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2602 ft NAVD88

LOCATION : W Side of Hwy 27

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES : 210623.9829, 2539684.203 State Plane (ft)

WATER LEVEL:	START : 6/30/16 14:08 END : 6/3	0/16 14:55 LOGGER : Nicole Badon
DEPTH BELOW SURFACE (FT)	SOIL DESCRIPTION	COMMENTS
INTERVAL (FT) RECOVERY (FT) #TYPE	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
	X ROAD FILL, fine to coarse angular gravel and asphalt, some silt,	PID (ppm) Breathing Zone FID (ppm)
	dark gray, dry.	
5	SILT (ML), little clay, low plasticity, medium dense to hard, little medium to coarse sand, dark gray to grayish brown, moist.	
7.0	-	Soil sample collected from 5 - 5.5 feet bgs
-	CLAYEY SILT (ML), slight plasticity, light brown, little medium sand throughout, dense, slightly moist, color change at ~15.5' to oxidized light brown and trace weathered basalt fragments (fine to coarse gravel-sized) present (15.5' to 17').	
10		Soil sample collected from 10 - 10.5 feet bgs
- 11.7		
15		Soil sample collected from 15 - 15.5 feet bgs
20	SILT (ML), oxidized yellowish orange to reddish brown, some medium gray, dark gray, and white mottling, little medium sand, some highly weathered basalt fragments (fine gravel-sized) throughout, color change to dark gray at ~25.5', moist, medium dense, 25.5', moist, medium dense, 25.5' to 27' = decomposed basalt, weathered to silt but structure present.	
- 13.1		Soil sample collected from 20 - 20.5 feet bgs
25		
27.0	SILT (ML), some very fine sand, little ~20% fine to coarse	Soil sample collected from 25 - 25.5 feet bgs
	gravel-sized basalt fragments (weathered, easily breakable), slight plasticity, light brown with yellowish orange/reddish brown oxidation throughout, some medium gray, white, and black mottling, medium dense, very moist/wet.	

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2602 ft NAVD88

LOCATION : W Side of Hwy 27

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

DRILLING METHOD AND EQUIPMENT : Schramm T300 Rotodrill, Sonic

BORING NUMBER:

SB-19

SHEET 2 OF 2

COORDINATES : 210623.9829, 2539684.203 State Plane (ft)

END : 6/30/16 14:55 WATER LEVEL: START : 6/30/16 14:08 LOGGER : Nicole Badon DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) SILT (ML), some very fine sand, little ~20% fine to coarse gravel-sized basalt fragments (weathered, easily breakable), slight plasticity, light brown with yellowish orange/reddish brown oxidation throughout, some medium gray, white, and black Soil sample collected from 30 - 30.5 feet bgs 10.9 mottling, medium dense, very moist/wet. 35 Soil sample collected from 35 - 35.5 feet bgs 37.0 SILT (ML), with weathered basalt fragments, same as 27' to 37', wet, no white mottling. 8.0 40 BASALT AND SILT, fine to coarse gravel sized fragments, dry to wet, ~41' bgs, hard. Soil sample collected from 40 - 40.5 feet bgs 42.0 Boring terminated at 42 ft bgs. 45 50 55 60

PROJECT NUMBER: BORING NUMBER: 661508 SB-20 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : W of Hwy 27, 60' S of SB04

ELEVATION : 2603 ft NAVD88

DRILLING CONTRACTOR : Environmental West Exploration, Inc. DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

COORDINATES : 210712.5246, 2539662.501 State Plane (ft)

WATER LEVEL:				1	START : 7/6/2016 END : 7/6/		RSG			
DEPTH E	ELOW SU		T)	Ŋ	SOIL DESCRIPTION	COMMENTS				
	INTERVA		ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, D RATE, DRILLING FLUI TESTS, & INSTRUMEN PID (ppm) Breathing Zo	D LOSS, ITATION			
	0.0	6.0	CORE-1		SILTY GRAVEL AND SAND (GM). - FAT CLAY WITH FINE SAND (CH), dark brown, moist, stiff. -	Fib (ppin) breating 20	- - - -			
-	7.0					SILTY GRAVEL WITH SAND (GM), gray, well graded gravel. Sharp transition to BROWN CLAY (CL), trace sand, lean, very stiff, moist.	Soil sample collected from 5 - 5.5 f	eet bgs		
_ 10					GRAVELLY CLAY (CL), dark brown, poorly graded, fine brown stiff clay, moist.	Soil sample collected from 10 - 10.	- - 5 feet has			
		7.0	CORE-2	CORE-2	CORE-2	CORE-2		BROWN FAT CLAY (CH), trace to no sand, very stiff, moist, increase in trace orange mottling with depth, with trace gravel.		- - -
-	17.0				-	Soil sample collected from 15 - 15.	5 feet bgs _			
20					GRAY FAT CLAY (CH), with white and yellow mottling, moist, stiff, becoming light gray clay (CH) with trace yellow and white mottling.		-			
-		12.0	CORE-3		Increasing orangish-brown coloring, moist.	Soil sample collected from 20 - 20.	-5 feet bgs			
25					BROWN FAT CLAY (CH), stiff, moist, with reddish brown clay mixed within.	Soil sample collected from 25 - 25.	- 5 feet bas			
-	27.0				- BROWN FAT CLAY (CH), same as above, moisture seeping from					
- 30					above.		-			

PROJECT NUMBER: BORING NUMBER: 661508 BORING SHEET 2 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : W of Hwy 27, 60' S of SB04

ELEVATION : 2603 ft NAVD88 DRILLING C

DRILLING CONTRACTOR : Environmental West Exploration, Inc. DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

COORDINATES : 210712.5246, 2539662.501 State Plane (ft)

	LEVEL:				START : 7/6/2016 END : 7/6/	2016 LOGGER : RSG
	BELOW SU		T)			COMMENTS
			• /	0G	SOIL DESCRIPTION	
	INTERV		ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
				-		PID (ppm) Breathing Zone FID (ppm)
-		10.5	CORE-4		BROWN FAT CLAY (CH), same as above, moisture seeping from above. GRAY AND BROWN SILTY SAND, wet, fine sand, from 31-32.5' gray, brown, orange/brown clay, trace fine sand, stiff, moist.	Soil sample collected from 30 - 30.5 feet bgs _ _
35					_	- Soil sample collected from 35 - 35.5 feet bgs
-	37.0				BROWN SILTY SAND (SM), very fine, wet, 35.5-36.0', transitions back to gray, brown and orange-brown clay, moist, stiff with coarse basalt clasts at 35.5' bgs, up to 3" diameter, 1/2" thick.	-
-		5.0	CORE-5	æ	FRACTURED BASALT, clasts up to 3" diameter, decreasing moisture.	-
40				KX		Soil sample collected from 39 - 39.5 feet bgs
_	41.0			\boxtimes	Boring terminated at 41 ft bgs.	Soil sample collected from 40 - 40.5 feet bgs
						- - - - - - - - - - - - - - - - - - -
60					-	

SOIL BORING LOG

BORING NUMBER:

SB-21

SHEET 1 OF 3

PROJECT : UPRR Freeman RI, Freeman, WA

30

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

ELEVATION : 2636 ft NAVD88 DRILLING CONTRACTOR : Environmental West Exploration, Inc. COORDINATES : 211592.7329, 2539756.251 State Plane (ft) DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic END : 7/7/16 14:00 WATER LEVEL: START : 7/7/16 10:00 LOGGER : J. Freed DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) SILT WITH SAND (ML), dry, brown, loose, well graded sand. LEAN CLAY WITH SAND (CL), brown, wet, soft, cohesive, 0.0 ~15-20% predominately fine sand. 3.0 5 FAT CLAY (CH), dry, very firm, does not break with strong hand pressure, massive, dark brown, <10% coarse grained particles. 7.0 As above, moist. Moist at 7' FAT CLAY (CH), dry, crumbly, loose, light brown, highly cohesive, crumbles easily with light hand pressure, massive. Dry at ~8' 10 55 FAT CLAY (CH), dark brown, moist, very hard, crumbles with moderate hand pressure, cohesive. WELL GRADED SAND WITH GRAVEL (SW), dry, rust-brown, loose, gravel up to 2.5, rounded to subangular, well graded, ~40% 15 gravel, <10% silt. 17.0 FAT CLAY (CH), light brown to rust-orange, very hard, does not crumble with hand pressure, dry, bonded light gray/rust/light brown, irregular laminations. 20 5.5 GNEISS, light gray to white with oxidation, dry, decomposed 25 granite, large patches of 1/2 quartz crystals, minor clay within loosely compacted granite particles. GNEIŚS, as above, coarse crystals not observed in core, all minerals decomposed. 27.0

PROJECT NUMBER:

661508

SOIL BORING LOG

BORING NUMBER:

SB-21

SHEET 2 OF 3

PROJECT : UPRR Freeman RI, Freeman, WA

ELEVATION : 2636 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

LOCATION : Freeman, WA

COORDINATES : 211592.7329, 2539756.251 State Plane (ft)

WATER					START : 7/7/16 10:00 END : 7/7/	16 14:00	LOGGER : J. Free	d	
DEPTH B	ELOW SU		T)	g	SOIL DESCRIPTION	COMMENTS			
	INTERVA	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RAT TES	TH OF CASING, DRILLING E, DRILLING FLUID LOSS TS, & INSTRUMENTATION	, N	
					GNEISS, light gray to white with oxidation, dry, decomposed	PID (ppm)	Breathing Zone	FID (ppm)	
-		8.5			GNEISS, agine gravite wine wine wine oxidation, uy, decomposed granite, large patches of 1/2 quartz crystals, minor clay within loosely compacted granite particles. GNEISS, as above, becomes dark gray and easily compacted, dry, does not crumble with hand pressure. GNEISS, as above, densely compacted, crumbles with moderate hand pressure, dry, light gray, compacts granitic minerals observed, becomes oxidized at ~33.5' and very densely compacted.			-	
35					34.5-36.5' - possible infilled fracture core, very dense decomposed granitic particles, compacted, loosely cemented with clay, muscovite mica observed up to 1/2 wide, crumbles with moderate hand pressure, increasing mica with depth, moist.				
_	37.0				-			-	
40					-			-	
_		12.0			LEAN CLAY (CL), moist, rust-orange, minor particles with clay-granitic, crumbles when rolled. Decomposed granitic, gray, moderately firm, crumbles with moderate hand pressure, fine grained minerals.			-	
- 45					LEAN CLAY (CL), crumbles with hand pressure and when rolled, massive, light tan 45.5' to 46', becomes mottled at 46 (light tan and /	Increase in mine	eral grain size 45' to 45.5'	-	
_	47.0				rust orange).			-	
_					POORLY GRADED SAND (SP), most, very fine grained, orange motiling, gray, becomes medium grained at 46.5', white, dark gray. 46.75-47' - sharp transition, very fine grained.			-	
50					WEATHERED SANDSTONE, well rounded, predominately fine grained, crumbles with light to hand pressure, large consolidated clasts preset in core up to 1 1/2, crumbles with strong hand pressure, moist, light gray.				
_		12.0		· · · · · · · · · · · · · · · · · · ·	-	Becomes oxidiz	ed at 52'	-	
-				· · · · ·	-	Minor granitic ve		-	
 55				· · · · · · · · · · · · · · · · · · ·	WEATHERED SANDSTONE, dark to olive gray, abundant mica present, sandstone clasts crumble with light hand pressure, moist, possible light alteration from nearby granitic, ??/vein, predominately fine grained, granitic vein at 55', decomposed mafic mineral content up to 1/2, sharp transition, 4 thick vein/intrusion,	particles Mica contact po	to dark gray weathered sa ssibly due to granitic vein a etamorphism/metasomatisi		
_	57.0			· · · · · · · · · ·	weathered sandstone continues to 57', moist, gray, fine grained.				
-				· · · · · · · · · · · · · · · · · · ·	-	Minor voin at 50	El grapitio Otticita esidad	-	
60				· · · · ·		wind ven at 58	.5', granitic, 2' thick, oxidat		

PROJECT NUMBER: BORING NUMBER: 661508 SB-21 SHEET 3 OF 3

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : Freeman, WA

ELEVATION : 2636 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc. DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

COORDINATES : 211592.7329, 2539756.251 State Plane (ft)

WATER					56.251 State Plane (π) DRILLING METHOD AND EQUIPMENT START : 7/7/16 10:00 END : 7/7/1	
		IRFACE (F	T)		SOIL DESCRIPTION	COMMENTS
	INTERVA		ERY (FT)	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
			#TYPE	В	STRUCTURE, MINERALOGY	PID (ppm) Breathing Zone FID (ppm)
-		10.0			WEATHERED SANDSTONE, moist, predominately fine grained, crumbles easily with hand pressure, medium gray, consolidated lumps of sandstone throughout.	Note: oxidized at 62' ~4' thick
65					WEATHERED SANDSTONE, as above, becomes grayish-tan	
-	67.0				colored. Boring terminated at 67 ft bgs.	
70					-	
-					-	-
- 75					- 	-
-					-	-
- 80						
-					-	-
- 85						
-					-	-
90					-	

PROJECT NUMBER: BORING NUMBER: 661508 SB-22 SHEET 1 OF 2

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : S of S access to Site, 30' E of Hwy 27

ELEVATION : 2601 ft NAVD88

DRILLING CONTRACTOR : Environmental West Exploration, Inc. DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

COORDINATES : 210686.4829, 2539732.814 State Plane (ft)

WATER LEVEL: START : 7/20/2016 END: 7/20/2016 LOGGER : RSG DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION g INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) WELL GRADED GRAVEL WITH SAND AND SILT (GW), moist, 0.0 10% silt, 20% medium sand. 2.0 CORE-1 5 WELL GRADED GRAVEL WITH SAND AND SILT (GW), same as Soil sample collected from 5 - 5.5 feet bgs above, increasing coarse gravel/small cobbles. Very loose - driller uses catcher 7.0 10 WELL GRADED GRAVEL WITH SAND AND SILT (GW), same as above, probable. 0.0 CORE-2 15 WELL GRADED GRAVEL WITH SAND AND SILT (GW), same as above, probable. 17.0 7-17' - very soft limited recovery, driller cases 0-20' to prevent soughing 20 BROWN CLAY, FAT (CH), wet, soft, with decomposed basalt clasts, trace oxidation, yellow and orange medium to high plasticity. Soil sample collected from 20 - 20.5 feet bgs CORE-3 5.5 25 Soil sample collected from 25 - 25.5 feet bgs 27.0 BROWN CLAY, FAT (CH), same as above (wet). Increasing fine and medium sand (wet). 30

SB-22 SHEET 2 OF 2

SOIL BORING LOG

BORING NUMBER:

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : S of S access to Site, 30' E of Hwy 27

PROJECT NUMBER:

661508

ELEVATION : 2601 ft NAVD88

DRILLING CONTRACTOR : Environmental West Exploration, Inc. DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

COORDINATES : 210686.4829, 2539732.814 State Plane (ft)

WATER LEVEL:					START : 7/20/2016 END : 7/20			
DEPTH E	BELOW SU	JRFACE (F	T)	υ	SOIL DESCRIPTION		COMMENTS	
	INTERV	1	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RAT	TH OF CASING, DRILLIN E, DRILLING FLUID LOS FS, & INSTRUMENTATIC	S.
						PID (ppm)	Breathing Zone	FID (ppm)
-					BROWN CLAY, FAT (CH), same as above (wet). BROWN SANDY CLAY - FAT (CH), fine to medium sand, trace	Soil sample colle	ected from 30 - 30.5 feet	bgs _
-					fine gravel, trace oxidation.			-
- 35					-			_
					_	Soil comple coll	atad from 2E 2E E fact	hao
-	37.0			X	BASALT FRACTURED, clasts up to 4" with brown sandy clay, moist, decreasing moisture with depth.	Hard drilling	ected from 35 - 35.5 feet	bgs _
-					Boring terminated at 37 ft bgs.	-		-
- 40					-			=
								-
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-					-	-		_
45					_	-		
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- 55					-			-
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PROJECT NUMBER: 661508 BORING NUMBER: SB-23 SHEET 1 OF 3

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : NE Corner of North Overflow Parking Lot

ELEVATION : 2643 ft NAVD88

DRILLING CONTRACTOR : Environmental West Exploration, Inc. DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

COORDINATES : 210844.469, 2539091.321 State Plane (ft)

WATER LEVEL:					START : 7/20/16 12:45 END : 7/20	
DEPTH E		IRFACE (F	T)	ŋ	SOIL DESCRIPTION	COMMENTS
	INTERV	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION
-	0.0	5.0			BROWN LEAN CLAY (CL), trace fine sand, moist, stiff, low plasticity.	PID (ppm) Breathing Zone FID (ppm) - - -
5	7.0				BROWN LEAN CLAY (CL), same as above.	Soil sample collected from 5 - 5.5 feet bgs
 10					-	 Soil sample collected from 10 - 10.5 feet bgs
- - 15		4.0			- - BROWN LEAN CLAY (CL), same as above, becoming hard.	
-	17.0				BROWN LEAN CLAY (CL), as above.	Soil sample collected from 15 - 15.5 feet bgs -
20						- Soil sample collected from 20 - 20.5 feet bgs
-		5.5			-	
25	27.0				BROWN LEAN CLAY (CL), as above.	Soil sample collected from 25 - 25.5 feet bgs
- - 30					-	-

SOIL BORING LOG

BORING NUMBER:

SB-23

SHEET 2 OF 3

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : NE Corner of North Overflow Parking Lot

ELEVATION : 2643 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc. DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

PROJECT NUMBER:

661508

COORDINATES: 210844.469, 2539091.321 State Plane (ft)

WATER LEVEL:					START : 7/20/16 12:45 END : 7/20/16 15:15 LOGGER : RSG				
DEPTH BELOW SURFACE (FT)					SOIL DESCRIPTION	COMMENTS			
	INTERVA	VAL (FT) RECOVERY (FT) #TYPE		GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION			
					Increasing coarse sand - 29-30' - FAT CLAY WITH SAND (CH),	PID (ppm)	Breathing Zone	FID (ppm)	
-		9.0			Increasing coarse sand - 29-30 - FAT CLAY WITH SAND (CH), transition to orange-brown clay, FAT (CH) with trace granite gravel and mica, granite clasts from 1/2 to 2, moist, hard.	Soil sample colle	cted from 30 - 30.5 feet b OCs	- bgs - -	
35					-	-		-	
- 35	- 37.0				Transitions to GRAY FAT CLAY (CH), little to no sand, no mica,	Soil sample collected from 35 - 35.5 feet bgs	ogs		
-					very hard, moist. Gray with white mottling CLAY (CH), possibly decomposed basalt,				
-					moist, stiff.				
40					Becoming brown and gray CLAY, FAT (CH), increase in moisture, medium plasticity, firm, becoming soft with depth.				
					_		atad from 10 10 E foot k		
-	-	11.0			-	1 '	cted from 40 - 40.5 feet b	Jys _	
-					Gravel transition to REDDISH BROWN CLAY, very moist, possibly	PID = 0.7 ppm V		-	
_ 45					wet starting at ~43' bgs, soft, trace medium sand.			-	
_						Soil sample colle	cted from 45 - 45.5 feet k	ogs _	
-	47.0				REDDISH BROWN CLAY, LEAN (CL), very hard, decreasing moisture, little to no sand, moist.	PID = 1.3 ppm VOC		-	
- 50					GRAY, BROWN, REDDISH BROWN FAT CLAY (CH), moist, soft with trace basalt clasts - up to 1 diameter, possible highly weathered.			-	
					GRAY, BROWN, REDDISH BROWN FAT CLAY (CH), same as above, decreasing gray, increasing yellow.	Soil sample collected from 50 - 50.5 feet bgs		ogs	
-		10.5			LIGHT GRAY CLAYEY SAND (CH), soft, with tan clayey sand, very fine, moist.	– Soil sample collected from 55 - 55.5 feet bgs			
55					REDDISH BROWN CLAY (CL), possible decomposed basalt, moist, firm, light gray lightly cemented siltstone, possible oxidation.				
-	57.0				-				
-				X	FRACTURED BASALT WITH BROWN CLAY AND SAND, decreasing moisture basalt clasts up to 2.			-	
- 60				X	Becomes FRACTURED BASALT, with gray sand and silt clasts up to 1/2 diameter, decreasing moisture.	Hard drilling		-	

ch2m:

PROJECT NUMBER: BORING NUMBER: 661508 SB-23 SHEET 3 OF 3

SOIL BORING LOG

PROJECT : UPRR Freeman RI, Freeman, WA

LOCATION : NE Corner of North Overflow Parking Lot

ELEVATION : 2643 ft NAVD88

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

DRILLING METHOD AND EQUIPMENT : Speed Star, Sonic

COORDINATES : 210844.469, 2539091.321 State Plane (ft)

WATER	WATER LEVEL:				START : 7/20/16 12:45 END : 7/20	0/16 15:15 LOGGER : RSG		
DEPTH E	EPTH BELOW SURFACE (FT)			SOIL DESCRIPTION	COMMENTS			
				90				
	INTERVA	AL (FT) RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
						PID (ppm) Breathing Zone FID (ppm)		
				\mathbb{R}				
-	-			Æ		Soil sample collected from 60 - 60.5 feet bgs		
				КЖ	FRACTURED BASALT CLAST from 2-4.5 diameter.	Very hard drilling		
	-			КЖ	Boring terminated at 62 ft bgs.			
					Bonng terminated at 62 it 595.			
-	1				-	-		
_					-	-		
65								
-	1				-			
_]				-	-		
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70								
	1							
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PROJECT NUMBER: BORING NUMBER: 661508 SB-25 SHEET 1 OF 1

SOIL BORING LOG

30

• ••• –						
ROJECT : Grain Handling Faci	ility at Freeman	LOCATION : Cene	x Facility			
LEVATION: 2597.90 ft mslft N	NAVD88 (ground surf	ace) DRILLING CONTR	ACTOR : Environme	ntal West Explorati	on, Inc	
OORDINATES : 210872.601,	2539629.111 (ft NA	VD88) DRILLING METHO	D AND EQUIPMENT	Г:		
ATER LEVEL:		START : 11/19/16 10:40	END : 11/1	9/16 13:22	LOGGER : L. Baur	mann
EPTH BELOW SURFACE (FT)		SOIL DESCRIPTION			COMMENTS	
INTERVAL (FT) RECOVERY (FT		SOIL NAME, USCS GROUP SYMBC COLOR, MOISTURE CONTENT, RELA DENSITY OR CONSISTENCY, SOI STRUCTURE, MINERALOGY	TIVE	RATE,	HOF CASING, DRILLING DRILLING FLUID LOSS 5, & INSTRUMENTATION	,
		ace gravel giving way to SILTY CLAY (C		PID (ppm)	Breathing Zone	FID (pp
0.0	Gray suna moist, little			PID = 0.0		
4.0	SILTY CL	AY (CL), brown, very dense, mica flecks	6.			
5			 			
8.0	SILTY CL	AY (CL), brown/tan, very dense, mica fl	ecks.			
10						
12.0	SILTY CL SILTY SA	AY (CL), brown/orange with fine to coar ND gravel, weathered, mica flecks.	se SAND and - -			
15			_			
	RHYOLIT	IC CLAYS (CL), brown/orange/white str	eak			
2020.0	CLAY WIT	TH SAND (CL), little gravel, crumbly.				
- 22.3			-			
	Bottom of	borehole at 22.33 ft bgs.	-			
25						
			-			



PROJECT NUMBER: BORING NUMBER: 661508 BORING SHEET 1 OF 2

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : Cenex Facility

ELEVATION: 2598.79 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc COORDINATES : 210840.371, 2539572.708 (ft NAVD88) DRILLING METHOD AND EQUIPMENT : WATER LEVEL: START : 11/19/16 14:16 END: 11/19/16 16:07 LOGGER : L. Baumann DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm ORGANICS (OL) AND GRAVEL WITH CLAY, dark brown, 0.0 crumbly. SILT/CLAY, brown, soft, wet with some sand. CLAYEY SILT (ML), tan/brown, very dense, crumbly with some sand, mica flecks. 5.0 5 1445-SB26-SS-5 10 10.0 SILTY SAND (SM), weathered, fine grained, firm. 1500-SB26-SS-10 PID = .3 VOC Taking sample below soil change - gray clay lense is SANDY SILT, soft. - dense, SILTY SAND (SM). 15 15.0 SANDY SILT (ML), tan/light brown, soft. 1515-SB26-SS-15 SILTY SAND (SM), orange, dense. - alternating. 20 20.0 SILTY SAND (SM), orange, dense, well cemented, oxidized sharp, friable condensed silt with sand, orange to burnt color, 1530-SB26-SS-20 wet, dense. - soft silty orange brown sand, wet. CLAY (CL), dark brown with flecks, of clay, moderate density. 24.0 Depth measuring tape can no longer go down 25 25.0 the boring, the sides are too goopy 1150-SB26-SS-25 Alternating dark and light brown, gray and tan CLAY (CL) with white clay mottles, density varying, wet. 30



BORING NUMBER: SB-26

SHEET 2 OF 2

PROJECT : Grain Handling Facility at Freeman

LOCATION : Cenex Facility

PROJECT NUMBER:

661508

ELEVATION: 2598.79 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc COORDINATES : 210840.371, 2539572.708 (ft NAVD88) **DRILLING METHOD AND EQUIPMENT :** WATER LEVEL: START : 11/19/16 14:16 END: 11/19/16 16:07 LOGGER : L. Baumann DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL **GRAPHICI** DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm Alternating dark and light brown, gray and tan CLAY (CL) with white clay mottles, density varying, wet. 1610-SB26-SS-30 31.4 Bottom of borehole at 31.42 ft bgs. 35 40 45 50 55 60



BORING NUMBER:

SB-27

SHEET 1 OF 1

PROJECT : Grain Handling Facility at Freeman

LOCATION : Between the 1st and 2nd Southwest Structures

DRILLING METHOD AND EQUIPMENT :

ELEVATION : 2598.04 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT NUMBER:

661508

COORDINATES : 210905.093, 2539565.824 (ft NAVD88)

WATER LEVEL: DEPTH BELOW SURFACE (FT)					START : 11/20/16 07:58 END : 11/2	20/16 08:41	LOGGER : L. Baun	nann		
DEPTH E			-T)	GRAPHIC LOG	SOIL DESCRIPTION		COMMENTS			
	INTERVA		AL (FT) RECOVERY (FT) #TYPE		(FT) ECOVERY (FT) #TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE, TESTS	H OF CASING, DRILLING DRILLING FLUID LOSS, S, & INSTRUMENTATION	
-	0.0				CLAY (CL), WITH GRAVEL, grains for 3", to brown SILTY CLAY (CL), wet, soft, some sand, mica flecks, downward increasing stiffness.	<u>PID (ppm)</u> -	Breathing Zone	FID (ppm - -		
 5	4.0				CLAY (CL), grayish, some fine sand, extremely wet and soft.	PID test = 0.0 Bagged PID test	= 0.0	-		
-	8.0				Increasing stiffness, transitioning to tan-brown SILTY CLAY (CL) with mica.	0815-SB27-SS-5	i	-		
					SILTY CLAY (CL), brown, stiff, 5-10% muscovite mica, some fine sand grains, 1' subrounded tan gravel, rust red.	SB27-SS-10		-		
-	12.0				- CLAYEY GRAVEL (GC), with coarse sand, brown, angular, decomposed granite.	PID test = 0.0 12-18' - PID = 0.0		-		
 15	16.0				SANDY CLAY (CL), tan, with reddish mottles of decomposed siltstone.	PID test of bagge 1.5" - coarse san feldspar	-	-		
-	18.0				SILTY CLAY (SC), orangish brown, with white, olive, reddish brown mottles, pieces of decomposed rock, siltstone.	-		-		
20					Bottom of borehole at 19 ft bgs. —					
_ 25					-			-		
-								-		
30										



PROJECT NUMBER: BORING NUMBER: **SB-28** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : Between 3rd and 4th Silos from South

DRILLING CONTRACTOR : Environmental West Exploration, Inc ELEVATION: 2600.10 ft mslft NAVD88 (ground surface) DRILLING METHOD AND EQUIPMENT :

661508

COORDINATES : 210934.132, 2539476.749 (ft NAVD88)

WATER				START : 11/20/16 09:40 END : 11	/20/16 11:05	LOGGER : L. Bauma	ann
1		JRFACE (FT)		SOIL DESCRIPTION		COMMENTS	
	INTERVAL (FT)						
	intr Er (v)	RECOVERY		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RATE, DR	F CASING, DRILLING ILLING FLUID LOSS, INSTRUMENTATION	
					PID (ppm)	Breathing Zone	FID (ppm
-	0.0		222222	SILTY ORGANICS (OL) to 1/2" minus gravel.	-		-
-	4.0			SILTY CLAY (CL), very soft, increasing firmness, plastic.	-		_
5				SILTY CLAY (CL), firm, hemogenous brown, plastic, mica flakes, some black specks.	0954-SB28-SS-5		
-							-
-	8.0			SILTY CLAY (CL), firm, hemogenous brown, plastic, mica flakes, some black specks.	-		-
10				-	1008-SB28-SS-10		
-	12.0			8" layer of olive green/tanist CLAY (CL) with decomposed basalt, gravel, very stiff, one rounded oz 1.5" gravel. SILTY CLAYEY SAND (SC), tan, soft to very soft, wet, plastic.	 		-
_ 15	15.0				-		-
-	16.0			CLAY (CL), 4" layer, olive, very stiff, dense. CLAYEY SAND (SC), wet, gray to tan, soft.	1034-SB28-SS-15		-
-					-		-
20	19.5			1-2" layers of olive-orangey CLAY (CL). Bottom of borehole at 19.5 ft bgs.	1113-SB28-SS-19		
-					-		-
25				-	-		
-					-		-
- 30					-		-



ELEVATION: 2600.20 ft mslft NAVD88 (ground surface)

SB-29 SHEET 1 OF 1

BORING NUMBER:

SOIL BORING LOG

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT : Grain Handling Facility at Freeman

LOCATION : North lab side of north most Silo

PROJECT NUMBER:

661508

COORDINATES : 210975.153, 2539392.51 (ft NAVD88) DRILLING METHOD AND EQUIPMENT : WATER LEVEL: START : 11/20/16 12:53 END: 11/20/16 13:40 LOGGER : L. Baumann DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm ORGANICS (OL), dark brown, wet, weed, gravel, silt. 0.0 SILTY CLAY (CL), brown, firm, mica flecks, plastic. 4.0 5 5.0 1310-SB29-SS-5 8.0 10 10.0 1320-SB29-SS-10 6" stiff brown CLAY (CL) with gravel, subrounded. 12.0 4" tan SILTY CLAY (CL), soft, fine to few coarse sand, good plasticity Quartz cobble, oxidized decomposed GRANITE. 13.5 Bottom of borehole at 13.5 ft bgs. 1330-SB29-SS-13 15 20 25 30



PROJECT NUMBER: BORING NUMBER: 661508 SB-30 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : Cenex Facility

 ELEVATION:
 2599.69 ft mslft NAVD88 (ground surface)
 DRILLING CONTRACTOR:
 Environmental West Exploration, Inc

 COORDINATES:
 210878.462,
 2539524.362 (ft NAVD88)
 DRILLING METHOD AND EQUIPMENT:

WATER LEVEL: START : 11/20/16 13:46 END: 11/20/16 14:49 LOGGER : L. Baumann DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm SILTY CLAY (CL) WITH GRAVEL, brown, gravel includes 0.0 concrete. SILTY CLAY (CL), brown and tan, writh mottles of black, orange and gray, firm. 4.0 5 1412-SB30-SS-5 CLAY (CL), grayish brown, with ~5-10% mica, muscovite firm to very firm. 8.0 CLAY (CL), brown, homogeneous, cohesive and firm. 10 10.0 1420-SB30-SS-10 12.0 CLAY (CL), brown, homogeneous, cohesive and firm. Clays expanding 4' of soil in 3' of depth 15 15.0 1434-SB30-SS-15 16.0 Bottom of borehole at 16 ft bgs. 20 25 30



SHEET 1 OF 1

SOIL BORING LOG

BORING NUMBER:

SB-31

PROJECT : Grain Handling Facility at Freeman

LOCATION : Next to road - west from SB-30

ELEVATION: 2603.25 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc COORDINATES : 210840.371, 2539508.979 (ft NAVD88) DRILLING METHOD AND EQUIPMENT : WATER LEVEL: START : 11/20/16 14:50 END: 11/20/16 15:40 LOGGER : L. Baumann DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL **GRAPHICI** DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm

PROJECT NUMBER:

661508

					PID (ppfil)	Breathing Zone	FID (ppm
	0.0			1' GRAVEL, and asphalt.			
-			<i>.</i>	SILTY CLAY (CL), brown, moist, stiff, homogeneous.	-		-
_					_		_
_					-		-
_					_		_
5	5.0						
э	5.0			SILTY CLAY (CL), brown, moist, stiff, homogeneous.	-		
_					1510-SB31-SS-5		_
-					-		-
_	8.0				_		_
				SILTY CLAY (CL), brown, very stiff, cohesive plastic and homogeneous.			
_				nomogeneous.	-		-
10				_	_		_
					1520-SB31-SS-10		
-				Increasing grain size of coarse sand in brown SILTY CLAY	- 1020-0001-00-10		-
_	12.0			(CL) to some small gravel, quartz, column shaking.	_		_
		ľ	•	Increasing grain size of coarse sand in brown SILTY CLAY (CL) to some small gravel, quartz, column shaking. 4-6" layers of rounded quartz gravel in SILTY CLAY (CL), mixed with decomposed rock.			
-				mixed with decomposed fock.	-		-
_			-		_		_
15_	15.0	1					
15	15.0		•	Bottom of borehole at 15 ft bgs.			
_				U U	_		_
-					-		-
_					_		_
_					-		-
20				-	_		
-					-		-
_					_		
-					-		-
					_		
<u>-</u>							
25				-	-		
-					-		-
_					1		1
_					-		-



PROJECT NUMBER: BORING NUMBER: 661508 SB-32 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : ~170' s.f. south most Silo, below paring area

DRILLING METHOD AND EQUIPMENT :

ELEVATION : 2591.56 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210714.379, 2539750.708 (ft NAVD88)

WATER LEVEL: START : 11/21/16 09:50 END: 11/20/16 10:35 LOGGER : L. Baumann DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm SILTY CLAY (CL), mixed gravel, grass, brown, wet, soft. 0.0 SILTY CLAY (CL), light brown with little coarse sand, almost dry, friable, too dry for plasticity. 4.0 5 5.0 - increasing moisture to moist, firm. 1000-SB32-SS-5 SILTY CLAY (CL) brown with orange, black and tan mottling, moist to wet, soft, some decomposed rock, some pieces/layers 8.0 <1/2" gray clay. 10 10.0 1008-SB32-SS-10 12.0 SILTY CLAY (CL), dark brown, wet, increasing firmness with 20% white/yellow CLAY (CL), black and red/orange mottling. 15 15.0 1015-SB32-SS-15 16.0 SILTY CLAY (CL), brown, with laminate, olive black, orange and white in places, firm to semi-firm, decomposed rock, gneissic. 20 20.0 SILTY CLAY (CL), brown, with laminate, olive black, orange and white in places, firm to semi-firm, decomposed rock, 1022-SB32-SS-20 gneissic. 23.0 Bottom of borehole at 23 ft bgs. 25 30



PROJECT NUMBER: 661508 BORING NUMBER: SB-33 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman

LOCATION : Edge of parking area ~90' south of south most Silo

DRILLING METHOD AND EQUIPMENT :

ELEVATION : 2592.02 ft mslft NAVD88 (ground surface) DRI

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 210786.897, 2539693.572 (ft NAVD88)

			0.091, 20	55505	3.572 (ft NAVD88) DRILLING METHOD AND EQUIPMEN	
WATER LEVEL: DEPTH BELOW SURFACE (FT)						21/16 11:50 LOGGER : L. Baumann COMMENTS
	INTERVA		• /	GRAPHIC LOG	SOIL DESCRIPTION	COMMENTO
	INTERV		COVERY (FT)		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS,
			#TYPE	GR	STRUCTURE, MINERALOGY	TESTS, & INSTRUMENTATION PID (ppm) Breathing Zone FID (ppm)
_	0.0				SILTY GRAVEL (GH), black to brown, angular.	PID (ppm) Breathing Zone FID (ppm PID reading of gravel 0.1 ppm
-						-
5	5.0					4-8' - PID reading of 0.0 ppm
-					CLAYEY SILT (ML), brown, soft.	1121-SB33-SS-5
-	8.0				CLAYEY SILT (ML), brown, too dry to roll, firm, mica present, columns snaking in the case.	-
10	10.0				-	-
	10.0				CLAYEY SILT TO SILTY CLAY (ML/CL), brown, very firm, semi-plastic, very cohesive, some quartz gravel.	
_	12.0					_
-					SNAKING CLAY (CL), orangey-tan, very firm in places, decomposed minerals, blooded black ~2mm long, 25 mm wide, horn blade?.	-
 15	15.0				- - gray/white globular, ~4mm orangey matrix, strength - snaps	-
-	16.0				upon separation.	1150-SB33-SS-15
-	17.0				Bottom of borehole at 17 ft bgs.	
-					-	-
20					_	
-					-	-
-					-	-
-					-	-
25					-	-
-					-	-
-					-	-
-					-	-
30					-	-

ch2m.

PROJECT NUMBER: BORING NUMBER: 661508 SB-34 SHEET 1 OF 3

Soil Boring Log

PROJECT : UPRR Freeman, Freeman, WA

LOCATION : South of Grain Facility/Highway 27

GROUND ELEVATION :

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES:	DRILLING METHOD AND EQUIPMENT : Schramm T300 4" x 6", Sonic Rotary								
WATER LEVEL :	START :	1/19/17 14:10 END : 1/10/17 10:30 LOGGER : L. Lubell	Reviewed By :						
DEPTH BELOW GROUND SURFACE (ft) (ft) (ft) RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS 6"-6"-6" (N)	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	COMMENTS SAMPLE TYPE, AIR MONITORING, PID (ppm) SOIL GAS MONITORING, FID (ppm)						
		CLAY (CL), very dark brown (7.5YR 2.5/3), moist to wet, stiff, low plasticity, trace organic material, basalt fragments, ? to ?. CLAY WITH SILT (CL), dark brown (10YR 3/3), moist, very stiff. CLAY (CL), dark brown (10YR 3/3), dry, very stiff.	_						
8.0 - 10 - - - - - - - - - - - - - - - - - -		CLAY WITH SILT (CL), dark brown (10YR 3/3), wet, stiff. CLAY (CL), dark brown (10YR 3/3), to strong brown (?), ?, moist, stiff to very stiff. NO RECOVERY.	-						
- 18.0 - 18.0 - 18.0 - 18.0 - 10.0 - 10.0 - 10.0 - 10.0 - 28.0 - 28.0 - 28.0 - 28.0 - 30		CLAY WITH SILT (CL), dark yellowish brown (10YR 4/6 with gray (2.5Y 5/1) mottling, moist, medium stiff to very stiff. CLAY WITH SILT (CL), dark yellowish brown (10YR 4/6 with gray (2.5Y 5/1) strong brown (2.5YR 4/6), moist, stiff to very stiff to dark gray (5Y 4/1) with white mottling at 27.5'.	-						
28.0 28.0 28.0 30 28.0		CLAY WITH SILT (CL), very dark gray (5Y 3/1) with white mottling (5Y 8/1), medium stiff to stiff, moist, low plasticity.							

Ch2m.

PROJECT NUMBER: BORING NUMBER: 661508 **SB-34** SHEET 2 OF 3

Soil Boring Log

PROJECT : UPRR Freeman, Freeman, WA

LOCATION : South of Grain Facility/Highway 27

GROUND ELEVATION :

DRILLING CONTRACTOR : Environmental West Exploration, Inc. DRILLING METHOD AND EQUIPMENT : Schramm T300 4" x 6", Sonic Rotary COORDINATES WATER LEVEL START : 1/19/17 14:10 LOGGER : L. Lubell END: 1/10/17 10:30 Reviewed By : DEPTH BELOW GROUND SURFACE SOIL DESCRIPTION COMMENTS STANDARD PENETRATION TEST RESULTS L0G RECOVERY INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL SAMPLE TYPE, GRAPHIC ŧ (FT) COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL AIR MONITORING, PID (ppm) SOIL GAS MONITORING, FID (ppm) STRUCTURE, MINERALOGY 6"-6"-6" (N) CLAY WITH SILT (CL), very dark gray (5Y 3/1) with white mottling (5Y 8/1), medium stiff to stiff, moist, low plasticity. 10.0 CLAY WITH SILT (CL), dark brown (10YR 3/2) with gray (2.5Y 5/1), dark yellowish brown (10YR 4/4) mottling, 35 moist, medium stiff, low plasticity. 38.0 CLAY (CL), light olive (10Y 5/4), moist, medium stiff, some silt. SILT WITH CLAY (ML), grayish brown (2.5Y 5/2), wet, soft. 40 CLAY WITH SILT (CL), light olive brown (2.5Y 5/3) with white mottling, moist, medium stiff to very stiff, low plasticity. 10.0 CLAY WITH SILT (CL), gray (2.5Y 5/1), strong brown (2.5YR 4/6), moist, medium stiff to stiff, low plasticity. 45 CLAY (CL), very dark gray (5Y 3/1) with white mottling (5Y 8/1), medium stiff to stiff, moist, low plasticity. <u>48.</u>0 CLAY WITH SILT (CL), brown (10YR 4/3) with gray (2.5Y 5/1), moist, medium stiff, low plasticity, strong brown UPRR RECOVERY FT, FREEMAN LOGS.GPJ, STOCK.GLB, 1/17/17 mottling (7.5YR 5/6). 50 10.0 CLAY WITH SILT (CL), very dark gray (5Y 3/1), white (5Y 8/1) mottling, with dark red (2.5YR 3/6) veins, moist, stiff, low plasticity. 55 58.0 CLAY WITH SILT (CL), very dark gray (5Y 3/1), white (5Y 8/1) mottling, with dark red (2.5YR 3/6) veins, moist, stiff,

low plasticity.

ch2m.

