



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Cascade

Start Time/Date: 0831 11/27/18

Lead Driller: Roger Rodriguez

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-1951

Logged By: Curtis Landers Page 1 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
835	8	10	8-16	2	28.2			
↓	10	12	8'	2	↓			
↓	12	14	↓	2	28.2			
↓	14	16	↓	2	↓			
0841	16	18	16-20	2	31.3			
↓	18	20	4'	2	↓			
0852	20	22	20-26	2	25.5			
↓	22	24	6'	2	↓			
↓	24	26	↓	2	↓			
0900	26	28	26-36	2	47.9			
↓	28	30	10	2	↓			
↓	30	32	↓	2	↓			
↓	32	34	↓	2	↓			
↓	34	36	↓	2	↓			
0912	36	38	36-38	2	25.7			
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CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Cascade

Start Time/Date: 0831 / 11-27-18

Lead Driller: Roger Rodriguez

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KRB106 S1

Logged By: Curt's Landers Page 2 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0929	38	40 38-40	2	2	28.2			
	40	42	8'	2				
	42	44		2				
	44	46		2				
0945	46	48	46-55	2	37.5			
	48	50	9'	2				
	50	52		2				
	52	54		2				
	54	55		1				
1010	55	56	55-60	1	30.6			
	56	58	11'	2				
	58	60		2				
	60	62		2				
	62	64		2				
	64	66		2				
								* Next Page



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Cascade

Start Time/Date: 0831 / 11-27-18

Lead Driller: Roger Rodriguez

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB 106 SI

Logged By: Curtis Landers Page 3 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1038	66	68	66'-76'	2	40.5			
	68	70	10'	2				
	70	72		2				
	72	74		2				
↓	74	76	↓	2	↓			
1100	76	78	76'-86'	2	39.4			*Added ~1 gal H ₂ O
	78	80	10'	2				
	80	82		2				
	82	84		2				
↓	84	86	↓	2	↓			
1135	86	88	86'-96'	2	54.1			
	88	90	10'	2				
	90	92		2				
	92	94		2				
↓	94	96	↓	2	↓			
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CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Cascade

Start Time/Date: 0831 / 11-27-18

Lead Driller: Roger Rodriguez

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB106 S1

Logged By: Curtis Landers Page 4 of 4

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1205	96	98	96'-106	2	34.2			Added ~1 gal H ₂ O
↓	98	100	10'	2	↓			
	100	102	↓	2	↓			
	102	104	↓	2	↓			
↓	104	106	↓	2	↓			
1228	106	108	106'-116	2	42.2			
↓	108	110	10	2	↓			
	110	112	↓	2	↓			
	112	114	↓	2	↓			
↓	114	116	↓	2	↓			
1350	116	118	116'-126	2	53.7			
↓	118	120	10	2	↓			
	120	122	↓	2	↓			
	122	124	↓	2	↓			
↓	124	126	↓	2	↓			
								* Next Page



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Cascade

Start Time/Date: 0831 / 11-27-18

Lead Driller: Roger Rodriguez

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB10681

Logged By: Curtis Landers Page 5 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1413	126	128	126-136	2	53.8			
	128	130	10'	2				
	130	132		2				
	132	134		2				
✓	134	136	✓	2	✓			
1435	136	138	136-142	2	53.8			Added ~1 gal H ₂ O
	138	140	6'	2				
✓	140	142	✓	2	✓			
1537	142	144	142-146	2	86.7			Disturbed sample - 142-146 Added ~1 gal H ₂ O
✓	144	146	4'	2	✓			
1607	146	148	146-156	2	39.5			
	148	150	10'	2				
	150	152		2				
	152	154		2				
✓	154	156	✓	2	✓			Added ~1 gal H ₂ O while pushing casing
								* Next Page



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAFB/06 S1

Logged By: Curtis Landers Page 6 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
828	156	158	156-166	2	22.3			
	158	160	10'	2				
	160	162		2				
	162	164		2				
↓	164	166	↓	2	↓			
1028	166	168	166-176	2	32.2			
	168	170	10'	2				
	170	172		2				
	172	174		2				
↓	174	176	↓	2	↓			
1107	176	178	176-186	2	27.5			
	178	180	10'	2				
	180	182		2				
	182	184		2				
↓	184	186	↓	2	↓			
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CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAFB106 SI

Logged By: Curtis Landers

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1140	186	188	186-196	2	33.3			
	188	190	10'	2				
	190	192		2				
	192	194		2				
↓	194	196	↓	2	↓			
1206	196	198	196-206	2	41.3			
	198	200	10'	2				
	200	202		2				
	202	204		2				
↓	204	206	↓	2	↓			
+301 G 1401	206	208	206-216	2	33.9			
	208	210	10'	2				
	210	212		2				
	212	214		2				
↓	214	216	↓	2	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAFB106 S1

Logged By: Curtis Landers Page 8 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1440	216	218	216-226	2	34.6			Added ~1 gal H ₂ O
	218	220	10'	2				
	220	222		2				
	222	224		2				
↓	224	226	↓	2	↓			
1507	226	228	226-234	2	45.4			
	228	230	8'	2				
	230	232		2				
↓	232	234	↓	2	↓			
1543	234	236	234-246	2	42.7			
	236	238	12'	2				
	238	240		2				
	240	242		2				
	242	244		2				
↓	244	246	↓	2	↓			
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CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAFB106 S1

Logged By: Curtis Landers Page 9 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1644	246	248	246-256	2	46.4			
↓	248	250	10	2	↓			
↓	250	252	↓	2	↓			
↓	252	254	↓	2	↓			
11/29 ↓	254	256	↓	2	↓			
0927	256	258	256-266	2	56.2			
↓	258	260	10'	2	↓			
↓	260	262	↓	2	↓			
↓	262	264	↓	2	↓			
↓	264	266	↓	2	↓			
1009	266	268	266-276	2	48.8			* Whole Run disturbed (266'-276')
↓	268	270	10'	2	↓			* Disturbed
↓	270	272	↓	2	↓			* Disturbed
↓	272	274	↓	2	↓			* Disturbed
↓	274	276	↓	2	↓			* Disturbed
								* Next Page

E.A.			CORE TEMPERATURE LOG					
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Boring/Well ID: KAPB106 SI				Logged By: Curtis Landers Page 10 of				
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1055	276	278	276-285	2	60.1			
	278	280	9'	2				
	280	282		2				
	282	284		2				
↓	284	285	↓	1	↓			
1212	285	286	285-286	1'	41.3			
1354	286	288	286-296	2	41.7			
	288	290	10'	2				
	290	292		2				
	292	294		2				* Disturbed (292-296)
↓	294	296	↓	2	↓			* Disturbed
1430	296	298	296-306	2	37.2			
	298	300	10	2				
	300	302		2				
	302	304		2				
↓	304	306	↓	2	↓			
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CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAFB106

Logged By: Curtis Landers

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1555 Ja	306	308	306- 310	2	39.2			
↓	308	310	4	2	↓			
11/30 0815	310	312	310- 316	2	44.6			
↓	312	314	6'	2	↓			
↓	314	316	↓	2	↓			
12/1 845	316	318	316- 326	2	50.4			* Added ~3 gal H ₂ O
↓	318	320	10'	2	↓			
↓	320	322	↓	2	↓			
↓	322	324	↓	2	↓			
↓	324	326	↓	2	↓			
1008	326	328	326- 336	2	28.3			* Added ~1 gal H ₂ O
↓	328	330	10'	2	↓			
↓	330	332	↓	2	↓			
↓	332	334	↓	2	↓			
↓	334	336	↓	2	↓			
								* Next Page

EA		CORE TEMPERATURE LOG						
Project: Kirtland BFF					Project Number: 62735DM02.1017			
Boring/Well ID: KAFB 100 SI					Logged By: Curtis Landers Page 12 of			
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1145	336	338	336-345	2	38.4			Added ~1 gal H2O
	338	340	9'	2				
	340	342		2				
	342	344		2				
✓	344	345	✓	1	✓			
1228	345	346	345-346	1'	65.6			
1355	346	348	346-356	2	32.0			
↑	348	350	10'	2				
	350	352		2				
	352	354		2				
✓	354	356	✓	2	✓			
1532	356	358	356-366	2	29.1			
	358	360	10'	2				
	360	362		2				
	362	364		2				
✓	364	366	✓	2	✓			
* Next Page								



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAFB106 S

Logged By: CRL /

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1618	366	368	366-376	2	38.2			
	368	370	10'	2				
	370	372		2				
	372	374		2				
↓	374	376	↓	2	↓			
12/2/18 0810	376	378	376-380	2	42.5			
↓	378	380	↓	2	↓			
0650	380	382	380-386	2	26.1			
↓	382	384	↓	2	↓			
↓	384	386	↓	2	↓			
1035	386	388	386-390	2	47.0°C			
↓	388	390	↓	2	↓			
1122	390	392	390-396	2	37.5°C			
↓	392	394	↓	2	↓			
↓	394	396	↓	2	↓			
1431	396	398	396-400	2	46.1			
↓	398	400	↓	2	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAPB-1005

Logged By: C. M. M. Y. A.

