

Date Started:	10/31/2019	Surface Elevation:	480.26 ft amsl	Boring No.: IRZ-17
Date Completed:	11/05/2019	Northing (NAD83):	2103000.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615871.28	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	192 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezguita	Drill Bit:	15.5 & 17.5 inch Tri-cone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.6 ft bgs	
Rig Geologist:	K. Keon / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid			
1	(0.0 - 19.9) 6.67 mins/ft	NR		(0.0 - 19.9') 18.0" Steel Casing	(0.0 - 19.5') No recovery (NR)	(0.0') Confirmed drill casing was centered on pilot borehole. Observed trace amounts of Wildcat Washed Plastering Sand in drill cuttings (See Photo Log). (0.0 - 19.9') Smooth drilling	(0.0 - 19.9') 1281.38 gallons of water used; 0 gallons of water recovered; 1281.38 gallons of water lost			
2										
3										
4										
5										
6										
7										
8										
9										
10									(10.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	
11										
12										
13										
14										
15										
16										
17										
18										
19										
20		SP			(19.5 - 21.5') Topock - Fill;					

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Final 5/14/20

Date Started:	10/31/2019	Surface Elevation:	480.26 ft amsl	Boring No.: IRZ-17
Date Completed:	11/05/2019	Northing (NAD83):	2103000.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615871.28	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	192 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 & 17.5 inch Tri-cone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.6 ft bgs	
Rig Geologist:	K. Keon / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
21	(19.9 - 40.6') 2.13 mins/ft	SP	SP	(19.9 - 40.6') 18.0" Steel Casing	Poorly graded sand (SP); yellowish brown / moderate yellowish brown (10YR 5/4)	(19.9 - 40.6') Smooth drilling (20.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	(19.9 - 40.6') 427.14 gallons of water used; 1250 gallons of water recovered; 822.86 gallons of water gained
22					(21.5 - 24.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); dark yellowish brown (10YR 4/4)		
23		SM	SM				
24							
25					(24.0 - 28.0') Topock - Fluvial Deposits; Sandy silt with gravel (ML); yellowish brown / moderate yellowish brown (10YR 5/4)		
26		ML	ML				
27							
28					(28.0 - 29.0') Topock - Fluvial Deposits; Silty sand with gravel (SM); yellowish brown / moderate yellowish brown (10YR 5/4)		
29		SM	SM				
30					(29.0 - 30.0') Topock - Fluvial Deposits; Sandy silt with gravel (ML); yellowish brown / moderate yellowish brown (10YR 5/4)		
31							
32			(30.0 - 33.5') Topock - Fluvial Deposits; Elastic silt with sand (MH); yellowish brown / moderate yellowish brown (10YR 5/4)				
33	MH	MH					
34			(33.5 - 35.5') Topock - Fluvial Deposits; Silty sand with gravel (SM); yellowish brown / moderate yellowish brown (10YR 5/4)				
35	SM	SM					
36			(35.5 - 38.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); yellowish brown / moderate yellowish brown (10YR 5/4)				
37	SM	SM					
38			(38.0 - 44.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown (5YR 4/3)				
39							
40			GM				

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Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 & 17.5 inch Tri-cone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.6 ft bgs	
Rig Geologist:	K. Keon / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
41	(19.9 - 40.6) 2.13 mins/ft			(19.9 - 40.6') 18.0" Steel Casing		(40.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log). (40.6 - 53.0') Smooth drilling	(40.6 - 61.8') 2000 gallons of water used; 500 gallons of water recovered; 1500 gallons of water lost
42		GM					
43							
44							
45					(44.5 - 53.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)		
46							
47		SM					
48							
49							
50	(40.6 - 61.8) 3.74 mins/ft			(40.6 - 61.8') 18.0" Steel Casing		(50.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	
51							
52							
53							
54		SW			(53.0 - 54.0') Topock - Alluvium Deposits; Well graded sand with gravel (SW); brown (10YR 4/3)	(53.0 - 55.0') Rough drilling	
55					(54.0 - 57.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)	(55.0 - 60.6') Smooth drilling	
56		SM					
57							
58		SW-SM			(57.0 - 59.0') Topock - Alluvium Deposits; Well graded sand with silt and gravel (SW-SM); reddish brown (5YR 4/3)		
59							
60		ML			(59.0 - 59.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown / moderate		
		SM					