Soil Boring Log

BORING NUMBER:

SB-34

SHEET 3 OF 3

PROJECT : UPRR Freeman, Freeman, WA

LOCATION : South of Grain Facility/Highway 27

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

COORDINATES:

GROUND ELEVATION :

DRILLING METHOD AND EQUIPMENT : Schramm T300 4" x 6", Sonic Rotary

PROJECT NUMBER:

661508

ATER	LEVEL :		STA	ART : 1	/19/17 14:10 END : 1/10/17 10:30 LOGGER : L. Lul	
GROUND SURFACE (ft)	INTERVAL (ft)	RECOVERY (FT)	STANDARD PENETRATION TEST RESULTS	GRAPHIC LOG	SOIL DESCRIPTION SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE	COMMENTS SAMPLE TYPE, AIR MONITORING, PID (ppm)
GROUNE	INTE (RECO (F	6"-6"-6" (N)	GRAPI	DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SOIL GAS MONITORING, FID (ppm)
_	63.0	6.1			CLAY (CL), dark bluish gray (5B 4/1), moist, stiff, low plasticity, trace white mottling. CLAY (CL), very pale brown (10YR 7/3)/light gray (10YR 7/2), moist, very stiff, low plasticity, trace mica flakes, trace silt.	-
_ 65		5.0			CLAY (CL), reddish brown (2.5YR 4/4) with reddish yellow mottles (7.5YR 3/6), dry to moist, stiff, low plasticity, some mica flakes, trace silt/very fine sand. CLAY (CL), reddish brown (2.5YR 4/4), thin laminated gray	_
_	68.0	5.0			(2.5Y 5/1), dry, stiff, lots mica flakes 65.2 to 66', trace silt and very fine sand, (weathered sandstone?). SANDSTONE (SS), brownish yellow (10YR 6/8)/light gray	-
- 70 - -	55.0	10.0			(2.5Y 7/1) motified, moist, medium dense, fine grained sand, little clay/silt. SANDSTONE (SS), light gray (2.5Y 7/2), dry, dense, weathered sandstone, fine to very fine grained, few silt/clay. CLAY (CL), dark brown (2.5Y 7/3), dry, very stiff, trace fine grained black fragments, silt, very weathered sandstone.	- - _ Very hard drilling -
- 75 -	78.0				SANDSTONE (SS), gray (2.5Y 6/2) to light brownish gray (2.5Y 6/2), dry, medium dense, fine grained sand, silt, weakly cemented, trace mica flakes.	-
_ 80		5.0	SANDSTONE (SS), gray (2.5Y 6/2) to light brownish gray (2.5Y 6/2), dry, medium dense, fine grained sand, silt, weakly cemented, trace mica flakes. WEATHERED GRANITE, olive gray (5Y 5/2), moist, soft,		[–] Very hard drilling 	
_	83.0				very micaceous, stilty. Boring terminated at 83 ft bgs.	-
_ 85 _						
_						



PROJECT NUMBER: BORING NUMBER: 661508 BORING SB-35 SHEET 1 OF 3

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300M 4" x 6", Sonic Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

ELEVATION : 2619.34 ft mslft NAVD88 (ground surface) COORDINATES : 210456.989, 2539724.01 (ft NAVD88)

WATER LEVEL: END: 1/13/17 13:00 START : 1/12/17 15:23 LOGGER : J. Nowinski DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm CLAY (CL), brown (7.5YR 4/3), moist to dry, stiff to very stiff, 0.0 low to no plasticity, trace organic 0-1'. NO RECOVERY. 3.5 5 No 5' sample 8.0 CLAY (CL), brown (7.5YR 4/4), dry, very stiff, no plasticity. 10_ No 5' sample NO RECOVERY. 3.5 15 18.0 CLAY (CL), brown (7.5YR 4/4), moist, stiff, low plasticity. 20 CLAY (CL), brown (7.5YR 4/4), dry, stiff, friable, no plasticity. CLAY (CL), brown (7.5YR 4/4), dry, very stiff, no plasticity. 6.5 25 NO RECOVERY. 25' sample collected at 24.5 ft 28.0 CLAY (CL), brown (7.5YR 4/4), dry to moist, stiff, low plasticity. 30



SB-35

SHEET 2 OF 3

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300M 4" x 6", Sonic Rotary

BORING NUMBER:

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

ELEVATION : 2619.34 ft mslft NAVD88 (ground surface) COORDINATES : 210456.989, 2539724.01 (ft NAVD88)

END: 1/13/17 13:00 WATER LEVEL: START : 1/12/17 15:23 LOGGER : J. Nowinski DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm CLAY (CL), brown (7.5YR 4/4), dry to moist, stiff, low plasticity. 10.0 35 CLAY (CL), orangish brown with pistachio green mottling, hard with low plasticity, some black coarse basalt, some fragments (angular), fibrous root ?? material near 37 1/2" sandy silt layer at 37.5 (0.7). 38.0 40 SILTY CLAY (CL), intermixed orangish brown and pistachio green with black layers, moist, moderate plasticity, bluish-gray sandy clay layers from 41-41.5' and 43-43.5', with thinner layers throughout interval. 10.0 45 48.0 SILTY CLAY (CL), reddish brown, moist, firm, ~1" bluish gray sandy clay layers near 53', 56' and 57'. 50 10.0 55 58.0 CLAY (CL), brown with intermixed reddish-brown, bluish gray, orangish brown and dark brown intervals, moist, soft to firm, outside of core is wet - likely in water, some angular rock fragments near 79'. 60



DRILLING METHOD AND EQUIPMENT : Schramm T300M 4" x 6", Sonic Rotary

BORING NUMBER:

SB-35

SHEET 3 OF 3

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

ELEVATION : 2619.34 ft mslft NAVD88 (ground surface) COORDINATES : 210456.989, 2539724.01 (ft NAVD88)

WATER LEVEL: END: 1/13/17 13:00 START : 1/12/17 15:23 LOGGER : J. Nowinski DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm CLAY (CL), brown with intermixed reddish-brown, bluish gray, orangish brown and dark brown intervals, moist, soft to firm, outside of core is wet - likely in water, some angular rock fragments near 79'. 10.0 65 68.0 Hydropunch sample SB35-GW-69-70 70 9.0 75 78.0 80 6.0 WEATHERED BASALT, basalt fragments in clay matrix, gray, wet. BASALT, black, competent. 84.0 Bottom of borehole at 84 ft bgs. 85 90



SB-36 SHE

SHEET 1 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 4" x 6", Sonic Rotary

BORING NUMBER:

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION : 2624.25 ft mslft NAVD88 (ground surface) COORDINATES : 210458.906, 2539237.083 (ft NAVD88)

END: 1/11/17 10:35 WATER LEVEL: START : 1/11/17 08:45 LOGGER : D. Lubell DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm CLAY WITH SILT (CL), black (7.5YR 2.5/1), moist, medium 0.0 stiff, some fine subrounded gravels, trace organics. CLAY (CL), brown (7.5YR 5/4), dry, very stiff, no plasticity, friable. 5 NO RECOVERY. 9.0 CLAY WITH SILT (CL), dark brown (7.5YR 6/3), moist, soft, low 10 plasticity. CLAY (CL), brown (7.5YR 5/3), dry, very stiff, low plasticity, little quartz fragments, trace mica 18.5-19'. 15 19.0 CLAY WITH SILT (CL), very dark gray (7.5YR 3/1), moist, 20 medium stiff, low plasticity. CLAY WITH SAND (CL), gray (2.5Y 6/1), moist, stiff, fine grained sand, micaceous, quartz fragments, low plasticity, weathered. CLAY (CL), dark greenish (5GY 5/1), dry, very stiff, iron 25 oxidation mottling at 28-20' bgs. 29.0 CLAY (CL), greenish gray (5GY 5/1), dry, very stiff, little oxidation mottling, low plasticity 30



BORING NUMBER:

SB-36

SHEET 2 OF 2

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION: 2624.25 ft mslft NAVD88 (ground surface) COORDINATES : 210458.906, 2539237.083 (ft NAVD88)

COORD	INATES	: 210458	3.906, 2	53923	7.083 (ft NAVD88) DRILLING METHOD AND EQUIPMEN	T : Schramm T300 4" x 6", Sonic Rotary	
WATER					START : 1/11/17 08:45 END : 1/11		
DEPTH B	BELOW SL	OW SURFACE (FT) TERVAL (FT) RECOVERY (FT) #TYPE		g	SOIL DESCRIPTION	COMMENTS	
	INTERVA			GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION PID (ppm) Breathing Zone FID (p	nm
_					CLAY (CL), greenish gray (5GY 5/1), dry, very stiff, little oxidation mottling, low plasticity.		<u> </u>
- - 35					CLAY (CL), greenish gray (10GY 5/1/), moist, medium stiff, trace silt, trace fine grained sand, low plasticity.		-
-	39.0				CLAY WITH SILT (CL), yellowish red (5R 4/6), trace gray (2.5Y 6/1) mottling, dry, medium stiff, friable.		-
40	00.0				CLAY (CL), brown (7.5YR 4/2), gray (5Y 5/1) mottling, moist, medium, low plasticity.		_
					CLAY WITH SILT (CL), yellowish red (5YR 4/6), gray (5Y 5/1) mottling, moist, medium, low plasticity.		-
-	48.0				CLAY (CL), very dark gray (10YR 3/1), dry, medium to stiff, friable, low to no plasticity, little iron oxidation.		
50	40.0				SANDY CLAY (CL), interbedded layers of cementation (gray (2.5Y 5/1) iron oxidation, hard, with fine grained sand, clay.	48-52' - very hard drilling	-
	52.0				CLAY (CL), basalt fragments interbedded, black. Bottom of borehole at 52 ft bgs.		
55							
- 60					-		



BORING NUMBER:

SB-37

DRILLING METHOD AND EQUIPMENT : Schramm T300M Rotodrill 4" x 6", Sonic Rotary

SHEET 1 OF 3

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

ELEVATION : 2623.48 ft mslft NAVD88 (ground surface) COORDINATES : 210484.671, 2539486.189 (ft NAVD88)

END: 1/12/17 12:35 WATER LEVEL: START : 1/11/17 14:43 LOGGER : DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm CLAY (CL), dark brown (7.5YR 3/3), moist, stiff, trace organic roots 0-4", trace mica 0-3', low plasticity. 0.0 5.2 5 NO RECOVERY. 8.0 CLAY (CL) with Silt, dark brown (7.5YR 3/3), moist, stiff, trace organic root material, low plasticity. CLAY (CL), brown (7.5YR 4/3), dry, very stiff, no plasticity. 10 7.0 15 NO RECOVERY. 18.0 CLAY (CL), brown (7.5YR 4/3), moist to dry, medium stiff to very stiff, low to no plasticity, trace quartz fragments at 24.5-25', trace black fragments (soft) - manganese?. 20 7.0 25 NO RECOVERY. 28.0 CLAY (CL), yellowish red (5YR 5/8) with bluish gray (5B 5/1), dry, very stiff, no plasticity. 2.0 30



SB-37

SHEET 2 OF 3

SOIL BORING LOG

BORING NUMBER:

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

 ELEVATION:
 2623.48 ft mslft NAVD88 (ground surface)

 COORDINATES:
 210484.671,
 2539486.189 (ft NAVD88)

DRILLING CONTRACTOR : Enviornmental West Exploration, I

DRILLING METHOD AND EQUIPMENT : Schramm T300M Rotodrill 4" x 6", Sonic Rotary END: 1/12/17 12:35 WATER LEVEL: START : 1/11/17 14:43 LOGGER DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm CLAY (CL), brown (7.5YR 4/3), moist, stiff, low plasticity. 30.0 8.0 CLAY (CL) with Silt, yellowish red (5YR 5/8), very dry, very stiff, bluish gray mottling at 36.4-38'. 35 38.0 CLAY (CL) with Silt, dark yellowish brown (10YR 4/4), white (2.5Y 8/1) mottles, little iron oxidation, moist, soft to medium stiff, low plasticity. 40 10.0 45 48.0 CLAY (CL) with Silt, brown (10YR 4/3), white (2.5Y 8/1) mottling, black mottling, moist to dry, soft to stiff with depth, low plasticity. 50 10.0 55 58.0 CLAY (CL) with Silt, brown (10YR 4/3) with gray (5Y 5/1) mottles, moist, soft, low to medium plasticity. Hard drilling at 58' 60



SHEET 3 OF 3

BORING NUMBER:

SB-37

DRILLING METHOD AND EQUIPMENT : Schramm T300M Rotodrill 4" x 6", Sonic Rotary

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

ELEVATION: 2623.48 ft mslft NAVD88 (ground surface) COORDINATES: 210484.671, 2539486.189 (ft NAVD88)

END: 1/12/17 12:35 WATER LEVEL: START : 1/11/17 14:43 LOGGER : DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm CLAY (CL) with Silt, dark reddish brown (5YR 3/4) with gray (2.5Y 4/1), pale brown (2.5Y 8/2), black, yellow (5Y 7/6) mottling, moist, stiff, low plasticity oxidation. 10.0 65 68.0 CLAY (CL), dark reddish brown (5YR 3/4), gray (2.5Y 4/1) mottling, wet, soft, low plasticity, trace silt. 70 CLAY (CL), dark reddish brown (5YR 3/4) and gray (2.5Y 4/1) moist, stiff, low to no plasticity. 10.0 75 78.0 CLAY (CL), very dark gray (7.5YR 3/1), dry to moist, very stiff, no plasticity. Driller indicates part of sample fell out shoe while tripping out (~15 ft) BASALT, black with yellow crystalline, competent, bedrock. \rightarrow 1.5 80 NO RECOVERY. 81.0 Bottom of borehole at 81 ft bgs. 85 90



DRILLING METHOD AND EQUIPMENT : Schramm T300 4" x 6", Sonic

BORING NUMBER:

SB-40

SHEET 1 OF 4

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

ELEVATION : 2580.41 ft msfft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

COORDINATES : 210427.453, 2540100.558 (ft NAVD88)

				2.510	START : 2/13/17 09:45 END : 2/13		LOGGER :	
WATER LEVEL: DEPTH BELOW SURFACE (FT)			=T)			/17 13.45	COMMENTS	
		NTERVAL (FT)		00	SOIL DESCRIPTION			
	INTERV	RECOVERY (FT)		GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	RAT	TH OF CASING, DRILLING E, DRILLING FLUID LOSS, TS, & INSTRUMENTATION	
				Ŭ		PID (ppm)	Breathing Zone	FID (ppm
_	0.0				GRAVEL (GC) WITH CLAY, dark gray (7.5YR 3/1), wet, loose, road bed.			_
-					LEAN CLAY (CL) WITH TRACE SILT, brown to strong brown (7.5YR 4/4 to 7.5YR 4/6), moist, soft, low plasticity.			-
5		6.0			SILT (ML), strong brown (7.5YR 4/6), moist, cohesive, medium stiff, trace organic material.			_
-					NO RECOVERY.	10:00 - Collect	SB40-SS-05	-
- - 10	7.0				CLAY (CL), strong brown (7.5YR 4/6), wet, soft, low to medium plasticity. - at 7.5' SAND (SP), wet, medium to coarse grained, quartzitic. SILT (ML) WITH FINE SAND, yellowish-brown to light yellowish-brown (7.5YR 5/4 to 7.5YR 6/4), moist to dry, stiff.			-
-		9.0			-	~10:10 - SB40-	-SS-10	-
	17.0				WELL GRADED SAND (SW) WITH SILT AND CLAY, moist, variegated very dark gray (7.5YR 3/1) to very dark grayish-brown (7.5YR 3/3) with possible relic phenocrysts - yellow (7.5YR 7/6 to 7.5YR 8/6), clay also red to light red, fine grained material; with angular gravel-sized rock fragment (weathered basalt, possibly).	10:15 - SB40-S	SS-15	
20					NO RECOVERY. SILT (ML) with CLAY, moist to wet, soft, cohesive; variegated black (7.5YR 2.5/1) to yellowish-red (5YR 5/8) with relic phenocryst of light gray to white (10YR 7/2 to 10YR 8/1) clay.			-
-		10.0				SB40-SS-20		-
25	27.0				SILT (ML) with CLAY, moist, variegated gray (7.5YR 6/1) with yellow (2.5Y 7/6 to 2.5Y 8/6) velic phenocryst - clay rich. SILT (ML) with CLAY, moist to wet, soft, cohesive; variegated black (7.5YR 2.5/1) to yellowish-red (5YR 5/8) with relic phenocryst of light gray to white (10YR 7/2 to 10YR 8/1) clay. SILT (ML) with CLAY, moist, variegated gray (7.5YR 6/1) with yellow (2.5Y 7/6 to 2.5Y 8/6) relic phenocryst - clay rich. SAND (SW), very dark gray (7.5YR 3/1), wet, loose; fine	SB40-SS-25		
- - 30					grained, clayey/silty; trace reddish-brown mottling; some very stiff/well indurated rock fragment (gravel-sized). WEATHERED BASALT, dark gray to black (7.5YR 4/1 to 7.5YR 2.5/1), dry, hard to soft, with clay and silt; angular rock fragments up to several inches; trace olive yellow mottling (2.5Y 6/6 to 2.5Y 6/8.			-



BORING NUMBER:

SB-40

SHEET 2 OF 4

57.0

60

PROJECT : Grain Handling Facility at Freeman LOCATION : Freeman, WA ELEVATION: 2580.41 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Enviornmental West Exploration, Inc. COORDINATES: 210427.453, 2540100.558 (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Schramm T300 4" x 6", Sonic END: 2/13/17 13:45 WATER LEVEL: START : 2/13/17 09:45 LOGGER DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LoG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPF STRUCTURE. MINERALOGY PID (ppm) Breathing Zone FID (ppm WEATHERED BASALT, dark gray to black (7.5YR 4/1 to 7.5YR 2.5/1), dry, hard to soft, with clay and silt; angular rock fragments up to several inches; trace olive yellow mottling SB40-SS-30 (2.5Y 6/6 to 2.5Y 6/8. 9.5 SILT (ML), dark gravish-brown to olive brown (2.5Y 4/2) to (2.5Y 4/3), dry, hard; silt to gravel sized rock fragments; 35 angular, trace reddish-brown mottling. SB40-SS-35 NO RECOVERY. 37.0 SILT (ML) WITH SAND AND GRAVEL very dark grayish-brown (2.5Y 3/2), moist to wet, loose to cohesive silt; angular rock fragment up to 1-2". 40 SILT (ML) with CLAY, moist, variegated very dark gray (2.5Y 3/1) to strong brown (7.5YR 4/6) to yellow (5Y 7/6) clay rich SB40-SS-40 relic phenocryst. SILT (ML) WITH SAND, gray (5Y 5/1) with olive (10Y 4/4). - coarse sand sized grains at 43';. 45 - dark yellowish-brown (10YR 4/6) laminae from 45-47', wet, slightly cohesive. SB40-SS-45 TMS/MSD 47.0 SILT (ML) WITH SAND, gray (5Y 5/1) with olive (10Y 4/4). SILT (ML), clayey, dark gray (2.5Y 4/1) to dark grayish-brown (2.5Y 4/2), moist, soft. - some yellow mottling at 49'. 50 SB40-SS-50 SILT (ML), dark brown to strong brown (7.5YR 3/4) to (7.5YR 4/6), moist, cohesive. 10.0 SILT (ML) WITH SAND AND CLAY, dark gray (7.5Y 4/1) with some vellowish-brown (10YR 5/8) mottling and relic-like clay to silty phenocysts, some very stiff/well indurated weathered basaltic rock fragments. 55 SB40-SS-55

> SILT (ML) WITH FINE SAND (SW), gray to dark gray (5Y 5/1 to 5Y 4/1); moist, cohesive, soft to stiff; rare white mottled veins. - mottling at 58' yellow (5Y 7/6 to 5Y 7/8) and strong brown

(7.5YR 5/8);.

PROJECT NUMBER:

661508



BORING NUMBER: SB-40

SHEET 3 OF 4

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Schramm T300 4" x 6", Sonic

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

ELEVATION : 2580.41 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc.

PROJECT NUMBER:

661508

COORDINATES: 210427.453, 2540100.558 (ft NAVD88)

WATER LEVEL: START : 2/13/17 09:45 END: 2/13/17 13:45 LOGGER DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION Log INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPF STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm SILT (ML) WITH FINE SAND (SW), gray to dark gray (5Y 5/1 to 5Y 4/1); moist, cohesive, soft to stiff; rare white mottled veins. SB40-SS-60 and field duplicate 10.0 light olive (10Y 5/4) mottling at ~64' (stiff clay). relic - ?? mineralization (?) 65 SB40-SS-65 WELL GRADED SAND (SW-SM), dark gravish-brown to olive brown (2.5Y 4/2) to (2.5Y 4/3), moist, loose to moderately 67.0 cohesive, very fine grained, silty to clayey. SILT (ML) WITH FINE SAND (SW), gray to dark gray (5Y 5/1 to 5Y 4/1); moist, cohesive, soft to stiff; rare white mottled veins. LEAN CLAY (CL), white to light gray (2.5Y 8/1) to (2.5Y 7/1), 70 moist, very stiff to hard, some mottling to brownish-yellow to yellowish-brown (10YR 6/8) to (10YR 5/8). SB40-SS-70 10.0 SILTY TO SANDY CLAY (CL)/CLAYEY/SILTY SAND (SC-SW), white (N8); moist, very stiff to hard, some strong brown (7.5YR 75 5/8) to pale yellow brown (10YR 5/8) mottling; very fine grained sand; quartzitic. SB40-SS-75 77.0 SILTY TO SANDY CLAY (CL)/CLAYEY/SILTY SAND (SC-SW), white (N8); moist, very stiff to hard, some strong brown (7.5YR 5/8) to pale yellow brown (10YR 5/8) mottling; very fine grained sand; quartzitic. SILT (ML) with CLAY, white (N8), laminated brownish-yellow to yellow (10YR 6/8 to 10YR 7/8), moist, very stiff to hard, 80 laminae more abundant with depth, becoming more yellowish with depth and clay-rich. SB40-SS-80 10.0 CLAY (CL) WITH SOME SILT/FINE SAND, reddish-yellow (7.5YR 6/8), dry to slightly moist, becoming mottled white with depth. 85 SB40-SS-85 SILTY TO CLAYEY SAND (SM-SC), variegated reddish yellow (7.5YR 7/0) to pinkish gray (7.5YR 7/2), moist, cohesive, fine to 87.0 coarse-grained quartz muscovite, weathered feldspar (weathered granite). SILTY TO CLAYEY SAND (SM-SC), variegated reddish yellow (7.5YR 7/0) to pinkish gray (7.5YR 7/2), moist, cohesive, fine to coarse-grained quartz muscovite, weathered feldspar 90



DRILLING METHOD AND EQUIPMENT : Schramm T300 4" x 6", Sonic

BORING NUMBER:

SB-40

SHEET 4 OF 4

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

DRILLING CONTRACTOR : Enviornmental West Exploration, Inc.

ELEVATION : 2580.41 ft mslft NAVD88 (ground surface) COORDINATES : 210427.453, 2540100.558 (ft NAVD88)

END: 2/13/17 13:45 WATER LEVEL: START : 2/13/17 09:45 LOGGER DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RECOVERY (FT) RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm (weathered granite). WELL GRADED SAND WITH CLAY (SW-SC), variegated white SB40-SS-90 to pink (5YR 8/1 to 5YR 7/3), moist, clay to medium sand sized grains, quartzitic, abundant muscovite, weathered (clayey) feldspar. 8.5 CLAY (CL) WITH SOME SILT/FINE SAND, reddish-yellow (7.5YR 6/8), dry to slightly moist, becoming mottled white with 95 depth. NO RECOVERY. SB40-SS-95 97.0 Bottom of borehole at 97 ft bgs. 100 105 110 115 120



SHEET 1 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90 Air Rotary, 6"

BORING NUMBER:

SB-43

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

PROJECT NUMBER:

661508

ELEVATION: 2553.77 ft mslft NAVD88 (ground surface) DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : 209040.988, 2539568.883 (ft NAVD88)

WATER LEVEL:					START : 1/20/17 13:00 END :	LOGGER : R. McComb		
DEPTH I	BELOW SU	JRFACE (F	-T)	U	SOIL DESCRIPTION	COMMENTS		
	INTERV		. (FT) RECOVERY (FT) #TYPE		SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION		
						PID (ppm) Breathing Zone FID (ppm		
-	0.0				LEAN CLAY (CL), dark grayish-brown (10YR 4/2), moist, soft, low to moderate plasticity with trace silt; with some rootlets, trace mica.	Breathing Zone = 0 ppm VOCs Fluctuates from 0.1'		
5	5.0							
	5.0				LEAN CLAY (CL), very dark gray (10YR 3/1) to very dark grayish-brown (10YR 3/2), moist, soft; moderate plasticity, trace mica.	1315 - 5' bgs		
10	10.0							
-					LEAN CLAY (CL), dark grayish (2.5Y 4/1), moist, low to medium plasticity, soft.	1332 at 16' - no water drilling with no water being used Hard drilling at 10-11'		
- 15	15.0				LEAN CLAY (CL), as 10-13' with few little light gray (2.5Y 7/1) angular lithic fragments.			
-					LEAN CLAY (CL), with some very dark angular to saturated little fragments (weathered basalt?) with minor iron oxide coating.	1345 at 15' 13-15' - rapid drops in drilling, water absent		
-				H	BASALT, black (2.5Y 2.5/1), hard, fragment silt - 1/8", angular,	-		
20 - - -	20.0				with trace reddish-brown oxidation, weak lithic fragments. WEATHERED AND COMPETENT BASALT WITH LEAN CLAY, black (2.5Y 2.5/1) basalt with dense dark grayish-brown (2.5Y 4/2) lean clay and few oxidized (reddish brown) lithic fragments.	1400 - 20' Borehole still void of water at 20'		
25 - -	25.0				COMPETENT BASALT, black (N1) angular lithic fragments, very fine silt to ~1/2" in grain size.			
30				KΧ	-			
- 30			I	\square				



PROJECT NUMBER: 661508

BORING NUMBER: SB-43

SHEET 2 OF 2

SOIL BORING LOG

DRILLING METHOD AND EQUIPMENT : Mobile B-90 Air Rotary, 6"

PROJECT : Grain Handling Facility at Freeman

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc

ELEVATION : 2553.77 ft mslft NAVD88 (ground surface) COORDINATES : 209040.988, 2539568.883 (ft NAVD88)

WATER LEVEL: START : 1/20/17 13:00 END : LOGGER : R. McComb DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL GRAPHIC DEPTH OF CASING, DRILLING COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL RECOVERY (FT) RATE, DRILLING FLUID LOSS TESTS, & INSTRUMENTATION #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm COMPETENT BASALT, black (N1) angular lithic fragments, 30.0 very fine silt to ~1/2" in grain size. MW17D-25-01127 - Collected 8260 Driller noted trace water while drilling 20-25' 1415 - 25' Measured ~0.5' of water during connection of drill rods Collected GRAB GW sample at 1445 25' - Switched to open borehole drilling @1452 - resume drilling, very little water blown from borehole, blow day and resume advancing 35.0 35 borehole BASALT WITH LEAN CLAY, clay is olive brown (2.5Y 4/3), soft, Abundant water encountered at 37' bgs, driller wet. noted ~1/2' drip in rods associated with water production Artesian conditions noted upon arrival at MW-40 40.0 17D on 1/13/17 Bottom of borehole at 40 ft bgs. Flow at surface estimated at < 1 gpm 45 50 55 60

JACOBS[®]

PROJECT NUMBER:	BORING NUMBER:
661508	SB-44

DRILLING CONTRACTOR : Environmental West Exploration, Inc

SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Sonic

	LEVELS			START : 4/7/2017 END : 4/7				LOGGER : R. McComb		
			GRADE (ft)	SOIL DESCRIPTION						
	INTERV	AL (ft) RECOVE	ERY (ft) SAMPLE ID (TIME)	SOIL NAME, USCS GROUP SYMBOL, MOISTURE CONTENT, RELATIVE DEN CONSISTENCY, SOIL STRUCTURE, MINI	SYMBOLLIC LOG	PID (ppm)	COMMENTS			
	0.0	5.5	SB44-SS-05 at 9:10	Silt (ML) 0.0 - 7.0' - brown (7.5 YR 5/4) to strong br YR 5/8), moist, grading from soft to stiff w	own (7.5					
	7.0	5.0	SB44-SS-10 at 9:20	Silty Clay (CL) 7.0 - 9.0' - brown (7.5 YR 4/4), moist to we some gravel Sandy Silt (ML) 9.0 - 10.5' - strong brown (7.5 YR 5/6) to r yellow (7.5 YR 6/6), dry, very stiff						
	12.0	3.0		Clay (CL) with Silt (ML) 10.5 - 12.0' - strong brown (7.5 YR 4/6), d stiff, dense with trace sand Clay (CL) 12.0 - 13.0' - yellowish red to dark yellowis YR 4/6 to 3/4), moist, soft to medium Gravel with Silt and Sand (GW) 13.0 - 13.5' - gray (5 YR 5/1 to 6/1), loose	sh brown (5					
15 - -	15.0 17.0	0.7	SB44-SS-15 at 9:30	gravel up to 1" Silt (ML) to Clay (CL) 13.5 - 15.0' - gray (7.5 YR 5/1) becoming strong brown (7.5 YR 3/8), dry, very dense	mottled -					
20		10.0	SB44-SS-20 at 9:40	Silt (ML) 15.0 - 17.0' - mottled gray (7.5 YR 5/1) be (2.5 YR 4/8) at 16', dry, stiff to hard but br Silt (ML) 17.0 - 20.0' - red (2.5 YR 4/8), dry, cohesi dense, trace fine sand and gray mottling Clay (CL) 20.0 - 21.5' - gray (N5), slightly moist, soft dense, some red mottling, trace silt, fine s Silt (ML) 21.5 - 27.0' - strong brown (7.5 YR 5/6), m dense, slightly cohesive	to medium			- - - - - - - - - - - - - - - - - - -		
25 	27.0		SB44-SS-25 at 9:45		- - -	-				
				Silt (ML) 27.0 - 30.5' - strong brown (10 YR 4/6), m trace fine sand	oist, soft, _ _ - -					



PROJECT NUMBER:	
661508	

BORING NUMBER: SB-44

SHEET 2 OF 3

SOIL BORING LOG

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Sonic

WATER LEVELS : --START : 4/7/2017 END: 4/7/2017 LOGGER : R. McComb DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) (mdd) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR E CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) Silt (ML) 30.5 - 37.0' - dark brown (7.5 YR 3/3) to very dark gray (7.5 YR 4/1), dry to very slightly moist, 10.0 SB44-SS-30 at 10:05 cohesive, soft to medium dense 35 SB44-SS-35 at 10:10 37.0 Clay (CL) 37.0 - 41.5' - strong brown (7.5 YR 5/6), moist, soft with trace silt 40 SB44-SS-40 at 10:25 Well-Graded Sand with Silt (SW) 5.5 41.5 - 43.0' - brown (5 Y 4/6) to (5 YR 3/4), very moist to slightly wet, soft, slightly cohesive Well-Graded Sand with Silt (SW) 43.0 - 47.0' - moist to dry, slightly cohesive to loose, little moisture 45 SB44-SS-45 at 10:30 47.0 Silt (ML) 47.0 - 49.0' - strong brown (7.5 YR 5/6) to gray (7.5 YR 5/1), moist, cohesive, soft, some clay Silt (ML) 50 49.0 - 56.5' - dark gray (7.5 YR 4/1), moist to wet at SB44-SS-50 at 10:45 55', cohesive, soft, some very fine sand 10.0 55 SB44-SS-55 at 10:50 57.0 Silt (ML) 56.5 - 57.0' - strong brown (7.5 YR 5/8) to brown (2.5 Y 5/4), moist, cohesive, soft Silt (ML) 57.0 - 58.5' - dark gray (7.5 YR 4/1) to dark brown (7.5 YR 3/2), moist, cohesive, soft, trace angular 60 gravel

JACOBS[®]

PROJECT NUMBER:	BORIN
661508	S

BORING NUMBER: SB-44

SHEET 3 OF 3

SOIL BORING LOG

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Sonic

WATER	LEVELS	3 :		START : 4/7/2017 END : 4/	7/201	7	LOGGER : R. McComb	
DEPTH	BELOW E	XISTING G	GRADE (ft)	SOIL DESCRIPTION	ő			
	INTERV	AL (ft) RECOVE	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR	SYMBOLLIC LOG	PID (ppm)	COMMENTS	
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERALOGY	SYM	L .		
	-	10.0	SB44-SS-60 at 11:15	Silt (ML) 58.5 - 63.0' - mottled yellowish brown (10 YR 5/8) to pale yellow (5 Y 8/3 to 8/4), moist, soft, very fine sand				
- 65 - -	67.0		SB44-SS-65 at 11:20	Silt (ML) 63.0 - 64.5' - red (2.5 YR 4/6 to 2.5 YR 4/8), dry to moist, slightly cohesive, some black clay Silt (ML) 64.5 - 67.0' - strong brown (7.5 YR 4/6) to very dark gray (7.5 YR 3/1) grading to brown (7.5 YR 5/2), dry to slightly moist, slightly cohesive, with poorly indurated/very stiff angular rock fragments				
- - - 70		7.0	SB44-SS-70 at 11:50	Silt (ML) 67.0 - 71.5' - gray (2.5 Y 5/1) with dark yellowish brown mottling (10 YR 3/4 to 10 YR 3/6) and yellow (10 YR 7/6), moist, cohesive, trace weathered gravel	-		- - - - - - - - - - - - -	
	74.0		SB44-SS-73 at 11:55	Well-Graded Gravel (GW) 71.5 -74.0' - very dark gray (10 YR 3/1) to brownish gray (10 YR 6/2), dry, loose, silt and sand sized weathered rock fragments, angular 2-3" gravel			- - - - - - -	
75				Bottom of Boring at 74.0 ft bgs on 4/7/2017				
80							- - - - - - - - - - - - - - - - - - -	
85								
90								
					T	1		



PROJECT NUMBER: BORING NUMBER: 661508 **SB-101B** SHEET 1 OF 2

SOIL BORING LOG

30

PROJECT : UPRR Freeman, Freeman, Washington LOCATION : Freeman, WA DRILLING CONTRACTOR : Environmental West Exploration, Inc. ELEVATION : COORDINATES : (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Sonic, 4" diameter END: 1/23/2018 WATER LEVEL: START : 1/23/2018 LOGGER : JE/JU DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY FID (ppm) PID (ppm) Breathing Zone ASPHALT. 0.0 GRAVEL FILL. CLAY, brown, soft, medium plasticity, dry. 100.0 5 5.0 Vapor screen set at 5' CLAY, brown, soft, medium plasticity, dry. CLAY, brown, stiff, low plasticity, dry. 100.0 10 10.0 CLAY, brown, stiff, low plasticity, dry. 100.0 CLAY, brown, soft, high plasticity, dry. 15 15.0 CLAY, brown, stiff, low plasticity, dry. Vapor screen set at 15' CLAY, tan, stiff, high plasticity, orange mottling, dry. CLAY, brown, stiff, medium plasticity, dry. 100.0 CLAY, tan, very soft, high plasticity, trace silt, moist. 20 20.0 CLAY, red/orange, oxidation and reducing zones, stiff, high 100.0 plasticity, dry. 25 25.0 CLAY, red/orange, oxidation and reducing zones, stiff, high Vapor screen set at 25' plasticity, dry. CLAY, red/orange, oxidation and reducing zones, stiff, very soft form 30-37', high plasticity, dry. 100.0



PROJECT NUMBER:BORING NUMBER:661508SB-101BSHEET 2 OF 2

DRILLING CONTRACTOR : Environmental West Exploration, Inc

SOIL BORING LOG

PROJECT : UPRR Freeman, Freeman, Washington

ELEVATION :

LOCATION : Freeman, WA

DRILLING METHOD AND EQUIPMENT : Sonic, 4" diameter COORDINATES : (ft NAVD88) END: 1/23/2018 WATER LEVEL: START : 1/23/2018 LOGGER : JE/JU DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION LOG INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL GRAPHIC DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY PID (ppm) Breathing Zone FID (ppm) 30.0 CLAY, red/orange, oxidation and reducing zones, stiff, very soft form 30-37', high plasticity, dry. Vapor screen set at 30' 100.0 35.0 35 Vapor screen set at 34' DTW in 8s = 37.19 100.0 Water in SV-101B at 17' bgs, will call Steve to discuss (17.36'), will step over 2' and drill 101C 37.0 Boring terminated at 37 ft bgs. 40_ 45 50 55 60



PROJECT NUMBER: BORING NUMBER: **SB-102B** 661508 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : UPRR Freeman, Freeman, Washington

ELEVATION :

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc COORDINATES : (ft NAVD88) DRILLING METHOD AND EQUIPMENT : Sonic, 4" diameter

WATER	LEVEL:				START : 1/24/2018 END : 1/24	4/2018 LOGGER : JE/JU		
DEPTH BELOW SURFACE (FT)					SOIL DESCRIPTION	COMMENTS		
	INTERVAL (FT)			GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL,			
		RECOVE	VERY (FT)		COLOR, MOISTURE CONTENT, RELATIVE	DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS,		
			#TYPE	GRA	DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY	TESTS, & INSTRUMENTATION		
				0		PID (ppm) Breathing Zone FID (ppm)		
	0.0			•••	ASPHALT.			
-				1111	GRAVEL FILL. CLAY, brown, stiff, low plasticity, dry.	-		
		100.0						
-					CLAY, tan, stiff, medium plasticity, dry.	-		
_								
5	5.0							
5-	5.0				-			
_					-	Geotech sample collected 5-10'		
						Vapor screen set at 5'		
-		100.0			CLAY, tan, stiff, medium plasticity, dry.	-		
_		100.0				4		
-					-	-		
10	10.0		-		_	_		
-					-	-		
_								
		100.0			CLAY, red/tan, medium dense, little to no plasticity, dry.			
-					-	-		
_								
15	15.0							
15	15.0				_			
_					-	Vapor screen set at 15'		
-		100.0			-	-		
_		100.0			-			
-					-	-		
20	20.0			////	=	4 _		
					-	1 1		
					-	4 4		
		100.0		////				
					-	Shelby tube at 22.5'-24.5'		
_					-	-		
25	25.0					Vapor screen set at 24'		
	_0.0			////	CLAY, brown, no plasticity, dry, oxidizing/reducing zones, some			
					silt.	Geotech sample collected 25-30'		
				////				
		100.0			-	1 1		
		100.0			CLAV top no plasticity activisted	4 -		
					CLAY, tan, no plasticity, soft, saturated.			
					-	1 1		
30	30.0			////	Boring terminated at 30 ft bas.			

Boring terminated at 30 ft bgs.



 PROJECT NUMBER:
 BORING NUMBER:

 661508
 SB-103B
 SHEET 1 OF 1

SOIL BORING LOG

PROJECT : UPRR Freeman, Freeman, Washington

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : (ft NAVD88)

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Sonic, 11" diameter

WATER LEVEL:					START : 1/25/2018	END : 1/25				
DEPTH B		RFACE (F	T)	Q	SOIL DESCRIPTION		COMME	ENTS		
	INTERVA	RECOVE	ERY (FT) #TYPE	GRAPHIC LOG	SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY		DEPTH OF CASI RATE, DRILLING TESTS, & INSTR	FLUID LOSS, UMENTATION		
	0.0				GRAVEL FILL.		PID (ppm) Breath	ing Zone	FID (ppm)	
-	0.0	100.0			CLAY, brown, stiff, medium plasticity, dry.				-	
5	5.0									
-	3.0	100.0			CLAY, brown, stiff, medium plasticity, dry, cobbles at 12',		Geotech sample collected 5- Vapor screen set at 5'	10'	-	
- 10	10.0	100.0			weathered, rounded.	-		-		
-	10.0									
_ 15	15.0	100.0			CLAY, tan, very soft, no plasticity, trace silt, saturated, oxidizing/reducing zones.	-			-	
-		100.0			CLAY, tan, soft, high plasticity, moist, some gravel at 22'.	-	Vapor screen set at 15'		-	
20	20.0					-			-	
_		80.0	-		NO RECOVERY.		Vapor screen set at 22' Geotech sample collected 22 Shelby tube at 22-24'	2-27'	-	
	25.0				SANDY CLAY, tan, no plasticity, very soft, fine to medium sa some silt, saturated. CLAY, soft, brown, medium plasticity, weathered zones, whit					
					orange in color, approximately 2-3" in size. Boring terminated at 27 ft bgs.	-			-	



PROJECT NUMBER: BORING NUMBER: 661508 **SB-104B** SHEET 1 OF 1

SOIL BORING LOG

PROJECT : UPRR Freeman, Freeman, Washington

LOCATION : Freeman, WA

DRILLING CONTRACTOR : Environmental West Exploration, Inc

COORDINATES : (ft NAVD88)

100.0

100.0

Boring terminated at 27 ft bgs.