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1405	400	402	400-406	2	27.7°C			
	402	404						
	404	406						
12/3/18 1007	406	408	406-414	2	44.7°C			
	408	410						
	410	412						
	412	414						
1140	414	416	414-419	2	18.5			
	416	418		2				
	418	419		1				
1405	419	420	419-426	1	54.2			
	420	422		2				
	422	424		2				
	424	426		2				
1445	426	428	426-428	2	29.7			
1545	428	430	428-436	2	32.1			
	430	432		2	32.1			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KA FB-106 S1

Logged By: C. Montoya

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0845	432	434	428-436	2	52.9			
↓	434	436	↓	2	↓			
0859	436	438	436-438	2	52.1			
↓	438	440	↓	2	↓			
↓	440	442	↓	2	↓			
↓	442	444	↓	2	↓			
↓	444	446	↓	2	↓			
0959	446	448	446-448	2	53.7			
↓	448	449	↓	1	↓			
1051	449	450	449-450	1	70.4			
↓	450	452	↓	2	↓			
↓	452	454	↓	2	↓			
↓	454	456	↓	2	↓			
1347	456	458	456-458	2	31.4			
↓	458	459	↓	1	↓			
1427	459	460	459-460	1	25.3			
↓	460	462	↓	2	35.6			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAPB-10631

Logged By: C. Montoya

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1613	464	466	464-468	2	36.0			
↓	468	468	↓	2	↓			
↓	468	469	↓	1	↓			
2/5/18 0855	469	470	469-476	1	22.7			
↓	470	472	↓	2	↓			
↓	472	474	↓	2	↓			
↓	474	476	↓	2	↓			
1035	476	478	476-486	2	27.3			
↓	478	480	↓	2	↓			
↓	480	482	↓	2	↓			
↓	482	484	↓	2	↓			
↓	484	486	↓	2	↓			
1025	486	488	486-496	2	25.4			
↓	488	490	↓	↓	36.2			
↓	490	492	↓	↓	↓			
↓	492	494	↓	↓	↓			
↓	494	496	↓	↓	↓			

CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAB-10651

Logged By: C. Montoya

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CORE TEMPERATURE LOG								
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Drilling Company: <i>Cascade</i>				Start Time/Date: <i>945 / 11/6/10</i>				
Lead Driller: <i>Roger Roderquet</i>				Completion Time/Date:				
Drilling Method: <i>Sonic Coring</i>				Final Depth:				
Boring/Well ID: <i>KAFB-10652</i>				Logged By: <i>C. Montoya</i> Page <u>1</u> of <u>16</u>				
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1000	8	12	2	100%	28.7			
↓	12	14	2	100%	31.7			
↓	14	16	2	100%	31.7			
1010	16	18	2	100%	31.7			
1010	18	20	2	100%	27.9			
1010	20	22	2	100%	27.9			
1015	22	24	2	100%	22.3			
1015	24	26	2	100%	22.3			
1020	26	28	2	100%	22.3			
↓	28	30	2	100%	22.3			
↓	30	32	2	100%	30.6			
↓	32	34	2	100%	30.6			
↓	34	36	2	100%	30.6			
1034	36	38	2	100%	30.6			
↓	38	40	2	100%	24.8			
↓	40	42	2	100%	24.8			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAFB-10652

Logged By: Carlos Mantoya Page 12 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1034	42	44	2	2h-3h	26.8			
1046	44	46	2	44-46	21.0			
1056	46	48	2	46-56	26.8			Added 1 Gal of water
1	48	50	2	1	1			
1	50	52	2	1	1			
1	52	54	2	1	1			
1	54	56	2	1	1			
1114	56	58	2	56-60	29.2			
1	58	60	2	1	1			
1	60	62	2	1	1			
1	62	64	2	1	1			
1	64	66	2	1	1			
1142	66	68	2	50.8				
1	68	70	1	1				
1	70	72	1	1				
1	72	74	1	1				
1	74	76	1	1				

EA			CORE TEMPERATURE LOG					
Project: Kirtland BFF					Project Number: 62735DM02.1017			
Boring/Well ID: KAERS-10652					Logged By: C. Montoya		Page 13 of 13	
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1157	76	78	2	76-84	33.1			
	78	80	2					
	80	82	2					
	82	84	2					
1210	84	86	2	84-90	32.8			
	86	88	2					
	88	90	2					
1228	90	92	2	90-96	33.2			
	92	94	2					
	94	96	2					
1345	96	98	2	96-99	31.6			
1345	98	99	1					
1415	99	100	1	99-106	55.4			Added 1 Gal of water. Driller lost 2ft of 7' core run. Will attempt to recover lost core or clean out run.
	100	102	2					
	102	104	2					
1436	104	106	1	104-106	58.2			core disturbed
	105	106	1				cm	

CORE TEMPERATURE LOG							
Project: Kirtland BFF						Project Number: 62735DM02.1017	
Boring/Well ID: <u>248B-10652</u>						Logged By: <u>C. Montoya</u> Page <u>14</u> of <u>14</u>	
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)
1450	106	108	2	106-116	34.2		
	108	110	2				
	110	112	2				
	112	114	2				
	114	116	2				
1509	116	117	1	116-120	31.4		
	117	120	3				
1528	120	122	2	120-126	28.9		
	122	124	2				
	124	126	2				
1600	126	128	2	126-136	35.9		
	128	130	2				
	130	132	2				
	132	134	2				
	134	136	2				
1625	136	138	2	136-142	28.8		
	138	140	2				

CORE TEMPERATURE LOG								
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Boring/Well ID: KAFB-10652				Logged By: C. Montoya		Page 15 of 15		
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1625	140	142	2	138-140	26.8			
0810	142	144	2	142-146	66.4			6 ft of Core was lost down Hole during return Trip to Surface. Driller will attempt to retrieve Disturbed Core
1	144	146	2	1	1			Added 1 Gal of Water
0813	144	146	1					11/7/18
0831	146	148	2	146-152	84.6			
1	148	150	2	1	1			
1	150	152	2	1	1			
0848	152	154	2	152-156	38.7			
1	154	156	2	1	1			
0915	156	157	1	No Recovery				156-157 interval went in hopper accidentally
1	157	158	1	Run 156-165				9 ft Run 156-165 - couldn't get last foot 165-166 w/ core barrel
1	158	160	2	1	1			
1	160	162	2	1	59.4			
1	162	164	2	1	1			
1	164	165	1	1	1			
0950	165	166	1	165-170				
1	166	168	2	1	37.3			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: CAFB-10652

Logged By: Lane Andrews Page 1 of 6

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0951	168	170	2	1	1			
1118	170	172	2	170-174	58.7°C			added 1 gallon water at 170'
1	172	174	2	170	1			4 ft Run disturbed (fell out) recovered w/ Next 6 ft Run so that 174-176' is undisturbed
1	174	176	2	1	1			
1146	176	178	2	176-182	1			
1	178	180	2	77.8	71.3°C			
1	180	182	2	1	1			added 1 gallon of water
1205	182	184	2	182-184	1			
1	184	186	2	1	44.4			
1325	186	188	2	186-190	1			
1	188	190	2	194	1			
1	190	192	2	1	1			
1	192	194	2	1	42.8			
1427	194	196	2	194-200	48.5			
1	196	198	2	1	1			
1	198	200	2	1	1			
1454	200	202	2	200-206	37.7			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID:

KAFB-10625

Logged By: *Law Address*

Page 1 of 7

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1454	202	204	2	200-206				
	204	206	2		47.7			
1522	206	208	2	200-214	50.9			
	208	210	2					
	210	212	2					
	212	214	2					
1540	214	216	2	214-216	40.2			added 1 gallon water
1615	216	218	2	216-218	67.1			
	218	220	2		67.1			
	220	222	2					
	222	224	2					
	224	226	2					
1648	226	228	2	226-				
	228	230	2	234	62.1			
	230	232	2					
	232	234	2					
11/8/14 0718	234	236	2	234-242	43.1			8 ft Run core disturbed - fell at w/ core barrel on Retrieval