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Drilling Method:	Dual Rotary	Total Depth:	192 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 & 17.5 inch Tri-cone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.6 ft bgs	
Rig Geologist:	K. Keon / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
61	(40.6 - 61.8) 3.74 mins/ft			(40.6 - 61.8') 18.0" Steel Casing	brown (5YR 4/4) (59.5 - 64.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)	(60.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log). (60.6 - 63.0') Smooth drilling	
62		SM					(61.8 - 79.5') 584.03 gallons of water used; 750 gallons of water recovered; 165.97 gallons of water gained
63						(63.0 - 64.0') Rough drilling	
64		GM			(64.0 - 65.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown (5YR 4/4)	(64.0 - 77.0') Smooth drilling	
65					(65.0 - 75.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (10YR 5/3)		
66							
67							
68							
69							
70		SM		(61.8 - 79.5') 18.0" Steel Casing		(70.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	
71	(61.8 - 79.5) 5.64 mins/ft						
72							
73							
74							
75							
76					(75.5 - 80.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown (5YR 5/4)		
77						(77.0 - 79.5') Rough drilling	
78		ML					
79							
80	(79.5 - 99.8) 4.06 mins/ft					(79.5 - 99.8') Drill rods chattering	(79.5 - 99.8') 206.16

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Drilling Method:	Dual Rotary	Total Depth:	192 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 & 17.5 inch Tri-cone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.6 ft bgs	
Rig Geologist:	K. Keon / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
81		ML			(80.5 - 82.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)	(80.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	gallons of water used; 3748.28 gallons of water recovered; 3542.12 gallons of water gained
82		SM			(82.0 - 85.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown (5YR 5/4)		
83		ML			(85.5 - 88.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4) trace dusky red (5R 3/4)		
84		ML			(88.0 - 96.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown (5YR 5/4)		
85		SM					
86		SM					
87		SM					
88		SM					
89		SM					
90	(79.5 - 99.8) 4.06 mins/ft			(79.5 - 99.8') 18.0" Steel Casing		(90.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	
91							
92		ML					
93		ML					
94		ML					
95		ML					
96		ML					
97		ML			(96.5 - 119.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)		
98		SM					
99		SM					
100		SM					

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Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 & 17.5 inch Tri-cone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.6 ft bgs	
Rig Geologist:	K. Keon / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
101						(99.8 - 121.1') Drill rods chattering (100.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	(99.8 - 121.1') 2424.66 gallons of water used; 2544.22 gallons of water recovered; 119.56 gallons of water gained
102							
103							
104							
105							
106							
107							
108							
109							
110	(99.8 - 121.1) 1.41 mins/ft	SM		(99.8 - 121.1') 16.0" Steel Casing		(110.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	
111							
112							
113							
114							
115							
116							
117							
118							
119							
120		ML			(119.0 - 124.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown		

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Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid			
121	(99.8 - 121.1) 1.41 mins/ft	ML		(99.8 - 121.1') 16.0" Steel Casing	/ moderate brown (5YR 4/4) trace dusky red (5R 3/4)	(120.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).				
122							(121.1 - 135.0') Changed out bottom hole assembly to drill with constant water due to heaving sands. Smooth drilling.	1910.69 gallons used; 4245.74 gallons recovered; 2335.05 gallons gained		
123		SM		(121.1 - 138.8') 16.0" Steel Casing	(124.0 - 132.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); brown (7.5YR 4/3) some strong brown (7.5YR 4/6)	(130.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).				
124										
125										
126										
127										
128		ML		(121.1 - 138.8') 16.0" Steel Casing	(132.0 - 133.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown / moderate brown (5YR 4/4)					
129										
130	(121.1 - 138.8) 1.80 mins/ft									
131		GM		(121.1 - 138.8') 16.0" Steel Casing	(133.0 - 136.5') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown (5YR 4/4)	(135.0 - 140.5') Rough drilling				
132										
133		SM		(121.1 - 138.8') 16.0" Steel Casing	(136.5 - 156.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)					
134										
135		SM		(121.1 - 138.8') 16.0" Steel Casing	(136.5 - 156.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)					
136										
137		SM		(121.1 - 138.8') 16.0" Steel Casing	(136.5 - 156.5') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)					
138										
139	(138.8 - 158.8) 1.72 mins/ft			(138.8 - 158.8') 16.0" Steel Casing		(138.8 - 158.8') 3445.74 gallons of water used; 2703 gallons of water recovered; 742.74 gallons				
140										