25

30

25.0

27.0

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Sonic, 4" diameter END: 1/25/2018 WATER LEVEL: START : 1/25/2018 LOGGER : JE/JU DEPTH BELOW SURFACE (FT) COMMENTS SOIL DESCRIPTION СОС INTERVAL (FT) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL DEPTH OF CASING, DRILLING RATE, DRILLING FLUID LOSS, TESTS, & INSTRUMENTATION GRAPHIC RECOVERY (FT) #TYPE STRUCTURE, MINERALOGY FID (ppm) PID (ppm) Breathing Zone GRAVEL FILL 0.0 CLAY, brown, stiff, medium plasticity, dry. 100.0 CLAY, brown, very stiff, high plasticity, dry. 5 5.0 Geotech sample collected 5-10' Vapor screen set at 5' CLAY, brown, medium dense, medium plasticity, gravel lense at 100.0 approximately 8', 2=3" in length. CLAY, very stiff, brown, medium plasticity, cobble at 14' 10 10.0 approximately 13-14' in length. 100.0 CLAY, very stiff, brown, medium plasticity, cobble at 14' approximately 13-14' in length, some gravel. 15 15.0 CLAY, very soft, tan, no plasticity, some gravel, wet. Vapor screen set at 15' CLAY, soft, brown, weathered oxidized zones, medium plasticity, 100.0 wet trace fines 20 20.0 CLAY, soft, brown, weathered oxidized zones, medium plasticity, wet, trace fines, some gravel.

> Geotech sample collected 22-27' Vapor screen set at 22' Shelby tube at 22-24'



661508	SB-201	SHEET	1
PROJECT NUMBER:	BORING NUMBER:		

OF 1

SOIL BORING LOG

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Sonic

WATER LEVELS : -START : 12/13/2018 END: 12/13/2018 LOGGER : JE DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) (mqq) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DI CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) GRAVEL (GW) . 0.0 - 0.5' - Access road **GRAVEL (GW)** 0.5 - 6.0' - brown/black, dry, some medium/fine sand, some cobbles, low recovery 5 SB201-S-5' CLAY (CL) 6.0 - 7.0' - brown, dry, medium density, plastic CLAY (CL) 7.0 - 15.0' - brown, dry, hard, plastic, mottled at 13.0' 10 15 SB201-S-15' MS/MSD CLAY (CL) 15.0 - 17.0' - brown, moist, soft, plastic, mottled Bottom of Boring at 17.0 ft bgs on 12/13/2018 20 25 30



PROJECT NUMBER:	BORING NUMBER:	
661508	SB-202	SHEET

DRILLING CONTRACTOR : Environmental West Exploration, Inc

SOIL BORING LOG

OF 1

1

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Sonic

WATER LEVELS : -START : 12/13/2018 END: 12/13/2018 LOGGER : JE DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) (mdd) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DI CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) GRAVEL 0.0 - 0.5' - Access road CLAY (CL) 0.5 - 3.0' - brown, very stiff, brittle, non-plastic SAND with Clay (SC) 3.0 - 5.0' - brown, dry, medium /fine sand, some hard clay 5 SB202-S-5' CLAY with Sand (CL) 5.0 - 7.0' - brown, dry, stiff/medium density, nonplastic, some medium/fine sand CLAY (CL) 7.0 - 13.0' - brown, dry, medium density, plastic 10 CLAY (CL) 13.0 - 14.0' - brown, wet, very soft, plastic CLAY (CL) 15 14.0 - 17.0' - brown, medium density, medium SB202-S-15' plasticity, red/tan silt inclusions Bottom of Boring at 17.0 ft bgs on 12/13/2018 20 25 30



PROJECT NUMBER:	BORING NUMBER:	
661508	SB-203	SHEET

DRILLING CONTRACTOR : Environmental West Exploration, Inc

SOIL BORING LOG

OF 1

1

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Sonic

WATER LEVELS : --START : 12/13/2018 END: 12/13/2018 LOGGER : JE DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) (mqq) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DI CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) GRAVEL (GW) 0.0 - 0.5' - Access road CLAY (CL) 0.5 - 1.0' - brown, dry, medium density, plastic SILT (ML) 1.0 - 6.0' - tan, dry, some clay, low recovery 5 SB203-S-5' CLAY (CL) 6.0 - 7.0' - brown, very stiff CLAY (CL) 7.0 - 8.0' - brown, moist, very soft, silt lense at 8.5 -9.0' CLAY (CL) 8.0 - 11.0' - brown, moist, very stiff 10 CLAY (CL) 11.0 - 13.0' - brown, wet, very soft, some sand, plastic CLAY (CL) 13.0 - 17.0' - brown, medium density, medium plasticity, red/tan silt inclusions 15 SB203-S-15' Bottom of Boring at 17.0 ft bgs on 12/13/2018 20 25 30



	*		
661508	SB-204	SHEET	1
PROJECT NUMBER:	BORING NUMBER:		

OF 1

SOIL BORING LOG

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Sonic

WATER LEVELS : -START : 12/13/2018 END: 12/13/2018 LOGGER : JE DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) (mqq) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DI CONSISTENCY, SOIL STRUCTURE, MINERALOGY SAMPLE ID (TIME) GRAVEL (GW) 0.0 - 0.5' - Access road CLAY (CL) 0.5 - 4.0' - brown, dry, soft, plastic CLAY (CL) 5 4.0 - 9.0' - brown, dry, medium/hard, plastic SB204-S-5' Sandy CLAY (CL) 10 9.0 - 15.0' - brown, hard, mottled, medium/fine sand SB204-S-15', SB204-S-FD 15 CLAY (CL) 15.0 - 17.0' - brown, medium density, medium plasticity, red/tan silt inclusions Bottom of Boring at 17.0 ft bgs on 12/13/2018 20 25 30



	02 200	•	-	•.
661508	SB-205	SHEET	1	OF
PROJECT NUMBER:	BORING NUMBER:			

1

SOIL BORING LOG

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Freeman, WA

ELEVATION :

DRILLING METHOD AND EQUIPMENT : Sonic

WATER LEVELS : -START : 12/13/2018 END: 12/13/2018 LOGGER : JE DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) (mqq) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DI SAMPLE ID (TIME) CONSISTENCY, SOIL STRUCTURE, MINERALOGY CLAY (CL) 0.0 - 3.0' - brown, very soft, plastic, lots of wood debris CLAY (CL) 3.0 - 6.0' - brown, dry, medium density, plastic 5 SB205-S-5' CLAY (CL) 6.0 - 15.0' - brown, dry, hard, plastic 10 15 SB205-S-15' CLAY (CL) 15.0 - 16.0' - brown, very soft, mottled, some med/fine sand CLAY with Sand (CL) 16.0 - 17.0' - brown, dry, very soft, mottled, medium/fine sand Bottom of Boring at 17.0 ft bgs on 12/13/2018 20 25 30



PROJECT NUMBER:

BORING NUMBER: **SB-206**

SHEET 1 OF 3

SOIL BORING LOG

DRILLING CONTRACTOR : Environmental West Exploration, Inc

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Near MW-14D

661508

ELEVATION :

DRILLING METHOD AND EQUIPMENT : 4" diameter, Sonic

WATER LEVELS : -LOGGER : JE/KS START : 6/19/19 09:30 END: 6/19/19 14:30 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) (mqq) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR DI SAMPLE ID (TIME) CONSISTENCY, SOIL STRUCTURE, MINERALOGY GRAVEL, tan, dry, some fine to medium sand 0.0 • CLAY, brown, dry, soft, medium to low plasticity 5.0 5 SB206-5' at 9:40 7.0 CLAY, brown, dry, soft, medium to low plasticity 10 SB206-10' at 9:50 GRAVEL, gray, dry, some fine to medium sand CLAY, brown, wet at 17', soft to very soft, medium plasticity, trace silt, mottled (weathered basalt) 3.0 15 SB206-15' at 10:00 17.0 CLAY, brown, wet, soft, medium plasticity, trace silt, mottled (weathered basalt) 20 SB206-20' at 10:15 10.0 25 SB206-25' at 10:20 27.0 CLAY, gray, wet, medium plasticity, some silt, green silt nodules from 33.5' to 34', mottled 30



SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Near MW-14D

661508

ELEVATION :

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : 4" diameter, Sonic

WAIER	VATER LEVELS :			START : 6/19/19 09:30	9/19 [·]	4:30	LOGGER : JE/KS	
DEPTH E	BELOW E	XISTING G	RADE (ft)	SOIL DESCRIPTION		g		
	INTERV	AL (ft)	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENSIT	LOR, Y OR	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINER	ALOGY	SYMB	Ē	
		10.0	SB206-30' at 10:35		-			
35 			SB206-35' at 10:45		- 			
-	37.0							
- - 40			SB206-40' at 11:15	CLAY, gray, wet, medium plasticity, trace silt mottled	,			
		10.0			- - - -			
45 - -	47.0		SB206-45' at 11:25		- - - - -			- - - - -
- - - 50	11.0		SB206-50' at 11:45	SILT, gray/brown, wet, noncohesive, trace to plasticity clay	o few low			
		10.0			-			
55 _ _ _	57.0		SB206-55' at 12:10		- - - -			- - - -
- - - - - - - - - - -				SILT, gray/brown, wet, noncohesive, trace to plasticity clay	o few low			



SHEET 3 OF

3

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Near MW-14D

661508

ELEVATION :

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : 4" diameter, Sonic

WATER LEVELS : -LOGGER : JE/KS START : 6/19/19 09:30 END: 6/19/19 14:30 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) (mqq) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR Ш SAMPLE ID (TIME) CONSISTENCY, SOIL STRUCTURE, MINERALOGY 10.0 SB206-60' at 12:40 65 SB206-65' at 12:45 67.0 SILT, gray/brown, wet, noncohesive, trace to few low plasticity clay CLAY, white, wet, medium plasticity, few silt, quartz and muscovite present from 75' to 77' $\,$ 70 SB206-70' at 14:00 10.0 75 77.0 SB206-77' at 14:05 Bottom of Boring at 77.0 ft bgs on 6/19/19 14:30 At 77' - GSA Sample 80 85 90



BORING NUMBER: SB-207

DRILLING CONTRACTOR : Environmental West Exploration, Inc

SHEET 1 OF 3

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Near the bus barn

PROJECT NUMBER:

661508

ELEVATION :

DRILLING METHOD AND EQUIPMENT : 4" diameter, Sonic

WATER LEVELS : -START : 6/21/19 09:00 END : 6/21/19 12:30 LOGGER : JE/KS DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR SAMPLE ID (TIME) CONSISTENCY, SOIL STRUCTURE, MINERALOGY GRASS/TOPSOIL, some gravel 0.0 CLAY, brown, dry, soft, low plasticity, trace silt CLAY, brown, dry, soft, medium plasticity 2.0 5 SB207-5' at 9:10 7.0 10 SB207-10' at 9:20 CLAY, brown, dry, medium dense, medium plasticity 8.0 15 SB207-15' at 9:25 17.0 CLAY, brown, dry, very soft, low to no plasticity, trace to little silt 20 SB207-20' at 9:30 CLAY, brown, dry, stiff, medium to high plasticity 10.0 25 SB207-25' at 9:35 27.0 CLAY, brown, dry, soft, medium plasticity 30



BORING NUMBER: SB-207

SHEET 2 OF 3

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Near the bus barn

PROJECT NUMBER:

661508

ELEVATION :

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : 4" diameter, Sonic

	WATER LEVELS : DEPTH BELOW EXISTING GRADE (ft)			START : 6/21/19 09:00	END : 6/21/19	12:30	LOGGER : JE/KS
DEPTH			GRADE (ft)	SOIL DESCRIPTION	ő		
	INTERV	AL (ft) RECOVE	RY (ft)	SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENSI CONSISTENCY, SOIL STRUCTURE, MINER	TY OR O	PID (ppm)	COMMENTS
-			(TIME)				
-	-	10.0	SB207-30' at 9:55	CLAY, brown, dry, high plasticity, mottled wi or white	ith gray		
35	37.0		SB207-35' at 10:00				
40		10.0	SB207-40' at 10:20	CLAY, brown, dry, soft, high plasticity			- - - - - - - - - - - - - - - - - - -
45	47.0		SB207-45' at 10:30	CLAY, reddish brown, dry, stiff, low plasticity CLAY, reddish brown, moist, stiff, low plastic increasing silt content			
50		10.0	SB207-50' at 10:45				- - - - - - - - - - - - - - - - - - -
55_ ⁻	57.0		SB207-55' at 10:55				
- - - 60				SILT, gray with reddish brown, moist, nonco few clay, wet clay seam at 69' to 69.5'	ohesive, _ - - - -		
L	!			Į		I	ļ



SHEET 3 OF 3

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Near the bus barn

661508

ELEVATION :

DRILLING CONTRACTOR : Environmental West Exploration, Inc

DRILLING METHOD AND EQUIPMENT : 4" diameter, Sonic

WATER	LEVELS	S :		START : 6/21/19 09:00	END : 6/2	1/19	12:30	LOGGER : JE/KS	
DEPTH I	BELOW E	XISTING G	GRADE (ft)	SOIL DESCRIPTION		g			
	INTERV	AL (ft) RECOVE	ERY (ft)	SOIL NAME, USCS GROUP SYMBOL, CO MOISTURE CONTENT, RELATIVE DENSIT CONSISTENCY, SOIL STRUCTURE, MINER	DLOR,	SYMBOLLIC LOG	PID (ppm)	COMMENTS	
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINER	ALOGY	SYMB	DIG		
		10.0	SB207-60' at 11:35		-			At 62' - GSA sample	
65 			SB207-65' at 11:45		- 			- - - - -	
-	67.0				-			At 67' - GSA sample	
70		10.0	SB207-70' at 12:00					- - - - - - - - - - - - - - - - - - -	
			SB207-75' at 12:10	CLAY with BASALT, brown, moist, very soft,	some			- - - - At 76' - GSA Sample	
-	77.0			silt, weathered basalt Bottom of Boring at 77.0 ft bgs on 6/21/19 12	2:30				
80					-			- - - - - - - - - - - - - -	
85					-			- 	
90					-				



DRILLING CONTRACTOR : Environmental West Exploration, Inc

SHEET 1 OF 4

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Near Marlow #2

661508

ELEVATION :

DRILLING METHOD AND EQUIPMENT : 4" diameter, Sonic

WATER LEVELS : -START : 6/20/19 09:00 LOGGER : JE/KS END: 6/20/19 14:30 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG INTERVAL (ft) (mqq) SOIL NAME, USCS GROUP SYMBOL, COLOR, COMMENTS RECOVERY (ft) MOISTURE CONTENT, RELATIVE DENSITY OR П SAMPLE ID (TIME) CONSISTENCY, SOIL STRUCTURE, MINERALOGY GRAVEL 0.0 CLAY, brown, dry, medium dense, low plasticity CLAY, brown, dry, hard, low plasticity 5.0 5 SB208-5' at 9:10 8.0 CLAY, brown, dry, hard, low plasticity 10 SB208-10' at 9:35 10.0 15 SB208-15' at 9:45 18.0 CLAY, brown, dry, hard, low plasticity 20 SB208-20' at 10:00 10.0 25 SB208-25' at 10:05 CLAY, brown, dry, hard, low plasticity 28.0 CLAY, reddish brown, moist, stiff, medium to high 30 plasticity



DRILLING CONTRACTOR : Environmental West Exploration, Inc

SHEET 2 OF 4

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Near Marlow #2

661508

ELEVATION :

DRILLING METHOD AND EQUIPMENT : 4" diameter, Sonic

WATER LEVELS :		START : 6/20/19 09:00	END : 6/20/19	14:30	LOGGER : JE/KS
DEPTH BELOW EXISTING GRADE	E (ft)	SOIL DESCRIPTION	ဗ		
INTERVAL (ft) RECOVERY (ft))	SOIL NAME, USCS GROUP SYMBOL, C MOISTURE CONTENT, RELATIVE DENS	OLOR, ITY OR RALOGY	PID (ppm)	COMMENTS
	SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINE	RALOGY	JILd	
- 10.0	SB208-30' at 10:30	CLAY, reddish brown, moist, medium dens	e, low		
35s	SB208-35' at 10:55	plasticity, trace to few silt CLAY, brown, moist, soft, high plasticity, m	ottled		- - - - -
38.0					-
40s	SB208-40' at 11:05	CLAY, brown, moist, soft, medium to low p mottled, trace to few silt	lasticity,		
45 45 48.0	SB208-45' at 11:10				- - - - - - - - - - - - - - - - - - -
- - 50 -	SB208-50' at 11:35	CLAY, brown, moist, very soft, high plastic gravel	ty, some		- - - - - - - - - - - - - - - - - - -
	SB208-55' at 11:45	CLAY, brown, moist, medium dense, low p mottled, trace to few silt	lasticity,		- - - - - - - - - - - - - - - - - - -
58.0 		CLAY, brown, wet, very soft, plastic, trace sand, dry above and below interval	to few		-



DRILLING CONTRACTOR : Environmental West Exploration, Inc

SHEET 3 OF 4

SOIL BORING LOG

PROJECT : Grain Handling Facility at Freeman, Freeman, Washington LOCATION : Near Marlow #2

661508

ELEVATION :

DRILLING METHOD AND EQUIPMENT : 4" diameter, Sonic

WATER	LEVELS	:		START : 6/20/19 09:00	END : 6/20	0/19 1	4:30	LOGGER : JE/KS
DEPTH			GRADE (ft)	SOIL DESCRIPTION		ÿ		
	INTERVA	AL (ft) RECOVE	ERY (ft)	SOIL NAME, USCS GROUP SYMBOL, COL MOISTURE CONTENT, RELATIVE DENSITY	.OR, Y OR	SYMBOLLIC LOG	PID (ppm)	COMMENTS
			SAMPLE ID (TIME)	CONSISTENCY, SOIL STRUCTURE, MINERA	SYME	Ē		
	-	10.0	SB208-60' at 12:00	CLAY, brown, moist, medium dense, low plas mottled, trace to few silt	ticity,			At 63' - GSA sample
- 65_ ⁻ - -			SB208-65' at 12:10		- 			- - - - - - -
	68.0				-			At 68' - GSA sample
			SB208-70' at 12:50	CLAY, brown, wet, very soft, low plasticity, wh nodules	nite silt			At 72' - GSA Sample
		10.0	SB208-75' at 13:00					
-	78.0				-			-
			SB208-80' at 13:55	CLAY, gray, wet, very soft, low to no plasticity	- 			- - - - - - - - - - - - - - - - - - -
		10.0	SB208-85' at 14:05	white silt nodules				
	88.0							
90								



DRILLING CONTRACTOR : Environmental West Exploration, Inc

SHEET 4 OF 4

SOIL BORING LOG

LOCATION : Near Marlow #2 PROJECT : Grain Handling Facility at Freeman, Freeman, Washington

661508

ELEVATION :

DRILLING METHOD AND EQUIPMENT : 4" diameter, Sonic

WATER LEVELS : --START : 6/20/19 09:00 LOGGER : JE/KS END: 6/20/19 14:30 DEPTH BELOW EXISTING GRADE (ft) SOIL DESCRIPTION SYMBOLLIC LOG PID (ppm) INTERVAL (ft) SOIL NAME, USCS GROUP SYMBOL, COLOR, MOISTURE CONTENT, RELATIVE DENSITY OR CONSISTENCY, SOIL STRUCTURE, MINERALOGY COMMENTS RECOVERY (ft) SAMPLE ID (TIME) CLAY, black or dark gray, wet, very soft, lots of 3.0 At 90' - GSA Sample weathered basalt chips 92.0 WEATHERED BASALT Bottom of Boring at 92.0 ft bgs on 6/20/19 14:30 95 100 105 110 115 120

Geophysical Survey

Geophysical Survey LLC 711 S Tacoma Street Kennewick, Washington 99336

August 24, 2017

Steve Demus CH2M 999 West Riverside Ave, Suite 500 Spokane, WA 99201

Re:

Geophysical Investigation UPRR Site Freeman, Washington

Mr. Demus:

Geophysical Survey LLC conducted a geophysical investigation at the UPRR site in Freeman, Washington on August 17, 2017. The objective of the survey was to detect and delineate underground storage tanks (USTs).

METHODOLGY

Frequency Domain Electromagnetic Method (EM-31)

The EM-31 has a dipole length of approximately 13 feet, the depth of investigation in the vertical dipole mode is approximately 19 feet. The method is based on a transmitting coil radiating an electromagnetic (EM) field which induces eddy currents in the earth. A resulting secondary EM field is measured at a receiving coil as a voltage which is linearly related to the subsurface conductivity.

Terrain (or ground) conductivity is a function of the natural soil matrix and pore fluid electrical conductivity. The depth of investigation is dependent upon the electrical conductivity of the subsurface, the distance between the transmitting and receiving coils, sensitivity of the equipment, and the power of the source. The conductivity value resulting from a measurement is a composite, and represents the combined effects of the thickness of the stratigraphic layers, their depths, their specific conductivity, and any man-made conductive objects that may be present such as metal objects. The quadrature component indicates the bulk apparent conductivity of the volume of ground sampled, in milli-Siemens per meter (mS/m). The in-phase component, magnetic susceptibility, is expressed in parts per thousand (ppt). Phase changes between the primary and secondary field are used to indicate the presence of metallic objects. Phase changes in value. In-phase component data provide information on the likely presence of buried metal objects.

Geophysical Investigation UPRR Site Freeman, Washington

Time Domain Electromagnetic Method (EM61)

Time domain electromagnetic methods involve generating a signal of known frequency and voltage from a transmitter. In the presence of metallic objects an EM signal is induced when the transmitted signal is applied. When the transmitter is turned off the induced signal decays at a rate proportional to the metal mass in which it was induced.

The Geonics EM61MK2 consists of a transmitter (Tx) and receiver (Rx) coil and a coincident receiver coil located 30 cm above the bottom coil. The transmitter coil is energized by a pulse of current and the receiver coils measure the response decay at fixed time intervals. Three time gates of data from the bottom coil and the top coil are recorded, differential data is the top coil minus channel 3 bottom coil data. Differential data is useful in negating affects of surface metal.

FIELD SURVEY

Mapping Control

A Trimble Pro6H GPS with sub-foot level accuracy was used for location control and mapping of surface features.

EM61 Data Acquisition

Electromagnetic data were collected using a Geonics EM61MK II metal detector. Data were collected at 0.6 foot intervals on transects spaced 5 feet apart. EM data were collected using NAV61 software from Geomar on an Allegro CX datalogger.

EM31 Data Acquisition

Electromagnetic data were collected using a Geonics EM31 Terrain conductivity meter. Data were collected at 0.6 foot intervals on transects spaced 10 feet apart. EM data were collected using NAV31 software from Geomar on an Allegro CX datalogger.

DATA PROCESSING

EM Data Processing

Electromagnetic data were processed using Trackmaker61MK2 & Trackmaker31 software from Geomar. EM 61 Channels 1-3 and top channel data were output to .xyz format and transformed to geo-referenced format using Didger from Golden Software. Data was gridded and contoured using a Kriging algorithm in Surfer 13 from Golden software. EM 31 Apparent conductivity and in-phase response data were output to .xyz format and transformed to geo-referenced format using Didger from Golden Software. Data was gridded and contoured using a Kriging algorithm in Surfer 13 from Golden Software. Data was gridded and contoured using a Kriging algorithm in Surfer 13 from Golden Software.

RESULTS AND INTERPRETATION

No USTs were detected in the survey. A metallic anomaly was detected at: E2539654 N210729 to E2539673 N210755. The anomaly is approximately 30 feet long and 3 feet wide. It exhibits a differential response of approximately 50 milli-volts and a peak in-phase response of 3 parts per thousand. The responses are less than a typical UST but in the range of drums or a section of large diameter piping. The EM61 coil response indicates an approximate depth of 3.0 feet.

Railroad tracks, rail cars and associated parts caused considerable interference along the northern portion of the survey area as did reinforced foundations and metal buildings of the grain silos.

Elevated apparent conductivity values at the center of the site appear to be associated with the recent boring locations.

CLOSURE

Geophysical surveys performed as part of this survey may or may not successfully detect or delineate any or all subsurface objects or features present. Locations, depths and scale of buried objects or subsurface features mapped as a result of this survey are a result of geophysical interpretation only, and should be considered as confirmed, actual, or accurate only where recovered by excavation or drilling.

Geophysical Survey LLC performed this work in a manner consistent with the level of skill ordinarily exercised by members of the profession currently practicing under similar conditions. No warranty, express or implied, beyond exercise of reasonable care and professional diligence, is made. This report is intended for use only in accordance with the purposes of the study described within.

Respectfully,

Geophysical Survey LLC

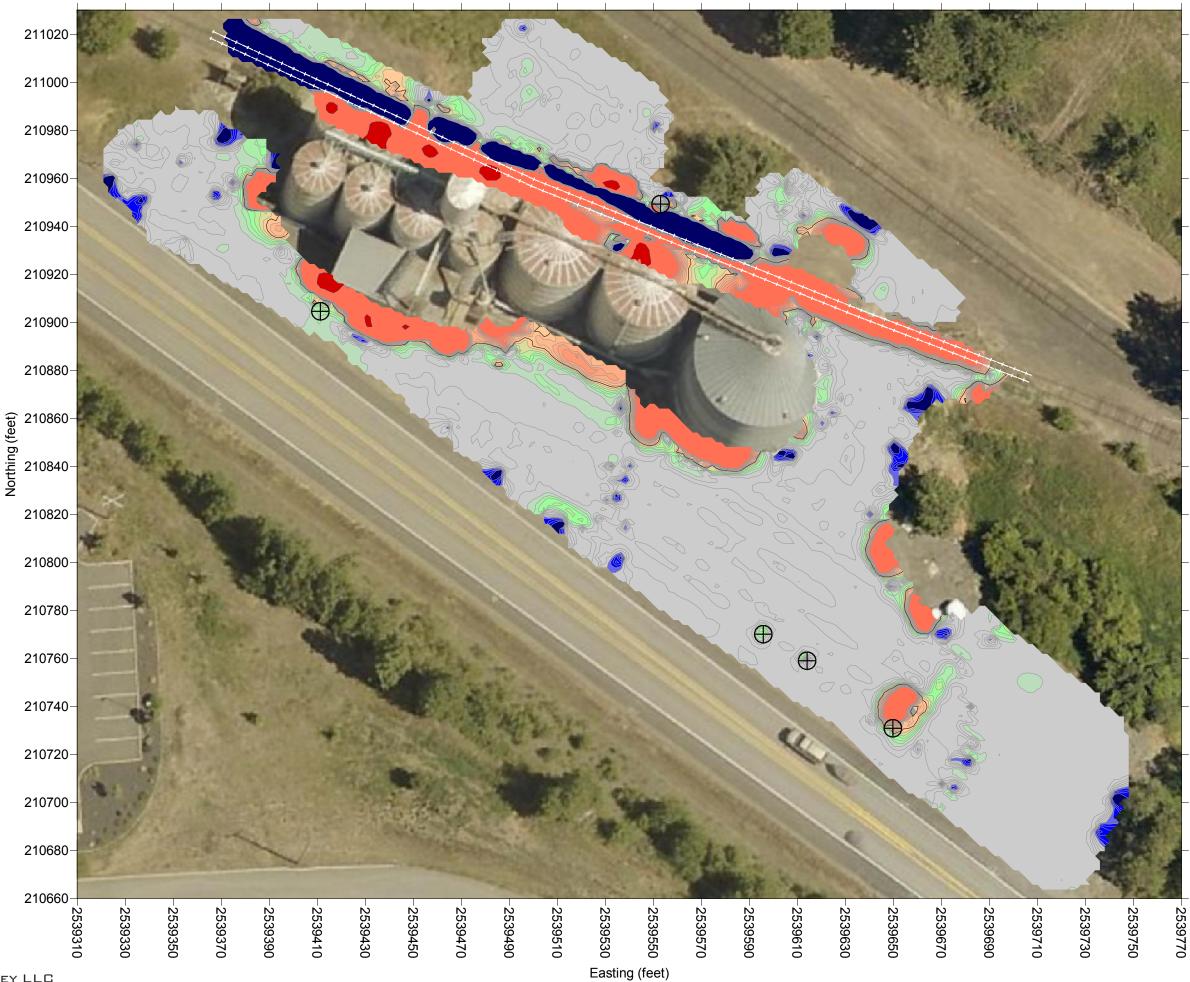
MI Ville

Mark Villa L.G. Geophysicist

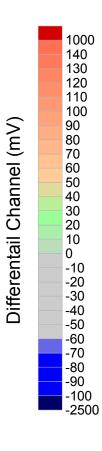
Geophysical Investigation UPRR Site Freeman , Washington

LIST OF FIGURES

- Figure 1 EM61 Data Contours
- Figure 2 EM31 Apparent Conductivity Data Contours
- Figure 3 EM31 Magnetic Susceptibility Data Contours



GEOPHYSICAL SURVEY LLC





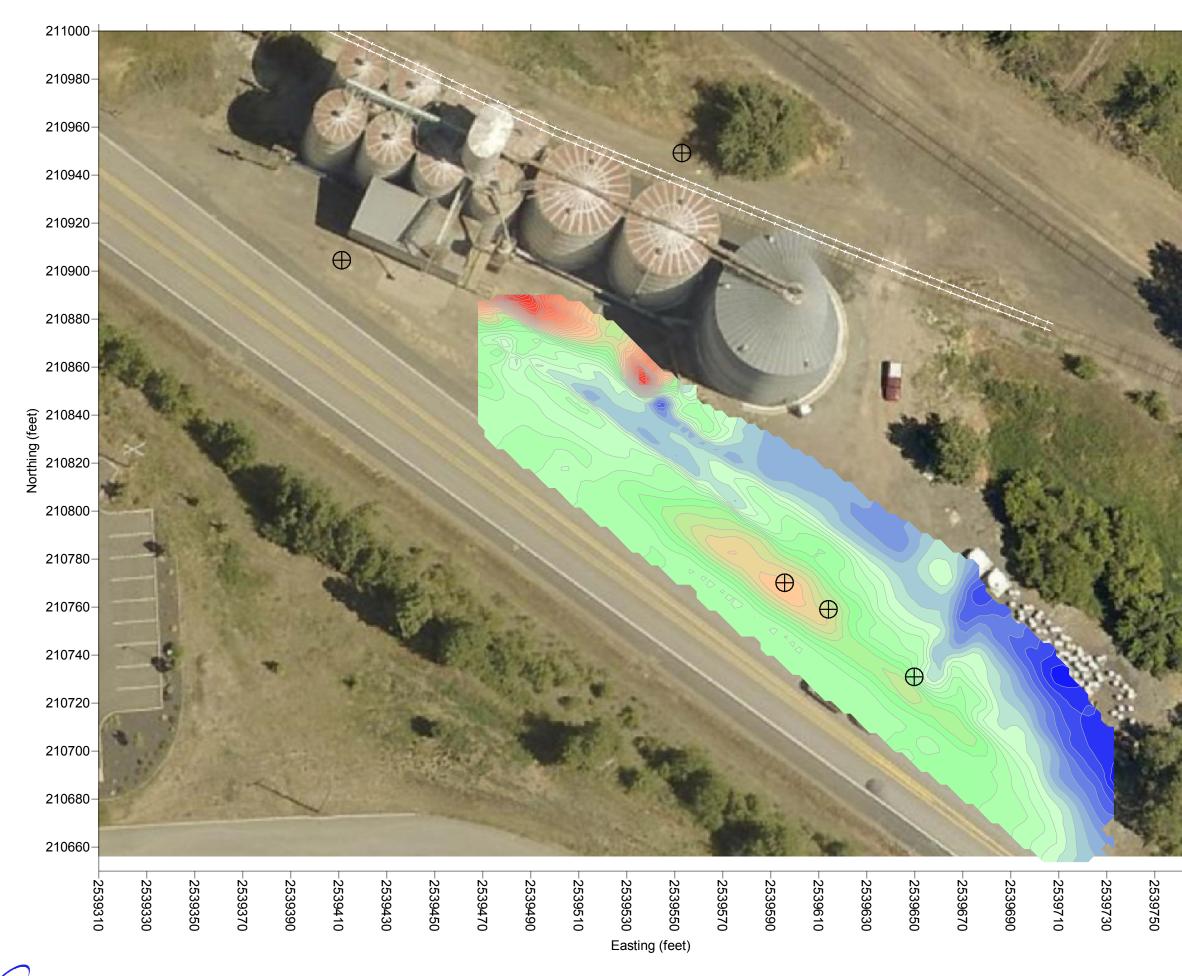
0 10 20 30 40 Washington State Plane NAD83

LEGEND

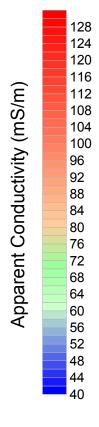


Monitoring Well

FIGURE 1 EM-61 Data Contours Freeman, Washington August 2016



GEOPHYSICAL SURVEY LLC





US Feet

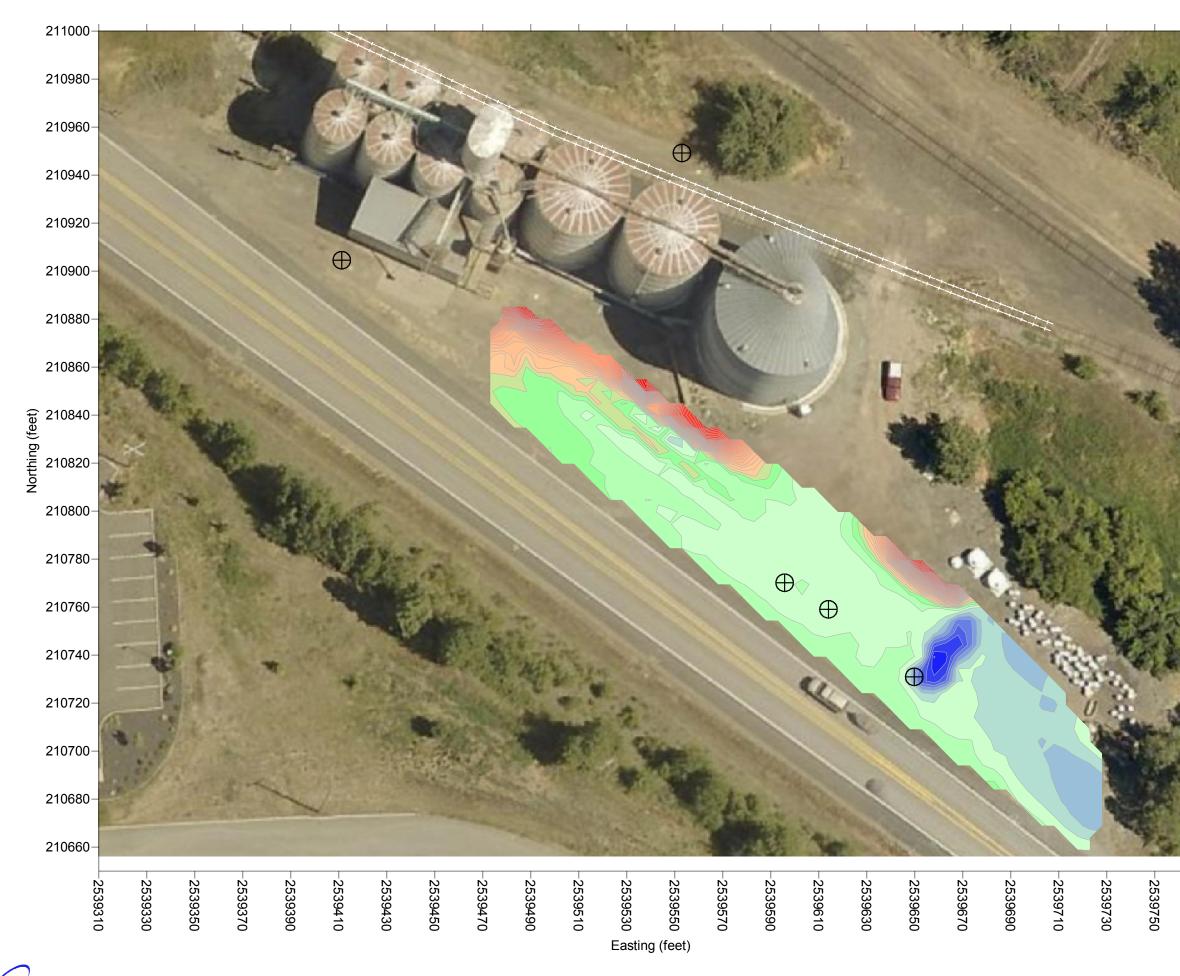
0 10 20 30 40 Washington State Plane NAD83



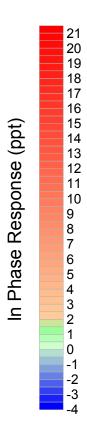
 \oplus

Monitoring Well

FIGURE 2 Apparent Conductivity Data Contours Freeman, Washington August 2016



GEOPHYSICAL SURVEY LLC





0 10 20 30 40 Washington State Plane NAD83

LEGEND

 \oplus

Monitoring Well

-2539770

FIGURE 3 In-Phase Response Data Contours Freeman, Washington August 2016 **Monitoring Sampling Forms**



DTW ² Begin Pur	Benle Purge Vol. (gal)			Р	ד In urge Rate ⁵:	itial DTW	Date: rival Time: (ft btc):	12/06/15 1253 23,23
DTW ²	Benle Purge Vol. (gal)	Temp		Р	_ In	itial DTW	rival Time: ′ (ft btc):	1253
DTW ²	Benle Purge Vol. (gal)	Temp		Р	_ In	itial DTW	(ft btc):	,23,23
DTW ²	Benle Purge Vol. (gal)	Temp	Field					
	(gal)	and the second se	Field	Deremet		1.	1	
	(gal)	and the second se	1	raramet	ers ¹		Mary St.	
			pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen etc.
1207					1 (110)	<u>(</u>		010,
Kartar			Di	24 14	KI			
5.11	11 1	Ti la	IID		Pue			
Selle 1	<u>.</u>	W.E	511.0	ris-				
		-		-				
			pu	11			- <u>-</u>	
			12	1301				
	/						-	
/								
							·····	
-	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
			² DTW: depth to	water measur	ed from top of cas	ing; total drawdow	vn should not ex	xceed 0.33 ft
	arameters stabi	lize for 3 success	sive readings; mi ⁵ target purge ra	nimum parame ate is 0.1 - 0.5	eter subset: pH, sp L/min (0.03 - 0.13	. cond., and turbio gal/min)	dity or DO	
	N/A						nple Time:	:
	NIA	-			_			
IRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	
D :						Field Dup	licate Time:	
۲.	20-30) ml i	n wete	i bail	ed him		dres	dant & drame
inu	ratin,	tanth	in in	color	1	1)	
	· · · · · · · · · · · · · · · · · · ·		5) 1000	<u>* · · · · · · · · · · · · · · · · · · ·</u>		
-					5	North Contraction		
		> 10 NTUS N/A N/A IRCLE): FD	d once field parameters stabilize for 3 success > 10 NTUs N/A N/A IRCLE): FD MS/MSD	ers in 3-5 minute intervals d once field parameters stabilize for 3 successive readings; minute intervals > 10 NTUs	ers in 3-5 minute intervals d once field parameters stabilize for 3 successive readings; minimum parameters 0.1 - 0.5 N/N N/N N/N N/N N/N N/N N/N N/	$\frac{1}{20-30} \text{ M/MSD} = Q \text{ Blank} \text{TO}$	- - ± 0.1 units ± 3% ± 10% ⁴ ± 0.3 mg/L - - ± 0.1 units ± 3% ± 10% ⁴ ± 0.3 mg/L ers in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdow d once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbits > 10 NTUs ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) N/A San N/A San N/A IRCLE): FD MS/MSD EQ Blank TOTAL PURG	± 0.1 units ± 3% ± 10% ⁴ ± 0.3 mg/L ± 10 mV ars in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not ex- d once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO > 10 NTUs ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) <u>N/A</u> MRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): D: Field Duplicate Time: <u>4 20 - 30 mL q water brided from Water Market</u>

steret 20.73 23.13

,48



	SITE:	UPR	R				V	Vell ID:	mw	-10			
	Field Team:		Uction	1/Ende	2				Date:	12/09/16	_		
	Weather/Te	mp:	203°F,	main	t, life	twend	7	Ar	rival Time:	0810			
	Well Conditi	ion:	Gord		0	Initial DTW (ft btc): 23.53							
	Purge Method: Submerstikk Pump						Purge Rate ⁵:						
			10. S.		Field	Parameters ¹							
	Time	DTW ²	Purge Vol.	Temp (°C)	pН	mS/cm Sp. Gond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, shee etc.	n,		
		Begin Pu	mping			y							
	0848	23.53	initial	7.7	6.88	0.451	1.4	1163	-552	clear, no oder			
	0853	23.50	1,18,40	6.2	7,21	0.492	Ø	0,60	-521	tr n			
	0558	24,30	2 liten	7.1	7.21	0.471	4.2	0.46	-466	L.			
*	0903	25.05	2.3L	7.50	7.20	6.474	3th HATE	NA		W CLUDY GUAY, NO	- Che		
	0908	25.40	2.564	7.0	7.21	0.461	333	1:77	-87	clondy gray, no			
	0915	26.02	4.09.6.	7.0	7.14	0.474	315	1.35	-81	in a			
	0920	26.20	4,306	"7.D	7.14	0.475	303	0:83	-80	h v			
	0925	26.26	4,80it	57.0	7.13	0474	290	0.87	-65	L			
	0430	26.26	5.0 lite	. 6.8	7.11	0.475	265	0.73	-62				
	0935	26.25	5.5.lil	6.5	7.11	0.479	274	0.62	-62				
		- 0935	2 SAMP	LE TIM	0								
	Stabilization Criteria ³	-	-	a.	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-			
				ize for 3 succes	sive readings; mi		er subset: pH, sp			xceed 0.33 ft			
	Sample ID:	mw	D-GW	-1209	16			Sa	mple Time:	0935			
	Analysis:	82603	6010;	23203/	310,1,41	UCPRIZ.	415.2:	360.0 ;	376,2	; RSKITS GET	zn		
	QC SAMPLE		FD	MS/MSD	EQ Blank	- 1	,	TAL PURG		/			
	Field Duplica	ate ID :	NA					Field Dup	licate Time:	NIA			
	Comments:	236	PPM CO	7			Dmu	; F	emus F	7=139mall			
			ppm VOC	f in we	Uat ; Bri	athing =	Ugu) (HACHT	DR 890) J			
		390	LEL	Jovell he	nd Zo	me z	0 70						
		pumpe	34HZ -	-35 Hz	- = lo	west les	rel at n	hiel w	pita with	h flow.			
		* 254302	ERACR, EM										