EXA			CORE TEMPERATURE LOG					
Project: Kirtland BFF					Project Number: 62735DM02.1017			
Boring/Well ID: KAFB-10625					Logged By: Love Anderson		Page 18 of 18	
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0748	236	238	2	234-242	43.1			
	238	240	2					
	240	242	2					
0747	242	244	2	242-246	T			
	244	246	2		61.2			
0817	246	248	2	246-253	61.2			
	248	250	2					
	250	252	2		52.9			
	252	253	1					added 1 gallon of water at 253
0858	253	254	1	253-256	T			
	254	256	2		32.1			
0929	256	258	2	256-264	T			
	258	260	2		33.8			
	262	264	2					
1038	264	266	2	264-272	51.6			
	266	268	2					
	268	270	2					

CORE TEMPERATURE LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Boring/Well ID: KAFB-10652					Logged By: Lane Andrews		Page 19 of 20		
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments	
1038	270	272	2	271-272	51.1°C			added 1 gallon of water	
1113	272	274	2	272-280	7				
↓	274	276	2	↓	↓				
↓	276	278	2	↓	77.7			Core from 276 to 280 is disturbed - it fell out of the core barrel & was re-retrieved	
↓	278	280	2	↓	↓				
1145	280	282	2	280-286	69.9				
↓	282	284	2	↓	↓				
↓	284	286	2	↓	↓			added 1 gallon of water before next run	
1222	286	288	2	286-288	56.2°C				
↓	288	290	2	↓	↓				
1350	290	292	2	290-296	↓				
↓	292	294	2	↓	↓				
↓	294	296	2	↓	44.9				
1430	296	298	2	296-300	↓				
↓	298	300	2	↓	35.9				
1500	300	302	2	300-306	30.5				
↓	302	304	2	↓	↓				



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAFB10652

Logged By: S. BENTLEY

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1500	304	306	2	306-306	30.5			
1542	306	308	2	308-312				
	308	310	2		36.1			
	310	312	2					
	314	316						
	316	318			318-314	60.48		
	318	320			314-316			
	320	322						
8:07	316	318	2	318-316	56.3			
	318	320	2	320-318				
	320	322	2	322-320				
	322	324	2	324-322				
	324	326	2	326-324				
9:19	326	328	2	328-326	55.4			
	328	330	2	330-328				
	330	332	2	332-330				
1009	332	334	2	334-332	68.9			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID:

KAPB 10652

Logged By: CURTIS LANDERS Page 11 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
11/13/18 1009	334	336	2	2 1/2	68.9			
↓	336	338	2	2 1/2	↓			
↓	338	340	2	2 1/2	↓			
1102	340	342	2	2 1/2	53.6			
↓	342	344	2	2 1/2	↓			
↓	344	345	1	1 1/2	↓			
1133	345	346	1	1 1/2	67.8			
↓	346	348	2 1/4	2 1/2	↓			
1211	348	350	2	2 1/2	54.7			
↓	350	352	2	2 1/2	↓			
↓	352	353	1	1 1/2	↓			
↑	353	354	1	1 1/2	34.1			
1404	354	356	2	2 1/2	↓			
1504	356	358	2	2 1/2	45.3			
↓	358	360	2	2 1/2	↓			
↓	360	362	2	2 1/2	↓			
↓	362	364	2	2 1/2	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: VAPB 10652

Logged By: CURTIS LANDERS Page 12 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1504	364	366	2	2 1/2	45.3			
1540	366	368	2	2 1/2	55.5			
↓	368	370	2	2 1/2	↓			
↓	370	372	2	2 1/2	↓			
1618	372	374	2	2 1/2	38.4			
11/14/18 ↓	374	376	2	2 1/2	↓			-So far today ~6 gallons of water added: ~1 gallon added every time they add casing - water removed w/ wet cuttings or clean-out runs
0747	376	378	2	2 1/2	40.1			
↓	378	380	2	2 1/2	↓			
↓	380	382	2	2 1/2	↓			
↓	382	384	2	2 1/2	↓			
0830	384	386	2	2 1/2	46.3			ADDED 1 GALLON H ₂ O
↓	386	387	1	1 1/1	↓			
0913	387	388	1	1 1/1	52.8			ADDED 1 GALLON H ₂ O
↓	388	390	2	2 1/2	↓			
↓	390	392	2	2 1/2	↓			
↓	392	394	2	2 1/2	↓			
1025	394	396	2	394-396				

CORE TEMPERATURE LOG								
Project: Kirtland BFF					Project Number: 62735DM02.1017			
Boring/Well ID: KAFB10652					Logged by: CURTIS LANDERS Page 13 of			
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1112	396	398	-	Ø	-			Sample fell down hole, will attempt to recover on next run
1112	396 398	398 400	2'	398 400	75.9			396-398 Disturbed
↓	398 400	400 402	2'	↓	↓			
↓	400 402	402 404	2'	↓	↓			
1202	402 404	404 406	2	402- 404	49.6			402-404 disturbed
↓	404	406	2	↓	↓			
1433	408	410 404	2	406 416			CL	
1433	406	408	2	406- 416	73.3			
↓	408	410	2	↓	↓			
↓	410	412	2	↓	↓			
↓	412	414	2	↓	↓			
↓	414	416	2	↓	↓			
1522	416	418	2	416- 419	51.7			
↓	418	419	2	↓	↓			
0834	419	420	1	419- 424	23.3			
↓	420	422	2	↓	↓			
↓	422	424	2	↓	↓			Added 1gal H ₂ O



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: 12443 10652

Logged By: CURTIS LAMBERS Page 1 of 4

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0954	424	426	2	424-432	49.1			
↓	426	428	2	↓	↓			
↓	428	430	2	↓	↓			
↓	430	432	2	↓	↓			
1118	432	434	2	432-436	42.4			
↓	434	436	2	↓	↓			
1201	436	438	2	436-442	45.5			
↓	438	440	2	↓	↓			
↓	440	442	2	↓	↓			
1336	442	444	2	442-448	40.1			
↓	444	446	2	↓	↓			
↓	446	448	2	↓	↓			
1431	448	450	2	448-450	31.6			
1517	450	452	2	450-456	42.2			Disturbed sample
↓	452	454	2	↓	↓			Disturbed sample
↓	454	456	2	↓	↓			Disturbed sample
1600	456	458	2'	456-458	25.8°C			

CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KARB 10652

Logged By: BR

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EA CORE TEMPERATURE LOG								
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Drilling Company: <u>Cascade</u>				Start Time/Date: <u>1528 / 11-18-18</u>				
Lead Driller: <u>Roger Rodriguez</u>				Completion Time/Date: <u>0930 / 11-21-18</u>				
Drilling Method: Sonic Coring				Final Depth: <u>512</u>				
Boring/Well ID: <u>KAFB-10653</u>				Logged By: <u>C. Ray Landers</u> Page <u>1</u> of <u>4</u>				
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1528	400	402	400-409	2	68.2			
	402	404	9ft	2				
	404	406		2				
	406	408		2				
	408	409		1				
1620	409	410	409-416	1	60.7			
	410	412	7ft	2				
	412	414		2				
↓	414	416	↓	2	↓			
0843	416	418	416-423	NR	78.1			Core barrel -4°C - 1.9°C on entry for run 416'-418' No Recovery
	418	420	7ft	2				
	420	422		2				
↓	422	423	↓	1	↓			
0926	423	425	423-429	2	29.1			Core barrel @ -2-7°C
	425	427	6ft	2	32.8			
↓	427	429	↓	2	40.6			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Cascade

Start Time/Date: 11/18/18 @ 1528

Lead Driller: Roger Rodriguez

Completion Time/Date: 0930 / 11-21-18

Drilling Method: Sonic Coring

Final Depth: 512

Boring/Well ID: KAFB106 S3

Logged By: Curtis Landers

Page 2 of 4

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1028	429	431	429-431	2'	42.9			Added ~1 gal H ₂ O
1114	431	432	431-436	1'	82.8			
↓	432	434	5'	2'	↓			
↓	434	436	↓	2'	↓			Added ~1 gal H ₂ O
1215	436	438	436-440	2'	46.6			
↓	438	440	4'	2'	↓			
1355	440	442	440-446	2'	52.3			
↓	442	444	6ft	2'	↓			
↓	444	446	↓	2'	↓			Added ~1 gal H ₂ O
1442	446	448	446-448	2'	45.6			
1540	448	450	448-455	2'	82.4			
↓	450	452	7'	2'	↓			
↓	452	454	↓	2'	↓			
↓	454	455	↓	1'	↓			
1637	455	457	455-457	2'	66.4			Added ~1/2 gal H ₂ O
↓	457	459	4'	2'	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: CascadeStart Time/Date: 1528 / 11/18/18Lead Driller: Roger RodriguezCompletion Time/Date: 0930 / 11-21-18