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141						(140.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log). (140.5 - 158.8') Smooth drilling	of water lost
142							
143							
144							
145							
146							
147							
148							
149		SM					
150	(138.8 - 158.8) 1.72 mins/ft			(138.8 - 158.8') 16.0" Steel Casing			
151						(150.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	
152							
153							
154							
155							
156							
157					(156.5 - 160.5') Topock - Alluvium Deposits; Sandy silt with gravel (ML); reddish brown / moderate brown (5YR 4/4)		
158		ML					
159							
160	(158.8 - 178.8) 1.52 mins/ft			(158.8 - 178.8') 16.0" Steel Casing		(158.8 - 179.0') Smooth drilling	(158.8 - 192.0') 3164.5 gallons of water used; 8081.1 gallons of water recovered; 4916.6 gallons

Final 5/14/20

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Drilling Method:	Dual Rotary	Total Depth:	192 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 & 17.5 inch Tri-cone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.6 ft bgs	
Rig Geologist:	K. Keon / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
161		ML				(160.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	of water gained
162		SM			(160.5 - 162.5') Topock - Alluvium Deposits; Silty sand (SM); reddish brown / moderate brown (5YR 4/4)		
163		GM			(162.5 - 164.0') Topock - Alluvium Deposits; Silty gravel with sand (GM); reddish brown / moderate brown (5YR 4/4)		
164					(164.0 - 183.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); reddish brown / moderate brown (5YR 4/4)		
165							
166							
167							
168							
169	(158.8 - 178.8) 1.52 mins/ft			(158.8 - 178.8') 16.0" Steel Casing			
170						(170.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log).	
171							
172		SM					
173							
174							
175							
176							
177							
178							
179	(178.8 - 192.0) 2.45 mins/ft			(178.8 - 192.0') 15.5" Open Hole		(179.0 - 192.0') Drilled without advancing casing. Tagged bottom to verify formation did not collapse after drilling complete.	
180							

Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, J = estimated value, NR = no recovery; Notes: depth to water collected during the first VAS interval of the pilot borehole

IRZ DRILLING LOG - PG&E - TOPOCK - C:\USERS\SSM\GRAND\DOCUMENTS\PG&E TOPOCK\DRIFT BORING LOGS\GINT FILES\05.14.20\TOPOCK DATABASE FOR PLOG.GPJ TOPOCK DATA TEMPLATE FOR PLOG.GDT 05/14/20 16:14

Date Started:	10/31/2019	Surface Elevation:	480.26 ft amsl	Boring No.: IRZ-17
Date Completed:	11/05/2019	Northing (NAD83):	2103000.19	
Drilling Co.:	Cascade	Easting (NAD83):	7615871.28	Client: PG&E
Drilling Method:	Dual Rotary	Total Depth:	192 ft bgs	Project: Final GW Remedy Phase 1
Drill Rig Type:	Foremost DR-24HD	Conductor Casing Diameter:	18 inches	Location: PG&E Topock, Needles, California
Driller Name:	Jon Martinez	Drill Casing Diameter:	16 inches	
Drilling Asst:	A. & H. Amezcuita	Drill Bit:	15.5 & 17.5 inch Tri-cone	Project Number: RC000753.0051
Tool-Pusher:	Arnold Lamon	Depth to First Water:	26.6 ft bgs	
Rig Geologist:	K. Keon / E. Redner	Converted to Well:	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	

Depth (ft)	Drilling Run (ft) and Average Penetration Rate	USCS Code	USCS Class	Casing Diameter	Description (See Pilot boring log for full geologic descriptions)	Drilling notes and observations confirming presence of temporary backfill material in drill cuttings	Drilling Fluid
181	(178.8 - 192.0) 2.45 mins/ft	SM	[SM]	(178.8 - 192.0) 15.5" Open Hole	(180.0 - 185.5') Topock - Alluvium Deposits; Gravelly silt with sand (ML); yellowish red (5YR 4/6)	(180.0') Observed trace amounts of Cal-Silica 1/4"-3/8" Pea Gravel in drill cuttings (See Photo Log)	
182							
183							
184							
185	ML	[ML]		(185.5 - 187.0') Topock - Alluvium Deposits; Silty sand with gravel (SM); yellowish red (5YR 4/6)			
186							
187	SM	[SM]		(187.0 - 192.0') Topock - Alluvium Deposits; Sandy silt with gravel (ML); yellowish red (5YR 4/6)			
188							
189	ML	[ML]				(190.0') Observed trace amounts of Cemex #3 MESH (8x10) Lapis Lustre Sand in drill cuttings (See Photo Log).	
190							
191							
192							

End of Boring at 192.0 ft bgs.

Final 5/17/4/20



Abbreviations: USCS = Unified Soil Classification System, ft = feet, bgs = below ground surface, amsl = above mean sea level, GW = groundwater, U = not detected above the laboratory reporting limit, J = estimated value, NR = no recovery; Notes: depth to water collected during the first VAS interval of the pilot borehole

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