			-	Ū				4	CHZIVIAILL
SITE:	UPER	2. Tre	man			V	Vell ID:	mw	-20
Field Team:			nt/En					Date:	12/09/16
Weather/Te	mp:	Upper 2	os fer	303 -She	w-light.	unt	Ar	rival Time:	1120
Well Conditi	on:	Gn			ÿ			/ (ft btc):	32.16
Purge Meth	od: .	Submer	sible 1	limp	. Pu	rge Rate ⁵:			
		Durge Vel	Tana	Field	Paramete			0.00	
Time	DTW ²	Purge Vol.		pН	MS CM. Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin Pu	mping					1.00.0		
1137	32.16	initial	7,1	8.99	0.280	5,3	2275	-143	clear, NO odor
1142	3373	2.8L	8.1	9.03	0,304	0.0	0.76	-176	P1 61
1148	33,191	4,04	81b	8.97	0.340	24.9	0.80	-180	1 11
1153	33.94	5.) la	, 8.6	8.55	0.360	24.9	0.75	-176	ti vi
458	34.00	6,2,914	87	8.36	0.366	13,0	1.07	-181	Le 7
1203	34.02	7. Slike	F18 1	8.28	0.374	9.3	1.06	-181	4 4
1208	34.05	8. Elte	,8.7	8.21	6.381	1.9	0.91	-178	Lr v
1213	34.11	9.8 pt	- 8.9	8.11	0.384	0,3	1.05	-174	U 4
1218	34.11	11,24	4 P.D	8,08	0:387-	0.0	1.00	-7172	er - tr
1223	34,10	12.1	88	8,04	0.393	0.4	0.91	-168	¥ 2
225	Se	mile	time						
Stabilization Criteria ³		-		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
¹ collect field para ³ stabilization ach			ing for 2 augusts		water measured				cceed 0.33 ft
⁴ for turbidity read		Dalameters stabil			ate is 0.1 - 0.5 L/			aity or DO	
Sample ID:	MW	20-G	1-120	۵ 0			Sa	mple Time:	1225
Analysis:	82603	6010 - 7	1320B)	31 . 1	PCPR13	6415.2	·, 300,0	376.2	: RSK175-GC-F7D
QC SAMPLE	; E (CIRCLE):	FD	MS/MSD	EQ Blank		ТО	TAL PURG	ED (GAL):	,
Field Duplica	ate ID :	NA					Field Dup	licate Time:	NIA
Comments:	G 1136	Co = (Sepm, All	EWZ K	L. (IN WE	LL HJ. BE	- All CK)		
	44 H	E- 33.04			LIGHT S	,		TIP. FER	10. 1 1 RON = 1. 37 Mg



SITE:	UPPR	- Freer	norm			V	Nell ID:	nw	30	
Field Team:		Nilow		to			_	Date:	1714	5/16
Weather/Te					whenge	rund	Ar	rival Time:		-
Well Condit		Con)		U		nitial DTW	(ft btc):	33	.61
Purge Meth	od:	Subma	all Pu	mp	Pu	rge Rate ⁵:				
				Field	Paramete	rs ¹				
Time	DTW ²	Purge Vol.	Temp 15 (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	1	odor, sheen, tc.
1	Begin Pu	mping								
0833	32.65	initial	7,4	6.72	0.385	3.1	5.41	284	cheir,	ne ador
0838	33.82	1.50,44	7.6	692	0,377	3.4	4777	285	ł	4
0843	34.08	Diolitin	6.3	698	0.386	3.2	4.91	292	i	ż
0848	34.22	2.8 liter	4.4	618	0.398	41	5.13	298	te	~/
0853	35.32	3.16tm	6.2	6.89	0.365	4.6	4.95	299	14	L
0858	35.53	3.8 lite	6.5	6.89	0.367	5.3	4.72	299	l.	r
0903	35.58	4.2.lde	6.3	6.91	0.368	7.6	4.76	298	ĺ.	4
0905	Stup	E TU	me							
			0					-		
11210			4	4						
/	-			13/121	6					-02
Stabilization Criteria ³	-	-	÷	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	1	-
¹ collect field para	ameters in 3-5 mi			² DTW: depth to	water measured	from top of cas	ing; total drawdov	wn should not ex	ceed 0.33 ft	
³ stabilization ach ⁴ for turbidity read		parameters stabi	lize for 3 succes		inimum paramete ate is 0.1 - 0.5 L/			dity or DO		
Sample ID:	-	D-GW	-121016					mple Time:	090	25
Analysis:	82608	3; 6010/0	oiss);232	03/310	1,40CP	2136/415	,2 ; 300.	0,576.	2, RSKI	7560-FI
QC SAMPLE			MS/MSD	EQ Blank			TAL PURG			
Field Duplica	ate ID :	PI	A				Field Dup	licate Time:	NIA	r
Comments:	35 112			Fern	rus Frem	= 0.0	Bmall	_		
	32.65 0	In primp 15	10,		· · · ·		٦			

0

112.55



SITE:	UPH		eman			V	Vell ID:	mw	-40	
Field Team:		Mca	mb/E	ndo				Date:	(2/08	116
Weather/Ter	mp:	14PF	clear,	Windy	<hr/>			rival Time:	1130	
Well Conditi	on:	Gni	1 2.	mp (In	itial DTW	(ft btc):	113	.03 0
Purge Metho	od: .	Subme	with B	artor	Pu	rge Rate ⁵:				
1				Field	Parameter		1.2.12	l denne		
Time	DTW ²	Purge Vol.	Temp v1 (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP · (mV)	Note color, e	odor, sheen, ic.
	Begin Pu	mping	4		2	ş				
1200	113.03	initial	6.2	7.57	0.455	4.3	4.76	286	clear,	nochee
1205	115.40	2 Litars	75	7.08	0,478	ø	4,24	297	clem, 1	noche
1210	115,28	3.5 like	8.4	7:03	0.493	0.0	3,90	297	ı(·	
1215	115.12	6.22	89	7.03	0.494	D.D	2.76	290	11	۲.
1218	115.04	6.0L	8.8	7.03	0.507	0-0	2.73	283	is ,	
1224	114.85	7.51	8.6	7.02	B40.50	0.0	2.60	220		ŀ
1227	114,82	8.01	8.6	7,03	0,498	0.D	2.70	201	11	11
12372	114.33	8.9l	8:3	7.08	0.500	4.3	3.29	183	L(4
1235	114.07	9.1.2	8.1	7.10	0.505	5.4	3.19	-179	łı	ł
1238	113.72	9,28	811	7.ID	0507	4.8	3.34	180	10	Ü
			SAMPL.	ECR4	5					
Stabilization Criteria ³	-	-	=	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	1	-
¹ collect field para ³ stabilization achi ⁴ for turbidity readi Sample ID:	ieved once field ; ings > 10 NTUs	parameters stabi	lize for 3 success - 120'811	sive readings; m ⁵ target purge r	water measured inimum paramete rate is 0.1 - 0.5 L/	r subset: pH, sp	cond., and turbi gal/min)		10	
Analysis:					CFR136/4	(C 2)A	0.0:376		1-175	St-EIN
QC SAMPLE		FD	MS/MSD	EQ Blank	1		TAL PURG	-) -		رير الم
Field Duplica	. ,	NIK	F					licate Time:	ti z / f	<u> </u>
Comments:	7	errono	Fron=	Qiom	all_		oid Dup		<u>~//</u>	
					V					

SITE:	UPRA	2-tre				۷	Vell ID:	MW-	5)
Field Team:		McCom	1-1 Enc	ło	.0			Date:	12/08/16
Weather/Te	mp:	Midta	<u>nai F; U</u>	Vindy	mostyc	ear	Ar	rival Time:	1353
Well Conditi		ON	d-		··	, in	itial DTW	/ (ft btc):	63.45
Purge Meth	od:	Sobme	nsilph +	ump	. Pu	rge Rate ⁵:			
		Dura Vol		Field	Paramete				
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	m form Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin Pu	mping			M. W. C. W.				
1405	63.45	NA-							->
1429	65.73	4.81	10.9	7.24	0.579	15.4	1.58	166	NO ODER
1434	65.65	7.51	11.4	7,25	0.594	27.3	1-48	175	20
1439	65.62	9.36	11.4	7.26	0.606	59.3	1.36	169	11
1444	65.61	12.2l	11.4	7.25	0,616	76.5	1.27	159	11
1449	65.52	14.81	11.5	7,29	0.621	105	1.39	150	11
1454	65.72	15.82	11.7	7.29	0.609	76.0	1.35	148	H
1459	65.80	17.5	11:1-	7.28	0.607	72,2	1.42	144	t (
1504	65.80	19.0	11.8	7.30	0.605	76.2	1.48	140	()
1505	SAM	RET	IME						
Stabilization Criteria ³	-			± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
¹ collect field para					water measured				ceed 0.33 ft
³ stabilization achi ⁴ for turbidity read		parameters stadi	lize for 3 succes		ate is 0.1 - 0.5 L/			idity or DO	
Sample ID:	MWSD	-BW-12	0816				Sa	mple Time:	1505
Analysis:	8260B;	6010;	2320 B/ 3	310.1;40	4FR 136/	415.2 ; :	300.0; 3	76.2;	RSK-175
QC SAMPLE		FD	MS/MSD	EQ Blank	/	,	TAL PURG		
Field Duplica	te ID :	NIA					Field Dup	licate Time:	N/M
Comments:	F	Envous	Fe=Ø	@ mall	<u> </u>				
		-							

0



0	SITE:	UPPR	1- Free	eman			v	Vell ID:	mw	-65
	Field Team:		Milin	nl.B	annan	n)			Date:	12/04/16
א	Weather/Ter	mp: 🗡.	GOD					Ar	rival Time:	1430
4	Well Conditi	on: 🦕	ovacant	<u>(hail)</u> ,	305 by	uthund	winh In	itial DTW	(ft btc):	36.02
	Purge Metho	od: .	Ba	lor		Pu	rge Rate ⁵ :	NA		
				alen an Tarakan	Field	Paramete				
	Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
		Begin Pu	mping							
	1435	36.02	initial	8.9	7.33	0.372	814	6.03	238	littlicial, no odor
	1502	42.95	21/2	8.6	7.55	0.365	offsede	6.07	-87	brown sedimentiled
	1515	43.95	3	9.2	7.54	0,350	offseale	5.76	-99	strongbrown, no ador
	1			End	Purpe	1515	n v2/4/			5
12/05	1302	36.32			0	1				
0	1334	38.43	Nonvieren	7.6	7.41	0,407	Offscale	5.78	125	Strong brown, woudor
0			in town							Sidnent
							đ			
					pu					
				-	13/4	16				
								5		100
	Stabilization		-		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
	Criteria ³ ¹ collect field para			A. Frank			from top of casi	ng; total drawdov		cceed 0.33 ft
	³ stabilization achi ⁴ for turbidity read		parameters stabi	lize for 3 succes			er subset: pH, sp /min (0.03 - 0.13		dity or DO	
	Sample ID:	mw6	5-GW-	-12051	0			Sa	mple Time:	1310 12/5/16
	Analysis:	8260B	; 6010	2320 B	310.1 ;	HOCFR	136/415.	2; 300,0	0:376.	2 . RSK-175 GC-FID
	QC SAMPLE	-	FD	MS/MSD	EQ Blank		•	TAL PURG	-	.1.0
	Field Duplica	ate ID :	NI	4				Field Dup	licate Time:	NIA
~	Comments:	136	$q = 1 \omega$	ell vol	me					
0										
								_		



SITE:	UPR	R- Fre	eman			V	Vell ID:	MW	1-6D
Field Team:		Metr	1/6	ndo			_	Date:	12/08/16
Weather/Te	mp:			andy we	now		A	rival Time:	án a si inn
Well Conditi	ion:	Gov	<u>b_</u>		0	In	nitial DTW	/ (ft btc):	128.24
Purge Meth	od:	Sulme	rsilile for	limp	Pu	rge Rate ⁵:			
A - 3 & - 4 - 4				Field	Parameter	rs ¹	San Star		
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	m S Cmi Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
ರೆ	Begin Pu								
0848/8	128,24	initial	7.9	7.02	0.447	7.2	2.70	257	OA12 water & Sinface
0920	128.45	5 liter	9.8	7.31	0.437	0,0	1.05	256	0912 wrter o sinface Clear, no idene
0925	123.37	9,121ton	99	7,34	0,429	Ø	1.00	253	i/
0932	128.36	13.6L	9.4	7,31	0.427	0.0	1.01	255	11
09391	128.33	15.8L	9.2	7.27	0,409	0,0	lipb	25%	Er
0944	128.35	19.0L	9,1	7.25	0.406	0,0	1109	255	61
0949	128.34	21.0L	9,4	7.22	0,402	0.0	1,10	253	1/
			En	Rup					
			-	0				-	
					12/08/	10			
								1	
Stabilization Criteria ³	-	-		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect field para	meters in 3-5 mi						ing; total drawdo		kceed 0.33 ft
³ stabilization ach ⁴ for turbidity read		parameters stabi	lize for 3 succes		ate is 0.1 - 0.5 L/			idity or DO	
Sample ID:	MWG	D-GW-	12081	6			Sa	mple Time:	0950/0955
Analysis:	82403	, 600	23206/3	sic. 1,40	OFR 1310/	415.2,3	300,0,3	76.2:25	SK-175
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank	1	•	TAL PURG	-	apr 21 Liters
Field Duplica	ate ID :	MUGI	D-GW-F	-D-1202			Field Dup	licate Time:	0955
Comments:	Nim	mal	33 Hz	10 0g	HE Bej	an les	hnis		
	FERR	DUS ILON	= 0.06	e My Th	U		1		



0	SITE:	UPER	Free	nan			V	Vell ID:	mu)-75
	Field Team	:	Mià	ml B	windy	m			Date:	12/06/15-12/07
	Weather/Te	emp: Nos	thy clave,	m 2 205	windy		•	Ar	rival Time:	1145
	Well Condit		Good				. Ir	itial DTW	/ (ft btc):	30,15
	Purge Meth	iod:	Ba	ler		. Pu	rge Rate ⁵ :	N/A		
					Field	Paramete	rs ¹	D	l dans	
	Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	msicm Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
		Begin Pu	mping		and the second					
	11:45	30.15	initial	7.6	6.52	0,373	303	6.13	291	
	12:12	42.4	5 gd	5.120	6.53	0,368	erroit. Tos turbio	5184	273	
	12:23	44.42	7 gel	7.5	6.23	0.378	ec te	5.09	287	
,	a.A. 6	D	Eno	Pinyen	n 12/0	6/15				
12/07/16	0905	30.39	PIA	0_	} '	1	с. 			
0	1012	32.60	-	7.8	5.89	0.524	67.5	6:77	276	
0										
	1				OM					
					1217	16			-	
			/							
	1	/								
	Stabilization Criteria ³	-	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
	¹ collect field para ³ stabilization act			l ilize for 3 succes	sive readings; m	inimum paramet	er subset: pH, sp			cceed 0.33 ft
	⁴ for turbidity reasonable ID:		S-FILL	20716		rate is 0.1 - 0.5 L	/min (0.03 - 0.13		mple Time:	0930
		· · · · · · · · · · · · · · · · · · ·								
	Analysis: QC SAMPL			MS/MSD	EQ Blank	-				376.2 ; RSK175
	Field Duplic	. ,	N/A				10			<u> </u>
	Comments:	0	89=10		d-dd ()	·	-	riela Daț	blicate Time:	
	ooninonta.	6.9	3-10	VILL VILL	- THE					
~		Ferrol	u Iron	$) = N^{\circ}$	b = 0	mall	•			



\bigcirc	SITE:	UPRR	- mee	man			V	Vell ID:	UL	1-85	
	Field Team:		Melor	nh Ba	uman	L			Date:	12/04/16	
	Weather/Te	mp:	Overcan	t, upper	(30° W	indy		Ar	rival Time:	1140	
	Well Conditi	ion:	Good	711		5	In	itial DTW	/ (ft btc):	36.53	
	Purge Meth	od:	Ba	iler		Pu	rge Rate ⁵:	N/N			
					Field	Paramete					
	Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.	
		Begin Pu	mping								
	1143	36.53	initial	9.7	6.23	0.417	ø*	5.81	319	clear, no odore	
	1220	49.80	5	10:2	6.40	0.398	447	5.80	297	clear, no adore Cloudy, no adore	
	1230	50.70	6	10.8	6.45	0.409	496	5.77	281	lightbrown, he a	dop
				End	pinen	this de	te 12/4	@ 12:3	0	0	
12/05	1152	36,43			. 07						
0	1230	39.51	to till	5:7	6.17	0,429	offscale	5.66	328	hight brom, we oden	
			GALIE								
					pu						
					13/4	16			-		
		ſ									
	Stabilization Criteria ³	E.	-		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV		
		meters in 3-5 mi ieved once field		lize for 3 succes			d from top of casi er subset: pH, sp			cceed 0.33 ft	
	⁴ for turbidity read	lings > 10 NTUs					/min (0.03 - 0.13				
	Sample ID:	MWBS	-GW-120!	516			-	Sa	mple Time:	1200	
	Analysis:	8260A	, 6010	; 2320	3/310.1;	40CFR	136/415,	2;300.0	; 376.1	-; RSKITSGC-FI	D
	QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		ТО	TAL PURG	ED (GAL):		
	Field Duplica	ate ID :	N/A					Field Dup	licate Time:	N/A	
0	Comments:	* not	sure to	nhdime	tin prob	innerd	m with	1H			
\bigcirc		2.562	= I well	lvolum	e		<u>د</u>				
		0									



SITE:	11PRR	-men	ran			V	Vell ID:	mω	-95
Field Team	:	Miler	nHB	anna	n			Date:	12/04/16
Weather/Te	emp:	Overe	art 3	7°F, we	indy	-			0920
					0	-			32.73
Purge Meth	iod:	Barle	w		. Pu	Irge Rate ⁵:	NII	1	
1	1	Purge Vol	Temp	Field			DO	OPP	Note color, odor, sheen,
Time	DTW ²	(gal)	(°C)	pН	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
	Begin Pu	Imping			1.15				
0925	32.23	initial	12.8	5.82	0,675	Ø	6.09	304	Our noaler
1015	36,60	5	11:7	5.91	0.572	officile	5.76	275	brow water
1105	38:70	11	9.9	6.17	0.568	Bacole	5.37	316	Bromy noodor,
			End	purp n	12/04				Jime Sedement
0945	32.64	K/A		0	,				
1105	34.09	for samples rely	10,5	6.17	0,726	496	6.48	290	Lythoman volge
									0
	-			py	1			-	
			/	12/4	HI6				
				6	/				
		-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
¹ collect field para			ing for 2 august						xceed 0.33 ft
			ize for 3 succes					idity or DO	
Sample ID:	MW95	-GW-120	516			-	Sa	mple Time:	0945 12/05/1k
Analysis:	8260B;	6010;2	320B/31	0.1; 40CF	7R 136/41	5,2;30	0.0;376	12; PSK-	175 GC-F71);
			MS/MSD	EQ Blank	and la.	-			
Field Duplica	ate ID :	MW95	-GW-FI	0-120511	0 8 (SI	Anly	Field Dup	licate Time:	2950 12/05/14
Comments:			-		-		nurto SI	tabilize	
	Teach	bailer							
					() . 0	A 4			
	1 1	Deerded	to nor	in bo	ano the	likati	in .		
	12 136/41	Decidid 10; 40ct 10Cs wee	FR 136 14	+05.1 ; 0	-13/012	+ H2/H1	in .		
	Field Team Weather/Te Well Condit Purge Meth Time OQ35 1015 105 105 105 105 105 105 105 105 1	Field Team: Weather/Temp: Well Condition: Purge Method: Time DTW ² Begin Pa 0935 32.23 1015 36.60 1105 38.70 0945 32.64 1105 34.09 0945 32.64 1105 34.09 0945 32.64 105 34.09 0045 32.64 105 34.09 005 34.09 005 34.09 005 34.09 005 34.00 005 34	Field Team: $McGn$ Weather/Temp: $OVere$ Well Condition: $Grocoldse Purge Method: Badle Time DTW^2 Purge Vol.(gal) Begin Pumping 0935 32.23 witch 1015 36.60 5 11 0945 32.64 M/A 105 34.70 11 0945 32.64 M/A 105 34.09 for 105 34.09 for for for Stabilization - - - 'collect field parameters in 3-5 minute intervals 3 stabilization achieved once field parameters stabil - 'for turbidity readings > 10 NTUs Sample JD: MW95-GW-120 - Analysis: 8260B; 6010; 22 QC SAMPLE (CIRCLE): FD Field Duplicate ID : MW95 - - Gorderts: -1.275 - 1.600 - - $	Well Condition: GDP_d Purge Method: $Baller$ Time DTW^2 Purge Vol. Temp (gal) Temp (°C) Begin Pumping $OQa5$ 32.23 $untcal$ 12.8 $IO15$ 36.60 5 11.7 $IO5$ 32.23 $untcal$ 12.8 $IO15$ 36.60 5 11.7 $IIO5$ 38.70 II 9.9 $OP445$ 32.64 M/A III $IIO5$ 34.09 $5under Mall 2.8 OP445 32.64 M/A III IIO5 34.09 5under Mall III IIO5 34.09 5under Mall IIII IIO5 34.09 5under Mall IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII$	Field Team: Ucantle Bauman Weather/Temp: Ownerst 37°F, und Well Condition: Gro d Purge Method: Bailer Field Time DTW2 Purge Vol. Temp (gai) (°C) PH Begin Pumping OP45 32.73 unital 1015 36.60 5 11.7 1105 38.70 11 9.9 0945 32.64 N/A 10.5 1105 34.09 for any or	Field Team: Uc Condition Druce of 37° F, windy Weather/Temp: Overce of 37° F, windy Well Condition: GDD J Purge Method: Bailer Time DTW2 Purge Vol. Temp (gal) (C) PH Sp. Cond. Begin Pumping PU O905 30.73 unital 12.8 5.82 0.615 1015 36.60 5 11.7 5.91 0.572 1105 38.70 11 9.9 6.17 0.588 1105 34.00 5 11.7 5.91 0.726 0945 32.64 N/A 9 10.1015 6.17 0.726 1105 34.09 5 5 6.17 0.726 1105 34.09 5 5 5 11 1105 34.09 5 5 10.15 6.17 0.726 Stabilization 5 9 5 5 10.15 5 * criteria ³ - ± 0.1 units ±	Field Team: $WcGnnH Gaumaann$ Weather/Temp: $Overeard, 37°F, windy$ Purge Method: $Grod J$ Ir Purge Method: $Grod J$ Purge Rate ⁵ : Field Parameters ¹ Time DTW ² Purge Vol. Temp PH InStance Turbidity gail (C) PH Sp. Cond. Turbidity Begin Pumping O925 32.23 united 12.8 5:82 0.615 Ø 1015 3660 5 11.7 5.91 0.572 Physica 1105 38.70 11 9.9 6.17 0.588 Macde 105 38.70 11 9.9 6.17 0.588 Macde 0945 32.64 K/A 1105 34.70 11 9.9 6.17 0.726 44% 0945 32.64 K/A 1105 34.70 34.70 10.5 6.17 0.726 44% 1105 34.70 34.70 10.5 6.17 0.726 44% 105 34.70 34.70 10.5 6.17 0.726 44% 105 34.70 34.70 10.5 6.17 0.726 44% 105 34.70 34.70 10.5 6.17 0.726 44% 106 44% 107 44% 106 44% 107 44% 108 45.60 5 30.000 30000000000000000000000000000	Field Team: $UcGnnll baumann Weather/Temp: Onecest 37^{\circ} F_{uundus} An Well Condition: GDP d Initial DTM Purge Method: GDP d Purge Rate 5: N/I Time DTW^2 Purge Vol. Temp PH Sp. Cond. Initial DTM Begin Pumping OQ45 33.73 Initial 12.8 5.82 0.645 \phi 6.07 IOI5 36.60 5 II.7 5.91 0.572 Bucle 5.76 IIO5 38.70 II 9.9 6.17 0.588 Bucle 5.37 Q445 32.64 M/A M/A M/A M/A M/A IIO5 34.09 41.7 0.588 Bucole 5.37 M/A M/A M/A M/A M/A M/A M/A IIO5 34.09 41.7 0.548 Bucole 5.37 M/A $	Field Team: U.C.Gn.H.I. Baumann Date: Weather/Temp: Over.card. 37° F, wundy, Arrival Time: Well Condition: Gov.d. Purge Add. Purge Method: Gov.d. Purge Rate 5: M/A Field Parameters ' Time DTW ² Purge Vol. Temp PxS.Cond. Turbidity DO ORP Mail DTW ² Purge Vol. Temp PxS.Cond. Turbidity DO ORP 0905 32.23 LmLcal 12.8 5.82 0.615 Ø 4001 Gov.d. 5.76 275 1105 36.60 5 11.7 5.91 0.572 Ø 4002 5.76 275 1105 38.70 11 9.9 6.17 0.782 Ø 402 5.37 316 09445 32.64 M/A Interfasion Interfasion



$\frac{2.9}{p}$ W^{2} $\frac{Purge V}{(gal)}$ $\frac{43}{51}$ $\frac{43}{51}$ $\frac{43}{51}$ $\frac{43}{90}$ $\frac{51}{6.2}$ $\frac{40}{5.75}$	(°C) 7.7 5 9.2 5 9.5	Field pH 7,21	Pur Parameter Sp. Cond.	rge Rate ⁵:	DO (mg/L)	rival Time: / (ft btc): ORP (mV)	<u>Чq.н</u> Note color, odor, shee etc.
$\frac{2.9}{p}$ W^{2} $\frac{Purge V}{(gal)}$ $\frac{43}{51}$ $\frac{43}{51}$ $\frac{43}{51}$ $\frac{43}{90}$ $\frac{51}{6.2}$ $\frac{40}{5.75}$	Summ ocilar ol. Temp (°C) 7.7 5 9.2 5 9.5	Field рн 7,21 7,32	Pur Paramete Sp. Cond.	rge Rate ⁵ : rs ¹ Turbidity (NTU)	DO (mg/L)	(ft btc): ORP (mV)	<u>Чq.н</u> Note color, odor, shee etc.
Purge V W ² Purge V gain gain 43 Start 43 Start 44 Start 47 Start 90 6,2 30 8,75	ol. Temp (°C) 7.7 5 9.2 5 9.5	Field рн 7,21 7,32	Sp. Cond.	rge Rate ⁵ : rs ¹ Turbidity (NTU)	DO (mg/L)	ОRР (mV)	Note color, odor, shee etc.
Purge V W ² Purge V gin Pumping 43 Start 40 G, 2 30 8,75	ol. Temp (°C) 7.7 5 9.2 5 9.5	рн 7,21 7,32	Sp. Cond.	rs ¹ Turbidity (NTU)	DO (mg/L)	(mV)	etc.
W ² (gal) yin Pumping <u>43</u> Start <u>43</u> Start <u>43</u> Start <u>40</u> 6,2 <u>30</u> 8,75	(°C) 7.7 5 9.2 5 9.5	рн 7,21 7,32	Sp. Cond.	Turbidity (NTU)	(mg/L)	(mV)	etc.
W ² (gal) yin Pumping <u>43</u> Start <u>43</u> Start <u>43</u> Start <u>40</u> 6,2 <u>30</u> 8,75	(°C) 7.7 5 9.2 5 9.5	7.21 7.32	0.681	(NTU) meter underfille	(mg/L)	(mV)	etc.
43 Start .41 ≈4.2 90 6.2 30 8.75	7.7 5 9.2 5 9.5	7.21 7.32	0.681	meter	41.95	162	
.41 ≈4.2 90 6.2 30 8.75	s 9,2 s 9,5	7,32				162	
90 6,2 30 8,75	5 9,5				2. J.o.		4
90 6,2 30 8,75		729			4.63	168	Slight Ter Sulfun oder
30 8.75		11.71	0.649	ji ti	4.69	192	Tan/Bros
	7.8	7.47	0.631	1. 4	4.90	136	Brongton
42 -					-		
,22 -	7.3	7.40	0,613	39.6	5.58	270	Ly bolow to cle
							Molder som
		PM	- bill				
		with	12 nu			5	
		<u>O</u>					
	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
	n 3-5 minute interva	n 3-5 minute intervals ce field parameters stabilize for 3 succe	± 0.1 units a 3-5 minute intervals 2 DTW: depth to ce field parameters stabilize for 3 successive readings; m	Mu Mu In the field parameters stabilize for 3 successive readings; minimum parameters	$\frac{M}{12} + \frac{M}{12} $	$\frac{M}{PW}$ $\frac{13/HlG}{13/HlG}$ $\frac{13/HlG}{13/HlG}$ $\frac{13/HlG}{13/HlG}$ $\frac{13/2}{PW}$	$\frac{W}{W} = \frac{1}{10\%^4} \frac{1}{\pm 0.3 \text{ mg/L}} \pm 10 \text{ mV}$ $\frac{1}{2} TW: depth to water measured from top of casing; total drawdown should not exceeded parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO$



0	SITE:	UPRI	2-7re	ema	n		v	Vell ID:	Mu	U-115
	Field Team:			A 1	Baum	ann				12/05/16
	Weather/Te	mp:	Clear, 1	Imur Jü	PF; Wh	roh		Ar	rival Time:	
	Well Condit		GUUI	- F - 1)	1	In			57.85
	Purge Meth	od:	B	aler		. Pu	rge Rate ⁵:			
			Việt tri ().		Field	Paramete				
	Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	nS.cm Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
		Begin Pu	mping	No. No.			1			
	1442	57.85	initial	6.7	7.75	6.476	Up Ko hiah	5.33	-17	
	1505	1	3.5	7.2	7.48	0.470	(1	4,77	- 33	
	1518	74.78	7.0	6.5	7.55	0.484	10	203	-95	
12/07/16	1345	58,05	-		-	-	_	-		
	1426	60.59		5.6	7,43	0.465	33.4	6.34	197	7
						-				
					M	-				
					1219416				-	
		/			-					
									4	
	Stabilization	-	and an other states of the state	an-strates	-	1.00.000	17	The second second	References	
	Criteria ³	-	-	-	± 0.1 units	± 3%	± 10% ⁴	and the second second	± 10 mV	-
	³ stabilization ach ⁴ for turbidity read			ilize for 3 succes	ssive readings; m	inimum paramet	d from top of casi er subset: pH, sp /min (0.03 - 0.13	ng; total drawdov . cond., and turbi gal/min)	wn should not e dity or DO	cceed 0.33 ft
	Sample ID:	MWI	IS-GW	- 12071	6			Sa	mple Time:	1350
	Analysis:	8260B	, 6010 ;	23206	310.1	4UCAL 1	36/415.2	360.0	5; 376	2; RSK175
	QC SAMPLE		FD	MS/MSD	EQ Blank		1	ZAL PURG	/	1
	Field Duplica	ate ID :	NA	CAD			_	Field Dup	licate Time	: NA
-	Comments:	3.	63-1	WE	3.63	Sullon	n=lwi	ell M	ime	
\bigcirc		F	errow,	TRO	UZ (), Ol ma	L			
	(discolo		betwee	n ziri	amput	iand	reagent	annu	le - suspect
	,		observ	rt d	U			Q		DR900 maybe
										maximuming



0	SITE:	UPR	R- Fre	emar	\		V	Vell ID:	mw	-125	
	Field Team:				uma	m			Date:	12/04/16	
	Weather/Te	mp:	ornea	t, wi	ndy, 3	sos °F		Ar		1300	
	Well Condit	ion:	GDT	2	1,		In	itial DTW	(ft btc):	42.95	
	Purge Meth	od:	Bar	ler		. Pu	rge Rate ⁵ :				
					Field	Paramete					
	Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, shee etc.	n,
		Begin Pu	mping								2
	1325	42.95	initial	9.1	6.39	0.729	affsale	6.23	87	lyht tan, nooder tan, no ador, he	, sediment
	1355	55.20	2.75	9.5	7.12	0.716	prole	5.87	-40	tan no ador he	my sult
				End	Rup	on 12/1	04/16			, , , , , , , , , , , , , , , , , , , ,	- 'eloy
12/05/1	61403	42.20			0				. 1		
	1434	46.15	forfame	5.8	6.89	0.885	954	5,95	3	beige, no ode	r
\bigcirc			inen								
\bigcirc											
					py						
					1214	16			-		
											-
	Stabilization Criteria ³	-	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	•	
	¹ collect field para ³ stabilization ach			lize for 3 succes	sive readings; m	inimum paramet	d from top of casi er subset: pH, sp.	cond., and turbi		xceed 0.33 ft	
	for turbidity read	•	10 0	1206		ate is 0.1 - 0.5 L	/min (0.03 - 0.13			Hur	
	Sample ID:						-			1415	-
				•			6/415,2	; 300,0	376,2	; ESKITSGC-F	10
	QC SAMPLI	E (CIRCLE):	FD	MS/MSD	EQ Blank		TO	TAL PURG	ED (GAL):		
	Field Duplic		<u> </u>				-		licate Time:		
0	Comments:		- 2/04/1	6 piny	ewater	is thick	- m al	undan	t sume	aded selficle	j'
U		tan/be	ige color	, no cal	<u>i</u> N.						_

.

	Ground					rm			9	CH2MHILL
\bigcirc	SITE: Field Team:	UPR	'R Fre	eman			V	Vell ID:	tus.	5
~	Field Team:		Ucan	MEn	dd.				Date:	12/07/16
	Weather/Te		20'F.	Dear,	(In	nde 13	dy-wan	n) Ar	rival Time:	1250
	Well Conditi	ion:	NA							NIA
	Purge Meth	od:	NA			. Pu	rge Rate ⁵:			
	E.s.		100 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		Field	Paramete	Contraction of the local division of the loc	a serie		
	Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
		Begin P	umping					and a second		
Influent	7155	NA		9.5	6.96	0,394	ø	5.57	.299	
			Ferr	ns Ir	m = q	. & ma	L			
						J				
Effluent	7300			16.5	7.68	Θ.381	0.0	5,74	500	
	_									
0		-								
					an	-				
				/	12171	6				
			/						÷	
		/								
	/									
	Stabilization Criteria ³			-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
	¹ collect field para ³ stabilization achi ⁴ for turbidity read	ieved once field	parameters stabi	lize for 3 succes	ssive readings; mi	water measured inimum paramete ate is 0.1 - 0.5 L/	er subset: pH, sp	ing; total drawdov . cond., and turbi gal/min)	wn should not ex dity or DO	ceed 0.33 ft
	Sample ID:	W55-	GW-JI	<u>V-170</u>	716 . 1	N\$5-G1	V-EF-	207/L Sai	mple Time:	1255; 1300
	Analysis:	82601	3, 6010	: 2330	B/3/0.1;	YOCHR 1	36/415.2	2: 300.0	1;3光	2: RSK175
	QC SAMPLE			MS/MSD	EQ Blank			TAL PURG		
	Field Duplica	ate ID :	NI	A				Field Dup	licate Time:	PIA
0	Comments:	effi	unt fr	(VČC	s inly	1				
\bigcirc		Inf	lunt -	= AUL	parana	fors +	Fern	o Jem		
		6								

Ground	valei ru	iryiny ai	iu Janij	ping Fo	[] []			-	CH2MHILL
SITE:	UPPR	2				N	Vell ID:	W-2	0
Field Team:		McCowl	/En	6			•		12/10/16
Weather/Te					new chq	nna 1,6	which Ar	rival Time:	1018
Well Conditi	ion:	GW)	0		0	-			19.10
Purge Meth	od:	Submers	ille fe	my	Pu	rge Rate ⁵ :			
			- 241 	Field	Paramete	rs ¹			Art and a star
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
1103	Begin Pu	mping			a the second second				
1168	19.92	4.8L	8-2	6.90	A .445	46.4	4.65	147	SLIGHTEN CLEUDA BROWNISH BLACK
1113	26.20	7.0L	7.9	6.85	0.453	32.1	4.28	147	MOSTLY CLEAN, SLIGHT BROWNISH COLOCIANO COCA
1118	20.33	8.9L	7.7	6.96	0.457	34.5	4.20	138	"
1123	20.49	9.5L	7.4	6.86	0.459	45.8	3,99	125	CLEAR, SLIGHT BROWNI
1128	20.58	10.41	7.5	6.87	0-456	52.8	3.68	115	11
1133	20.66	11.3L	7.2	6.88	0.458	56.7	3.59	111	~1
1138	20.70	12.2	6.8	6.90	0.458	66.8	3.44	196	"
1143	20.73	12.9	6.7	6.90	0.454	61.9	3.29	104	1
/	Pa							-	
		METICIS	STABLE						
			STABLE	C33221	to SAMP	L			
Stabilization Criteria ³	-	- 25	1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1. 1	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
¹ collect field para ³ stabilization ach			ize for 3 succes	sive readings; mi	inimum paramete	er subset: pH, sp	ing; total drawdov). cond., and turbi		cceed 0.33 ft
⁴ for turbidity read Sample ID:	-	-GW-	and b	target purge r	ate is 0.1 - 0.5 L	rmin (0.03 - 0,13		mole Times	1145
·			_	1211	InCEn	Br live			
Analysis:		/							076.2; 1314756e-
QC SAMPLE	= (CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	

Field Duplicate Time: ______

Comments: MULTINAR READINGS = OK. Ferrous Fe= 0,79 mg/L

TOTAL PURGED (GAL):

QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank Field Duplicate ID : N/A

 \bigcirc



SITE:	UPE	R				V	Vell ID:	W-	26
Field Team:		Vel		nso				Date:	12/09/16
Weather/Te	mp:	upper 20	\$ em 30	k show	my lighto	nunds	Ar	rival Time:	1355
Well Conditi	•	Gn	6		1- 0	Ir	itial DTW	(ft btc):	66.93
Purge Methe	od:	Subme	stike H	emp	. Pu	rge Rate ⁵:			
		a Sen ere		Field	Parameter	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp	pН	mSchi Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin Pu	12 N							
1413	66.93	initial	9.9	7,05	0.383	7.3	5.4D	203	clear, no olar
1418	67.07	10	109	6.94	0.388	Ø	5.14	206	11
1423	Gtioz	15.8	10.9	6.92	0.389	Ý	4.94	214	и
1428	67.00	20.8	1078	6.92	0.390	ø	5:37	220	21
1433	67.00	24.9	10.9	6.92	0.390	ø	5.04	225	l.,
1438	67.00	30.0	H,D	693	0.39	Ø	5.12	229	
1410	Sun	ple to							
		p	- MA			· · · · · · · · · · · · · · · · · · ·			· · · · · · · · · · · · · · · · · · ·
									-
						/			
Stabilization		-	2	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
Criteria ³ ¹ collect field para	meters in 3-5 mir	nute intervals	Robert Strange		water measured				ceed 0.33 ft
³ stabilization ach ⁴ for turbidity read		parameters stabi	lize for 3 succes	sive readings; mi		er subset: pH, sp	. cond., and turbi		
Sample ID:		6- GI	J- 120			t		mple Time:	1440
Analysis:					LOCAY 13	sduc.		•	2; RSK175Ge-FJ
QC SAMPLE		FD	MS/MSD	EQ Blank		4	TAL PURG		
Field Duplica	ate ID :							licate Time:	
Comments:	. /	The num	10				· ·		
	PED->1	um ver	r un/,	FERROUS	5 IRON=	0.00 m	3/10		<u> </u>
		1							

ll Condit	ion:	36° tight	store a	itside spi	ant	Ir	nitial DTW	(ft btc):	1000 N/A
ge Meth		Gra	1	inter stre	Pu				
				Field	l Paramete		210	Creme	
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pH	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin Pu	mping				N. and			
012	/	/	8.7	7,43	8.85	0.0	6.47	261	
10		-						/	
					2415				
				/ ~					
		/							
		/						ца ^н	
1	1								
tabilization Criteria ³		-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
bilization ach	lings > 10 NTUs			sive readings; mi	o water measure inimum paramet rate is 0.1 - 0.5 L	er subset: pH, sp		wn should not ex dity or DO mple Time:	
÷	E (CIRCLE):	FD	MS/MSD	EQ Blank		TO	TAL PURG		-
ld Duplic	. ,	10	MONUOD						
						-	гівій рир	licate Time:	1

CH2MHILL

Well ID: MARLOW Treatment SITE: UPRR-Freeman Date: 11/30/16 Field Team: Upper 30s, left snew Arrival Time: 0950 Weather/Temp: Treatment house Initial DTW (ft btc): N/AWell Condition: Purge Rate ⁵: *N/A* MA Purge Method: Field Parameters¹ Purge Vol. Temp ms cm Turbidity DO ORP Note color, odor, sheen, DTW² Time (gal) (°C) pH Sp. Cond. (NTU) (mg/L) (mV)etc. **Begin Pumping** 8.7 6.55 7.44 clear, no odor 9.0 6.1 307 1120 NA NA 30/10 Stabilization ± 3% $\pm 10\%^{4}$ ± 0.1 units ± 0.3 mg/L ± 10 mV Criteria³ collect field parameters in 3-5 minute intervals ²DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) ⁴ for turbidity readings > 10 NTUs Sample ID: MARLOW -GW-113016 1000 Sample Time: Analysis: 8260 B; 6010; 7196A; 13208 310,1; 543500 F.D; 400 FR 136 415,2; EPA 300.0; EPA 376.2 QC SAMPLE (CIRCLE): (FD / MS/MSD EQ Blank TOTAL PURGED (GAL): N/A MAKLOW-GW-FD-113016 Field Duplicate Time: 1005 Field Duplicate ID : Comments: Anolysis (continued) RSK 175 Ter Method GC-FID Field Parameter collected ofter all samples were collected.