Drilling Method: Sonic Coring

Final Depth: 572Boring/Well ID: KAFB106S3Logged By: Curtis Lander Page 3 of 4

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0943	459	460	459-460	1	19.6			
↓	460	462	5'	2	22.0			
↓	462	464	↓	2	26.5			
1108	464	466	464-470	2	69.9			Added ~ 1/2 gal H ₂ O
↓	466	468	6'	2	↓			
↓	468	470	↓	2	↓			
↑ 1249	470	472	↑ 4'	2	50.9			SAMPLE WAS DISTURBED - FEW OUT OF CORE BARREL TWICE (470'-474')
↓	472	474	↓	2	62.7			
1338	474	475	474-480	1	23.9			
↓	475	476	6'	1	24.3			
↓	476	478	↓	2	23.5			
↓	478	480	↓	2	24.0			Last 3' (480-483') will be retracted - Next run & will be disturbed
1510	480	482	480-484	2	27.3			
↓	482	484	4'	2	↓			
1529	484	485	484-489	1	21.7			
↓	485	487	5'	2	22.0			

11/1/18

CORE TEMPERATURE LOG								
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Drilling Company: <i>Passive</i>				Start Time/Date:				
Lead Driller: <i>Roger R. L. L. L.</i>				Completion Time/Date:				
Drilling Method: Sonic Coring				Final Depth:				
Boring/Well ID: <i>KAFB-10654</i>				Logged By: <i>C. McIntoyA</i> Page 1 of				
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1049	340	342	2	340 346	25.9			
1	342	344	2	1	27.8			
1	344	346	2	1	41.6			
1230	346	348	2	346 356	33.6			Core Barrel cooled with Dry Ice
1	348	350	2	1	38.1			
1	350	352	2	1	34.4			
1	352	354	2	1	34.8			
1	354	356	2	1	39.7			
1440	356	358	2	356 366	20.1			Core Barrel cooled with Dry Ice
1	358	360	2	1	22.4			
1	360	362	2	1	24.8			
1	362	364	2	1	30.0			
1	364	366	2	1	31.8			
1608	366	368	2	366 376	50.9			Core was lost on return trip to surface. Driller successfully retrieved distorted core (10ft), therefore cores have High temps
1	368	370	2	1	50.6			
1	370	372	2	1	55.4			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KMB-10654

Logged By: C. Montoya

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1608	372	374	366-376	2	48.3			
1	374	376	1	2	50.0			
1735	376	378	376-380	2	21.6°C			Core Barrel Cooled with Dry Ice
	378	380		2	21.4°C			
	380	382		2	23.9°C			
	382	384		2	23.6°C			
	384	386		2	28.0°C			
11/2/14	0915	386	388	386-396	2	24.7		Core Barrel Cooled with Dry Ice
	388	390		2	27.1			
	390	392		2	35.2			
	392	394		2	35.0			
	394	396		2	37.8			
1105	396	398	396-406	0.5	N/A			Core was lost on return trip to surface. Driller successfully retrieved 10ft core run. While bagging cores, driller lost some core into the hopper, therefore core intervals are not continuous and have high temps
	397.5	398	400	2	18.1			
	398	400		2	46.0			
	400	402		2	59.9			
	404	406		2	45.3			

CORE TEMPERATURE LOG								
Project: Kirtland BFF					Project Number: 62735DM02.1017			
Boring/Well ID: KATB-10654					Logged By: C. Moutard		Page 13 of 13	
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1322	406	408	2	406-410	50.0			
└	408	410	2	└	56.7			
1500	410	412	2	410-415	31.8			
└	412	414	2	└	28.8			
└	414	415	1	└	29.4			
1543	415	417	2	415-420	24.2			
└	417	419	2	└	26.0			
└	419	420	1	└	35.2			
11/3/18 1010	420	422	2	420-426	49.6°C			Core barrel clogged with dry clay. Driller informed us that a core run has been lost down hole while tripping to surface. 1 Gal of water added. Driller successfully retrieved 6 ft core disturbed core run.
└	422	424	2	└	52.6			
└	424	426	2	└	60.2			
1120	426	428	2	426-430	66.6			
└	428	430	2	└	55.6			
1205	430	432	2	430-436	31.2			
└	432	434	2	└	38.2			
└	434	436	2	└	46.2			
1504	436	438	2	436-446	65.2			Added 1 Gal of water

CORE TEMPERATURE LOG

Project: Kirtland BPP

Project Number: 62735DM02.1017

Boring Well ID: RAB-10659

Logged By: C. Munksgaard

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft bgs)	Temperature (°C)	Penetration Rate (ft/min)	Water Injection rate (gpm)	Comments
1504	438	440	2	436-446	46.5			
↑	440	442	2	1	47.7			
↑	442	444	2		53.3			
↓	444	446	2		39.7			
11/4/18 0758	446	448	2	446-450	53.0			Driller lost 10ft of core on return trip to surface. Had to make several attempts to retrieve core.
↑	448	450	2	446-450	46.6			Added 1 gal of water
↑	450	452	2	450	63.2			
↓	452	453	1		71.3			
1850	453	454	1	453-460	26.7			Boat Borehole cooled with dry ice
↑	454	456	2	1	23.6			
↑	456	458	2		24.4			
↓	458	460	2	↓	22.4			
0955	460	462	2	460-464	31.4			
↓	462	464	2	↓	35.7			
1040	464	466	2	964-969	23.1			
↑	466	468	2	↓	28.5			
↑	468	469	1	↓	27.5			

Boring/Well ID: 12-52B-10654

Project Number: 417541/002.1017

Logged by: C. M. [signature]

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1233	469	470	469-470	1	23.9			Reel Cooled with br. 2cc
	470	472		2	23.9			
	472	474		2	22.9			
	474	476		2	26.5			
1420	476	478	476-483	22	21.2			Reel Cooled with br. 2cc
	478	479		1	21.4			
	479	481		2	21.9			
	481	483		2	22.7			
	483	484		3	-			Reel Cooled with br. 2cc, 1st 3 ft Down hole Driller's Switch, Release
1637	484	486	484-486	2	25.4			Reel Cooled with br. 2cc
	486	488		2				
	488	490		2	24			
	490	492		1	25.4			
1630	492	493		1				
	493	494		1	22.0			
	494	496		2	22.4			
	496	498		2	22.5			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Casade

Start Time/Date: 0953 10/21/18

Lead Driller: Ryan Rodriguez

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KATR-10655

Logged By: C. Montoya

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1411	400	402	400-406	2	34.1			(1320) 401-405 interval was dropped down hole on return trip to surface. Drill with attempt to retrieve. Disturbed core.
1	402	404		2	43.8			Added 2 gal of water.
1	404	406		2	43.5			This interval is transition from Arch Drilling to sonic. 2 ft of possibly stuff. High core temps are due to core dropping out of barrel on first return trip to surface.
1454	406	407	406-411	1	22.9c			
1	407	409		2	22.0c			
1	409	411		1	22.9c			
1546	411	413	411-416	2	45.8c 41.7c			High temps are due to repeated loss of 5 ft core down hole during return trip to surface.
1	413	415	416-418	2	62.8c			
1	415	416	418-419	1	71.7c			
1712	416	418	416-421	2	21.9			Core Bit Temp: -6.8 C°
1	418	420		2	22.7			
1	420	421		1	22.2			
1753	421	423	421-426	2	30.0			Core Bit Temp: -6.2 C°
1	423	425		2	32.2			
1	425	426		1	39.2			
0902	426	428	426-436	2	22.8			Added 1 gal of water. Core Bit Temp: -6.8c°



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID:

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
902	428	430	426-436	2	24.0			
	430	432		2	28.9			
	432	434		2	32.4			
	434	436		2	48.6			Last 5 ft of core fell out of core barrel on returned trip to surface. Driller successfully retrieved 12 ft core run after returning for bottom 5 ft, have high temps on first 5 ft.
1040	436	438	436-446	2	49.5			
	438	440		2	40.7			
	440	442		2	39.8			
	442	444		2	44.1			
	444	446		2	60.9c			
1321	446	448	446-451	2	25.1			Core Bit Temp: -4.1 C
	448	450		2	25.9c			
	450	451		1	26.8			
1415	451	453	451-456	2	41.3			
	453	455		2	42.8			
	455	456		1	49.4c			
1600	456	458	456-461	2	21.2			Core Bit Temp: -6.6 C Added 1 Gal of water
	458	460		2	21.9			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID:

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1600	460	461	458-461	1	24.9c			
1649	461	463	461-466	2	44.7			Added 1 Gal of water
	463	465		2	49.2			
	465	466		1	36.6			
10/2/14 0840	466	468	466-471	2	20.7			Core Barrel cooled w/ Dry Ice
	468	470		2	22.2			
	470	471		1	23.2			
0920	471	473	471-476	2	19.9			Core Barrel cooled w/ Dry Ice
	473	475		2	20.7			
	475	476		1	19.5			
1102	476	478	476-486	2	20.5			Core Barrel cooled w/ Dry Ice
	478	480		2	20.7c			
	480	482		2	21.3c			
	482	484		2	22.4			
	484	486		2	25.7c			
1331	486	488	486-488	2	21.3			
	488	490		2	21.6			

Project Number: 62735DM02.1017

Logged By:

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Comments



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: *Cascade*

Start Time/Date:

Lead Driller: *Roger Rodriguez*

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: *KAPB-106.S7*Logged By: *J. Messenger* Page 1 of 4

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
<i>1-21-19</i> 0825	401	402	<i>401-411</i>	1'	39.0			<i>400-401 not recovered</i> <i>401-406 disturbed</i>
	402	404		2'				
	404	406		1'				
	406	408		1'				
	408	410		1'				
	410	411		1'				
0935	411	412	<i>411-416</i>	1'	26.9			
	412	414		2'				
	414	416		2'				
1025	416	418	<i>416-428</i>	2'	32.7			
1110	418	419	<i>418-423</i>	1'	33.0			
	419	421		2'				
	421	423		2'				
1300	423	424	<i>423-430</i>	1'	30.4			
	424	426		2'				
	426	428		1'				



CORE TEMPERATURE LOG

Project: Kirdland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
↓	428	430	430	2'	↓			
1348	430	432	430-432	2'	68.9			
1445	432	434	432-434	2'	58.6			
↓	434	436	↓	↓	↓			
1535	436	438	436-438	2'	67.5			
↓	438	440	↓	↓	↓			
↓	440	442	↓	↓	↓			
↓	442	444	↓	↓	↓			
↓	444	446	↓	↓	↓			
1630	446	448	446-448	2'	34.3			
↓	448	450	↓	↓	↓			
↓	450	452	↓	↓	↓			
↓	452	454	↓	↓	↓			
↓	454	456	↓	↓	↓			
1-21-19 0832	456	458	456-458	2'	45.4			
↓	458	460	↓	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0920	460	462	460-466	2'	46.9			
↓	462	464	↓	↓	↓			
↓	464	466	↓	↓	↓			
1015	466	468	466-468	2'	31.1			
1055	468	470	468-473	2'	23.6			
↓	470	472	↓	2'	↓			
↓	472	473	↓	1'	↓			
1035	473	474	473-480	1'	27.7			
↓	474	476	↓	2'	↓			
↓	476	478	↓	2'	↓			
↓	478	480	↓	2'	↓			
1325	480	481	480-481	1'	30.6			
1420	481	482	481-486	1'	39.9			
↓	482	484	↓	2'	↓			483-486' gravel - difficult to drill through and raised temp. slightly
↓	484	486	↓	2'	↓			

CORE TEMPERATURE LOG								
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Drilling Company: <u>Cascade</u>				Start Time/Date: <u>1/6/19</u>				
Lead Driller: <u>TLopez Rodriguez</u>				Completion Time/Date: <u>1252 1/6/19 cm</u>				
Drilling Method: Sonic Coring				Final Depth:				
Boring/Well ID: <u>KAER-10658</u>				Logged By: <u>C. McIntyre</u> Page <u>1</u> of <u> </u>				
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1329	10	12	2	10-16	1			
	12	14	2		19.2			
	14	16	2					
1334	16	18	2	16-21	1			
	18	20	2		19.7			
	20	21	1					
	20	21		cm				
1400	21	22	1	21-26	1			
	22	24	2		19.3			
	24	26	2					
1409	26	28	2	26-36	33.0			
	28	30	2					
	32	34	2					
	34	36	2					
1422	36	38	2	36-40	31.3			
	38	40	2					



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KXEB-10658

Logged By: C. Montoya

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1432	40	42	2	90-44	19.4			
	42	44	2					
	44	46	2					
1442	46	48	2	46-50	26.6			
	48	50	2					
1452	50	52	2	50-56	26.4			
	52	54	2					
	54	56	2		43.2 Cen			
1511	56	58	2	56-66	28.6			
	58	60	2					
	60	62	2					
	62	64	2					
	64	66	2					
1525	66	68	2	66-76	29.2			
	68	70	2					
	70	72	2					



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: XAFB-10658

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1526	72	74	2	66-76	29.2			
1	74	76	2	1	1			
1555	76	78	2	76-86	46.8			
1	78	80	2	1	1			
1	80	82	2	1	1			
1	82	84	2	1	1			
1	84	86	2	1	1			
1615	86	88	2	86-93	77.9			
1	88	90	2	1	1			
1	90	92	2	1	1			
1	92	93	1	1	1			
1630	93	94	93-100	1	33.7			
1	94	96	1	2	1			
1	96	98	1	2	1			
1	98	100	1	2	1			
1650	100	102	100-106	106	23.3			



CORE TEMPERATURE LOG

Send Again Monday

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-10658

Logged By: CM-1/6 KR-1/7 Page 14 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1656	102	104	100-106	2	233			
1	104	106	1	2	1			
1-7-19 0820	106	108	106-116	2	339			
1	108	110	1	1	1			
1	110	112	1	1	1			
1	112	114	1	1	1			
1	114	116	1	1	1			
0840	116	118	116-120	2	42.6			
1	118	120	1	2	1			
0903	120	122	120-126	2	51.3			
1	122	124	1	2	1			
1	124	126	1	2	1			
0931	126	128	126-136	2	37.9			
1	128	130	1	2	1			
1	130	132	1	2	1			
1	132	134	1	2	1			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-10658

Logged By: KR

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0931	134	136	10	2'	37.9			
1027	136	137 ^{36"} 138 145	1	40.5				
	137 ^{36"} 138	139		2				
	139	141		2				
	141	143		2				
↓	143	145	↓	2	↓			
1053	145	146	145 ^{36"} 150	1	56.8			
	146	148		2				
↓	148	150	↓	2	↓			
1126	150	152	150 ^{36"} 156	2	40.0			
	152	154		2				
↓	154	156	↓	2	↓			
1207	156	158	156 ^{36"} 160	2	41.4			
	158	160		2				
	160	162		2				
↓	162	164	↓	2	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-10658

Logged By: KR

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1207	164	166	156-166	2	41.4			
1357	166	168	166-172	2	29.1			
	168	170		2				
	170	172		2				
	172	174		2				
✓	174	176	✓	2	✓			
1452	176	178	176-186	2	33.2			
	178	180						
	180	182						
	182	184		✓	✓			
✓	184	186	✓	no recovery				184-186 fell out — no recovery
1530	184	186	184-186	2	35.5			
1550	186	187	186-196	1	30.5			
	187	189		2				
	189	191		2				
✓	191	193	✓	2	✓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-10658