Groundwater Purging and Sampling Form

CH2MHILL

Groundwater Purging and Sampling Form CH2MHILL Well ID: <u>Asher Spigot</u> Date: 11/30/16 SITE: UPRR-Freeman Field Team: Arrival Time: 1147 Weather/Temp: 30's, some Snow Initial DTW (ft btc): ____/a____ Well Condition: Purge Rate 5: N/a, and Purge Method: Field Parameters¹ msan Purge Vol. Temp Turbidity DO ORP Note color, odor, sheen, DTW² Time (gal) (°C) pН Sp. Cond. (NTU) (mV) (mg/L)etc. **Begin Pumping** 7.29 NIA 0,2 1225 NIK 19.4 0.687 303 Obar, no odon 4.20 N Stabilization $\pm 10\%^{4}$ ± 0.1 units ± 3% ± 0.3 mg/L ± 10 mV Criteria³ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) ⁴ for turbidity readings > 10 NTUs Sample ID: Asher-GW-113016 Sample Time: 11:55 82608; 6010; 7196A, 23208/310,1; SM3500 FeD; YOCFR 136/415,2; EPA 300.0; EPA 376.2 Analysis: TOTAL PURGED (GAL): N/A QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank Field Duplicate ID : N/A Field Duplicate Time: N/A Comments: Field parameters collected ofter all samples were collected.



SITE:	JPRR-	Freeman	1			V	Vell ID:	Lasho	w well spigst 11/30/16 1250 N/A	
Field Team:		LB/RA	1					Date:	11/30/16	
Weather/Te	mp:	Ulla 30	's				Ar	rival Time:	1250	2
Well Conditi	ion: 🤇	Dut door	Spigo	t-middle	e of bac	<i>kLawn</i> Ir	itial DTW	(ft btc):	NIA	
Purge Meth	od:	M	7		Pu	rge Rate ⁵:	**			_
		The second		Field	Paramete	rs ¹	1925151			1
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ms/im Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.	
	Begin Pu				day					
1330	NIA	NIA	8.2	7:71	0.353	0.0	6.88	165	no alor, cloir	
]
				RA	11/30/11	0				
	-							*		-
		F								-
										-
Ote billion Marson			10-10-10 M		11-20					
Stabilization Criteria ³	-	-		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV		
¹ collect field para ³ stabilization ach	ieved once field	parameters stabi	lize for 3 succes	sive readings; mi	inimum paramete	er subset: pH, sp	ing; total drawdov . cond., and turbi		xceed 0.33 ft	
⁴ for turbidity read	lings > 10 NTUs	6	. In case we		ate is 0.1 - 0.5 L	'min (0.03 - 0.13				
Sample ID:	Lash	aw-Gu)-11301	6			Sa	mple Time:	300	-
Analysis:	82606,	6010;-	1196A, 7	320B/	310.1; 5	43500 F	D'40CI	=K 136/	415, 21, EPA 300.0;	EA 376
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	NA	_
Field Duplica	ate ID :	/					Field Dup	licate Time:		_
Comments:	Field	peranu	ten co	lected.	after 5	ample 1	vere col	leated		_
		1			0	I				-

	UPRR-H	Treeman				N	Nell ID:	Slva	Residence Sp 1430/16 1340
ield Team:		LB/RM						Date:	1/30/16
Veather/Ter	mp:	UPPER	30's				Ar	rival Time:	1340
Vell Conditi	on: 🤇	Jut dore	Residence	Spiyot		lr	nitial DTW	(ft btc):	NA
urge Metho	. bc	NA			. Pu	rge Rate ⁵:			
				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pH	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheer etc.
	Begin Pu	mping						- hand	
1420	/	/	15.5	7.31	0,493	12.9	4.42	273	/
		í.							
				1.1	XB				
				A	n	,			
			/	ſ		:			
				1					
Stabilization Criteria ³	-	•		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
	meters in 3-5 min ieved once field j		pilize for 3 succes	² DTW: depth to ssive readinos: mi	water measured	from top of cas	ing; total drawdov b. cond., and turbi	vn should not ex dity or DO	cceed 0.33 ft
for turbidity read	ings > 10 NTUs			⁵ target purge r	rate is 0.1 - 0.5 L	min (0.03 - 0.13	gal/min)		
Sample ID: «	Silva-G	W-1130	016				Sa	mple Time:	1400
nalysis: 🜮	2605;60	10;7196	A;2320	\$/3101;SI	43500 Fe	0;40 CF	R 136/41	5.2; EPA .	300.0; EPA-376.
C SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	
ield Duplica				/				licate Time:	-

SITE:	OPKK	Freema	1			١	Nell ID:	Reed ((30)
Field Team:		LB/RI							12-1-16
Neather/Te	mp:	32° L	+ Snow	~	_		Ar		0855
Nell Conditi		Outside				Ir	nitial DTW	/ (ft btc):	
Purge Metho	od:		/	Gab	Pu	ırge Rate ⁵:	NA		
				Field	Paramete	ers ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pH	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, shee
Turic	Begin Pu	- Aller			op. cond.		(mg/L)	(000)	etc.
1.0.14			0.0	6.3.6	200	01.0	7.82	196	T T
6924	/	(9,2	6.35	,392	0.0	1.84	110	
_				-					
		· · · · ·							
				11-5-5	ALL				
-					n.				
			2	-					
			1						
				_				*	
	/								
Stabilization Criteria ³	-	1000	-	± 0.1 units	±3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
collect field para			£			d from top of cas	ing; total drawdor	wn should not e	xceed 0.33 ft
stabilization achi			ilize for 3 succ	cessive readings; mi ⁵ target purge r	inimum paramet ate is 0.1 - 0,5 L	er subset: pH, sp /min (0.03 - 0.13	. cond., and turbi gal/min)	dity or DO	
Sample ID:		(w-30).	-GW-					mple Time	0905
Analysis:		-940							
QC SAMPLE	E (CIRCLE):	FD	MS/MS	D EQ Blank		то	TAL PURG	ED (GAL)	······································
Field Duplica								licate Time	
							. ioid Dup		·

ield Team:	-	R Freem Rucco	rl.					Date:	Well, Freemanste 2/24/17
Veather/Te	•			my breeze					0825
Vell Conditi		Freemun GRA		outsid S	(1	-	itial DTW		N/A
Purge Meth		CNA	2			-	6RA	5	
		Purge Vol.	Temp	Field	Paramete	rs ¹ Turbidity	DO	ORP	Note color, odor, sheen
Time	DTW ²	(gal)	(°G)	pН	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
	Begin P	umping							
0840					ms/m	6.63			
1000	NIA	GRAB	8.1	6.9	49,7	8.2	15.59	351	clear, no odore
								1	
				<u> </u>				1	
			-					1.1.1.1.1	
		-			 				
1	-	-			*				
							بد		
OL LYP (act militimetro its par						
Stabilization Griteria ³		-	•	± 0.1 units	± 3%	±10% ⁴	\pm 0.3 mg/L	±10 mV	-
¹ collect field par	hieved once fiel	d parameters stab	ilize for 3 succe	ssive readings; m	ninimum parame				xceed 0.33 ft
Sample ID:	LAN	<u>6-6w-8</u>)22417	••		-	Sa	mple Time	0830
Analysis:	8260B;	EPA6010;	23200	310,1 ; 30	0.0; SM	2546C; 4	OCFR 136	H5.2; 376	2; RSK-175 GC-F
QC SAMPL	/	,	MS/MSD	,			TAL PURG		
Field Duplic	ate ID :	a/c	•				Field Dup	licate Time	:
Comments:	- Ino	peruble h		1	o time .	1 (110.0.	s or 2/2		

C



Purge Method: GKAB Purge Rate ⁵ : GKAB Field Parameters ¹ Time DTW ² Purge Vol. Temp (GB) pH Sp. Cond. Turbidity (NTU) DO (mg/L) ORP (mV) Nöte colo Begin Pumping 1110 N/A GRAB 15.5 7.1 44.3 0.0 7.44 298	or, odor, etc.
Time Purge Vol. Temp (gal) Turbidity (°G) DO ORP Nôte colo Begin Pumping Mis Mis	0.00000000
Time DTW ² (gal) (°G) pH Sp. Cond. (NTU) (mg/L) (mV) Begin Pumping M M M M M M	0.00000000
1 11	all and
1110 N/A GRAB 155 7.1 44.3 0.0 7.44 298	
	W. Street
	_
Stabilization	A
Stabilization Criteria ³ - - ± 0.4 units $\pm 3\%$ $\pm 10\%^4$ ± 0.3 mg/L ± 10 mV ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft	•



Purge Metho		GRAP		10 1000	Un lughe e	rge Rate ⁵ :	GRI	an nich.	NIA
	and a state	OPIN		Field	Paramete		and the states		
Time	DTW ²	Purge Vol.	Temp			Turbidity	DO		Note color, odor, sh
Time	Begin Pu	(gal)	(°C)	рН	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
1125	NA	BRAR	57.	7.6		6.3	11,33	296	c De
1105	(yrs	OKAC	5.7	7.6	40.4	0.5	11:00	276	clain, mal
					се 			-	
Stabilization			Service -	± 0.1 units	±3%	± 10% ⁴	+02mal	-+ 10 mV	Factor and the second
Criteria ³ collect field para	ameters in 3-5 n	inute intervals	to a line	the los on the	the state of the s	± 10%	± 0.3 mg/L	± 10 mV	
	nieved once field	I parameters stab	ilize for 3 succe	ssive readings; m	inimum paramet		. cond., and turb		1000 0.00 K
Sample ID:	-	1AW - G						mple Time:	105
·	42:00	GON (ave	W 000			-			
Analysis:	04005	PHOND	1 13205	310.1 3	00,0, 5	m 25400	, 40CFK	136/415:	2; 376.2; P
QC SAMPL	E (CIRCLE)		MS/MSD	EQ Blank		TC	TAL PURG	ED (GAL):	NIT
Field Duplic	ate ID :	/	JA			_	Field Dup	olicate Time:	

eather/Tei ell Conditi	•	30°F,	hosty	dirndy	, colm	In	Ari itial DTW		1200
urge Metho		GRA	1	an or of yo			Gf		
			Sec. 19	Field	Paramete		1.2.2.		
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin P	umping			nsm				
1050	NA	GRAB	3.7	7.2	37.2	0.0	12.64	281	clear, no doc
					P			-	
		_							
							1		
Stabilization Criteria ³	÷	-	•	± 0.1 units	±3%	±10% ⁴	± 0.3 mg/L	± 10 mV	
		minute intervals d parameters stat	oilize for 3 succe	² DTW: depth to essive readings; m			sing; total drawdo p. cond., and turb		xceed 0.33 ft
for turbidity read	dings > 10 NTL	ls		⁵ target purge	rate is 0.1 - 0.5 L		l gal/min)		
ample ID:		ED-GW				-			: 1210
nalysis:	SULCAB	EPAboro	; 2320	6/310.1;3	80.0; S	M2540C;	40CPR 1	36/415.2	-; 376:2; RSK-1
QC SAMPL	E (CIRCLE): FD	MS/MSD	EQ Blank	(TC	TAL PURG	GED (GAL)	NIB
ield Duplic	ate ID :	1)/1	9				Field Dup	olicate Time	:

2/2

6

C



ell Conditio		Spisoton	east six	ndy light	L	In			NIA
urge Metho	od:	GRAP			Pu	ge Rate ⁵: _	GRAI	B	
		Purge Vol.	Temp	Field	Paramete	Turbidity	DO	ORP	Note color, odor, sh
Time	DTW ²	(gal)	(°G)	pН	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
	Begin Pu	mping			mgam				
1015	N/A	GRAB	6.5	7.3	54.0	9.6	13.52	360	clear, no ado
			_						
					_				<u> </u>
					10			-	
Stabilization Criteria ³	÷.	-	E.	± 0.1 units	±3%	$\pm 10\%^{4}$	± 0.3 mg/L	± 10 mV	-
collect field para	ieved once field lings > 10 NTUs	parameters stat		ssive readings; m ⁵ target purge	o water measure iinimum paramet rate is 0.1 - 0.5 L	er subset pH, sp	. cond., and turb		xceed 0.33 ft
Sample ID:		EY-GW				-			: 1315
Analysis:	8260B,	EPALOTO;	23204/3	510,1; 30	o, sinz	540C,40	CFK 36	1415.2;	376.2, RSK-1
QC SAMPLI	E (CIRCLE)	: FD	MS/MSD	EQ Blank	(то	TAL PURG	ED (GAL)	HIA
Field Duplic		NII				-	Field Dup	olicate Time	:
Comments:	Ferr	ous IP	ON ZO,	11 mg/1					

Well Condition Purge Methor		305F;	Comb partly	dondy !	este war	da	Ar	rival Time:	2/24/17 1430
Purge Methc	on:	Spirat 1	heint of h	Wise, Mer,	et to same	se door In	itial DTW	(ft btc):	NIA
	od:	30's F; Spigot; GR	AB		Pu	rge Rate ⁵ :	ERAP		
harmon and the second					Paramete	and the second sec			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, s etc.
	Begin Pu	to a state of the		<u>I pre</u>	ms/m	1 (1110)	(g. =)		
1230	NA	GRAB	18.6	72	87.0	0.0	6.97	304	clem, nord
TESU	1175			1		0.0	0		new nous
	_			-					
				-					
						,			
		1			(c			-	
	-		-				-		
Stabilization	ACCORD NO.	1 Providence		a di secolaria		and the second second		-	
Criteria ³		-	-	± 0.1 units	± 3%	$\pm 10\%^{4}$	∉ 0.3 mg/L	± 10 mV	•

CH2MHILL



SITE:	UPR	RF	Veema	<u>-n</u>		٧	Vell ID:	MI	1-9D
Field Team:	-	R Mcc	ans/	5 Bart	OW			Date:	2/27/17
Weather/Ter	mp:	Snami	8,3	0° F	<u> </u>		Arr	ival Time:	N930
Well Conditi	on:	60	20						30.91
Purge Metho	- bc	Sub	mirsila	1 prof	o Pur	ge Rate ⁵ :	400	SmL/n	in
				Field	Parameter		1 Die		
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
1035	Begin Pu	mping 💃	5.9					T>	
1035	30.7	-1	8.01	6 54	0.566	27.7	19.07	147	400me/min
1043	31.01	1	8.82	6.89	0.535	25.7	10.99	144	
1051	31.01	1.5	P09	6.94	0.529	15.4	8.54	134	
1056	31.01	1.8	5.20	6.93	2.531	15.9	8.18	132	
1101	31.01	2.2	8.12	6,95	0.528	15.1	7,95	131	
1106	31,01	25	7.2	6.95	0.523	4.8	-7.86	129	
Int	30.96		7.86	6.95	0.534	7.0	7.67	129	
1116	30.98	3.0	7.62	6.95	0.530	9.7	7.84	128	
		1						-	
Stabilization Criteria ³	Э.	-		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
		parameters stab	lize for 3 succes	sive readings; m		er subset: pH, sp			cceed 0.33 ft
Sample ID:	m	W9D -	GW-	Ø2271-	7-	-	Sa	mple Time	1126
Analysis:	8260	OB; EP	A 6010	23206	3/310.1	; SM2	5406,0	100 CF1	2136/415,2; 376.2
QC SAMPL			MS/MSD	EQ Blank			TAL PURG		RSK- 175
Field Duplic	ate ID :					_	Field Dup	licate Time	:GGFI
Comments:	F	NYOUS	Iron	10111111111111111111111111111111111111					
	-pi	mp	edned (9 47		YF	Mous	tron=	0.01 mg/L
		pum	pal	901					

C



SITE:	UPK	RR-F	runn	~		v	Veil ID:		mw-	14D	
Field Team:		RMC	Comb/	SBA	rtow			Date:	2/27	/17	_
Weather/Ter			+ fre				An	rival Time:	1230	>	_
Well Condition	on:	900				In	itial DTW	(ft btc):	18.5	2	_
Purge Metho	od:	Subme	rsible	pune	Pu	rge Rate ⁵:					-
	and the second second			Field	Parameter						1
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, or etc	and a second second of	85
1250	Begin Pu	mping		1. A.					13 - 10 T		you
1250	20,98	~	7,42	7,44	0.324	#.5	15.70	124	slight	Ly cl	sindy
1258	20.54	1.1	7.13	7.42	0.324	> 887	8.57	121	cloudy	9.	5
1304	20,53	1.75	4.21	7.42	0.361	780	5.49	117.	n	n.	
1309	20.57	2.0	7.11	7.42	0,720	640	5.15	116	N	n	
1314	20.45	2,5	7.29	7.43	0.318	493	4.78	113	N	h	
1319	20.21	2.75	7.19	7.173	0.312	395	4.74	(10	И	light +	in
1324	19.84	3.25	6.93	7.45	0.316	336	4.76	108	И	5	
1329	19.83	3.5	7.03	7.44	0.317	274	4.69	12	И	¢1	
1934	19.83	3.75	7.06	7.45	0.318	237	4.61	- 114	11	η]
1339	19.75	4.0	6.97	7.46	0.320	200	4.63	112	14	11	
1344	19.80	4.25	6:95	7.45	0,723	174	4.55	111	12	η	7
Stabilization Criteria ³	÷.	a server	÷.	± 0.1 units	± 3%	±10% ⁴	i± 0.3 mg/L	± 10 mV			see
¹ collect field para ³ stabilization ach ⁴ for turbidity read		parameters stab	ilize for 3 succes	sive readings; m		er subset: pH, sj			cceed 0.33 ft		
Sample ID:	N	WIYD	-GW-	- \$2271	17	_	Sa	mple Time:	142	25	
Analysis:	8260B.	EPR 6010	;23206	30,1,	SM 25 40	cs 40cp	12 36 41	5,2,37	6.2;6	sik-ns	6C F1
QC SAMPLI	-		MS/MSD	EQ Blank		/		,			_
Field Duplic	ate ID :	NIA	*				Field Dup	olicate Time:			
Comments:	P	me	ct 127	1735	- ·	-					_
	H	onbe	sonde	not	redic	y du	ion Jih	i-chur.	at by		-
	F	errous	IRON	=011	2 mg/2	0	1		0		_
		/	Con	RLA							
			Jer	UNIC							

SITE:		UFRR	Friem	m		V	Vell ID:	MY	J-135
Field Team:	4	R. M	ncomb	S. B.	r r tow			Date:	2/28/17
Weather/Te	mp:	240	F, sun	ny	=		An	rival Time:	9.76
Well Conditi	on:	- 700	d			In	itial DTW	(ft btc):	9.76
Purge Metho	od:	baile	Y		Pu	rge Rate ⁵:			
		Dumo Vel	I Tomo	Field	Paramete			ODD I	N-1 - 1 - 1 - 1
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, she etc.
	Begin P	umping							
0905			4.95	6.71	0.382	40.8	12.36	157	clear, edo
pust Simpling	12.92	a.	辞.						Creev, -
Surping	11/14		1.						1
	-	-						la contener	
		-	-						
·	-			-				h 2	
					1			-	
	and the					-			
Stabilization	1990350	-	18-00-013		1.000				Same Arrest
Criteria ³		-		± 0.1 units	North M	± 10% ⁴	st: 0.3 mg/L	± 10 mV	•
¹ collect field para	hieved once field	d parameters stal	bilize for 3 succe	ssive readings; m	inimum parame	ed from top of cas ter subset: pH, sp _/min (0.03 - 0.13	o. cond., and turb		cceed 0.33 ft
Sample ID:	M	W135-	- GW.	- 0228	17	_	Sa	mple Time:	0900
Analysis:	8260B;	EPAGOIC	, 2320!	3/3101	SM254	10C: 40	(FR134)	415.2:3	76. 1. RSK=1
QC SAMPL			MS/MSD				TAL PURG		
Field Duplic	ate ID :	K	JIA					licate Time:	
Comments:					1. 1	-			
eeninono.	t (D GNU	MUN CON	oved by	6414	A 14	30		



SITE:	UPR	R Fr	whan			W	Vell ID:	M	W-ZD	
Field Team:		SBA	tan R	Milan	6			Date:	2/2	8/17
Weather/Ter		26° F	sunn	4			Ar	rival Time:	1000	>
Well Condition	on:	909		1		In	itial DTW	(ft btc):	31.4	3
Purge Metho	od:	sulm	ursible	pump	Pu	ge Rate ⁵:				
	1 B			Field	Paramete		- 12 mar			
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Nõte color, o et	odor, sheen, c.
1040	Begin Pu	mping	TW=	19.95	nd solut	of pung	my			
1045	33.15	0.6	7.70	8.83	0.292	28.6	12.36	-208	clur	colorles
1050	33.16	1.0	7,80	8:31	0.307	21.7	7.13	-208	1.	11
1002	33.53	1.25	7.78	8.26	0, 323	15.6	5.34	-207	Į1	3.1
1100	33.65	1.6	8.27	8.20	0.346	13.6	4.37	-202	ų	4
1105	33.7	2.1	8.28	8.15	0.353	10.5	3.49	- 201	Ч	U
1110	33.4	2.6	8.13	8.1L	0.358	8,76	3.06	- Lot	\bar{I}_{k}	וו
1115	33 81	3.0	8.45	8.11	0.311	5.52	2.81	-198		
1120	33.81	3.3	8.53	8.06	0.361	6.93	2.76	-191		
								-	_	
					1					
Stabilization Criteria ³				± 0.1 units	±3%	±10% ⁴	± 0.3 mg/L	± 10 mV		•
¹ collect field para ³ stabilization achi ⁴ for turbidity read	ieved once field	parameters stab	lize for 3 succes	sive readings; mi		er subset: pH, sp	. cond., and turb	wn should not ex idity or DO	cceed 0.33 ft	
Sample ID:			- GW-					mple Time:		5
Analysis:	8260	B; EFAG	010 23	20B/310	sn; sm;	1540c;	40 CFRI	36/415.	2 376-	2. RSK-17
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	GAL):	4	gal GC-1
Field Duplica	ate ID :					-		licate Time:		/
Comments:	<u></u>	vanit	VES 1/2	- Jul a	f white	r				
		pump	at 45							
		Hach	nica to	V park	id. by					
		Ferrons	Iron	=0.28m	ylL'					

ield Team:		M clom	1 Bart	TONO	. 1 .	702			2/28	
Veather/Ter Vell Conditio	•	Gover, 1	INTON	derole u	esh, vy			rival Time: / (ft btc):		10-21
Purge Metho			with pu	mp	Pu	rge Rate ⁵ :		<i>(</i> (11 D (C).		
					Parameter	'S ¹		1		
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	- And the second s	, odor, sheen, etc.
1318	Begin Pu	mping		17,17 (2 struct	Territoria de la competitione				
132 55	23.81	0.5	8.57	7.56	0.373	54.5	20.51	-102	der	Lixhe 1
1328	24.65	0.75	1.23	7.47	0.396	56 6	10.37	-53	ti -	1 0 1
1333	25,70	0.90	8.27	7.39	0.378	61.8	6.66	161	11	££
1734	25.95	1.2	8.21	7.36	0.402	43.1	5.09	444	b	N.
1343	26.84	1.25	7.88	7.34	0.402	39.2	4.35	486	ц	very light
1348	27. 15	1.25	8.48	7.38	0,399	27.0	4.06	187		1.0
1357	27.34	2.0	8,26	7.46	0.402	51.4	7.75	101		
1358	27.36	2.25	8,15	7.42	0.401	20.5	3.17	- 8		
1403	28.84	2,5	8.82	1.43	0.402	15,6	2.76	-77		
1408	29.01	3.0	8.54	7.48	0.407	12.4	2.95	-107		
1413	29.03	3.2	8,54	2.49	0,404	29.5	2.52	-117		
Stabilization Criteria ³	÷		-	± 0.1 units	± 3%	±10% ⁴	± 0.3 mg/L	±10 mV	Sec. St.	-
collect field para stabilization achi for turbidity read	ieved once field		lize for 3 succes	sive readings; mi	o water measured inimum paramete rate is 0.1 - 0.5 L	er subset: pH, sp	. cond., and turb	wn should not ex idity or DO	cceed 0.33 ft	
Sample ID:	MW	D-GW	-0228	317			Sa	Imple Time:	144	0
Analysis:	8260B,	iM600,	13203/3	10.1; 5/12	5400, 4	ocfrizi	415.2	376,2	RSK-1	75 fc A
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	GED (GAL):		
Field Duplica	ate ID :						Field Dup	olicate Time:		
Comments:	<i>i</i>	<u>onne</u>	at 38	36mm	ped up	1 to 40	->42	743	Due	to law
		flas			8 mg/L					



SITE: _	UP	RR Free	man b/Bat / clou in val			۷	Vell ID:	mw-	95
ield Team:	-	Melm	b/Bat	n				Date:	02/28-03/01
/eather/Ten	np:	33° F	/ clon	dy			An	rival Time:	0715
ell Conditio	on:	Water	in vaul	L)		In	itial DTW	(ft btc):	0715 31.53'
urge Metho	od:	Ba	lor		Pu	rge Rate ⁵:			
	A.				Paramete	Color Statements			
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
0815	Begin Pu	mping						and high	
0852			1.42	613	0.578	230	7.17	17.6	ton, cloudy
								-	
Stabilization		(1997)	I TOTAL SEALS						
Criteria ³		•		a the state of the	± 3%	the second states of	a state of the second second	± 10 mV	
collect field para stabilization achi for turbidity read	eved once field	parameters stal	bilize for 3 succes	sive readings; m	o water measure inimum paramet rate is 0.1 - 0.5 L	er subset pH, sj	ing; total drawdov o. cond., and turbi gal/min)	vn should not ex dity or DO	cceed 0.33 ft
Sample ID:	Mu	195-GI	<u>U-03011</u>	17		-	Sa	mple Time:	
Analysis:	Mars,	EPAGO10	22203	310.1 ; 5	M2540C	;40CFR	136/4152	: 376.2	,RSK-MSGC.FIN, P
QC SAMPLE	(CIRCLE)	FD	MS/MSD	EQ Blank		тс	TAL PURG	ED (GAL):	C
Field Duplica	ite ID :						Field Dup	licate Time:	
Comments:	Bar	ler 8	gallens	m 2/28	3 - (pu	y Leep	re Sumpl	lang)	
						- 700 -			
		us IRO							



SITE:	UPRRI	Freeman McComb 33°	~			V	Vell ID:	M	w - 75
ield Team:	-1	McComb	Barto	w				Date:	2/28-03/01
Veather/Ter	np:	330		ondy			Ar		
Vell Condition	on:	Good Baile		,		In	itial DTW	(ft btc):	0900 29 0 5
Purge Metho	od:	Baile	r		Pu	rge Rate ⁵:			
	1			Field	Paramete	rs ¹	The second	1775	
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pH	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
0915	Begin Pu			1 60	op. cond.	(1410)		(eic.
0942	_		6.72	6.86	0,352	27.6	7.60	134	slipty cloudy
					-				
Stabilization Criteria ³	1		t.	± 0.1 units	± 3%	±10% ⁴	s± 0.3 mg/L	±10 mV	•
collect field para	ieved once field	parameters stat	liize for 3 succe	ssive readings; m		d from top of cas er subset: pH, sp			cceed 0.33 ft
Sample ID:	mω	75-Gw	- 0301	17			Sa	mple Time:	0925
Analysis:	82603:	4 PALODIC	>: 1270	R/210.1:	sm 2540	(HNF	RISLANS	2.376	.2; RSKINS-GE
QC SAMPLE			MS/MSD	/		•	TAL PURG		
	. ,	. , 0			۱ ۱				·
Field Duplica			_				1-	blicate Time:	
Comments:		o galle	ns pur	ged 21	28/17 6	21430	s-(Hry	n before	sompling)
			_						
	-		en =						



SITE:	UPR	RFV	eema	n		v	Vell ID:	MW	- 5D		
Field Team:		R.M	ccome	0/5.0	SE-rtow	L				17	_
Weather/Te			"F Sh				Ar	rival Time:	3/1/		-
Well Conditi	ion:		od	1		In	itial DTW	(ft btc):	63.	33	_
Purge Meth	od:	subm		pump	Pu	rge Rate ⁵ :					
1.2 · · · · · ·				Field	Parameter	rs ¹			1		
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	Sp. Cond.	Tűrbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, o etc	Contraction of the second s	
1050	Begin Pu		1.30								
1059	65.05	0.5	9.30	7.43	0.461	29.0	10.36	66	VSC, 4	very light	yella
1104	64.4	0,75	9.12	7.39	0.459	31.4	6.61	81	T b	11	
1199	64.44	1.0	9.12	7.18	0.460	30.3	5.21	91	11	71	
1114	64.45	1.25	9.37	7.36	0.459	22.2	4.41	97	П	11	
1119	14.23	1,5	9.38	7.39	0.458	30,6	3.87	101	bi	ы	
1124	64.35	1.8	9.35	7.39	0.456	415.3	3,67	102	claw	, cololas	•
1127	i4.3	2.05	9.42	7.39	0.458	13.3	3.65	103	11	11	
1130	64.32	2.25	9.42	7:40	0.458	11.7	3.59	103	μ	1.	
1133	64.32	2.4	9.34	7.40	0.457	10.2	3.54	-104	11	1,	
1132	64.32	2.1	9.34	7.40	0.457	7.78	3.49	105	11	4	
								•			
Stabilization Criteria ³	-	•		± 0.1 units	± 3%	±10% ⁴	± 0.3 mg/L	± 10 mV			
¹ collect field para ³ stabilization ach ⁴ for turbidity read			lize for 3 succes	sive readings; m	o water measured inimum paramete rate is 0.1 - 0.5 L	er subset: pH, sp	. cond., and turb		cceed 0.33 ft		
Sample ID:	/V	NWSD	-GW-	- Ø3Ø1	17	-	Sa	mple Time:	114	0	_
Analysis:	82608:	(FAGO	23200/	3107; sm	15406	HOLFRIS	415.2	3762;	RSK-17	5-60-1	FID
QC SAMPL	E (CIRCLE):	FD	MS/MSD	EQ Blank	() (то) GED (GAL):	3.0		
Field Duplic	ate ID :					_	Field Dup	olicate Time:			_
Comments:	Dh	mp het	- 81								_
	Fe	rrans	Iron= 0	1.00 mg	IL						-
	_				-						_

	UP	RR J	ruma			Well ID: US5- Instruct					
eld Team:	-	Bart	an MCa	udy, v					3/1/17		
/eather/Ten	np:	41'	Fclo	ndy, v	nindy.				1200		
	JII.	10		1		111		(ft btc):	N/A		
urge Metho	od:				Pu	rge Rate ⁵:					
1.1.2.21		Purge Vol.	Temp	Field	Paramete	rs ¹ Tűrbidity	DO	ORP	Note color, odor, sheen,		
Time	DTW ²	(gal)	(°G)	pН	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.		
	Begin Pu	Imping			1						
1245	~	-	9.73	2.30	0.362	0	6.95	10 to 19	Clin, colorles		
									1		
				-							
	-				-						
	-										
								apatan dan Tar			
								*			
		1					1				
Stabilization				± 0.1 units	± 3%	±10% ⁴	,± 0.3 mg/L	±10 mV			
Criteria ³ collect field para			1	² DTW: depth to	water measure	d from top of cas	ing; total drawdov	wn should not e	cceed 0.33 ft		
stabilization achi for turbidity read			ilize for 3 succes	ssive readings; m ⁵ target purge i	inimum paramet rate is 0.1 - 0.5 L			dity or DO			
	- -	_	ient -	GW-Ø			_	mole Time:	1215		
								-			
									415.2; 376.2; RSK		
QC SAMPLE		: FD	MS/MSD	EQ Blank		τO	TAL PURG	ED (GAL):			
Field Duplica	ate ID :					-	Field Dup	licate Time			
Comments:											
	-	_	_	_		1			neter - ferrors		

C

0

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1.



SITE:	UPR	CR Fre	empn_			V	Vell ID:	MW	- 6D
Field Team:		J. BAV	tow, R.	McCan dy, w	6			Date:	3/1/17
Weather/Ter	np:	41° F	clon	dy w	inly		Ar	rival Time:	1345
Well Condition	-	en	0001			In	itial DTW	(ft btc):	131.4
Purge Metho	od:	subm	wsill	pump	Pu	rge Rate ⁵ :			
				Field	Parameter	A CONTRACTOR OF A CONTRACTOR OFTA CONTRACTOR O		1 de la	
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
1418	Begin Pu	mping				i da a			
1428	131.6	0.25	7.18	7.46	0.315	2.22	8.99	130	clerr/colorles
1423	131.45	0.5	7.55	2.54	0.375	3.59	6.36	100	.t) y
1438	131.49	0.75	7.12	7.49	0.381	3.09	4.89	93	<i>ty</i>
1443	131.43	1.0	6.80	7.49	0.379	3.11	6.51	92	11 v
1449	131.43	1.1	6.64	7.50	0.378	3.09	5.86	56	tr v
1453	121.45	1.25	6.49	7.49	0.386	2,37	4.39	95	11 Î ⁺
1459	131.48	1.5	6.59	7.45	0.395	1.81	4.13	89	p p
1503	131.4.8	1.75	7.28	7.45	0,396	2.57	4.52	87	10 11
								-	
Stabilization Criteria ³				± 0.1 units	± 3%	±10% ⁴	± 0.3 mg/L	± 10 mV	
¹ collect field para ³ stabilization ach ⁴ for turbidity read	ieved once field lings > 10 NTUs	parameters stab		sive readings; m ⁵ target purge r		er subset: pH, sp	ing; total drawdo b. cond., and turb gal/min)		ceed 0.33 ft
Sample ID:	M	W6D-(5W-0;	30117		-	Sa	mple Time:	1510
Analysis:	82600	< PA 601	0;23200	3/310.7	SM2546	i, 40 cr	FR136/4	15,2;37	L. L. RSK-175-66
QC SAMPLE	E (CIRCLE):	EP.	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	5
Field Duplica	ate ID :	-FD	-0301	17.		-	Field Dup	licate Time:	1000
Comments:	<u> </u>	mpad	- 221	72	35				
							_	-	
	F	irrans	Iron =	> 0.00	mell			1.0700	
	F	D - 03	50117 (01000)				
	m	s/msD	; 1	MW6D-	GW-0	3017-1	ns ~ r	NW6D-	-GW-030117-M



SITE:	UPR	R Free	eman			v	Vell ID:	M	W-18I	>
Field Team:	-	SB	ertaw	R. Mu	Comb			Date:	3/2/1:	7
Weather/Ter	mp:		°F n	nostly	dandy		Ar	rival Time:	1440	
Well Condition	on:	90	bod				itial DTW	(ft btc):	50,20	
Purge Metho	od:		emile	pump	Pur	rge Rate ⁵:				
				Field	Parameter		- Altone			
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	Sp. Cond.	Türbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odo etc.	r, sheen,
1520	Begin Pu	mping 5	0.35 P	The						
1525	50.25	0.5	1,70	7.82	0.387	113	4.68	11	light the	slightlyc
1530	50,30	1.0	7.92	7.n	0.386	105	3.57	-5	D.	u I
1535	50.30	1.25	7:96	7.2	0,385	87.3	3.14	-30	verylight	- ton slight
1540	50,30	2,25	8,32	7.83	0.32	35.6	2,26	-54	n	clear
1545	50,70	2.5	8.13	7.84	0.380	28.0	2.16	- 64	Ller	colates
1550	50.35	2.75	7.87	7.58	0,377	25.4	1.50	-73	11	1
1555	50,25	3.0	7.71	7.84	0.375	19.0	1.60	-78	ĺi –	4
1500	50.25	3.5	245	7.85	0.376	14.5	1.47	- 77	14	<u>j</u> 4
1603	50,25	3.75	7.58	7.15	0, 373	12.2	1:50	-77	à 4	2)
1606	50.25	4.0	7.99	7.55	0.377	12.2	1.34	-81	ji -	h
1609	50,25	4.25	7.93	1.85	0.374	12,2	1.31	- 84		
Stabilization Criteria ³		•	•	± 0.1 units	± 3%	±10% ⁴	± 0:3 mg/L	± 10 mV	-	
		parameters stab	ilize for 3 succes	sive readings; m	o water measured inimum paramete rate is 0.1 - 0.5 L	er subset: pH, sp	. cond., and turb		xceed 0.33 ft	
Sample ID:	-		-W-0		ale 13 0.1 - 0.3 E	1111 (0.05 - 0.15		mole Time:	1620	
Analysis:										11152
QC SAMPLE		FD	MS/MSD	FO Blank	RSIL 17.	5 60 FI	B. Fria	AS INON	DEFRI36	<u>1913.</u>
Field Duplica		10	NOMOD		A Contraction of the second seco	10				
Comments:		umo	664.	1	le r	- -		olicate Time		
		Terron	o Thin	N= 6	df s	11-	<u>~ 0∖</u>			
		,	200			15				
										/
										/



SITE:	UPRR	Fre	MRA			V	Vell ID:	M	W-16	P
Field Team:	-	SB	a-rtan	R.N	1. Comb	,		Date:	3/2/1=	7
Weather/Ter	mp:	43	·F, m	osthy c	handing_		Ar	rival Time:	1246	>
Well Conditi		900	2	I		In		(ft btc):	46.05	»
Purge Metho	od:	sulmer	ribk p	innp	Pu	rge Rate ⁵ :				
				Field	Parameter	rs ¹			175 3 5 1	as and
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, od etc.	and the second s
1305	Begin Pu	mping								
1310	46.35	0.25	1.54	7.44	0,609	92.9	8.44	× 44 36	lightton	clew
1315	46.35	0.5	8.54	7.45	0.608	75.3	6.05	129	Į1	
1326	46,25	0.8	8,25	7.45	0.607	46.9	5.19	107	Very life	I ton der
1378	46.35	1.25	8,58	1.46	Ditt	2018	4.00	96	10	1
1336	46.35	1.5	8.82	2.46	0.612	13.3	4.50	95	deer,	coorle
1335	46.30	1.8	8.81	7.45	0-613	11.6	4.33	93	1	11
1336	46.25	2	8.81	7.46	0.42	10.3	4.28	97	£1	n
1341	46.15	2,25	8.80	7.46	0.611	8.09	4.22	94	þ	11
			-					-		
Stabilization Criteria ³			•	± 0.1 units	± 3%	±10% ⁴	± 0.3 mg/L	± 10 mV	0	
	ameters in 3-5 mi		iliza fas 2 ausoas		o water measured				kceed 0.33 ft	
⁴ for turbidity read			1120 101 3 500003		rate is 0.1 - 0.5 L			ially of DO		
Sample ID:	1	nWill	2-6h)- 03	Ø217	-	Sa	mple Time:	/34!	5
Analysis:	82600	· GPAGO	10. EPA	23206/	31011; 6	\$ 300.0	; SM254	DC, 400	FR136/	415.2
QC SAMPL	E (CIRCLE):	, FD	MS/MSD	EQ Blank	RSKLIT	TO TO	TAL PURC	BED (GAL):	FR136/4	
Field Duplica	ate ID :	FD	- 030;	217			Field Dup	blicate Time:	100	
Comments:	- pu	mpel	1 -> +	nend.	down to	59				
		Ferr	rans ly	ron 0	00 mg	16				
					0					



SITE:	UPR	R FVI	LMEN			V	Vell ID:	MI	W-125
Field Team:		S. Br	rtan,	R. Mc	comb			Date:	3/2/17
Field Team: Weather/Te Well Conditi	mp:	38 1	- Cla	ndy			Ar	rival Time:	0940
Well Conditi	ion:	bail	rod)		In	itial DTW	(ft btc):	42.02
Purge Meth	od:	bail			Pu	rge Rate ⁵:			
			a adada	Field	Paramete		and the second		
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	MS Cm. Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin Pu						(
1000	42.62	Und of GRAR	7.80	7.12	0.778	190	10.99	52	tan no odor
-								-	
				1					
Stabilization Criteria ³	-	-	-	± 0.1 units	±3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect field par		parameters stat	ilize for 3 succes	ssive readings; m		d from top of cas er subset: pH, sp	ing; total drawdo b. cond., and turb	wn should not e	the second of the second
Sample ID:	MU	N12S - 1	5W-0	30217		-	Sa	mple Time	000
Analysis:	82608	', CPAG	OW EFA	2320B/3	101, EPL	300.0;	SM2540	c) 460	R136/415.2; 374.
QC SAMPL	E (CIRCLE)	; FD	/ f MS/MSD	EQ Blank	GCIFIC	, Frida TO	TAL PURG	ED (GAL)	FR 136/415.2; 374.
Field Duplic								licate Time	
Comments:		bailed	3 cello	No on	3/1/17	-			
	1	Ferrir	1 IRON	= 0.2	DImali				
					3				