Logged By: KR

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1550	193	196	186-196	0				Bottom fell out, No Recovery
1615	193	194	193-196	1	33.4			Recovered, Disturbed
↓	194	196	↓	2	↓			Recovered, Disturbed
1650	196	198	196-206	2	23.1 3 _{KL}			
↓	198	200	↓	2	↓			
↓	200 202 KL	202 204 KL	↓	↓	↓			
↓	202 204 KL	204 206 KL	↓	↓	↓			
↓	204	206	↓	↓	↓			
-8-19 6820	206	209	206-216	2	25.6			
↓	208	210	↓	2	↓			
↓	210	212	↓	2	↓			
↓	212	214	↓	2	↓			
↓	214	216	↓	2	↓			
0850	216	218	216-226	2	24.0			
↓	218	220	↓	↓	↓			
↓	220	222	↓	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
↓	222	224	↓	↓	↓			
↓	224	226	↓	↓	↓			
1010	226	228	226-230	2	29.4			
↓	228	230	↓	2	↓			
1040	230	232	230-236	2	41.1			
↓	232	234	↓	↓	↓			
↓	234	236	↓	↓	↓			
1115	236	238	236-238	2'	31.0			
1140	238	240	238-241	2'	34.5			
↓	240	241	↓	1'	↓			
1435	241	242	241-246	1'	26.4			
↓	242	244	↓	2'	↓			
↓	244	246	↓	2'	↓			
1505	246	248	246-250	2'	31.5			
↓	248	250	↓	↓	↓			
↓	250	252	↓	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
↓	252	254	↓	2'	31.5			
↓	254	256	↓	↓	↓			
1605	256	258	258-266	2'	41.2			
↓	258	260	↓	↓	↓			
↓	260	262	↓	↓	↓			
↓	262	264	↓	↓	↓			
↓	264	266	↓	↓	↓			
1645	266	268	266-276	2'	58.2			
↓	268	270	↓	↓	↓			
↓	270	272	↓	↓	↓			
↓	272	274	↓	↓	↓			
↓	274	276	↓	↓	↓			
1-9-19 0825	276	278	276-286	2'	31.2			
↓	278	280	↓	↓	↓			
↓	280	282	↓	↓	↓			
↓	282	284	↓	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
↓	284	286	↓	↓	↓			
0935	286	287	286 243	1'	66.7			
↓	287	289	↓	2'	↓			
↓	289	291	↓	↓	↓			
↓	291	293	↓	↓	↓			
1025	293	294	293 296	1'	65.0			
↓	294	296	↓	2'	↓			
1335	—	—	—	—	—			failed to bring up recoverable run
1535	304	306	304 313	2'	41.6			
↓	306	308	↓	↓	↓			
↓	308	310	↓	↓	↓			
↓	310	312	↓	↓	↓			
↓	312	313	↓	1'	↓			
1620	313	315	313 319	2'	42.3			
↓	315	317	↓	2'	↓			
↓	317	319	↓	2'	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

Page 1 of 1

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1-10-19 0830	319	320	319 324	1'	34.7			
	320	322		2'				
	322	324		2'				
	324	326		2'				
0950	326	328	326 330	2'	58.1			
	328	330		1'				
	332	334		1'				
	334	336		1'				
1115	336	338	336 340	2'	36.5			
	338	340		1'				
	340	342		1'				
	342	344		1'				
	344	346		1'				
1350	346	347	346 355	1'	84.5			
	347	349		2'				
	349	351		2'				



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
	351	353	4'	2'				
	353	355	2'	2'				
1505	356	358	2'	356 366	35.3			355-356 disturbed + discarded
	358	360						
	360	362						
	362	364						
	364	366						
1-15-19 0920	366	368 376	366 376	2'	36.1			
	368	370						
	370	372						
	372	374						
	374	376						
1015	376	378	376 386	2'	38.6			
	378	380						
	380	382						
	382	384						



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

Page 13 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1	384	386	1	1	1			
1210	386	388	386 386	2'	54.0			
	388	390						
	390	392						
	392	394						
	396	396						
1400	396	398	396 400	2'	60.4			
	398	400						
	400	402						
	402	404						
	404	406						
1-16-19 0920	406	408	406 406	2'	64.0			
	408	410						
	410	412						
	412	414						
	414	416						



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1020	416	418	416-419	2'	41.3			
↓	418	419	↓	1'	↓			
1105	419	420	419-424	1'	40.5			
↓	420	422	↓	2'	↓			
↓	422	424	↓	2'	↓			
1250	424	426	424-430	2'	26.7			
↓	426	428	↓	↓	↓			
↓	428	430	↓	↓	↓			
1350	430	432	430-436	2'	37.8			
↓	432	434	↓	↓	↓			
↓	434	436	↓	↓	↓			
1440	436	438	436-440	2'	28.3			
↓	438	440	↓	↓	↓			
1520	440	442	440-446	2'	26.6			
↓	442	444	↓	↓	↓			
↓	444	446	↓	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

Page 1 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1620	446	448	446 450	2'	27.2			
↓	448	450	↓	↓	↓			
1-17-19 1250	450	452	450 456	2'	34.2			
↓	452	454	↓	↓	↓			
↓	454	456	↓	↓	↓			
1355	456	458	456 460	2'	36.6			
↓	458	460	↓	↓	↓			
1455	460	462	460 466	2'	51.8			
↓	462	464	↓	↓	↓			
↓	464	466	↓	↓	↓			
1605	466	468	—	2'	40.6			
1-18-19 0855	468	470	468 474	2'	3.9			
↓	470	472	↓	↓	↓			
↓	472	474	↓	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

Page 1 of 1

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1045	474	476	474 478	2'	21.8			
↓	476	478	↓	↓	↓			
1155	478	480	478 488	2'	27.3			
↓	480	482	↓	↓	↓			
↓	482	484	↓	↓	↓			
↓	484	486	↓	↓	↓			
↓	486	488	↓	↓	↓			
1400	488	490	488 498	2'	25.9			
↓	490	492	↓	↓	↓			
↓	492	494	↓	↓	↓			
↓	494	496	↓	↓	↓			
↓	496	498	↓	↓	↓			
1505	498	500	498 506	2'	22.1			
↓	500	502	↓	↓	↓			
↓	502	504	↓	↓	↓			
↓	504	506	↓	↓	↓			

CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:	
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Boring/Well ID:

Logged By:

Page 1 of _____[illegible]



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Cascade

Start Time/Date: 0820 10/6/18

Lead Driller: Roger Rodriguez

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: LAFB-10659

Logged By: C. Montoya

Page 1 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0831	8 to 10 cm	10 8 cm	0510	2.2	76.3		-	
0834	10	12	6-12		74.5			
0834	12	14	12-14		74.5 76.8			
0839	14	16	14-15.7	1.7	75.0			
0839	16	18	16-17.5	1.5	75.			
0839	18	20	18-19.5 18-20 cm	1.5	75.0			
0853	20	22	20-21.6 21.6	1.6	73.5			
↓	22	24	22-23.6 1.6					
↓	24	26	24-25.6 1.6					
0900	26	28	26-27.6 1.6		68.4			
↓	28	30	28-29.4 1.6					
0918	30	32	30-32 1.7		85.0			
↓	32	34	32-34 1.6					
↓	34	36	34-35.4 1.4					
	36	38	36-38 2.0		68.4			
	38	40	38-40 2.0		68.4			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: *Cascade*

Start Time/Date: *10/6/18*

Lead Driller: *Roger Rodriguez*

Completion Time/Date:

Drilling Method: *Sonic Coring*

Final Depth:

Boring/Well ID: *KAFB-10659*

Logged By: *C. Montoya*

Page *12* of *12*

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1040	40	42	40-46	2	66.9			
	42	44		2				
	44	46		2				
1046	46	48	46-48	2	69.4			
	48	50		2	69.4			
1105	50	52	50-56	2	74.4			
	52	54		2				
	54	56		1.5				
1113	56	58	56-60	2	69.1			
1113	58	60	56-60	2				
1129	60	62	60-66	2	69.3			
	62	64		2				
	64	66		2				
1138	66	68	66-70	2	68.8			
	68	70		2				
1258	70	72	70-76	2	68.6			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Cascade

Start Time/Date: 8:00 10/6/18

Lead Driller: Roger Rodriguez

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-10659

Logged By: G. McIntyre

Page 3 of 3

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1258	72	74	70-76	2	68.6			
1	74	76	70-76	2	68.6			
1306	76	78	76-80	2	67.4			
1	78	80	76-80	2	67.4			
1327	80	82	80-82	2	69.1			
1	82	84		2				
1	84	86		2				
1339	86	88	86-90	2	69.8			
1	88	90	86-90	2	69.8			
1405	90	92	90-98	2	69.5			
1	92	94		2				
1	94	98		2				
1417	96	98	96-100	2	77.5			
1417	98	100	96-100	2	77.5			
1446	100	102	100-106	2	99.6			
1446	102	104	100-106	2	99.6			talked to driller, driller proposed adding water to cool core.