L

SITE:	UPRA	<u>-</u> Fr	eeman			V	Vell ID:	mh	VIIS
Field Team:	-100	5 Bar	tal, R	McCon	L				3/2/17
Weather/Te	mp:	40	° mos	McCon Hy clou	dy		Ar	rival Time:	1035
Well Conditi	ion:	<u> </u>	\	5		. In	itial DTW	/ (ft btc):	57.10
Purge Meth	od:	- good bailer	·		Pu	rge Rate ⁵ :			
12 - H	ARE STOR			Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	рH	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin P			<u> </u>	mstan		(mg/c)		GIC.
1	-	End of GRAB	8.02		0,437 12100	0			
1050	57.10	GRAB	0.02	7.54	JET QU	\$ 27.5	11.76	117	lypottom, no oda
					_	5 S 1 1			
		-							
				L					
		1			-				
Stabilization	1		857 P.557	ALC: COLOR	5-328-M	CONTRACTOR OF	1		
Criteria ³	.			± 0.1 units	the state of	Carl Stall	,∉ 0.3 mg/L		a second second second
	ameters in 3-5 n hieved once field		ilize for 3 succes	² DTW: depth to ssive readings; mi	water measure nimum paramet	d from top of cas	ing; total drawdo cond. and turb	wn should not e	exceed 0.33 ft
⁴ for turbidity rea						/min (0.03 - 0.13			
Sample ID:	<u> </u>	IWIIS-	GW-	030217		_	Sa	Imple Time	:050
Analysis:	8260B	· LALOI	D. SPAT	3200/210	1 · E.F.A-1	300,0: (M	25400	LOCE	2:10/4:51:320
QC SAMPL	E (CIRCLE)	: FD	MS/MSD	EQ Blank	FIDIE	Ways Fr TO	TAL PURG	ED (GAL)	2136/415.2;376
Field Duplic	ate ID :					_	Field Dup	olicate Time	:
Comments:	b	ailed 1	O gall	ions an	3/1/17				
	F	erroun	JRon =	Diedon	nall			-	
					3				



SITE: Field Team: Weather/Ter Well Condition	UPER	Frenci	m		_	V	Vell ID:	Mu	-65
Field Team:	-	Uclow	4Bart	in	_			Date:	03/03/17
Weather/Ter	mp:	Ovenañ	t una	L low	305		Ai		0815
Well Condition	on:	6000	Ĺ	J)		Ir	nitial DTW	/ (ft btc):	35.40
Purge Metho	od:	Baler	(_	_ Pu	rge Rate ⁵ :	N/A		
			in inter	Fiel	d Paramete	rs ¹		15 3 - 8	and the second second
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin P	a second second			The second		1	<u> </u>	
0852	-	/	7.20	7.47	0.327	116	6.44	123	light dan, clou
					1				
					-				
				-					
Stabilization Criteria ³			-	± 0.1 units	5 ± 3%	±10% ⁴	⊮± 0.3 mg/L	± 10 mV	
¹ collect field para ³ stabilization achi ⁴ for turbidity read	ieved once field	l parameters stat	ilize for 3 succe	ssive readings; i	to water measure minimum paramet e rate is 0.1 - 0.5 L	er subset: pH, sj	p. cond., and turb	wn should not e idity or DO	xceed 0.33 ft
Sample ID:	mw	65 - Gw	-0302			_		mple Time	. 0845
Analysis:	\$2608	; ERA6	010. EP-	1232001	3101, 2	RA JOCA	C SM2J	406,4	OCFR136/415.2
QC SAMPLE	E (CIRCLE)	: FD	MS/MSD	EQBlan	k k	TC	TAL PURC	GED (GAL)	
Field Duplica	ate ID :	yiA				_	Field Dup	olicate Time	-
Comments:	Fen	the TR	20N Z	0,10 n	ng/L		·		

- ield Team:	1	Ucor	MDeny	47			Vell ID:		
Neather/Ter	np:	Which -	IMUT3	S INHA	rant-		An	rival Time:	1000
SITE: Field Team: Neather/Ter Nell Conditio	on:	Goot	- 11	9 0000		In	itial DTW	(ft btc):	03/03/17 1000 48.05
Purge Metho	od:	Baler	GARB		Pu	rge Rate ⁵ :			
			All and a second	Field	Parameter			00032-11	and the second second
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	Sp. Cond.	Tůřbidity (NTU)	DO (mg/l)	ORP (mV)	Note color, odor, shee
	Begin Pu	and the second s	(0)	<u>pri</u>	op. cond.	(110)	(mg/L)	(01V)	etc,
1000	48.05	67848	7.92	7.54	0.574	225	HAC	146	lightboom, as a
1000	1010.2	0.0.0	IIIC	1.57	U.ST4	003	1635	110	Joconnejie
							-		
								/	
		-		_					
					1		1		
				L	21217				
					2				
			/		-				
		/						1	
		/							
	1								
Stabilization	Participants -	10 - 3 M	and set of		. 06/				1000 C 1000 C
Criteria ³ ¹ collect field para	mators in 3.5 m	inuto intopuolo		± 0.41 units	± 3%	$\pm 10\%^4$	± 0.3 mg/L	± 10 mV	
³ stabilization ach	ieved once field	parameters stab	lize for 3 succes	sive readings; m	inimum paramet	er subset: pH, sp	. cond., and turbi	dity or DO	ceeu 0.55 il
⁴ for turbidity read			22000		ate IS 0.1 - 0.5 L	/min (0.03 - 0.13			1010
Sample ID:				1	1	4		mple Time:	
	-		PA2320	9/310.1;	FM300.0	SH 25400	- YUCFR	36415.2	1,376.2, 1921
QC SAMPLE	E (CIRCLE):		MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	
Field Duplica	ate ID :	NA	*			_	Field Dup	licate Time:	AYA .
Comments:									•
	Fin	im IRI	1 = 0	14 000					

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SITE: Field Team: Neather/Ter Well Condition	UPKR	Freen	lan			V	Vell ID:	MW	-85
Field Team:	-	Mia	ml/Pe	muy				Date:	03/03/17
Weather/Ter	np:	Oyence	and me	en 1	u7 30		Ar	rival Time:	0770
Well Condition	on:	6753	·	0 / /		In	itial DTW	(ft btc):	35.18
Purge Metho	od:	Barles	/		Pu	rge Rate ⁵:	GRAB		
	Sela -			Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	-11	mstom	Turbidity	DO	ORP	Note color, odor, sheen,
1 IIIIC	Begin Pu	and the second		рН	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
	a construction	After	62.					2.5	and a star was the
09:30	35.18	GRAB	97.67	646	0.373	28.0	10.47	175	hyptown; nodden
								/	
							/		
		-				/			
	-	-		(c)	n			_	
				31	117				
-			/	51	~				
		/							
	/				÷			4	
<u> </u>	/		-		-				
	-								
Stabilization Criteria ³	-	-	-	± 0.1 units	± 3%	±10% ⁴	± 0.3 mg/L	± 10 mV	÷
¹ collect field para ³ stabilization ach ⁴ for turbidity read	ieved once field		ilize for 3 succes	sive readings; m	o water measured inimum paramete rate is 0.1 - 0.5 L	er subset: pH, sp	. cond., and turbi gal/min)	dity or DO	
Sample ID:						- 250	Sa	mple Time	0925
Analysis: 8	52608,9	ALLNU	SEC VA3	1310.1	; EPA 300.	U'SM2	Ö :40CFA	136 415	2;376.2; RSU-1751
QC SAMPLE			MS/MSD	EQ Blank			TAL PURG		
Field Duplica	ato ID ·	N1	٨						
						-	гиа рар		NIA
Comments:			·						
		~		2 -	1.				
	ten	ans I	Rim T.	5 0.0	mall				

/eather/Te /ell Condit	emp: ion:	Onerio Gova	st, cyli	tuanh	, upper	3dis In	Ar Initial DTW	rival Time:	<u>03/03/17</u> 18.46
urge Meth	iod:	Subma	where pu	imp	Pu	rge Rate ⁵:			
2-10	i.	Dumo Vel	Toma	Field	Paramete	And a second sec		000	
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	рH	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Nôte color, odor, sheen, etc,
	Begin Pu	mping			in the s				
150	18.46	initial	7.14	7.77	0.333	20:7	10.54	26	closer, no odors
1155	19.14	0.5	7.52	7.06	0.386	0.9	7.74	77	Lr
1200	19.58	1.25	1.54	7.02	0.385	6.1	6.52	66	L.
1205	19.92	2.0	7.57	7.00	0.384	0.8	5.83	58	(i
1210	20.25	3.0	7.54	7.00	0.383	1.9	5,43	49	E L
1215	20.42	3,5	7.38	7.01	0.381	0.2	5.11	42	FI
1220	20.55	4.0	717	7.02	0,381	9.3	4,95	39	t i
1225	20,60	4.5	7.13	7.02	0.380	9.2	4.75	35	21
1230	20.60	5.0	7.03	7.03	0.379	8.4	4.68	-34	
Stabilization		R. A.		t O torito	1.20/				
stabilization ac	rameters in 3-5 m	parameters stab	ilize for 3 succes	sive readings; m		er subset: pH, sj	± 0.3 mg/L sing; total drawdo p. cond., and turb	wn should not e	xceed 0.33 ft
Sample ID:	adings > 10 NTUs	0-GU-		7		-	Sa		12:35
Analysis: (\$260B; 8	PAbolo	EPA 2320	B 310.1;	FPA300.0	5112540	e' 40CFK	136/415,2	1; 376.2; RSK17
QC SAMPL	E (CIRCLE):	FD	MS/MSD	EQ Blank	C	тс	TAL PURC	GED (GAL)	: <u></u>
	cate ID :	NA					Field Dup	olicate Time	•

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	2		nl/Der					Date:	03/03/17
Veather/Tei					1305			rival Time:	
Vell Conditi	-5		-Water					(ft btc):	31.62
Purge Metho	Dd:	Subm	ersible p	1		rge Rate ⁵ :			
	1 9-00	Purge Vol.	Temp	Field	Paramete	rs ¹ Turbidity	DO	ORP	Nõte color, odor, sh
Time	DTW ² Begin Pu	(sel)	(°G)	рН	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
0735	31.62	initid	6.99	7.19	0,310	0.3	10.44	243	Clear, no ador
0740	32.20	2	7.74	7.3	0.295	ø	10.03	232	1.7
0745	32.85	3	7.43	7.10	0.292	ø	8.42	227	12
0350(0)	33.48	4	7.03	7.18	0.287	0.4	7.48	221	17
035500	33.89	5	7.34	7.12	0.287	1.2	7.94	216	14
0800	34.75	6	7.36	7.(]	0.288	0.5	7.21	210	ji -
0805	35.19	1	1:74	7.11	0.290	ø	7.14	201	ł
0810	35.25	8	7.65	7.12	0.289	0,4	662	194	4
0815	35.24	9	7.67	7.12	0.287	ø	6.58	187	V
0820	35.29	ID	755	7.12	0.288	ø	6.59	182	
_	-		GND						
Stabilization Griteria ³	-		•	± 0.1 units	± 3%	±10% ⁴	∉ 0.3 mg/L	±10 mV	•
collect field para stabilization ach for turbidity read	ieved once field	parameters stat	ilize for 3 succes	sive readings; π	o water measured iinimum paramete rate is 0.1 - 0.5 L	er subset pH, sj	o. cond., and turb		xceed 0.33 ft
Sample ID:	mw	30-GU	1,030	317			Sa	mple Time	0820
Analysis: δ	52605;	PALLONO	EDA 23	2013/31	DI', EPA3	<u>w.o', s</u>	M2540C	40CFR	136/415.2;3
QC SAMPLE			MS/MSD	EQ Blank	-		TAL PURG	~	
Field Duplica	ate ID :	NIA					Field Dup	licate Time	NIR
Comments:	F	errows	Irun ?	0,04	mg/L				

eld Team	UPRR :==	Milanb	1/1	05	-		Vell ID:		3-3-17
/eather/Te			/		, UPAR 30	ŝ	- Ar	rival Time:	
ell Condi		Good		1-) 11	Ir	nitial DTW	(ft btc):	110.68
urge Meth	iod:	Submers.	hle - 1	87	Pu	rge Rate ⁵:			
		to A 15		Field	Paramete				San San San San
Time	DTW ²	Purge Vol. (gal)	Temp (°G)	pН	nstrm Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sl etc.
	Begin Pu	mping					and the second second		
13:33	110.68	Inihal	7.44	7.59	0.399	0.6	9.65	84	clair, no alor
3:38	111.90	0.5	8.00	7.36	0.423	0.4	9.75	101	- 1
3:43	111.85	0.75	8.16	7.27	0.427	0.2	8.03	106	11
3:51	111.80	1.0	8.12	7.25	0.427	0.0	6.48	107	11
3:56	111.78	1.25	8.26	7.25	0.428	0.1	6.22	105	j L
4:01	111.85	1.50	8.28	7.25	0.429	0.2	5.89	104	11
4:06	111.95	1.75	8.33	7.25	0,427	0.2	5.72	102	11
14.11	111.95	2.0	8.44	7.24	0.425	6.2	5.59	102	ŧ,
14:16	111.98	2.25	8.46	7.25	0,420	0,0	5.42	102	V
					· · · · · · · · · · · · · · · · · · ·				
/									
Stabilization Criteria ³	P	•	•	± 0.1 units	±3%	±10% ⁴	± 0.3 mg/L	±10 mV	•
collect field pa stabilization ad	adings > 10 NTUs	parameters stab		ssive readings; m ⁵ target purge	o water measured inimum paramete rate is 0.1 - 0.5 L	er subset pH, s		dity or DO	14:20
nalysis:	8260B, 1	EPA GOID	EPA 3310	B/310.1 , E	PASCOU	5m 2540C	HOCFR 1	36/415.2.3	76.2, RSK 17
C SAMPL	E (CIRCLE):		MS/MSD	EQ Blank					2.25
ield Duplic	cate ID :	NA				_	Field Dup	licate Time:	
Comments	Ferro	us Iron	= Ø.¢	30 mg	12				

NTE.								-		
SITE:		2R Fre				V	Vell ID:		1-26	
Field Team:		Demus 1							3-9-17	
Weather/Te	-	33°F	r chercust	, Diezi	Y		Ar	rival Time:	0740	
Well Conditi	-			D, Loos				(ft btc):	Sicel - 59 93-60	
Purge Meth	od: -	S. Davers. 1	il pump		Pu	ge Rate ⁵:				
-	<u> </u>	Purge Vol.	Tomp	Field	Paramete	and the second s		000	N ¹² 2	
Time	DTW ²	(gal)	Temp (°G)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.	
	Begin Pu	mping								
8:15-	69.48 59.98	Initial	7.05	6.47	349	0	9.18	202		
820	66.01	0.75	7.20	6.74	344	0	7.96	185		
825	66.00	1.00	6.83	681	344	0	6.71	173		
830	66.00	1.33	7.55	6.83	344	0	6.32	160		
835	66.00	1.50	7.42	6.86	343	0	5.64	151		
840	66.00	2.00	7.63	6.86	343	0	5.43	145		
845	46.00	2:25	7.54	6.87	343	D	5.23	142		
850	66.00	2.50	7.27	6.87	341	0	5.10	137		
8.55	66.00	2.45	1.42	4,87	342	0	5, ठुप्	-135		
									1	
Stabilization	e	•	-	± 0.1 units	± 3%	±10% ⁴	± 0.3 mg/L	±10 mV	÷	
Criteria ³ ¹ collect field para	•	parameters stab	- ilize for 3 succes	² DTW: depth to sive readings; m ⁵ target purge r	water measured	from top of cas ar subset: pH, sp	ing; total drawdo b. cond., and turb gal/min)	wn should not e		
Analysis:					E 14 a			•		
•									5.2, 376.2, RSUI	
QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 2.75										
Field Duplic	0				Field Duplicate Time:					
Comments:		And the second second	in water si	et.						
	# Dtu	Louis	TED FR	zom st	the ch	SING				

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Ground	water Pu	irging a	nd Samı	pling Fo	rm			9	CH2MHILL
SITE:	_UP0	RR Fr	Reman			N	Vell ID:	Marl	ow No. 2
Field Team:		Demus	Gnar / Ba	unn					3-9-17
Weather/Te	emp:		Outrea		27 <u>y</u>			rival Time:	
Well Condit					·	lr	nitial DTW	(ft btc):	42.33
Purge Meth	od:	Submeribl	· Pump	0	. Pu	rge Rate ⁵ :			
				Field	Paramete				an a
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	рH	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen etc.
	Begin Pu								
0:23	42.33	Initial	7.19	7.36	0.273	572	7.7.2	85	Very turbid, oxidation
10:28	42.32	0.5	7.59	7.52	0.275	545	4.7.0	46	Turbid, Oxidation
10:33	42.38	1.0	7.31	7.46	0.273	560	3.1.2	24	Turbid, Oxidation
10:38	42.38	1.5	7.47	7.37	0.274	421	2,2.8	-1	Turbid, oxidation
10:43	42.38	2.0	7.43	7.36	0.275	244	.1.8.1	-6	Clearing
10:48	42.38	2.5	7.30	7.35	0.275	203	1074	-6	Clearing
10:53	42.38	3,0	7,15	7,36	0.275	191	1.53	-5	Clearing
10:58	42.38	3.25	6.67	7.36	0.276	184	1.48	-4	Clearing
					·				
Stabilization Criteria ³	-			± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
	ameters in 3-5 mil		lizo for 2 oueses	² DTW: depth to	water measured	from top of cas	ing; total drawdov	vn should not ex	kceed 0.33 ft
⁴ for turbidity read		parameters stabi	120 101 3 500005	⁵ target purge r	ate is 0.1 - 0.5 L	/min (0.03 - 0.13	gal/min)	aity or DO	
Sample ID:	Mark	No2 -	GW-C	30917			Sa	mple Time:	11.00
Analysis:	8200B	6010,	2320B;	310.1, E	PA300.0	, SM JS	40C, 40	CFR 136/	4152, RSK175
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	3.25
Field Duplica							Field Dup	licate Time:	
Comments:	Water	in well	Vault av	nd enteri	ng utell.				
		-0							
	Ferrous	1100 =	0.10 mg	y/L					

Ground	water Pu	irging a	nd Sam	pling Fo	rm				CH2MHILL
SITE:	Uf	PRRF	reeman			N	Vell ID:	MU	1-135
Field Team:		SA	RMUS				_		5-31-17
Weather/Te	mp:	68°F. Da	Att. claud	, bripzy			- Ar		12:00
Well Condit		Good	,	/ /					
Purge Meth	od:	Bail		· · · · · · · · · · · · · · · · · · ·	Pu	rge Rate ⁵ :			
				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol.	Temp		mSlow	Turbidity	DO	ORP	Note color, odor, sheen,
Time	Begin Pu	(gal)	(°C)	рН	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
	Degin Fu								
12:25			1281	7.40	0.334	14.5	10.83	224	
	ξ	-							
		1				3. S	10 0 W		
						- 1 L	Ş.		
							1		
									2
Stabilization Criteria ³	-		-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect field para							ing; total drawdo		kceed 0.33 ft
³ stabilization ach ⁴ for turbidity read		parameters stab	ilize for 3 succes		inimum parameto ate is 0.1 - 0.5 L			dity or DO	
Sample ID:	-	35- GU)- 053	1. A.		·		mple Time:	12:15
Analysis:				0.0,25	40, 5310	, 4500	KSIL175	- 353.)	
QC SAMPLE			MS/MSD	EQ Blank			TAL PURG	·	
Field Duplica	ate ID :	~				_	Field Dup	licate Time:	
Comments:	Ferrous	Iron	= 0.03	mall					
				n 5/30	117, 50	moled no	harre.		
	J					1	- Je		
	· · · · · · · · · · · · · · · · · · ·								

Groundwater Purging and Sampling Form												
SITE:	UPR	R. Free,	ทลก			١	Nell ID:	MW	-125			
Field Team:									5-31-17			
Weather/Te				· · · · · · · · · · · · · · · · · · ·			- Ar		8:30			
Well Condit	ion:	Good	Garrent						38.55			
Purge Meth		Bail					~					
				Field	Paramete	-						
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pH	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.			
	Begin Po	Imping										
9:15			14.89	7.52	,831	222	10.54	148				
				_								
Stabilization Criteria ³		-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	•			
¹ collect field para ³ stabilization achi			izo for 2 europa				ing; total drawdov		cceed 0.33 ft			
⁴ for turbidity read			120 101 3 500005		ate is 0.1 - 0.5 L/			aity or DO				
Sample ID:	MWD	S-GW-	053117	2		e.	Sa	mple Time:	9:05			
Analysis:	8260, 1	6010/7470	,2320	EM300	0,250	10, 5310	,4500,	RSK175	353.2			
QC SAMPLE			MS/MSD	EQ Blank	-		TAL PURG					
Field Duplica	ite ID :					•	Field Dup	licate Time:				
Comments:	Ferrous	Fren =	0.08	Mg/L	7							
				-30-17, 5	angled N	echarge.						
	_				1			· · ·				

Ground	Groundwater Purging and Sampling Form											
SITE:	[]PR	12 Fran	6A			1	Nell ID:	Mul	-115			
SITE: Field Team:		5 De	wvs						5.31-17			
Weather/Te							- Ar		9:50			
Well Conditi	ion:	Good				Ir	nitial DTW	(ft btc):	55,40			
Purge Meth	od:	Bail					_					
				Field	Paramete							
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	рН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.			
	Begin Pu					(((10)	(mg/L)	(1117)	610.			
			14.2	710	()	Lo is	9/11	167				
			14.81	7.19	0.426	60.0	9.46	197				
				+								
Stabilization Criteria ³	-	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-			
¹ collect field para ³ stabilization achi ⁴ for turbidity read	ieved once field		lize for 3 succe	ssive readings; mi		er subset: pH, sp	ing; total drawdov cond., and turbi gal/min)		cceed 0.33 ft			
Sample ID:	-	15 - Gu	1.05			,		mple Time:	(t) (t_0)			
-	-				2 - 10 -							
	-			0,300.0	,2540,5				10			
QC SAMPLE	. ,	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	12			
Field Duplica							Field Dup	licate Time:				
Comments:	Ferrous	5 Iron	= 0,10 1	ng/L								
	12 ga	lons he	uled or	5-30-1	7. Samp	bd rech	wge.					
							v					

SITE: UPBR Freeman Well ID: MW-10s Field Team: 5. Daws Date: 5-3/-17 Weather/Temp: Partly cloudy, breezy Arrival Time: 11:00 Well Condition: Good Initial DTW (ft btc): 4/6.53 Purge Method: Bail Purge Rate 5:										
Field Team: S. Deaus Date: S = 3/-1 7 Weather/Temp:									9	CH2MHILL
Field Team: S. Deaus Date: S = 3/-1 7 Weather/Temp:	SITE:	UPR	R Free	man			١	Nell ID:	Mw.	-10s
Weather/Temp: Partly closely, brog zy Arrival Time: 11:00 Well Condition: Good Initial DTW (ft btc): Good Purge Method: Barl Purge Rate 5:										
Well Condition: Good Initial DTW (ft btc): Ya 53 Purge Method: Bail Purge Rate 5:	Weather/Te	emp:						A	rival Time:	11:00
Purge Rethod: Barl Purge Rate 5: Time DTW ² Purge Vol. Temp Turbidity DO ORP Note color, odor, sheen, etc. Begin Pumping	Well Condit	ion:	hood				Ir	nitial DTW	/ (ft btc):	46.53
Time DTW ² Purge Vol. (qal) Temp ("C) pH Sp. Cond. Turbidity (NTU) DO (mgL) ORP Note color, odor, sheen, etc. Begin Pumping	Purge Meth	od:	Bail			Pu				
Time DTW ² (gal) (°C) pH Sp. Cond. (NTU) (mg/L) (mV) etc. Begin Pumping					Field	Paramete	rs ¹			
Begin Pumping Image: Provide the second	Time	DTW ²	1 .		рH	Sp. Cond			and the second se	
Stabilization				1	P	oprovinar	(((10))	(mg/c/	((())	610.
Stabilization		-	-	15110	ZLE	622	19.5		2.)0	
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :				0,10	1-05	1025			~~~	
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Criteria ³ - + 0.1 units $\pm 3\%$ $\pm 10\%^4$ $\pm 0.3 \text{ mg/L}$ $\pm 10 \text{ mV}$ - ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO 5 ⁴ for turbidity readings > 10 NTUs 5 target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW [05 - GW - 053117$ Sample Time: $11'10$ Analysis: $8 2 GO$, $GO 10 / 7470$, 2320 , 300.0 , 2540 , 5310 , 4500 , $851L + 25$, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :							6			
* collect field parameters in 3-5 minute intervals * DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft * stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO * for turbidity readings > 10 NTUs * target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: MW 105- GW- 053117 Sample Time: Analysis: & 2000, 000/7470, 2300, 300.0, 2500, 5310, 4500, 6510, 4500, 6512, 75, 353.2 QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank Field Duplicate ID:	Contraction in the second second	-	-		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
* for turbidity readings > 10 NTUs * target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: $MW 105 - GW - 053117$ Sample Time: $11'10$ Analysis: $8260, 600/7470, 2320, 300.0, 2540, 5310, 4500, 4512175, 353.2$ QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID:	¹ collect field para			ilize for 3 succo						.ceed 0.33 ft
Analysis: $8 260, 600/7470, 2320, 300.0, 2540, 5310, 4500, 8512/75, 353.2$ QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :			parameters stap	INZE IOI 5 SUCCE:					aity or DO	
Analysis: $8 260, 600/7470, 2320, 300.0, 2540, 5310, 4500, 8512/75, 353.2$ QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :	Sample ID:	MWI	05- GI	N- 05	3117	ħ.		Sa	mple Time:	11:10
QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): 1.3 Field Duplicate ID :										
Comments: Ferrous Icon = 0.04 mg/L						,				
	Field Duplica	ate ID :						Field Dup	licate Time:	
	Comments:	Ferrous	Icon =	0.04	myll					
						Sample	Fecovery			
		J								

SITE:	Uf	RRFM	RMan			١	Vell ID:				
Field Team:		5 De	MUS	1					5-31-12		
Weather/Te		10°F	partly (loudy			Ar	rival Time:	12:55		
Well Condit	ion:	07000				Ir			27.05		
Purge Meth	od:	Bail			Purge Rate ⁵ :						
				Field	Paramete	rs ¹					
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	рН	mS/cm Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.		
	Begin Pu	mping									
13:20	_	-	15.48	8.05	0.333	0.0	<i>[1.78</i>	181			
								<u> </u>			
			-								
Stabilization Criteria ³			-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-		
¹ collect field para ³ stabilization achi ⁴ for turbidity read	eved once field		lize for 3 succes	sive readings; mi	water measured nimum paramete ate is 0.1 - 0.5 L/	r subset: pH, sp		vn should not ex dity or DO	cceed 0.33 ft		
Sample ID:	MW	75-G	W-05					mple Time:	13:10		
Analysis:	8260, (000/747	0, 2320	,300.0,24	540,5310	4500, R	SK175, 3	532	·····		
QC SAMPLE	(CIRCLE):	FD	MS/MSD	EQ Blank	100	то	TAL PURG	ED (GAL):	28		
Field Duplica							Field Dup	licate Time:			
Comments:	·	illons bo		19/L 5-30-17	. Sampleo	Necover	¥.				

	Ground	lwater F	Purging a	nd Sam	pling F	orm			A	CH2MH	
12	SITE:	OPAR	Friend	91		_	١	Nell ID:	Silva		
	Field Tear	n: _	L. Bau	impun			_		Date	6-1-17	
	Weather/T	emp:	58°, C	louds.			_	Date: <u>6- 1- 17</u> Arrival Time: <u>930</u>			
	Well Cond	lition:	Spigot	on back	Porach		1	nitial DT	N (ft btc):	/	
	Purge Me	thod:	Grap of	Spigot		Pi	urge Rate ⁵				
					Fié	ld Paramet	ers				
	Time	DTWF	Purge Vol.	lemp (PC)	6Ht	Sp; Cond)	Turbidity	DO (mc/L);	ORP (mV)	Note color, ocor, etc.	
		A REAL PROPERTY.	Punging			<u> </u>		<u>. (09/6)</u>		<u></u>	
(0958			19.13	7,49	0.401	0.6	7,51	194		
	•				1						
	1				-		-				
										-	
		_									
					_						
									-		
					+		1		1.		
	Stabilizati	ÓD)									
			-5 minute intervals		12011/un		€10%5	at the second second	L BIOM		
	³ stabilization		field parameters sta	abilize for 3 succ	essive readings	th to water measur ; minimum param ge rate is 0.1 - 0.5	eter subset pH,	sp. cond., and to	down should not urbidity or DO	exceed 0.33 ft	
			la-GW-	06011		ge foto lo 0, 1 - 0,0	umm (0.00 - 0.		Sample Time	e: 1000	
	Analysis:								·		
	QC SAMI	PLE (CIRCI	_E): FD	MS/MS	D EQ Bla	ink	Т	OTAL PUF	RGED (GAL	.):	
	Field Dup	licate ID :						Field D	uplicate Tim	e:	
	Commen	ts: <u>Reside</u>	at seems -	to Nat u	rout to	visually	interact	-/ San	pleas. Pre	fers to proter	
		ton	lot be of	home.		_					
		5	= = 0 0								

Groundwater	CR - Free				Well ID:	SI I	CH:			
Field Team:	L. Ba		-	-		wen iD:				
Weather/Temp:	Clouds					_		Date: <u>6-1-17</u> rrival Time: <u>1040</u>		
Well Condition:		house s	ant			nitial DTV				
Purge Method:	Spiget		1 301	Pi	- Irge Rate ^f					
			FIA	d Paramete				19 - S. 19 - 44 - 44 - 44 - 44 - 44 - 44 - 44 -		
Time DTV	Purge-Vol	Temp (°C)		Sp. Cond.	Turbidity	DO	ORP	Note color		
200	in Pumping			I Sp. Cond.		<u>(mg/L)</u>	<u>(<u></u></u>			
S Million		10.70		1 11-7			3253			
1058		18:19	6.30	0,453	2.2	32.39	300)			
								-		
								-		
		1	3							
					1					
						+		-		
				-				-		
				-				-		
							1			
Stabilization Criteria st	4		1200 Mani	B ±3%5	±:0%	5	L BiOmy			
¹ collect field parameters i ³ stabilization achieved on ⁴ for turbidity readings > 1	ice field parameters s 0 NTUs	tabilize for 3 succ	essive readings; ⁵ target purg	n to water measure minimum parame re rate is 0.1 - 0.5	ed from top of o eter subset: pH,	casing; total drawd , sp. cond., and tu	down should not			
Sample ID: <u>St</u>	ark-Gu	1- O GOII	7		-	S	ample Tim	e: <u> (00</u>		
Analysis:										
QC SAMPLE (CIR	CLE): FD	MS/MSI	EQ Bla	nk	Т	OTAL PUR	GED (GAL	.):		
Field Duplicate ID	EDO	2-GW	0601	17			uplicate Tim			
Comments:		<u> </u>			-		plicate filti	e. <u>1120</u>		

SITE:	UPRR	Freev	wan		-	١	Nell ID:	MW-	15
Field Team:		Dem	us/B	rown					6-2-17
Weather/Te	mp:	Mostl	15Unn	cown 4 68	0		Ar		11:38
Well Conditi	on:	Good	1	1	-	Ir			16.94
Purge Metho	od:	Bail			_ Pu	rge Rate 5:			
				Field	I Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity	DO	ORP	Note color, odor, sheen,
	Begin Pu		(0)		Sp. Conu.	(NTU)	(mg/L)	(mV)	etc.
		-	17.00						
11'55	~		15.89	7,45	0,873	62,9	5.69	154	
							3		
Stabilization Criteria ³	-	-		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect field parar ³ stabilization achie			ize for 3 succes	² DTW: depth to	water measured	from top of casi	ng; total drawdov	vn should not ex	ceed 0.33 ft
⁴ for turbidity readi				⁵ target purge ra	ate is 0.1 - 0.5 L/	min (0.03 - 0.13	gal/min)	aity of DO	
Sample ID:	MWI	S-GW	1-060;	217			Sar	nple Time:	11:45
Analysis:	8260,6	010/742	10,232	0,300.0	2,2540,	5310,4	-500, RS	K175 :	3532
QC SAMPLE		FD	MS/MSD	EQ Blank			TAL PURG		
Field Duplicate ID :							Field Dupl	licate Time:	
Comments:	mall								
				9	-17 50	mpled	recover	Ч,	
-	J					3		,	

SITE:	UPRF	R Freen	nan		_	١	Nell ID:	MW	-65
Field Team		Demu					_		6-2-17
Weather/Te	mp:	Mostly	Sunny	650			Ar		10:55
Well Condit		Good	/			İr	nitial DTW	/ (ft btc):	33.84
Purge Meth	od:	Bail			- Pu	rge Rate ⁵ :			
				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin Pu	mping							
11:20	-	_	14,75	7.25	0,28846	113	7.00	170	
						-			
Stabilization Criteria ³	-	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect field para ³ stabilization achi ⁴ for turbidity read	eved once field p		ize for 3 succes	sive readings; mi	water measured nimum paramete ate is 0.1 - 0.5 L/r	r subset: pH, sp	. cond., and turbi	vn should not ex dity or DO	ceed 0.33 ft
Sample ID:	MW6	5-GW-	0602	17			Sai	mple Time:	11-05
					0,2540	1,5310	.4500.	RSK 17	5,3532
QC SAMPLE		FD	MS/MSD	EQ Blank			TAL PURG		
Field Duplica	te ID :						Field Dup	licate Time:	
Comments:	Ferro	s Iro	<u>n=0,1</u>	1 mg/L	2				
	3.5 ga	llons p	uiled on	1 5-30	-17:5	ampled	recover	<u>y.</u>	
				····				5	

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SITE:	UPR	R Free	eman			N	Nell ID:	MW.	- 85
Field Team:		DEMI		20MIN			_		6-2-17
Weather/Te	mp:	Mosth	1 SUNNU	1.65°			Ar	rival Time:	10:00
Well Condit		Good	· ·	,		lr	nitial DTW	/ (ft btc):	33.67
Purge Meth	od:	Bail	-		. Pu	rge Rate ⁵ :			
				Field	Parameter	'S ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen,
	Begin Pu					((410)	(ingre)	(1117)	etc.
10:36			11 00	1.5.4	2 120		6.50		
10.56			16,99	6,64	0,424 mg	27.1	6.50	161	
		-							
Stabilization Criteria ³	-			± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect field paran ³ stabilization achi ⁴ for turbidity readi	eved once field p		ize for 3 succes	sive readings; mi	water measured nimum parameter ate is 0.1 - 0.5 L/n	subset: pH, sp.	. cond., and turbi	/n should not ex dity or DO	ceed 0.33 ft
Sample ID:	MWS	s-GW	-060)	17			Sai	nple Time:	10:15
Analysis:	8260,	6010 /7	420,2	320,3	00.0,25	40,53	10,4500), RSK [-	15, 3532
QC SAMPLE	(CIRCLE):	FD	MS/MSD	EQ Blank		TO	TAL PURG	ED (GAL):	4.
Field Duplica	te ID :						Field Dup	icate Time:	
Comments:	Ferrous	Iron	= 0,00	2 mg/L					
		lons bo		6-12	17. San	npled r	ecovery		·
	~								

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SITE:	UPRR	Freema	in			١	Nell ID:	Mw-	95
Field Team:		Demus		NN			_		66-02-17
Weather/Te	mp:	Sunnu	70°				Ar		12:10
Well Conditi		Good					nitial DTW	/ (ft btc):	30,02
Purge Meth		Bail			Pu	rge Rate ⁵ :			
				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO	ORP	Note color, odor, sheen,
Time	Begin Pu		(0)		Sp. Cond.	(1410)	(mg/L)	(mV)	etc.
12:00			16.400						
12:30			11.25	6.35	0,549	144	5.92	157	
									1
Stabilization Criteria ³	-	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect field para ³ stabilization achi			ize for 3 success	² DTW: depth to	water measured	from top of cas	ing; total drawdov	vn should not exe	ceed 0.33 ft
⁴ for turbidity readi			120 101 0 000000	⁵ target purge ra	ate is 0.1 - 0.5 L/	min (0.03 - 0.13	gal/min)		
Sample ID:	MW99	3 - GVV	-0662	17			Sai	mple Time:	12:25
Analysis:	<u> 5260,60</u>	10/742	0,2320	, 300.0,	2540, 5	310, 45	200, RSK	175, 35	532
QC SAMPLE	(CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	7.0
Field Duplica	te ID :	p)		2			Field Dup	licate Time:	
Comments:	Ferrou	s Iron	= 0,06	mg/L					
			6	5	11. Sa	mpled r	ecovery	8	
	0					1			

Well	ID: Asher - Residence
	Date: 6-5-17

Arrival Time: 35 1555

SITE: UPR	R-Freeman
Field Team:	L. Bauma
Weather/Temp:	67°F, 5
Well Condition:	Outsi
Purge Method:	

L. Soumany K. Stevens
67°F, Sung
Outside Fancett

____ Initial DTW (ft btc): _____ Purge Rate ⁵: _____

				Field	l Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen,
Time	Begin Pu	Contraction and the		<u> </u>	op. cond.	(((10)	(mg/L)	((()))	etc.
			4			1000	200	(a).	
1600			25.21c	5.36	0.650	2.6	31,79	2.86	
		·							
						1			
	· •								
								-	
		<u> </u>							
							4		
Stabilization Criteria ³	-	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
¹ collect field para				² DTW: depth to	water measured	from top of cas	ing; total drawdow	wn shouid not e	cceed 0.33 ft
³ stabilization achi ⁴ for turbidity read	ieved once field ings > 10 NTUs	parameters stabi	lize for 3 succes:	sive readings; m ⁵ target purge r	inimum paramete ate is 0.1 - 0.5 ⊔	er subset: pH, sp min (0.03 - 0.13). cond., and turbi gal/min)	dity or DO	
Sample ID:			-011					mple Time:	1/20
	HSNE/L	Gw.	060	31/			0a	inpre rame.	1600
Analysis:									
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	
Field Duplica	ate ID :						Field Dup	licate Time:	
Comments:	Fe	= 0.0							
								· · · · · · · ·	
			_						

1000	Temp (°C) 23.15	К, Ster Field рн (0-53		rge Rate ⁵ : rs ¹ Turbidity (NTU)	itial DTW	rival Time:	6-6-17 1245 Note color, odor, shr etc.
Purge Vol. (gal)	<u>- ce </u> Temp (°C)	Field	Pur Parameter Sp. Cond.	rge Rate ⁵ : rs ¹ Turbidity (NTU)	DO	/ (ft btc):	Note color, odor, sh
Purge Vol. (gal)	<u>- ce </u> Temp (°C)	Field	Pur Parameter Sp. Cond.	rge Rate ⁵ : rs ¹ Turbidity (NTU)	DO	ORP	Note color, odor, sh
Purge Vol. (gal)	Temp (°C)	рН	Parameter	rs ¹ Turbidity (NTU)	DO	and the second sec	
(gal)	(°C)	рН	Sp. Cond.	Turbidity (NTU)	W STREET	and the second sec	
(gal)	(°C)			(NTU)	W STREET	and the second sec	
nping	23.15	6.53	Ø·297	0.0			a solution of the solution of the
	23.15	6-53	Ø.297	0.0			
			0-211		11.33	168	
				10.00		168	
				0186			
	-	± 0.1 units	±3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
	Dom	arameters stabilize for 3 succes	ute intervals ² DTW: depth to arameters stabilize for 3 successive readings; mi Dom ⁵ target purge r	ute intervals ² DTW: depth to water measured arameters stabilize for 3 successive readings; minimum paramete	ute intervals ² DTW: depth to water measured from top of casin arameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. Dom ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 g	ute intervals ² DTW: depth to water measured from top of casing; total drawdow arameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbin Dom ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)	ute intervals ² DTW: depth to water measured from top of casing; total drawdown should not ex arameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO Dom ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

Ú.