EA CORE TEMPERATURE LOG

Project: Kirtland BFF	Project Number: 62735DM02.1017
Drilling Company: Cascade	Start Time/Date: 8/10/18
Lead Driller: Roger Rodriguez	Completion Time/Date:
Drilling Method: Sonic Coring	Final Depth:
Boring/Well ID: 1CAF3-10659	Logged By: C. Montoya Page 14 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1446	104	106	100-106	2	99.6			
1503	106	108	106-110	2	70.3			Added 1/2 gal of water
1	108	109.5	106-110	1.5	70.3			
1538	110	112	110-116	2	98.9			
1	112	114	1	2	1			
1	114	116	1	2	1			Added 1 Gal of water
1552	116	118	116-120	2	71.2			
1	118	120	116-120	2	71.2			Added 1 Gal of water
1627	120	122	120-126	2	72.8			
1	122	124	1	2	1			
1	124	126	1	2	1			
10/7/18	0801	126	126-130	2	69.6			
12/7/18	1	128	126-130	2	1			
0832	130	132	130-136	2	78.3			
1	132	134	1	2	1			
1	134	136	1	2	1			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: LAFB-10659

Logged By: C. Montoya

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10/7/18

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0850	136	138	136-140	2	76.8			
I	138	140	136-140	2	I			
0929	140	142	140-144	2	74.1			Added 2 Gal of Water to cool core
I	142	144	I	2	74.1			
0945	144	146	144-150	2	78.6			Added 1 Gal of Water to cool core
I	146	148	I	2	I			
I	148	150	I	2	I			
1029	150	152	150-156	2	71.0			
I	152	154	I	2	I			
I	154	156	I	2	I			
1043	156	158	156-160	2	78.8			Added 2 Gal of Water
I	158	160	I	2	I			
1136	160	162	160-164	2	72.1			Added 1 Gal of Water
I	162	164	I	2	I			
1153	164	166	164-170	2	77.0			Added 1 Gal of Water
I	166	168	I	2	I			
I	168	170	I	2	I			



CORE TEMPERATURE LOG

10/7/18

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: CAEB-10659

Logged By: C. Montoya

Page 1 of 1

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1320	170	172	170-176	2	66.7			
1320	172	174	174	2				
1320	174	176		2				
1340	176	178	176-180	2	74.8			
1	178	180		2				
1404	180	182	180-184	2	73.7			Added 1 Gal of Water
1	182	184		2				
1508	184	186	184-190	2	173.0			Lost Sample, Driller Attempted Second go to recover sample w/ Agar Bit. Disturbed core was successfully recovered
1	186	188		2				
1	188	190		2				
1600	190	192	190-194	2	120.7			
1	192	194		2				
1	194	196		2				
1655	196	198	198-200	2	81.4			Added 1 Gal of Water
1	198	200		2				
10/8/18 0958	200	202	200-206	2	98.0			
1	202	204		2	98.0			

10/8/18

CORE TEMPERATURE LOG								
Project: Kirtland BFF						Project Number: 62735DM02.1017		
Boring/Well ID: LA FB-10659						Logged By: C. Mantap		Page 7 of 7
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0958	204	206	200-206	2	98.0			
1023	206	208	200-210	2	80.4 ^{cm}			Added 1 Gal of Water
1058	208	210	206-210	2	↓			
1110	210	212	210-216	2	78.6			Added 1 Gal of Water
1125	212	214	↓	2	↓			
1140	214	216	↓	2	↓			
1225	216	218	216-220	2	181.3			4th Core Run was lost, During Return Trip to Surface. Driller will retrieve Disturbed Core with Auger Bits. Disturbed core successfully retrieved
1240	218	220	↓	2	↓			
1546	220	222	220-226	2	103.1			6th Core Run was lost During Return Trip to Surface. Driller recovered Disturbed Core
1610	222	224	↓	2	↓			
1625	224	226	↓	2	↓			
1640	226	228	226-230	2	94.6			
1655	228	230	↓	2	94.6 ^{cm}			
1709	230	232	230-232	2	197.6 ^{cm}			
0848	232	234	232-236	2	75.5			Added One Bag of ICE, ICE bridged in Drill Stem and did not make it to Depth
0924	234	236	↓	2	↓			
0924	236	238	236-240	2	66.6			Add 1 Gal of ICE WATER

10/9/18

EA		CORE TEMPERATURE LOG						
Project: Kirtland BFF					Project Number: 62735DM02.1017			
Boring/Well ID: LAFB-10659					Logged By: C. Montoya		Page 1 of 1	
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0920	238	240	2	236-240	66.6			
1011	240	242	2	240-246	78.6			Added 1 Gallon of ICE Water
	242	244	2					
	244	246	2					
1038	246	248	2	246-249	70.4			Added 1 Gallon of ICE Water
	248	249	1	246-249				Drill Chatter @ 250
								3ft Run done due to resistant material down Hole Driller didn't want to Break a Drill Rod
1152	249	250	1	249-250	72.9			First Dry ICE Run, Core Barrel Temp going up @ 29°F
	250	252	2					
	254	256	2					
1227	256	258	1	256-261	84.2			Added 1 Gal of ICE Water
	258	260	2					
	260	261	1					
1500	261	262	1	261-266	81.1			
	262	264	2					
	264	266	2					
1532	266	268	2	266-270	76.6			
	268	270	2					

10/9/18

E.A.			CORE TEMPERATURE LOG					
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Boring/Well ID: KAFB-10659				Logged By: C. Montoya		Page 19 of		
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1443	270	272	270-276	2	76.5			Added 11 Gal of ICE WATER (12) cm
	272	274		2				
	274	276		2				
0858	276	278	276-286	2	95.8			Added 2 Gallon of water. Core Barrel was set on ICE over night Driller will attempt 10ft run. Core Barrel Temp 45°F
	278	280		2	100.2			
	280	282		2	83.9			
	282	284		2	93.9			
	284	286		2	110.4			
0937	286	288	286-288	2	83.4			
1008	288	290	288-296	2	68.4			Added 1 Gallon of ICE Water, Dry ICE is in use Core Barrel Temp -25°F
	290	292		2	67.6			
	292	294		2	67.6			
	294	296		2	74.0			
1134	296	298	296-306	2	76.1			Core Barrel Temp 1.6°F Added 2 Gal of water
	298	300		2	72.8			
	300	302		2	73.2			
	302	304		2	70.7			

10/12/08

CORE TEMPERATURE LOG								
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Boring/Well ID: CAPB-10699				Logged By: C. Montoya				
				Page 10 of 10				
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1154	304	306 308 CN	246- 248 246	2	108.3			
1347	306	308	306- 310	2	84.5			Added 1 Gal of water
1	308	310	1	2	75.6			
1415	310	312	310- 316	2	86.7 85.5			Core Barrel Temp = 6.8F
1	312	314	1	2	81.5 80.6			
1	314	316	1	2	86.7			Low
1528	316	318	316- 324	2	68.7			Core Barrel Temp: 84F
1	318	320	1	2	78.6			
1	320	322	1	2	74.7			
1	322	324	1	2	104.5			
1609	324	326	324- 326	2	103.7			Added 1 Gallon of water
1653	326	328	326- 330	2	73.9			
1	328	330	1	2	77.2			
1726	330	332	330- 336	2	77.8			
1	332	334	1	1	81.0			lost one foot of core
1	334	336	1	2	83.2			
1847	336	338	336- 340	2	81.7 70.8			

10/11/18

10/11/18

CORE TEMPERATURE LOG								
Project: Kirtland BFF					Project Number: 62735DM02.1017			
Boring/Well ID: KAFB-10659					Logged By: C. Montoya		Page 11 of 11	
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0847	338	340	336-340	2	70.8			
0918	340	342	340-346	2	70.8			Core Barrel Temp: 36.2 F
1	342	344	1	2	75.7			
1	344	346	1	2	89.0			
1144	346	348	346-356	2	106.3			Core Barrel Temp: 57.5 F, Added 3.5 Gal core water. Driller had difficulties pulling core barrel out of hole.
	348	350	1	2	108.0			
	350	352	1	2	88.8			
	352	354	1	2	86.0			
1	354	356	1	2	98.5			
1155	356	358	356-360	2	74.7			
1	358	360	1	2	84.8			
1229	360	362	360-366	2	70.5			
1	362	364	1	2	72.4			
1	364	366	1	2	83.1			
1340	366	368	366-370	2	82.9			Core Barrel Temp: 40.1 F, Added 1 Gal of water
1	368	370	1	2	88.7			
1416	370	372	370-372	2	76.9			Core Barrel Temp: 40 F, Added 1 Gal of water



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAFB-10659

Logged By: C. Montoya

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1414	372	374	372-376	2	77.1			
1	374	376	376-380	2	91.2			
1540	376	378	376-380	2	90.2			Core Bit Temp: 46°F, Added 1 Gallon of water
1	378	380		2	89.1			
1	380	382		2	80.3			
1	382	384		2	95.3			
1	384	386		2	126.7			
10/16/18 0840	386	388	386-390	2	21.9			All Temps in °C
1	388	390		2	27.52			
0916	390	392	390-396	2	26.3			Core Barrell Temp: -31
1	392	394		2	28.7			
1	394	396		2	31.42			
1010	396	398	396-400	2	40.62			
1	398	400		2	49.52			
1045	400	402	400-406	2				Core Bit Temp: -13°C Added 2 Gall of water
1	402	404		2	22.9			
1	404	406		2	26.5			