SITE:	UPRI	Free	<u>mon</u> , K. S			۷	Vell ID:	Lasha	-AGRICULTU -6/6/17
Field Team:	4	Libiuma	11, K. S	Fevens_				Date	: 6/10/17
Weather/Te	mp:	Sun, 8	5			_			: 1425
Well Conditi	on:	good			L	_ In	itial DTW	/ (ft btc)	
Purge Meth	od:	Spigo	t		Pu	urge Rate ⁵:			
					Paramete		and the second		
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mall.)	ORP (mV)	Note color, odor, sheer
Time	Begin Pu	and the second second		<u>pn</u>	Sp. Cond.	<u>[(N10)</u>	(mg/L)	(mv)	etc.
			20.20			0.21			
		-	20,20	5.02	. 327	D.71	39,11	236	
	-								
						ļ			
		1				:			
-									
		-							
Stabilization		10000	30	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	1 8 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9 9
Criteria ³ collect field para	matam in 2.5 m	inute intervals		0.050	1 -11			1240	
stabilization ach	ieved once field	parameters stat	ilize for 3 succes	sive readings; mi	inimum parame	ed from top of casi ter subset: pH, sp	. cond., and turb		exceed 0.33 ft
for turbidity read			<i>(</i>		ate is 0,1 - 0,5 I	./min (0.03 - 0.13	gal/min)		
Sample ID:	Lashou	1-ag-l	6W-060	1617		_	Sa	mple Time	: 1430
Analysis:									
QC SAMPLE		FD	MS/MSD	EQ Blank		то):
	. ,					10			
Field Duplica	ate ID :				~	_):
Comments:					Fern	Dus	Fe	= 0.0	7

 \bigcirc

 \bigcirc

SITE: Field Team:			nd Samı	-				-	CH2
Field Team:		PRR	Freeman, 1	1		V	Vell ID:	Lang L	Jell
	L	, Kau	mann, 1	K. Ster	ing			Date:	6-6-1
Weather/Temp:	-	Sun, Z	54						
Well Condition:	_		-				itial DTW	/ (ft btc):	
Purge Method:						rge Rate ⁵ :			
	1	Purge Vol.	Temp	Field	l Paramete	rs ¹ Turbidity	DO	ORP	Note color,
Time D	DTW ²	(gal)	(°C)	pН	Sp. Cond.	(NTU)	(mg/L)	(mV)	e
B	egin Pur	nping							
1540			20.09	6.57	Ø.357	7.88	14.13	179	none
		<u></u>							
									ļ
								a.	
			<u> </u>						
Stabilization		and the second					(Contractioned)		
Criteria ³	-	-	- 1	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	



SITE:	URR	Freem	en			V	Vell ID:	Mw-	-16 D
Field Team:		L. Ba	umann	K.Ste	vens			Date:	6-7-17
Weather/Te	mp: Se	ın, 70° -	F				Ar	rival Time:	0803
Well Conditi	ion: 🛛 🙋	Good				. In	itial DTW	/ (ft btc):	窖, 44, 87
Purge Meth	od:	Portable	= pump		. Pu	rge Rate ⁵:	Pumps	Setting "	47'
7		A STATE	1700-00-	Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin Pu	The second states				1 (1) -1	<u> </u>	<u> </u>	
6947	44,82								
10 27	45.74		12.71	7,54	0,549	-0/0,	14,65	180	
1030	45.	3.5	13,22	7,53	0.546	90	13:77	182	
1033	45,30	3,75	13,52	7.47	0.547	90	13,72	186	
1036	45,26	4.5	13,50	7,49	0.549	1,54	13,69	195	
1643	45.26	4.75	13,97	7.65	0,544	5.19	13.15	201	
1046	45.26	5.0	15.11	7.53	0.532	3.62	12,34	203	
1048	45.26	5.25	15.95	7,5	0.519-	1,7,44	11.68	203	
1051	45.26	5.60	16, 92	7.44	6.510	0.76/1.0	11.15	209	No
1055	SA	Ar	nP	LE					
1123	44.63	10 yal Er	nd						
Stabilization Criteria ³	-	-	1	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
	ameters in 3-5 mi nieved once field		ilize for 3 succes				ing; total drawdo		cceed 0.33 ft
⁴ for turbidity read					ate is 0.1 - 0.5 L				
Sample ID:	MWIGE)-GW	-0607	17			Sa	mple Time:	055
Analysis:						5			
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	
Field Duplica	ate ID :	FDO	3-GW	-060	717	-	Field Dup	licate Time:	0800
Comments:	Total Pop	th of well	104,50			Erun-	0.08		

SITE:		RK Fr				V	Vell ID:		-18D
Field Team:		K. St	vens	-			(ti		6/7/1
Weather/Te	• • • •	87	Sunna						12 95
Well Condit		Good	1	<u>م</u>	-			/ (ft btc):	48.20
Purge Meth	od:	Glosn	b pun			rge Rate ⁵:			
		Purge Vol.	Temp	Field	Paramete	rs ¹ Turbidity	DO	ORP	Note color, od
Time	DTW ²	(gal)	(°C)	рН	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
1415	Begin Pu	Imping		1					
1430	48.25	1.D	15.67	9.39	Ø.33Ø	12.2	20.94	-32	nor
1435	48.25	1,5	15.06	9.20	0.329	6.49	14.8D	-46	ſ
1440	48.25	2.0	15,17	9.05	0.327	7.61	13.89	-48	
1445	48,25		15.31	8.84	0.331	6.73	13.DZ	-47	
14570	48.25	3.Ø	15.12	8.73	0.330	6.95	12.00	-47	
1455	48.25	3.5	14.99	8.62	0.328	5,83	11.34	-5ø	
15ØØ	48.25	3.75	14.90	8.59	0.329	4.68	11.20	-52	
15ø5	48,25	diama a	14.83	8.56	0.330	4.00	10.99	-53	
151Ø		4.25	14.97		0.33Ø	3,43	10.71	-53	
1515	48.25	4.5	15.01	8.52	0.329	3.44	10.52	-54	\checkmark
154Ø	48.18	7.ø	STO	PP PL	IMP-				
Stabilization Criteria ³	-		-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
³ stabilization ach ⁴ for turbidity read	dings > 10 NTUs	parameters stab		sive readings, m ⁵ target purge i	o water measured inimum paramete rate is 0.1 - 0.5 Li	er subset: pH, sp	. cond., and turb	wn should not e idity or DO	xceed 0.33 ft
Sample ID:	MWI8	D-GW	-0607	17			Sa	mple Time	1520
Analysis:					<u> </u>				
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		TO	TAL PURG	ED (GAL)	7.0
Field Duplica	ate ID :		NA				Field Dup	licate Time	NA
Comments:	TD: [Fe	2 0	O'TOC	C2					

SITE: Field Team	UPRA			IN CI		```	Vell ID:		-10/10
Veather/Te		at 1	65°E	K. Ste	vens		- ^ -	Date:	
Vell Condif	•	Cloudy C	OSP			l.			0920
Purge Meth		Portable	Dun D		Pu		fung s		28.64
		LOK LASTE	pamp	Field	Paramete		Jungs	Ci la	
	2	Purge Vol.	Temp			Turbidity	DO	ORP	Note color, odor, shee
Time	DTW ²	(gal)	(°C)	pH	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
2951	Begin Pu								
2958	31.38	,65	16.00	8.50	6.325	10.4	16,43	-139	*
51000	32.06	1.	14,98	8.03	0.337	9.60	12.42	- 127	
1003	32.23	135	14,58	7.97	0.343	6.44	11,08	-128	
1006	32.81	1.5	14,57	7.84	0.344	6.06	10,20	-125	
10.09	32.71	1.90	14,34	7,69	0.342	4,44	9.95	-119	
1012	32.65	ł	14,19	7.57		2.85	9.80	-113	
1015	32.65		14,09	7,51	0353		9.68	-108	
1015	S.L	M	DI	·	0013		tivo		
1017			660						
1070	00 50	2/1				-		····	Provil) and
IO32 Stabilization	29.57	3. Seel							Possible gray tinger
Criteria ³	-	~	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	· ·

		-						-40	Sec.
SITE:	UPRR	Frence				V	Vell ID:	Mw-0	31 D
Field Team:		L. Ba	umana /	K. Ste	vers			Date:	6-8-17
Weather/Te	mp:	70'F 4					Ai	rival Time:	-
Well Condit		Good				In			17,94
Purge Meth	od:	postabl	e pump		Pu	- irge Rate ⁵:		-	
				Field	Paramete				
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin Pu	mping				· · · · ·			· · · · · · · · · · · · · · · · · · ·
12045	17.39		13.41	7.10			5-0,00	524	Suther spull
	24.15	St	opped, a	called S	.D. ab	out fast		town.	7.04
1218	23.40		13,26	8.02	.381	28.8	35,37	456	Tan color
1220	25.36	2.0	12.54	8.93	, 385	22,9	11,79	476	
1222	25.91	2.25	12,56	8.92	.385	16,5	11.38	458	
1224	26.32	2.5	12.70	8-88	. 385	13.9	10.60	293	
1226	26.51	2.65	12.82	8-84	. 385	13.2	10.34	105	
1228	26.64	2.75	12.89		. 386	16.2	10,21	62	
1231	26.73	3-0	13.00	8.78	.387	23,1	10.00	-2	
1234	26.78	31	13.00	8.73	. 391	30.0	9,82	-411	
1236	26.79	3.15	13.04	8.71	. 393		9,71	-50	
Stabilization Criteria ³	-	45	ter .	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
¹ collect field para ³ stabilization ach ⁴ for turbidity read		parameters stabi	lize for 3 success phon culm	² DTW: depth to sive readings; mi ⁵ target purge r	nimum paramet	d from top of casi er subset: pH, sp /min (0.03 - 0.13	. cond., and turb	wn should not ex idity or DO	cceed 0.33 ft
Sample ID:	Muo	10-6	W-060	817		2	Sa	mple Time:	1240
Analysis:									
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank	5	ТО	TAL PURG	ED (GAL):	5.5
Field Duplica	ate ID :		_				Field Dup	licate Time:	
Comments:									
	<u></u>								· · · · · · · · · · · · · · · · · · ·
									· · · · · · · · · · · · · · · · · · ·

		UPRR					· · · ·	Nell ID:	MW-D.	SD
Well Condition: Good Initial DTW (ft btc): 62.6 Purge Method: Partable pump Purge Rate 5:			L'Baul	mann /K	risten J	tevens				
Purge Method: Purge Purge Purge Rate ⁵ :		•		t x			-: 			
Field Parameters ' Time DTW2 Purge Vol. Temp Turbidity DO OR Note color, or etc Begin Pumping OP 26 G2.60 IS 142 1,87 · Note color, or etc Begin Pumping OP 26 G2.60 IS 142 1,87 · · Note color, or etc OP 26 G2.63 S.42 N V V V V · OP 2.6 OP 2.6 G2.42.6 S.42.1 OP 2.6			0 11	N. 0		Du			(IT DTC):	62.6
Time DTW2 Purge Vol. (gal) Temp (°C) pH sp. Cond. Turbidity (NTU) DO (mgL) ORP (mV) Note color, oc etc Begin Pumping 09.26 62.60 15.42 1.87 475 9.40 290 etc 09.36 64.49 .5 1.5 V V V V V 0 35 281 0 0.9.28 64.45 .5 1.5 V V V V V V 0 35 281 0 0.9.28 2.41 2.85 2.81 0 0.9.35 2.81 0 0.9.7 .9.59 395 2.81 0 0.9.35 2.63 835 2.81 0 0.9.7 0.9.75 0.9.7 0.9.75 0.9.35 2.63 835 2.76 0 0.9.35 2.75 0.1 0.9.7 1.0.7 0.9.7 0.9.7 0.9.7 0.9.7 0.9.7 0.9.7 0.9.7 0.9.7 0.9.7 0.9.7 0.9.7 <td< td=""><td></td><td></td><td>Pactal</td><td>pump</td><td></td><td></td><td>-</td><td></td><td></td><td></td></td<>			Pactal	pump			-			
Begin Pumping OP		2					Turbidity	DO	ORP	Note color, od
09.26 62.60 15.42 1.87 .975 8.40 290 09.28 64.86 .5 15.4 4 4 4 23 8.41 285 09.30 64.74 .75 15.10 1.99 .466 4.23 8.41 285 09.30 64.74 .85 15.00 2.07 .459 3.95 8.35 281 04.34 64.95 1.00 14.90 2.14 .453 2.63 8.35 281 09.35 S A P 4 - - - - 09.35 S A P 4 - - - - 09.35 S A P 4 - - - - 1.100 14.90 2.14 .453 4 0.3 mgl. ± 10 mV - Stabilization .100 14.90 .40.1 1.93 - 1.01.1 ± 3% ± 10% ⁴ ± 0.3 mgl. ± 10 mV - * Stabilization .14.94 2.19.5	lime			(°C)	pH	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
09.28 C4.86 .5 15 V <td< td=""><td>04.00</td><td></td><td></td><td>1010</td><td></td><td>() ~ (</td><td></td><td></td><td></td><td></td></td<>	04.00			1010		() ~ (
0430 64,49 75 15,10 1.99 466 4,23 8,41 2.85 0432 64,45 .85 15.06 2.07 .459 3,95 8,35 281 0434 64,45 1.00 14.90 2.14 .453 2.63 8.33 2.76 0935 S A P F 4.33 2.63 8.33 2.76 0935 S A P F 4.33 2.63 8.33 2.76 0935 S A P F F F F F F F 0935 S A P F F F F F F F 0936 G2.95 2.75 F </td <td></td> <td></td> <td></td> <td></td> <td>1.81</td> <td>.475</td> <td></td> <td>8,40</td> <td>290</td> <td></td>					1.81	.475		8,40	290	
C9.32 G4.45 .95 I5.06 2.07 .459 3.95 8.35 281 O9.34 G4.45 I.00 I4.90 2.14 .453 2.63 8.35 281 O9.35 S A P F Image: Constraint of the second se		A 1			V	· ·		V	V	
0134 04.95 1.00 14.90 1.14 .453 2.63 8.33 2.76 0135 SAM P 4 1.00 14.90 1.14 .453 2.63 8.33 2.76 0135 SAM P 4 1.00 14.90 1.14 .453 2.63 8.33 2.76 0135 SAM P 4 1.01	0930	64,49		15.10	1.99		4,23	8,41	285	
0935 SAMPLE 0 - 1 - 0 - 1 - 0 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -			.85	15.06	2.07	.459	3,95	8,35	281	
0 0	0934	64,45	1.00	14.90	2.14	.453	2.63	8,33	276	
0954 62.95 2.75 Stabilization Criteria ³ 62.95 2.75 Stabilization Criteria ³ 62.95 2.75 ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO ⁴ for turbidity readings > 10 NTUs ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: MWOSD-GWOGOGY17 Analysis:	0935	S	A	M	PL	LE				
0954 62.95 2.75 Stabilization Criteria ³ 62.95 2.75 Stabilization Criteria ³ 62.95 2.75 ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO ⁴ for turbidity readings > 10 NTUs ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: MWOSD-GWOGOGY17 Analysis:										
Stabilization Image: Stabilization <thimage: stabilization<="" th=""> Image:</thimage:>		÷								
Stabilization Image: Stabilization <thimage: stabilization<="" th=""> Image:</thimage:>	AN DO									
Stabilization Criteria ³ Criteria ³ Construction (Criteria ³) Construction (C										
Stabilization Criteria ³ Criteria ³ Cull of the form of the for	0954	inac	210							
Chiefla procession ¹ collect field parameters in 3-5 minute intervals ² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.33 ft ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO ⁴ for turbidity readings > 10 NTUs ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: <u>MWOSD-GW-O60917</u> Sample Time: <u>O993</u> Analysis:			fulled			1.20/				
³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO ⁴ for turbidity readings > 10 NTUs ⁵ target purge rate is 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) Sample ID: <u>MWOSD-GW-O60917</u> Analysis: QC SAMPLE (CIRCLE): Field Duplicate ID : Field Duplicate ID :		Find at 6		-	1					-
Sample ID: MWOSD-GW-060917 Sample Time: 093 Analysis:	³ stabilization a	chieved once field		pilize for 3 succes	sive readings; mi	inimum paramete	er subset: pH, sp	. cond., and turb	idity or DO	10000 0.35 h
Analysis: QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): Field Duplicate ID : Field Duplicate Time: Field Duplicate Time:			en c	IALA		alo 13 0.1 - 0,5 E	min (0.00 - 0.10		mple Time	MA7
QC SAMPLE (CIRCLE): FD MS/MSD EQ Blank TOTAL PURGED (GAL): Field Duplicate ID : Field Duplicate Time:		MWD	20-61	N-060	<i>417</i>		-	Jd	mpie rime:	015
Field Duplicate ID :				Hertop		_				
		. ,	FD	MS/MSD			ТО			
Comments; Fe = 0.0		_	0				-	Field Dup	licate Time:	<u> </u>
	Comments	-te	= 0.0)						

SITE:	UPLK	Friemo	n		2	V	Vell ID:	MWO 3	D-
Field Team:		1 1	1.	6 Steve	15				6-9-17
Weather/Te	• ~	Sun W/		650		•)	Ai	rival Time:	1108
Well Condit	ion:	Wateri	1 Casing	Not over	well hear	/ In	itial DTW		
Purge Meth		portable				rge Rate ⁵ :			· · · · · · · · · · · · · · · · · · ·
					Paramete				
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pH	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
11555	Begin Pı	Imping							
11587	29.30	0.7	14.34	3.16	1.304	0.70	14,25	321	No odor colo.
1159	30.02	0.90	14.47	3.81	. 296	3.41	12.96	318	
1201	30.45	1.0	14,55	3,57	,292	5,28	12.16	315	
1204	30.78	1.15	1459	3,64	. 288	4,17	11.51	312	
1207	31.02	1.25	14.71	3,70	. 287	4,23	10.84	308	
1210	31,12	1.5	14,92	3,72	1	5.47	10.28	304	
1213	31.16	1.55	14.99	3,71	. 284	3.66	9,99	300	
1216	31,18	1.65	15.04	3.71	,284	3.73	9.83	297	1
1218	SF		$h \neq$	21	5				
1232	32.15	2.90							
Stabilization Criteria ³	20:10e	ad w/o pur	np -	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
		2017	lize for 3 succes	sive readings; mi	inimum paramet	d from top of casi er subset: pH, sp /min (0.03 - 0.13	. cond., and turb	wn should not ex idity or DO	xceed 0.33 ft
Sample ID:	MW03	D-GW-	-06091	7		_	Sa	mple Time:	1218
Analysis:									
QC SAMPLE	E (CIRCLE):	FD	M8/MSD	EQ Blank	7	ТО	TAL PURG	ED (GAL):	2:90
Field Duplica	ate ID :					-	Field Dup	licate Time:	
Comments:	PID R	adings	well have	1=0.4		Fe	= 0.0.	2	
		Bread	hing Zone	=00					
valt -				(1)	1 .			an tagan ta a	
* 1 " -	sensol 45 S	ieems to b	e off. Tr	ouble cali	brating				

SITE:	OPRI					١	Nell ID:	MWI	4D
Field Team:			many/		ins	-	-	Date:	6-9-17
Weather/Te	mp:	Some a	louds,	70			Ar	rival Time:	13 70-30
Well Condit	ion:	Good	1	0		. Ir	nitial DTW	/ (ft btc):	13-81
Purge Meth	od:	por ta	de pur	ľ	. Pu	irge Rate ⁵ :			
		Purgo Vol	Tomp	Field	Paramete			0.77.7	
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	рН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheer etc.
1414	Begin Pu	mping							
14196	16.09	and the second	Hole	in li	nen	Storge	1 pump	iles.	
1419	17.03	-				_//	1-1	1	silty ton a
1421	17.82	1.4	12,47	5,23	,356	284	125	-34	Jung road
1423		1.8	12.34	5.15	. 7 33	119	11.34	-32	
1425	18.66	2,15	12.28	5.09	.328	99,6	10.82	-32	
1427	18.79		12.31	5,03		84.6	10,44	-39	
1429	18.85	3.0	12,32	4.99	.338	74.0	10,20	- 39	
1431	18.91	3.5	12.33		,340	69.3	10.07		
1434	SA	M	PLE						
1450	15.80	60			5117	C			
Stabilization	12.80	6.0		± 0.1 units	± 3%		pling	1.10	
Criteria ³ ¹ collect field para	meters in 3-5 mi	nute intervals	~			$\pm 10\%^4$	± 0.3 mg/L ing; total drawdov	± 10 mV	-
stabilization ach	ieved once field		lize for 3 success	sive readings; mi	inimum paramet	er subset: pH, sp	. cond., and turbi	idity or DO	κсееα 0.33 π
for turbidity read			A COAS		ate is 0.1 - 0.5 L	/min (0.03 - 0.13			A. 6.
Sample ID:	MW 14)-Gw	-06041			-	Sa	mple Time:	1434
Analysis:				22501 52					
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		ТО	TAL PURG	ED (GAL):	6-0
Field Duplica	ate ID :					-	Field Dup	licate Time:	
Comments:		e=0	.08			1			
	*11) -1/01	15 -	()	-00	Imanth	Nes 7 ma		

SITE:	UPRR-	Freem	an		0	١	Vell ID:	MW-0	4D
Field Team	÷ .	L. Bau	mann/	K. Ster 65°	lens		-	Date:	6-9-17
Neather/Te	emp:	Sun W/	clouds,	65°	the second	<			1649 170
Well Condi	· · · · · · · · · · · · · · · · · · ·	6000		01		, Ir	nitial DTW	/ (ft btc):	109.10
Purge Meth	nod:	portable	fump, lo	n flow	Pu	rge Rate ⁵ :			
	1	Durgo Val	Toma	Field	Paramete	and the second se			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	рН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, shee etc.
	Begin Pu	mping							
1738	108.93	-	-		_				
1741	112.54	.4	18,60	5.99	. 430	10.6	11.97	135	clear vo
1744	112.10	. 70	17,31	5,79	. 417	4,57	10.18	140	CLEAR NO O JOR
1746	111.85	• 85	17.96	5.67	. 406	3,07	9,30	142	
1748	112,15	1.20	17,69	5,63	0.3,99	2.31	9.08	140	
1751	112.35	1.5	16.75	5.60	.401	2.	9,19	135	
1755	S	A/	\sim	PI	-5				
1800	110.00	2.5							
Stabilization Criteria ³	-	-	~	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
stabilization acl	ameters in 3-5 mi hieved once field g dings > 10 NTUs <u>MWOC</u>	parameters stab		sive readings; mi ⁵ target purge r	water measured inimum parametr ate is 0.1 - 0.5 L	er subset: pH, sp	gal/min)	wn should not ex idity or DO mple Time:	
Analysis		·							
QC SAMPLI	E (CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	12.
Field Duplic	ate ID :					-	Field Dup	licate Time:	
Comments:	Multi-Rac	- then pur	well head	-0.7		Fe=	0.0		
		Brea	buy zone	-0.3					

SITE:	UPRK	Freem	an				Nell ID:	WSE	5-Eff
Field Team:		L. Ban	lann				_		6-14-1
Weather/Ter	mp:					(* 10)*550***	A		0650
Well Conditi	on:	good -				1			/
Purge Metho	bd:	fonce	tta .	faucot		urge Rate ⁵ :	1	-	
				Field	Paramete	ers ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pH 🛠	Sp. Cond.	Turbidity	DO	ORP	Note color, odor,
Time	Begin Pi			<u>1 </u>	Sp. Colla.	(NTU)	(mg/L)	(mV)	etc.
0738			13.39	5.64	.364	0,39	50.00-+	(1)2	
				5,07	. /01			715	
Recal									
0740			13.89	3,13	2,44	0.39	10,99	399	
	,								
					27				
	1								
				ļ					
									1
		.7							
Stabilization Criteria ³	-	-		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
¹ collect field para				² DTW: depth to	water measure	d from top of cas	sing; total drawdo	I wn should not e:	xceed 0.33 ft
³ stabilization achi ⁴ for turbidity read			ilize for 3 succes	ssive readings; m ⁵ target purge r	inimum paramel ate is 0.1 - 0.5 L	ter subset: pH, s _/min (0.03 - 0.13	 cond., and turb gal/min) 	idity or DO	
Sample ID:	WS5-E	FF-GW	-06/417				Sa	mple Time:	0740
Analysis: 82						-			
QC SAMPLE	- 20		MS/MSD	EQ Blank		тс	TAL PURG	ED (GAL):	
Field Duplica	te ID :						Field Dur	licate Time:	
Comments:	Fe=				···· ···	-	I		
				······	-				

SITE:	Freemo	m-UPRI	2			V	Vell ID:	W85.	-Inf-
Field Team:		n-UPRI L. Baun	iann						6-14-17
Weather/Te	mp:	51'F					Ar	rival Time:	
Well Conditi	ion:	q	000			In			/
Purge Meth	od:	g fauce	ł		. Pu	rge Rate ⁵ :			/
				Field	I Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)			Turbidity	DO	ORP	Note color, odor, sheen,
Time	Begin Pu		(0)	рН	Sp. Cond.	(NTU)	(mg/L)	(mV)	etc.
2620		/ /			7 (2	. (7	7,73		1
0838		1	13.50	5.29	.362	0.67	1,13	311	
-									
					ļ				
0855	/	1							
Stabilization Criteria ³	-		•	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect field para ³ stabilization ach ⁴ for turbidity read	ieved once field lings > 10 NTUs	parameters stab		sive readings; m ⁵ target purge i	rate is 0.1 - 0.5 L.	er subset: pH, sp /min (0.03 - 0.13	. cond., and turbi gal/min)	dity or DO	
Sample ID:	<u>WS5-</u>	Inf-Gu	1-0610	417		-	Sa	mple Time:	840
Analysis;									
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		TO	TAL PURG	ED (GAL):	· · · · · · · · · · · · · · · · · · ·
Field Duplica	ate ID :						Field Dup	licate Time:	
Comments:	Fe=	0.0				-			
								-	

									ja -
SITE:	UPRR	Freeman				١	Nell ID:	MW17D	-
Field Team		L. Bac	lmann				-	Date:	6-14-17
Weather/Te	mp:	Sun,	56 F				A	rrival Time:	(7937
Well Condit	ion:	900	2			, Ir			63.21
Purge Meth	od:	Portable	pump		. Pu	rge Rate ⁵ :			
				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
	Begin Pu	Imping							
1205	67,43	.75	15.16	5.41	,939	121	1404	-205	
1208	68.37	1.0	15.17	5.32	.960	112	11,25	-212	Grey colore
1210	68.95	1.15	15.16	5.21	,963	128	9.25	-223	odor=sulf
1212	69.42	125	15.06	5121	.952	169	8.46	-234	
1216	70,61	1.5	15,10	5.24	1912	157	7,84	-244	
1219	71.15	1.65	15,24	5.26	. 834	158	7.43	-243	
1221	71,89	1,80	14.95	5.33	. 806	155	1,37	- 247	
1223	72.40	1,90	14,89	5.37	. 183	146	7,27	-249	
1225	72.75	2.0	14,99	5,42	.756	136	7,09	-250	
1230	5	A	mpl	2					
	Butt. Died	3.5							
Stabilization Criteria ³	1.10	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	
¹ collect field para ³ stabilization ach ⁴ for turbidity read		parameters stab	ilize for 3 succes	sive readings; m) water measure inimum paramet ate is 0.1 - 0.5 L	er subset: pH, sp	ing; total drawdo b. cond., and turb	wn should not ex idity or DO	cceed 0.33 ft
Sample ID:	-		-06141		ate is 0,1 - 0,5 L	mm (0.05 - 0.15		mple Time:	1230
Analysis:						-		·	10.00
QC SAMPLI	E (CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	3.5
Field Duplic	ate ID :						Field Dup	licate Time:	
Comments:	Fz=	0.19						_	
			-						

CH2MHILL

<

Ground			nd Sam	pling Fo	rm				CH2
SITE:	UPR. FREE	MAN				١	Well ID:	AF	w20
Field Team:		1 A	(yann)	Jen,	UIRic	.h	_	Date:	6-14-
Weather/Te	mp:	0	y don.	dif le	Lº F	-	Ar	rival Time:	#152
Well Condit	ion:		<u> </u>					/ (ft btc):	18,40
Purge Meth	od:				. Pu	Irge Rate ⁵:			
		Purge Vol.	Temp	Field	Paramete		0	000	IN-L
Time	DTW ²	(gal)	(°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, o etc
	Begin Pu	mping							
1539	18.23	:50	11.56	6.71	,372	51.6	8.04	-45	
1541	1838	.35	11,28	6.58	1374	27.0	7,68	-33	
1544	18.65	1.25	11.21	6.48	. 374	20,5	1,37	-22	Tan
1547	18.85	1.5	11.05	6.30	,373	14.8	1.07	-9	6 00
1550	19,09	1.8	10,94		.374	12.7	6.97	-3	000
1553	19,28	2.3	10.97		.373		6,92	0	
1555	\leq	212	m	V/Is	~	12:0	0.12		
1- 50				P-L	\leq				
1607	0								
1609	20.23	4.0							
Stabilization									
Criteria ³	-	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect field para ³ stabilization ach	ieved once field		ilize for 3 succes	sive readings; mi	inimum paramet	er subset: pH, sj	ing; total drawdov c. cond., and turb	wn should not e: dity or DO	xceed 0.33 ft
⁴ for turbidity read				° target purge r	ate is 0.1 - 0.5 L	/min (0.03 - 0,13			1
Sample ID:	w 20-6	nw-061	417				Sa	mple Time:	1555
Analysis:									
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		TC	TAL PURG	ED (GAL):	
Field Duplica		1				_	Field Dup	licate Time:	
Comments:	Fe	= 01	31						

Ground								-	CH2MHILL
SITE:	UPRR	Freem	an		•	١	Vell ID:	MW.	-06P
Field Team		L. Bann	nann/J	1	ich			Date:	6-15-17
Weather/Te	mp:	57° - 0	landa 1	hain				rival Time	and the second s
Well Condit	ion:	57°- cl good				lr	nitial DTV	/ (ft btc):	12995
Purge Meth	od:				. Pu	rge Rate ⁵ :			
				Field	Paramete				
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen etc.
	Begin Pu	Imping							
130	13014	.5							
747	130.85	.5	14,04	6.62	,3 87	452	7,80	221	
750	130,31	1.10	12,99	7,17	.366	0.55	2,37	203	
753	130,86	1,25	12,72	117	,377	,80	7,46	196	
756	130.88	1,75	12,76	6.98	.381	.60	7,38	19/	
759	130.86	2.25	12.84	6.96	. 386	.52	7,44	185	
0801	130,98		12.87	6,94	, 386	<u>(</u>	7,37	183	
0805	\leq	1	M	P	\langle				
0816	130.4	5.0							
Stabilization Criteria ³	-	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect field para ³ stabilization ach ⁴ for turbidity read	ieved once field		lize for 3 succes	sive readings; mi	water measured inimum paramete ate is 0.1 - 0.5 L/	r subset: pH, sp	. cond., and turb	wn should not e: idity or DO	kceed 0.33 ft
Sample ID:	MWO	GD-C	GW-0	0615	17		Sa	mple Time:	0805
Analysis:									
QC SAMPLE	E (CIRCLE):	FD	MS/MSD	EQ Blank		ТО	TAL PURG	ED (GAL):	
Field Duplica	ate ID :						Field Dup	licate Time:	
Comments:	F	2= 0.0							
				1					

6.28 6.379 7.86

SITE	:	UPRR	- Fre	eman			١	Nell ID:	MU	-19D
Field To			. 1		Jamie 1	Brown			1.00	6-15-
Weathe	er/Ten	np:	57°, c	/				- Ai	rival Time	
Well Co	onditic	on:	9000							56.05
Purge I	Netho	d:	1:	Flor p	ortable,	wap Pu			(
					Field	Paramete	rs ¹			
Time		DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, s etc.
		Begin Pu			pri		(((10)	1(iiig/L)	(1117)	610.
		56.02	-							1
101		56.34	.35	13,42	8.55	.452	3,10	5,31	138	
10 1	3	56.34	.70	12.50	8.50	, 45-6	28,2	5.25	139	
102		56.34	1.0	12.07	8,34	. 450	12.2	5.22	143	
1024	1	56,34	1,3	11.90	8.12	.448	3,18	5.12	150	
102	7	56,34	1.70	11,86	\$7.81	.447	1,77	5.09	160	
1030	>	56,33	2.0	11,80	7,30	, 448	1.16	5.07	178	
10 32	3 -	56,33	2.20	11,78	7,19	.447	1.28	5,10	180	
1036	, ,	56.34	2,60	11,27	7,15	.447	1.81	5,12	180	
104	1		51	\frown	M	$-\mathcal{P}$	1	5		
105	>	56.03	3.5							
Stabiliza Criteri	ation	-	-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-
¹ collect fie ³ stabilizati	ld param on achie	neters in 3-5 min ved once field p lgs > 10 NTUs		ilize for 3 succes	² DTW: depth to ssive readings; mi ⁵ target purge ra	nimum paramete	er subset: pH, sj	ing; total drawdo b. cond., and turb gal/min)	wn should not e idity or DO	xceed 0.33 ft
Sample	ID:	MW19	D-GL	V-0615	-17		_	Sa	mple Time	1040
Analysis	s: _									
QC SAI	/IPLE	(CIRCLE):	FD	MS/MSD	EQ Blank		тс	TAL PURG	ED (GAL)	:
Field Du	plicat	e ID :						Field Dup	licate Time	1
Comme	nts:	F	e=d	04	-					

SITE:					-	V	Vell ID:	W2	6		
Field Team	:	L. Bou	mann	J. Bro	~ y			Date:	1200 6-15		
Neather/Te	emp:	Clouds	57"			-	A		1200		
Nell Condi	tion:					. Ir	itial DTW	/ (ft btc):	64.52		
Purge Meth	od:				. Pu	urge Rate ⁵ :					
				Field	Paramete						
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen etc.		
	Begin Pu	Imping			· · · · · · · · · · · · · · · · · · ·	······					
	64,53								1.1		
1251	64,60	.75	14.49	7.90	.346	1.14	16.37	166			
1253	64,60	1.25	13.07	8,44	. 351	2.10	13,41	142	Clear \$ 00		
1255	64.59	1.25	12.93	8,14	, 344	0.66	11.94	152			
1257	64,59	2.15	12.92	7.89	,344	1.14	11.12	160			
1259	64,58	2.75	12.90	7,45	.344	1,01	10,62	177	aner flow Ro		
1301	64,57	3.15	13,00	7,04	,342	4.07	10.00	193	Contras Files Re		
1303	64,57	3.35	13.16	6.45	, 343	.56	9.57	196			
1305	64657	3,55	13,31	6.92	.342	.61	9,17	196			
1307	64.56	3.80	17.40	6.88	,341	2.21	8.76	196			
1309	64.55	4,0	13.43	7.22	. 342	0.54	863	180			
Stabilization Criteria ³	-		-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV			
collect field para stabilization act	ameters in 3-5 mi lieved once field dings > 10 NTUs		lize for 3 success	sive readings; mi	nimum paramet	d from top of casi er subset: pH, sp /min (0.03 - 0.13	. cond., and turbi	wn should not ex dity or DO	cceed 0.33 ft		
Sample ID:	W	26 - 6	w-06	1517			Sa	mple Time:	1320		
Analysis:											
QC SAMPLI	E (CIRCLE):	FD	MS/MSD	EQ Blank		TO	TAL PURG	ED (GAL):			
Field Duplica	ate ID ;					_	Field Dup	licate Time:			
Comments:											
Comments:											

	VIN	1. Laumann					Well ID: <u>Read well</u>				
Field Team: Weather/Temp:		L. Bou	mann				-	Date:	D6-20-17		
		80', 5	un	sincerny for	122	Arrival Time: <u>130 (</u> Initial DTW (ft btc):					
		Spigot	acruss di	sivering for	mhouse	Initial DTW (ft btc):					
Purge Metho	od:	Purge Rate ⁵ :									
		Durra Mat	T	Field	Paramete						
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, she etc.		
	Begin Pu	mping		<u> </u>	· · · · ·						
1310	~	/	17,38	9.12	:301	1.02	9,85	223	Øodor		
									& color		
	·										
Stabilization Criteria ³		-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV			
¹ collect field para				² DTW: depth to	water measured	d from top of cas	ing; total drawdo	wn should not e	xceed 0.33 ft		
³ stabilization achi ⁴ for turbidity readi	ngs > 10 NTUs	parameters stabi	lize for 3 succes	ssive readings; mi ⁵ target purge ra	nimum parameti ate is 0.1 - 0.5 L	er subset: pH, sp /min (0.03 - 0.13	o. cond., and turb gal/min)	idity or DO			
Sample ID:	Road	- GW-	0620	17			Sa	mole Time	1315		
Analysis:											
-	(0)001 51										
QC SAMPLE	(CIRCLE):	FD	MS/MSD	EQ Blank		ТО	TAL PURG	ED (GAL):			
Field Duplica						-	Field Dup	licate Time:			
Comments:	F	=0.0	ソ								

SITE:	UPRR			<u></u>		V	Well ID:	THOR	SON RES WE		
		GREER	BROW	N	Date: 6-26-17						
Weather/Temp: Well Condition: Purge Method:		PARTI	Y SUNN	r 80°	Arrival Time: <u>12:35</u> Initial DTW (ft btc):						
		GOOD									
		GRAB									
				Field	Parameter						
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheer etc.		
	Begin Pu	umping			<u> </u>			(0.0.		
12:42			16.83	4.50	0.280	0.0	20.93	28			
10.12			10.03	1.50	0.200	0.0	d0.15	~0			

		<u> </u>									
Stabilization Criteria ³		-	-	± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-		
collect field paran stabilization achie for turbidity readi	eved once field	parameters stabi	lize for 3 success	sive readings; mi	water measured nimum paramete ate is 0.1 - 0.5 L/r	subset: pH, sp	ing; total drawdow . cond., and turbio gal/min)	n should not ex dity or DO	ceed 0.33 ft		
		SON-G	MI-OG					nple Time:	10110		
nalysis:	THUR	.3010 9	<u>vv 000</u>						240		
C SAMPLE	(CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURGI	ED (GAL):			
ield Duplicat											

SITE:	UPR	LR FREEMAN				Well ID:		MWAD		
Field Team:		GREEP/BROWN						Date:	6 26 17	
Weather/Temp:		OVERC	AST -	150	Ar			rrival Time: 1030		
Well Condition: Purge Method:		GOOD				l Ir	nitial DTW	(ft btc): 30.02		
		Subme	ursible		Pu	urge Rate ⁵ :				
				Field	Paramete	rs ¹				
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	рН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sh etc.	
11:13/	Begin Pu				op: cond.	(,,,,,,)	<u>((())/()</u>	<u>[(iiv)</u>	610.	
11:15	30,30	0,5	15-41	6.77	0:470	7.6	7.81	213		
11:18	30.27	1.0	15,27	6.99	0.451	4,9	730	203		
11:21	36,20	1.2518	15.58	6.99	0.449	1.4	7.12	202		
11:24	30.20	1.5	15.77	6.93	0,450	0.0	7.10	202		
<u> </u>										
			. 5							
Stabilization Criteria ³	-	-		± 0.1 units	± 3%	± 10% ⁴	± 0.3 mg/L	± 10 mV	-	
collect field para stabilization ach for turbidity read Sample ID: Analysis:	ieved once field j ings > 10 NTUs	parameters stabi		sive readings; mi ⁵ target purge r	water measured nimum paramete ate is 0.1 - 0.5 L/i	r subset: pH, sp	. cond., and turbi gal/min)	wn should not ex idity or DO mple Time:		
QC SAMPLE	(CIRCLE);	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):		
Field Duplica	ite ID :		1				Field Dup	licate Time:		
Comments:	Fe ^{2t}	- 0.00	> mg/L	· · · · · · · · · · · · · · · · · · ·					R	

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0

Field Team:								NAKI	DVV MFLI #
		GREE	R/BRO	WN					0W WELL#2 6-26-17
Weather/Ter		SUNN					- Ar		14:02
Well Conditi	on:	GOOD				lr			41.47
Purge Metho	od:	SUBME	RSIBLE		. Pu	rge Rate ⁵ :			
				Field	l Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	рН	Sp. Cond.	Turbidity (NTU)	DO (mg/L)	ORP (mV)	Note color, odor, sheen, etc.
1415	Begin Pu	mping							
1420	41,59	0.25	17.24	4.16	0.328	148	25.00	नम	
1423	41.53	0.5	17.10	6.40	0.313	183	12.19	-40	
1426	41.52	0.6	16.78	6.71	0,312	138	9.97	-48	
1429	41.52	0.75	17.02	7.05	0.294	62.8	8.97	-59	
14:32	41.52	0.8	17.15	7.13	0.309	39.3	8.52	-63	
1435	41.52	1.0	17.06	7.16	0 304	51,5	8.54	-64	
1438	41.52	1.1	17.58	7.05	0.313	34.0	7.97	-61	
1441	41,52	1.2	17.30	6,95	0.305	30,5	8.09	-58	
1444	41.52	1.3	17.09	6.93	0.305	30,1	8,01	-56	
1447	41,52	1.5	17,89	6,80	0.315	29.7	7,34	-50	
1450	41.52	1.6	17.86	6.81	0.308	27,2	7.33	-51	
Stabilization	41.52	1.7	17.95	6.79 ± 0.1 units	0 308 ± 3%	25.2 ±10%	7.14 ± 0.3 mg/L	-51 ±10 mV	-
¹ collect field para ³ stabilization achi ⁴ for turbidity read	eved once field p		lize for 3 succes	sive readings; m	o water measured inimum parameto ate is 0.1 - 0.5 Li	er subset: pH, sp	ing; total drawdor cond., and turbi gal/min)	wn should not ex dity or DO	cceed 0.33 ft
Sample ID:	MARLO	₩2·(<u>610-06</u>	2617			Sa	mple Time:	1500
Analysis:									
QC SAMPLE	(CIRCLE):	FD	MS/MSD	EQ Blank		то	TAL PURG	ED (GAL):	
Field Duplica	te ID :					_	Field Dup	licate Time:	
Comments:	FEat	= O,	74 ma	1/1					
						·			

CH2MHILL

Ch2m

Project Nan	ne:	UPRR Fre	eman					Well ID:	MW-1D
Field Team:		Demn	s. Hur	nphrey	5				10-10-17
Weather/Te	mp:	cloud	5, 600	1		_	A		11:50
Well Condit	ion:	_ good							21,39
Purge Meth	od:	cloud good blad	ider p	ump					
					Paramete	ers ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)
12:05	-	0	-	-	-	-	-	-	following setup, just prior to purging
12:07	23,30	0.3	11.52	7.41	521	0.355	667	2.86	mildly burbie
12:12	24.02	0.4	11,18	7,30	520	0.357	534	2.92	11 11
12:17	25,84	0,6	10.98	7,21	518	0.353	218	3,23	oleor
12:22	26.95	0.9	10.98	7.18	523	0.353	320	3.04	
12:27	27.96	1.2	10.96	7.17	518	0.355	Ö, D	2.89	mildy taxbid
*									,
							·		

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

± 0.1 units

± 10 mV

± 3%

 $\pm 10\%^{4}$

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

-

⁴ for turbidity readings > 10 NTUs

Sample ID:	MWI	<u>) - Gv</u>	N-101	1017	
QC Sam	ple (circle):	FD	MS/MSD	EQ Bla	nk
Field D	uplicate ID: _	Ferrors	- 4811	0.34	Male
Commonto					J

Sample	Time:	_1	2	1 P	3	Ō	

Total Purged (gal): - /. 4

± 0.3 mg/L

Field Duplicate Time: _____

Comments:

Stabilization

Criteria³

ch2m:

Project Name:	UPRR Freemon	Well ID:	MW-15
Field Team:	Demus, Humphreys	Date:	10-12-17
Weather/Temp:	cloudy, dvizzle, 36 F	Arrival Time:	13:58
Well Condition:		Initial DTW (ft btc):	
Purge Method:	good bailer	(bailed pre-ie	ous day)

				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)
		0	-	-	-	-	-	-	following setup, just prior to purging
14:15			230	6.47	202				purging Proble 1957 Submersed
14:20			9.14	6.90	40	0.820	215	4,30	
								¢	
							-		
Stabilization Criteria ³	-	-	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	-

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turb	idity read	lings > 1	0 NTUs
-----------------------	------------	-----------	--------

Sample ID: <u>MWIS-Gw-101217</u>	Sample Time: <u>14:10</u>
QC Sample (circle): FD MS/MSD EQ Blank	Total Purged (gal):
Field Duplicate ID:	Field Duplicate Time:
Comments: well bailed dry on previous day	
Comments: well bailed dry on previous dry Fe ^{2t} : 0.54 mg/L	
J	

62 Location Freeman WA Date 9-14-17 Project / Client UPAR Freeman	Location <u>Enerman</u> WA Date <u>9-14-19</u> 63 Project / Client <u>DRK Freeman</u>
MW-2D Diw: - 29.99 Diwy -	MW-14D Div, - 15.22
12.51 13.51 13.51 13.61 13.47 13.47 13.47 13.47 13.47 13.47	der der
072 30.61 30.61 30.05 30.05 30.05 30.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
2	Le main and a main and
1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	12:00 10:00 10:000
T I I I I I I I I I I I I I I I I I I I	A Runum A Runo Runo C Runo C R
200 10 10 10 10 10 10 10 10 10 10 10 10 1	22 6.39 0.39 5 6.39 0.39 5 6.39 0.39 5 6.39
(end 322 purpres c. 377 c. 368 c. 368 c. 368 c. 368 c. 568 c.	11-1-2-2 1-1-1-2-2 1-1-1-2-2 1-1-1-1-
PURGLED 7.036	DIW DIW Nsiin punpint 15:90 7:53 15:32 7:39 15:32 7:39 15:32 7:39 15:32 7:39 15:32 7:40 15:32 7:40 15:32 7:40 15:32 7:39 15:32 7:39
7.1k 8:44 8:44 8:58 9:13 9:15	11.12 12.23 12.23 12.23 12.59 12.59 12.59 12.59 12.59 12.59 12.59 12.59 12.59
H10000 8 2 2 2 2 2 2 3 8 5	Here a war to t

64 Location Freeman, WA Date 9-14-12 Project / Client UPRR Freeman	Location <u>Freehon</u> , WA Date <u>9-25-17</u> 65 Project/Client UPRE Freehog
The bird bird phility lent lent <td>Aujert: URRE Freeman Task: Re-sample Silven well, aquilie test support Weather: 62°F, mostly claudy (new: 5. Denvis onside. Molo to Silven Residence. 1130 S. Denvis onside. Molo to Silven VOCS. Molo to aquilien testing at Eur 90 1300 Appart sile</td>	Aujert: URRE Freeman Task: Re-sample Silven well, aquilie test support Weather: 62°F, mostly claudy (new: 5. Denvis onside. Molo to Silven Residence. 1130 S. Denvis onside. Molo to Silven VOCS. Molo to aquilien testing at Eur 90 1300 Appart sile

MW-4D Purge Log	Dia, = 114,09		M	v-9	n	P	irse log	AT0-: = 32.74
in in tege bay	Duise volum = 25gal Ferrous iron = 0.05ms/c		ηιν	· 1		• 0	ise Log	purge volume = 3.2 scl Ferrors Fron = 0.06
				9	rodu wol			
550 000 000 000 000 000 000 000 000 000		OKP	132	441	122	170	<u>د ک</u>	
2:4 2:4 125 2:4 125 70.6 32.6 32.6				6.0				
1000 11.0 2 10 10 10 10 10 10 10 10 10 10 10 10 10	¢.	Temo	13.63	10.19	058	13.10	1301	Siz
8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	MW410- Gw-teos17	A.o.	17.38	6.39	4.98	4.72	4.43	ioo
60rd 3955 1405 1405 1405 1405 1403 1385 1384 1384	- Q -	End	360	8081	325	377	182'	- 0 - 6w -
するとうないで	MW46	0#	XSS	727	7.08	2.03	7.05	Mwab 12:40
114.33 114.33 115.115 114.43 114.43 114.43 114.43 114.43 114.43 114.43 114.43 114.43 114.43	10. they	Dia	32,41	33.00	32.85	31.82	0378	10 : Nime:
11:01 11:01 10:51 10:52 10 10:52 10 10:52 10 10 10 10 10 10 10 10 10 10 10 10 10	Sample Sample	Line		21.11			12135 3	Sample 10 Sample Time

ch2m:

Project Name:
Field Team:
Weather/Temp:
Well Condition:

Purge Method:

UPRR Freeman	
Demns, Ham	phreys
- cloudy cool	
good	
bladder pun	np

Well ID: $\underline{MW} - \underline{5D}$ Date: $\underline{10} - \underline{10} - \underline{17}$ Arrival Time: $\underline{08:10}$ Initial DTW (ft btc): <u>62,60</u>

	UNE DE LE			Field	Paramete	rs ¹	Sen 246	120	
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)
08:43	62.57	0	-	-	-	-	-	-	following setup, just prior to purging
08:59	63.36	0.5	11.25	6.49	289	0.412	20.5	6.70	
09:03	63.49	0.7	11.84	6.84	294	0.398	24.8	6.22	
09.08	63.60	0.8	11.95	7.08	297	0.395	26.1	6.00	
09:13	63.65	1.0	12.11	7.21	295	0.392	16.6	5.92	
09:18	63.63	1.2	12.11	7.24	292	0.391	11.7	5.81	
09:23	63.63	1.4	12.12	7.27	286	6.389	6.0	6.02	
							6.54		
								7	
				1.1					
						10			
						12			
Stabilization Criteria ³	-	-	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	

¹ collect field parameters in 3-5 minute intervals

²DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity readings > 10 NTUs

Sample ID:	MWSD	· GV	U-1011	017			
QC Sam	nple (circle):	FD	MS/MSD	EQ Blank			
Field D	ouplicate ID:						
Comments:	installed	mi	ni blade	ler pump			
Ferrus Iren = 0.03 mg/L							

Sample Time: 09:25

Total Purged (gal):		8
---------------------	--	---

Field Duplicate Time:

74 Location Treeman, WA Date 10-5-17 Project / Client PRR Freeman	Project / Client VPAR Freemy
Task: 30 Graudicater Sampling Unatter: AM-467, mostly cleady Chow Store Domos 0830 treater Onsite, Bagin solup at MW-60 Calibrater Ibr. Da U-52 At - CIULUSH	MW-6D Punge Log Die: -129,2 Forge Value - 21 Ferrous iron - 0,
calibration fluid Lot # - 79D191 pt - 4.00	
$ \begin{array}{c} (ord - 4.57 \\ \hline \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \$	248 248 213 213 213 213 211 211
	2.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1.5 1
	Temp 10.250 10.560 10.64 10.64
	532 4.99 4.99 4.10 4.10 4.10 1 4.00 1
	AH 6:01 . 20 364 . 203 355 203 355 203 351 215 351
	ALPU FLPU FLPU PLPU PLPU PLPU PLPU PLPU P
	7:07 124 9:07 124 9:17 124 9:17 124 9:27 124 9:27 124 9:27 124 9:27 124

ch2m:

Project Name:	UPRR Freeman	Well ID:	MW-65
Field Team:	Demos, Humphreys	Date:	10-12-17
Weather/Temp:	clouds, 36°F	Arrival Time:	10:45
Well Condition:	good	Initial DTW (ft btc):	
Purge Method:	bailer		
	Field Parameters	1	

		and a second second		TIVIU	i aramete				
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)
		0	-	-		-	-	-	following setup, just prior to purging
11:05			7.90	7.22	170	0.236	flashing	4.60	
						-			
	E.		8						
						É			
Stabilization Criteria ³	-	•	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity readings > 10 NTUs

Sample ID: MW65-6-W - 101217	Sample Time: 10: 55				
QC Sample (circle): FD MS/MSD EQ Blank	Total Purged (gal):				
Field Duplicate ID:	Field Duplicate Time:				
Comments: well barked previous day					
Serrons iron: 0.17 mg/L					

ch2m:

Project Name:
Field Team:
Weather/Temp:
Well Condition:

Purge Method:

UPRR Freema	n
Demus	Humphreys
1.	loudy, cool
good	
bladder	pmp

Well ID: $\underline{MW-6U}$ Date: $\underline{/0-10-17}$ Arrival Time: $\underline{/0:37}$ Initial DTW (ft btc): $\underline{37,51}$

Real Prese				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	рН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)
10.58	37.49	0	-		-	-	-	-	following setup, just prior to purging
						,			
			_						
									·
					-				· • • •
Stabilization Criteria ³	-	-	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	-

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO ⁴ for turbidity readings > 10 NTUs

Sample ID:	Sample Time:	
QC Sample (circle): FD MS/MSD EQ Blank	Total Purged (gal):	
Field Duplicate ID:	Field Duplicate Time:	
Comments: installed new bladder pump		
-pump did not work		

ch2m:

Project Name:	UPRR Freeman	Well ID:	MW-6U
Field Team:	Damus, Humphreys	Date:	10-12-17
Weather/Temp:	mostly cloud, 36°F	Arrival Time:	11:10
Well Condition:	good	Initial DTW (ft btc):	
Purge Method:	bailer		
	Field Parameters 1		

i leiu ratallieteis									
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)
		0	-	-	-	-	-	-	following setup, just prior to purging
11:30			9.91	6.93	172	0.476	26.6	3.59	
	14								
Stabilization Criteria ³	-			± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity	readings	> 10	NTUs
----------------------------	----------	------	------

Sample ID:	Sam
QC Sample (circle): FD MS/MSD EQ Blank	Total Pure
Field Duplicate ID:	Field Duplica
Comments: well bestert previous day	
ferrors iron 0.07 mg/L	

Sample Time: <u>//:20</u>____

Total Purged (gal):

Field Duplicate Time:

ch2m:

Project Name:	UPRR Freeman
Field Team:	Demus, Hamphreys
Weather/Temp:	clo-dy, cost
Well Condition:	good
Purge Method:	boiled yesterday

				Field	Paramete	rs ¹	TRAILE ST		
		Purge Vol.	Temp		ORP	Sp. Cond.	Turbidity	DO	Comments (color, odor,
Time	DTW ²	(gal)	(°C)	pН	(mV)	(uS/cm)	(NTU)	(mg/L)	sheen, etc.)
_	-	0	-	-	-	-	-	-	following setup, just prior to purging
14:02	-	le perimo	10.21	8.10	51	0.319	38.4	9.32	
		,							
						8			
Stabilization Criteria ³	•	-	I	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	-

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO ⁴ for turbidity readings > 10 NTUs

1	OF	turbialty	readil	igs >	1

Sample ID:	MW75	- GW - 101	0)7		Sam	ple Time:	14:05	
QC Sam	ple (circle):	FD MS/MSD	EQ Blank		Total Pur	ged (gal):		
Field D	uplicate ID:				Field Duplic	ate Time:		
Comments:	bailes	Simph	following	boiling	nearty	dry	yekrday_	
		Iron = 0.		J				
	•		J'					

Project Name:	UPRR Freeman	Well ID:	MW-85
Field Team:	Demus Humphreys		10-12-17
Weather/Temp:	Jordy, 36°F	Arrival Time:	13:05
Well Condition:	good	Initial DTW (ft btc):	
Purge Method:	bailer		
	Eield Devenetors		

ch2m:

				Field	Paramete	IS '			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DÓ (mg/L)	Comments (color, odor, sheen, etc.)
		0		-	-	-		-	following setup, just prior to purging
13:24			10.60	6.44	208	0.346	64.7	3.43	
								_	
						13			
Stabilization									
Criteria ³	-	-	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	•

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity	readings >	10 NTUs
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Sample ID: <u>MW83</u>	5-6	W-101	Sample Time: 13 : 20	
QC Sample (circle):	FD	MS/MSD	EQ Blank	Total Purged (gal):
Field Duplicate ID:				Field Duplicate Time:
Comments: we)/	pum	pech di	y on	previv-s dry
Fe ^{2t}		3 mg/	/	

MW-4D Purge Log	Dia, = 114,09		M	v-9	n	P	irse log	AT0-: = 32.74
in in tege bay	Duise volum = 25gal Ferrous iron = 0.05ms/c		ηιν	· 1		• 0	ise Log	purge volume = 3.2 scl Ferrors Fron = 0.06
				9	reduced			
550 000 000 000 000 000 000 000 000 000		OKP	132	441	1721	170	<u>د ک</u>	
2:4 2:4 125 2:4 125 70.6 32.6 32.6				6.0				
1000 11.0 2 10 10 10 10 10 10 10 10 10 10 10 10 10	¢.	Temo	13.63	10.19	058	13.10	1301	Siz
8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8 8	MW410- Gw-tuos17	A.o.	17.38	6.39	4.98	4.72	4.43	ioo
60rd 3955 1405 1405 1405 1405 1403 1385 1385 1384	- Q -	End	360	8081	325	377	182'	- 0 - 6w -
するとうないで	MW46	0#	XSS	727	7.08	2.03	7.05	Mwab 12:40
114.33 114.33 115.115 114.43 114.43 114.43 114.43 114.43 114.43 114.43 114.43 114.43 114.43	10. they	Dia	32,41	33.00	32.85	31.82	0378	10 : Time :
11:01 11:01 10:51 10:52 10 10:52 10 10:52 10 10 10 10 10 10 10 10 10 10 10 10 10	Sample Sample	Line		21.11			12135 3	Sample 10 Sample Time



Project	Name:
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Field Team:

Weather/Temp:

Well Condition:

Purge Method:

UPRR Freemon	
Demos, Humphreys	
cloud, 36°/=	
good	
beiler	

				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)
		0	-	-	-	-	•	-	following setup, just prior to purging
13:45			11.06	6.24	215	0.514	501	14.32	
	_								
			-						
						1			
0.11.1									
Stabilization Criteria ³	•		-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO ⁴ for turbidity readings > 10 NTL is

TOP	turbialty	readings	2	10	N	I

Sample ID:	MW95	- G	W-10	1217	Sample Time:	13:40
QC Sampl	le (circle):	FD	MS/MSD	EQ Blank	Total Purged (gal): _	
Field Dup	olicate ID:				Field Duplicate Time: _	
Comments:	well	Pamp	ped di	7 02	previous day	
	Fe 2+:			/	mall	Ĵ
			PA	/	J′ .	

Project Name:	UPRR Freemen	Well ID:
Field Team:	Demis, Himphreys	Date: 10-12-17
Weather/Temp:	cloudy, cool	Arrival Time: 08:00
Well Condition:	good	Initial DTW (ft btc): 31.67
Purge Method:	submersible	
	Field Parameters	1

ch2m:

				Field	Paramete	rs			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DÓ (mg/L)	Comments (color, odor sheen, etc.)
08:27	3).6)	0	-	•	-	-	•	-	following setup, just prior to purging
02-29	37.52	2.5	11.48	6.39	141	0.399	18-1	8-74	
08:34	32.57	ID	11.61	6.77	141	0.397	9.4	7.3	
08:39	32.59	16	11.63	6.85	156	0.395	6.9	\$7.22	
08:44	32.61	25	11.61	6.93	170	0.395	4.4	7.13	
08:49	32.63	.31	11.62	7.64	166_	0.400	2.4	6.93	
08:54	32.63	37	11.64	7.02	163	0.401	2.5	6.52	
						114			
Stabilization		4							
Criteria ³	-		-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	-

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity	readings	>	10	NTUs
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Sample ID: <u>MW9U-GW-101217</u>	Sample Time: <u>9:00</u>
QC Sample (circle): FD MS/MSD EQ Blank	Total Purged (gal): 45
Field Duplicate ID:	Field Duplicate Time:
Comments: bladder pump not available	
HHT III	



Project Nam	ie:	UPR	R Fr.	? e man				Well ID:	MW-105	
Field Team:		DPRR Freeman Penns, Humphreys cloudy, 38°/-					Date: 10-12-17			
Weather/Te	mp:	cloud	2, 30	is F		_	A	rrival Time:	12:00	
Well Conditi	on:	9000	ĺ					W (ft btc):		
Well Condition: 500d Purge Method: bailer				bailer						
				Field	Paramet	ers ¹				
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)	
		0	-	-	-		1	-	following setup, just prior to purging	
12:20	<u>`</u>		10.31	7.43	171	0.521	10.9	11.76		
								- ,		

¹ collect field parameters in 3-5 minute intervals

.

-

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

± 0.1 units

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity readings > 10 NTUs

Stabilization

Criteria³

Sample ID: <u>MW105 - GW - 101217</u>	Sample Time: 12:15
QC Sample (circle): FD MS/MSD EQ Blank	Total Purged (gal):
Field Duplicate ID:	Field Duplicate Time:
Comments: well pumped dry previous	day
ferrous iron: 0.02 mg/L	·

± 10 mV

± 3%

 $\pm 10\%^{4}$

± 0.3 mg/L

-

Project Name:	UPRR Freeman	Well ID:	N-115
Field Team:	Demus, Humphreys	Date: /0	.12-17
Weather/Temp:	mostly cloudy, 36°F	Arrival Time: // .	40
Well Condition:	good	Initial DTW (ft btc):	
Purge Method:	bailer		
	Field Devenetors		

ch2m:

				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DÓ (mg/L)	Comments (color, odor, sheen, etc.)
		0	-	-	-		-	-	following setup, just prior to purging
									94
							-		
								14	
							-		
Stabilization Criteria ³	-	-	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	•

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for	turbidity	readings	>	10	NTUs

Sample ID: NOVES MW115-GW-101217	Sample Time: <u>11:50</u>
QC Sample (circle): FD MS/MSD EQ Blank	Total Purged (gal):
Field Duplicate ID:	Field Duplicate Time:
Comments: well projed duy previous day	
ferrous iron: 0.00 mg/L	
)	

ch2m:

Project Name:	UPRR Freeman	Well ID:	MW-125
Field Team:	Demus, Humphraps	Date:	10-12-17
Weather/Temp:	cloudy, 36 DF	Arrival Time:	
Well Condition:	good	Initial DTW (ft btc):	
Purge Method:	bailer		
	Field Parameters	1	

Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DÓ (mg/L)	Comments (color, odor, sheen, etc.)
		0	-	-	-	-	-	-	following setup, just prior to purging
			9.31	6.99	176	0.681	242	6.32	
							8		
						A a the state			
Stabilization Criteria ³	-	-	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	-

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity readings > 10 NTUs

Sample ID: <u>MW125 - GW - 101217</u>	Sample Time: 09:35
QC Sample (circle): FD MS/MSD EQ Blank	Total Purged (gal):
Field Duplicate ID:	Field Duplicate Time:
Comments: bailed previous day	
ferrous iron = 0.20 mg/L	

ch2m:

Project Name:	UPRR Freeman	Well ID: M	N-135
Field Team:	Demus Humphrys	Date: 10	-12-17
Weather/Temp:	cloudy, 36°F	Arrival Time:/	0:10
Well Condition:		Initial DTW (ft btc):	
Purge Method:	good baile		
	Field Parameters	1	

				I IGIU	raiamete	15			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)
		0	-		-	-	-	-	following setup, just prior to purging
10:18			8.13	7.24	168	0.324	116	6.21	
	-								
							-		
Stabilization									
Criteria ³	-	-	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	-

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity readings > 10 NTUs

Sample ID: MW135-GW-101217	Sample Time: 10:20
QC Sample (circle): FD MS/MSD EQ Blank	Total Purged (gal):
Field Duplicate ID:	Field Duplicate Time:
Comments: forrows 100 - 0.09 mg/L well total previous day	
pumped day	

62 Location Freeman WA Date 9-14-17 Project / Client UPAR Freeman	Location <u>Enerman</u> WA Date <u>9-14-19</u> 63 Project / Client <u>DRK Freeman</u>
MW-2D Diw: - 29.99 Diwy -	MW-14D Div, - 15.22
12.51 13.51 13.51 13.61 13.47 13.47 13.47 13.47 13.47 13.47	der der
072 30.61 30.61 30.05 30.05 30.05 30.0	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4
2	Le main and a main and
1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	12:00 10:00 10:000
T I I I I I I I I I I I I I I I I I I I	A Runum A Runo Runo C Runo C R
200 10 10 10 10 10 10 10 10 10 10 10 10 1	22 6.39 0.392 0.295 0.205 0.205 0.205 0.205 0.205 0.205 0.205 0.205 0.205 0.205 0.205 0.20
(end 322 purpres c. 377 c. 368 c. 368 c. 368 c. 368 c. 568 c.	11-1-2-2 1-1-1-2-2 1-1-1-2-2 1-1-1-1-
PURGLED 7.036	DIW DIW Nsin punping 15:90 7:53 15:32 7:39 15:32 7:39 15:32 7:39 15:32 7:39 15:32 7:40 15:32 7:40 15:32 7:40 15:32 7:39 15:32 7:39
7.1k 8:44 8:44 8:58 9:13 9:15	11.12 12.23 12.23 12.23 12.59 12.59 12.59 12.59 12.59 12.59 12.59 12.59 12.59
H10000 8 2 2 2 2 2 2 3 8 5	Here a war to t

	P	rojec	t/(Clier	it	ι	19/	4R	17	Centri	n					Proje	ect /	Clier	nt_L	PPP	RR	1	λæ	man							
n	nu	1-16	30	2	1	rge	u	log		P	uige	volu	3	.08 8.554/615 9.12		M	ו- ע	50)	Pər	z	Lo	\$		P	ing	e v	= olum Iror	e	35	c llo,
OKP	130	Ş	-76	76-	25-	- 101	001-	-105							Se .	たれ	0	T	4									•			
421	٥	20	4.7	2.7	Ø	0	õ	0							Turb 01		_		0 11												
Temp	10,34	10.35	10.17	47.0	07:01	10.10	10.01	10.14							Temo	10.01	10.19	10,26	b.29		2										
2)	\$.15	4,00	5.58	3.07	2.33	2.64	2.50	147			612				00	4.87	5:00	5.63	515		FILDU.V			-							
love	310	: 311	1307	300	305	102.	304	1304			612001 - W.9- (BIWW				Cend	13418	1346	348	1349		50-GW	30									
to	えん	275	142	7.80	7.83	7.85	2.85	7.84			nuil)-(13:40				370	ant	7.35	7.30		= MU1!	= 14:30									
MIN	53.15	53,15	\$3.20	23.22	55.75	53.15	53.24	\$3.18				Sample time 13			Dre		91.57				Samob (D=	1.12									
Tiak	300	50	1510	1315	1320	1325					UQUAD	ndw.	1		Time	CI H	4.15	ar.H	4:75	. 1	Sam	Samole	-		-					+	+

70 Location Frammen, WA Project / Client UPLR F	Date 10-2-12	Location <u>Freeman</u> , WA Project / Client <u>UPRR</u> Free	Date 10-2-13 71
MW-21D Purge Log	Drw; - 66.18 Porso volume - 3541.	MW-160 Prize Log	Dith - 47.30 pulse volume - 3.5gellons Ferrors iron - 0.06 ms/L
02.0 20.7 1-1-1 20.7 1-1-1 20.7 1-1-1-1 20.7 1-1-1-1 20.7 1-1-1-1 20.7 1-1-1-1 20.7 1-1-1-1 20.7 1-1-1-1 20.7 20.7 20.7 20.7 20.7 20.7 20.7 20.7	Ferrors iron = 0.412 mg/L	0 RP 139 137 137 138 138	
1100 34 120 130 140 140 140 140 140 140 140 140 140 14		12.4 b 18.3 0 0 13.3 13.3 13.3 13.3 13.3 13.3 13.	
4		10.05 10.05 10.08 10.08	
6.15 6.15 3.65 3.65 3.65 3.65 3.65 3.65 3.65 3.6	5100	AQ. 14.68 233 6.63 6.63 6.63	Ticooj-Wid-OMWM
103 103	-215001-61-015-011CMW 01:11	6009 1411 1411 1411 1411 1411 1411 1411	- (M) - (
2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	- dic mi	p It 232 7.32 7.32 7.32 7.32 7.32 7.32 7.36	so:ti
66.43 66.43 66.53 66.55 66.55 66.55 16.55		1974 1975 1975 1975 1975	L D
Time 10:32 10:57 10:57 10:57 11:05 11:05	Sample (1) - Sample time -	1:42 11:58 11:58 11:58 11:58 11:58	Samplu

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1 dder

, cool

o-mo

Ch2m.

Project Name:	UPRR Freeman
Field Team:	Demus
Weather/Temp:	clandy, c
Well Condition:	and

Purge Method:

Well ID:	MW-17D
 Date:	10-10-17
Arrival Time:	13:03
Initial DTW (ft btc):	63.63

				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)
13:09	-	0	-	-	-	-	-	-	following setup, just prior to purging
13:11	65,87	0.2	12.97	7.47	231	0.589	37.1	5.35	clear
13:16	67.22	0,4	12.70	7.37	-72	0.612	45.2	4.56	clear
13:21	70,88	0.7	12.34	7.53	-160	0,681	32.6	1,89	dear
13:26	73.53	1.1	12.33	7.63	-170	0.631	67.0	1.65	septic odor clear
13:31	75.81	1.4	12.34	7.73	-170	0.619	83.0	1.51	septil odor eker
13:36	79.07	1.9	12.36	7.67	-163	0.635	97.0	1.47	septir odo!
Stabilization Criteria ³	-	-	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	

Humphreys

¹ collect field parameters in 3-5 minute intervals

²DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min) ³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO ⁴ for turbidity readings > 10 NTUs

Sample ID: <u>MW17D - GW - 101017</u>	Sample Time:3 : 4 O
QC Sample (circle): FD MS/MSD EQ Blank	Total Purged (gal): 2, 3
Field Duplicate ID: Ferrovs Iron = 0.23 mg/L	Field Duplicate Time:
Comments:	

	P	rojec	t/(Clier	it	ι	19/	4R	17	Centri	n					Proje	ect /	Clier	nt_L	PPP	RR	1	λæ	man							
n	nu	1-16	30	2	1	rge	u	log		P	uige	volu	3	.08 8.554/615 9.12		M	ו- ע	50)	Pər	z	Lo	\$		P	ing	e v	= olum Iror	e	35	c llo,
OKP	130	Ş	-76	76-	25-	- 101	001-	-105							Se .	たれ	0	T	4									•			
421	٥	20	4.7	2.7	Ø	0	õ	0							Turb 01		_		0 11												
Temp	10,34	10.35	10.17	47.0	07:01	10.10	10.01	10.14							Temo	10.01	10.19	10,26	b.29		2										
2)	\$.15	4,00	5.58	3.07	2.33	2.64	2.50	147			612				00	4.87	5:00	5.63	515		FILDU.V			-							
love	310	: 311	1307	306	305	102.	304	1304			612001 - W.9- (BIWW				Cend	13418	1346	348	1349		50-GW	30									
to	えん	275	142	7.80	7.83	7.85	2.85	7.84			nuil)-(13:40				370	ant	7.35	730		= MU1!	= 14:30									
MIN	53.15	53,15	\$3.20	23.22	55.75	53.15	53.24	\$3.18				Sample time 13			Dre		91.57				Samob (D=	1.12									
Tiak	300	50	1510	1315	1320	1325					UQUAD	ndw.	1		Time	CI:H	4.15	ar.H	4.75	. 1	Sam	Samole	-		-					+	+

	0					_								
MW-191 -reads) Purge dischuze koze	Log	Ditu; = terrasion purge vel	53.32 -0.03mg/c ne = 2.55g/los		M	10-	- 20	D	Pur	se log	pu	IV;=9. ispuelume rors iron	- 3 gal
1450 1450 1450 1450	- 5-				ore	84	89	00	115	12.8				
1004 324 93.6	74.5 F5				Tab	40	303	5010	32.6	314				
Tent Dury Dury Dury Dury Dury	- Qe+	2150			Temp	01.11	14.34	1.93	13.22	11.95			41500	
6.3) 25.1		- GW-100517	2		De	5.54	4134	4.00	3.87	4.16			01- M 10	
235 1408 232 397 233 397		MW190 -	-GW-100517		Cend		494 494						US: 1	
52.04 53.39 53.43 58.43 58.43		Sample 10:1 Sample time =	FD-C		Tim Div pit	14:40 43:00 773	14:45 43,38 7.28	14.50 3.80 r.35	14155 9325 140 15100 9324 740	1			Sample ID :	and address

	0					_								
MW-191 -reads) Purge dischuze koze	Log	Ditu; = terrasion purge vel	53.32 -0.03mg/c ne = 2.55g/loss		M	10-	- 20	D	Pur	se log	pu	IV;=9. ispuelume rors iron	- 3 gal
1450 1450 1450 1450	- 5-				ore	84	89	00	115	12.8				
1004 324 93.6	74.5 F5				Tab	40	303	5010	32.6	314				
Tent Dury Dury Dury Dury Dury	- Qe+	2150			Temp	01.11	14.34	1.93	13.22	11.95			41500	
6.3) 25.1		- GW-100517	2		De	5.54	4134	4.00	3.87	4.16			01- M 10	
235 1408 232 397 233 397		MW190 -	-GW-100517		Cend		H944						US: 1	
52.04 53.39 53.39 53.43 53.43		Sample 10:1 Sample time =	FD-C		Tim Div pit	14:40 43:00 773	14:45 43,38 7.28	14.50 3.80 r.35	14155 9325 140 15100 9324 740	1			Sample ID :	and address

70 Location Frammen, WA Project / Client UPLR F	Date 10-2-12	Location <u>Freeman</u> , WA Project / Client <u>UPRR</u> Free	Date 10-2-13 71
MW-21D Purge Log	Drw; - 66.18 Porso volume - 3541.	MW-160 Prize Log	Dith - 47.30 pulse volume - 3.5gellons Ferrors iron - 0.06 ms/L
02.0 20.7 1-1-1 20.7 1-1-1 20.7 1-1-1-1 20.7 1-1-1-1 20.7 1-1-1-1 20.7 1-1-1-1 20.7 1-1-1-1 20.7 1-1-1-1 20.7 20.7 20.7 20.7 20.7 20.7 20.7 20.7	Ferrors iron = 0.412 mg/L	0 RP 139 137 137 138 138	
1100 34 120 130 140 140 140 140 140 140 140 140 140 14		12.4 b 18.3 0 0 13.3 13.3 13.3 13.3 13.3 13.3 13.	
4		10.85 10.85 10.68 10.68	
6.15 6.15 3.65 3.65 3.65 3.65 3.65 3.65 3.65 3.6	5100	AQ. 14.68 233 6.63 6.63 6.63	Ticooj-Wid-OMWM
103 103	-215001-61-015-011CMW 01:11	6009 1411 1411 1411 1411 1411 1411 1411	- (M) - (
2002 200 2002 200 200	- dic mi	p It 232 7.32 7.32 7.32 7.32 7.32 7.32 7.32	so:ti
66.43 66.43 66.53 66.55 66.55 66.55 16.55		1974 1975 1975 1975 1975	L D
Time 10:32 10:57 10:57 10:57 11:05 11:05	Sample (1) - Sample time -	1:42 11:58 11:58 11:58 11:58 11:58	Samplu

Project Name:	UPRR Freemen	Well ID: WZ6
Field Team:	Humphreys Brown	Date: 10-16-17
Weather/Temp:	Sunny, mild	Arrival Time: 14:30
Well Condition:	good	Initial DTW (ft btc):
Purge Method:	submers, bh	67.02

Ch2m

Sample Time: 15:20

Total Purged (gal): _____

Field Duplicate Time:

				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DÓ (mg/L)	Comments (color, odor, sheen, etc.)
14:55	67.02	0			-			-	following setup, just prior to purging
4:56	67.28	0.5	11.47	7.59	17	+304	0.0	7.27	clear
14:59	67.25	3.	11.14	7.41	110	.30Y	0.0	6.86	cher
15:02	67.25	5	11.17	7.32	120	.304	0.0	6.78	char
15:05	67.24	7	11.19	7.25	126	.304	0.0	6.74	char
15:08	67.24	9	11,19	7.14	130	.305	0.0	6.69	clear
15:11	67.24	/	11.20	7.11	131	1304	0.0	6.67	cher-
15:14	67.24	13	11.20	7.00	132	.305	0.0	6.61	clean
15:17	67.24	15	11.21	7.03	132	,303	00	6.61	
Stabilization Criteria ³	-	-	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	1

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

1617

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity readings > 10 NTUs

Sample ID:	w26-	GW-	10
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FD

QC Sample (circle):

MS/MSD EQ Blank

Field Duplicate ID:

Comments:

ch2m:

Project Name:	UPRR Framen		Well ID:	W20
Field Team:	Humphreys, Brown		Date:	10-16-17
Weather/Temp:	Sanny, mild	š	Arrival Time:	12:15
Well Condition:	good		Initial DTW (ft btc):	20.21
Purge Method:	J Su			

				Field	Paramete	rs ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DO (mg/L)	Comments (color, odor, sheen, etc.)
12:47	19.99	0		-	-	-		-	following setup, just prior to purging
12:48	20.80	1	9.78	7.75	18	.321	66.8	6.36	5-onins-35
12:54	24,02	4	9.73	7.59	28	.322	36.2	6.02	promish 2 23
12:57	26.46	3	9.29	7.39	28	1311	22.0	5.12	brownsh-grey
13:00	28.68	14	9.29	7.32	27	313	17.0	5.19	1
13:03	31.15	20	9.30	7.27	15	.294	15.1	4.36	11
13:06	33.19	26	9.27	7.37	- 24	.260	13.8	2,93	11
13:09	34,20	32	9.27	7.49	-37	.248	12.8	2.64	11
13:12	36.68	37	9.28	7.53	-34	1246	12. D	2.71	
13:16	38.35	52	9.27	7.48	-29	.243	10.1	2.72	
Stabilization Criteria ³	-	-	-	± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	-

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity readings > 10 NTUs

Sample ID: <u>W20-</u>	GW	-10161	7	Sample Time: <u>13: 20</u>
QC Sample (circle):	FD	MS/MSD	EQ Blank	Total Purged (gal): 60
Field Duplicate ID:				Field Duplicate Time:
Comments:				

Comments:

ch2m:

Project Name:	UPRR Freemon	Well ID: Marlow HZ
Field Team:	Humphreys, Brown	Date: 10-16-17
Weather/Temp:	sunny, cool	Arrival Time: 09;40
Well Condition:	good	Initial DTW (ft btc): 43.70
Purge Method:	submersible	

				Field	Paramete	ers ¹			
Time	DTW ²	Purge Vol. (gal)	Temp (°C)	pН	ORP (mV)	Sp. Cond. (uS/cm)	Turbidity (NTU)	DÓ (mg/L)	Comments (color, odor, sheen, etc.)
10:28	43.70	0		-	-				following setup, just prior to purging
10:30	4	1	9.91	8.50	-12	0.444	39,8	5.52	N BANK
10:35	44.38	4	10.05	8.14	13	0.445	35.5	4.93	
10:38	44,31	9	10.06	7.77	27	0.445	12.5	3.46	
10:43		12	10,08	7.65	28	1445	10.7	3.30	
10:47	44.33	15	10.09	7.62	13	,444	14.7	3,18	1.1.1.1.1.1.1
10.5)		18	10.10	7.68	18	,444	21.2	3.31	-
				- 1					
٢									
174 A. A. A.									The second second
Stabilization Criteria ³	-	-		± 0.1 units	± 10 mV	± 3%	± 10% ⁴	± 0.3 mg/L	

¹ collect field parameters in 3-5 minute intervals

² DTW: depth to water measured from top of casing; total drawdown should not exceed 0.1 m (0.33 ft); target purge rate: 0.1 - 0.5 L/min (0.03 - 0.13 gal/min)

³ stabilization achieved once field parameters stabilize for 3 successive readings; minimum parameter subset: pH, sp. cond., and turbidity or DO

⁴ for turbidity readings > 10 NTUs

Sample ID: Morlow 2	-6W-101617	Sample Time:	0:55
QC Sample (circle): FD	MS/MSD EQ Blank	Total Purged (gal):	3
Field Duplicate ID:		Field Duplicate Time:	
Comments: submersilh	Now higher that	apdime 1	



GROUNDWATER PURGING AND SAMPLING FORM

GENERAL INFORMATION

Project Name: UPRE-Freemon				
Well ID: Reed Les. Well				
Time Arrived at Well: 1000				

Date: <u>9-13-17</u>	
Field Team:	X umany
Weather Conditions:	10° some cloud

PURGE INFORMATION

Initial DTW (ft btc):

Time Begin Purging: 1026

Time	DTW (ft btc)	Purge Volume (gał)	рН	Sp. Cond. (µS/om) MS/cm	Turbidity (NTU)	Dissolve d Oxygen (mg/L)	Temp (ºC)	ORP (mV)	TDS (mg/L)	Comm. (color, odor)	
1027	/	2	8.10	,257	1.2	27,43	15.58	157		ND	
					_						
Sample	Identifica	tion: <u>Reec</u>	I-Gw-	091317		Sam	ple Time:	1030			
						Sample Volume:					
	Sample II	ר						la Tima:			
				ment Blan		QA/QC Sample Time: MS/MSD:					
	.pou.co		Equip			NION	NOD	-			
Comme	nts:										

Purge Method:

114

. 1

Time	DTW (ft btc)	Purge Volume (gal)	рН	Sp. Cond. - (µS/cm) _mS/cm_	Turbidity (NTU)	Dissolve d Oxygen (mg/L)	Temp (°C)	ORP (mV)	TDS (mg/L)	Comm. (color, odor)		
1515		2.5	7.57	0.479	75,3	6.44	20.96	194		no oder, cloudy - c after 2	leare	10
										after 2	minu	te
									C.			
Sample	Identificat	tion: <u>Ash</u>	ER-GW	-091217		Sam	ple Time:	1520)			
Analysis	:					Sam	ple Volun	ne:				
QA/QC	Sample II	D:				QA/0	QC Samp	le Time:				
	plicate:			ment Blan			MSD:					
Comme	nts:		×									
		14	5° 1									
		14 1	3									

GROUNDWATER PURGING AND SAMPLING FORM

CENEE		INICO		
GENEF	KAL.	INFU	ノベルル	

ch2m:

2011

Project Name: UPRR Freeman	Date: 09-12-17
Well ID: THORSON	Field Team: L. Baumann, J. Brown
Time Arrived at Well: _/400	Weather Conditions: <u>SUNNY 8D</u> °

PURGE INFORMATION

Initial DTW (ft btc):

Time Begin Purging: _____

Time	DTW (ft btc)	Purge Volume (gal)	рН	Sp. Cond. -(µS/cm) ms/cm	Turbidity (NTU)	Dissolve d Oxygen (mg/L)	Temp (°C)	ORP (mV)	TDS (mg/L)	Comm. (color, odor)
1415	$\left \right\rangle$	3	7.9	0.262	0.0	7.82	16.38	-71		no odor, clear
Comple	Identified	1			1217		nla Timor	1/12/		
		tion: <u>'THc</u>						1420		
Analysis		K				Sam	pie volui	ne:		
QA/QC	Sample I	D:				QA/Q	QC Samp	le Time:_		
Field Duplicate: Equipment Blank:						MS/MSD:				
Comme	nts:									
					······································					

ch2m:

GROUNDWATER PURGING AND SAMPLING FORM

GENERAL INFORMATION

Project Name: UPRR Freeman	Date:	09-	12-	17
Well ID STARK	Field Te	aam.	1	RAIM

 Time Arrived at Well:
 1430
 Weather Conditions:
 SUNY SO

 Well ID:
 Stark
 Field Team:
 L. BAUMANN, J. BROWN

PURGE INFORMATION

Initial DTW (ft btc):

Time Begin Purging: <u>1450</u>

Time	DTW (ft btc)	Purge Volume (gal)	рН	Sp. Cond. (µS/cm) MS/cm	Turbidity (NTU)	Dissolve d Oxygen (mg/L)	Temp (°C)	ORP (mV)	TDS (mg/L)	Comm. (color, odor)
1450		30	7,84	,285	0.0	6.13	17,63	198		%
		L.								
			8							
Sample	Identifica	tion: <u>57</u> A	RK-GW	-09121-	1	Sam	ple Time:	145	4	
						Sam	ple Volun	ne:		
	Sample II	ب				0.0/0	QC Samp	la Timo:		
	uplicate:			nent Blan			VSD:			
	piloute		Ечирі			WON	wob	-		
Comme	nts:									

ch2m:

GROUNDWATER PURGING AND SAMPLING FORM

CENEDAL	INFORMATION
GENERAL	INFORMATION

Troject Name. UT KIC (Teoriur)	Project Name:	UPRR	Freeman	
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Well ID: LANG

Time Arrived at Well: <u>1055</u>

Date: <u>09-12-17</u> Field Team: <u>L. Baumann, J. B</u>rowh

Weather Conditions: <u>Sunny 75°</u>

PURGE INFORMATION

Initial DTW (ft btc):

Time Begin Purging:

Time	DTW (ft btc)	Purge Volume (gal)	pН	Sp. Cond. (µS/cm)	Turbidity (NTU)	Dissolve d Oxygen (mg/L)	Temp (°C)	ORP (mV)	TDS (mg/L)	Comm. (color, odor)
1058		<i>i</i> .5	6.20	0.337	6.1	11.20	16.52	196		no odor, tan
										0 0
		12								
			=							
						up.				
Sample	Identificat	tion: <u>LAN</u>	IG-GW-	091217	7	Sam	ple Time:	1100		<u> </u>
Analysis						Sample Volume:				
QA/QC	Sample II	D:				QA/0	C Sampl	e Time:		
QA/QC Sample ID: Field Duplicate: Equipment Blank:						QA/QC Sample Time: MS/MSD:				
Comme	nts:									
				-	21	·				