10/16/18



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID:

Logged By:

Page 13 of

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1128	406	408	406-410	2	33.2C			
1	408	410	1	2	33.4C			
1238	410	412	410-416	2	22.9			
1	412	414	1	2	28.8			
1	414	416	1	1.5	28.2			
1400	416	418	416-418	2	40.2C			Spoke to Driller about High Temps during cleaning runs Driller will no longer bring up core during clean out runs to try to control Temp
1455	418	420	418-428	2	28.7C			Core Bit Temp: -8.1 C Added 1 bbl of water.
	420	422		2	25.2C			
	422	424		2	27.9			
	424	426		2	49.0			
	426	428		2				Core Bit Temp: -3.1 C
1617	426	428	426-436	2	29.3C			
	428	430			32.7C			
	430	432			36.1C			
	432	434			48.1C			
	434	436			35.1C			
10/17/18	436	438	436-440		23.5			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAPB-10659

Logged By: C. Montoya

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0845	438	440	436-440 2	2	34.2			
0915	440	442	438-440 2	2	35.8			Core Bit Temp: -35 C
	442	444	446 2	2	31.9			
	444	446	446 2	2	36.0			
1040	446	448	446-451 2	2	21.2			Core Bit Temp: -51
	448	450		2	26.8			
	450	451		1	28.6			
1125	451	453	451-456 2	2	26.2			Core Bit Temp: -6.1 C
	453	455		2	26.7			
	455	456		1	36.9			
1345	456	458	456-461 2	2	24.3			Core Bit Temp: -7.0 C
	458	460		2	25.1			
	460	461		1	27.4			
1417	461	463	461-465 2	2	27.6			
	463	465		2	25.4			
	465	466		1	26.5			
1632	466	468	466-471 2	2	23.2			Added 1 gal of water



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAFB-10659

Logged By: C. Montoya

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1632	467	470	466-471	2	22.70			
1	470	471	1	1	23.70			
1710	471	473	471-476	2	21.30			
1	473	475	1	2	21.20			
1	475	476	1	1	22.00			
10/18/18	1647	476	478-482	2	22.70			
1	478	480	1	2	22.10			
1	480	482	1	2	34.40			
1739	482	484	482-484	2	40.60			
1	484	486	1	2	25.80			
10/19/18	1	486	487-488	1.5	25.2			
1429	488	490	1	2	33.6			
1	490	491	1	0.5	29.8			
								Added 2 Cyl of water, could not advance casing any further, Arch rig will put casing down to 490' bgs.
10/30/18	1510	491	493	20.1				Driller having difficulties retrieving core, Core has fallen back into the hole during return trip to surface. Driller will attempt to retrieve core using a 20ft core barrel and a "Flapper" Bit.
1	493	495	1	20.1				
1	495.5	501	1	20.2				Driller attempted a 20ft run but only recovered 17ft. (491'-502' recovered) Due to Flaring Sands

Project Number: 62735DM02.1017

Logged By: C. Montoya

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CORE TEMPERATURE LOG								
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Drilling Company: <i>Cascade</i>				Start Time/Date: <i>12-16-18 / 0749</i>				
Lead Driller: <i>Roger Rodriguez</i>				Completion Time/Date:				
Drilling Method: Sonic Coring				Final Depth:				
Boring/Well ID: <i>KAPB-106V1</i>				Logged By: <i>C. Landers</i> Page <u>1</u> of <u>9</u>				
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
756	8	10	<i>8-16</i>	2	24.5			
	10	12	<i>8'</i>	2				
	12	14		2				
↓	14	16	↓	2	↓			
0800	16	18	<i>16-22</i>	2	24.9			
	18	20	<i>6'</i>	2				
	20	22		2				
0836	22	24	<i>22-24</i>	2	24.9			
↓	24	26	<i>24'</i>	2	↓			
0842	26	28	<i>26-32</i>	2	22.1			
	28	30	<i>6'</i>	2				
	30	32		2				
0855	32	34	<i>32-36</i>	2	22.7			
	34	36		2				
0902	36	38	<i>36-42</i>	2	21.6			
	38	40	<i>9'</i>	2				



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Cascade

Start Time/Date: 12-16-18

Lead Driller: Roger Rodriguez

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-106V1

Logged By: C. Landers
J. Messenger
L. Andrews

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0902	40	42	36-42 6'	2	21.6			
0912	42	44	42-46 4'	2	22.7			
1	44	46	4	2	1			
0929	46	48	46-52 6'	2	21.9			
1	48	50	1	2	1			
1	50	52	1	2	1			
0942	52	54	52-56 4'	2	22.6			
1	54	56	1	2	1			
0951	56	58	56-58 2'	2	22.1			
1	58	60	6'	2	1			
1	60	62	1	2	1			
1102	62	64	62-66 4'	2	21.4			
1	64	66	1	2	1			
1113	66	68	66-72 6'	2	22.5			
1	68	70	1	2	1			
1	70	72	6'	2	1			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date: 12/18/18

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

KAFB-106A1

Logged By: Lane Anlaess

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1138	72	74	72-74 1'	2	24.3			
	74	76	4' 1'	2	↓			
1148	76	78	76-82 6'	2	22.5			
↓	78	80	1' 6'	2	↓			
↓	80	82	1' 2'	2	↓			
1350	82	84	84-86 2'	2	23.1			
↓	84	86	4' 2'	2	↓			
1405	86	88	86-92 6'	2	22.2			
↓	88	90	↓	2	↓			
↓	90	92	↓	2	↓			
1419	92	94	92-96 4'	2	22.4			
↓	94	96	1' 2'	2	↓			
1430	96	98	96-102 6'	2	23.2			
↓	98	100	↓	2	↓			
↓	100	102	↓	2	↓			
1445	102	104	102-108 6'	2	20.8			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date: 12/16/18

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KATB-106.V1

Logged By: Lane Andress

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Curtis Landers

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1445	104	106	102-106 4'	2	30.8			
1530	106	107 108	106- 115	1	35.5			
1	107 108	109 110	1	2	1			
1	109 110	111 112	9'	2	1			
1	111 112	113 114	1	2	1			
1	113 114	115 116	1	2	1			
1548	115	116	115- 120	1	30.7			
1	116	118	5'	2	31.1			
1	118	120	1	2	28.7			
12/17/18 0846	120	122	120- 126	2	29.3			on 12-16/18: added ~2.5 gallon of water added ~2.5 gallons water core barrel is stuck @ 115 pushing casing then pulling out - unstuck 12/16/18
1	122	124	6'	2	1			
1	124	126	1	2	1			
0910	126	128	128- 130	2	28.8			
1	128	130	4'	2	1			
0926	130	132	130- 134	2	25.1			
1	132	134	6'	2	1			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date: 12/16/18

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-106 VI

Logged By: Lure Address Page 45 of 9

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0926	134	136	134-136 6' 1	2	25.1			
0956	136	138	136-140 4' 1	2	26.5			
1	138	140	4' 1	2				
1009	140	142	142-146 4' 1	2				
1	142	144	6' 1	2	31.1			
1	144	146	1	2				
1547	146	148	1	2				
	148	150	4' 1	2	27.2			
	150	152	1	2				
1606	152	154	6' 1	2	24.9			
	154	156	1	2				
1633	156	158	1	2	29.4			
	158	160	1	2	29.6			
1655	160	162	1	2	32.3			
	162	164	6' 1	2				
	164	166	1	2				



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

KFB-106 V1

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
2/18/18 0900	166	168	2'	16'-170	29.4			
+	168	170	2'	↓	↓			
SM 0950	176	178	2	176-178	36.1			
↓	178	180	2	4'	↓			
1008	180	182	2	180-186	37.4			
↓	182	184	2	6'	↓			
↓	184	186	2	↓	↓			
1116	186	188	2'	186-196	37.6			
↓	188	190	↓	↓	↓			
↓	190	192	↓	↓	↓			
↓	192	194	↓	↓	↓			
↓	194	196	↓	↓	↓			
1150	196	198	2	196-198	35.4			
↓	198	200	2	4'	↓			
1320	200	202	2	200-204	27.2			
↓	202	204	2	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

KAFB-106VI

Logged By: *Low Andress*
Joshua Messenger

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1402	204	206	2'	204	30.4			
↓	206	208	2'	↓	↓			
↓	208	210	2'	↓	↓			
1455	210	211	1'	210-215	28.4			
↓	211	213	2'	5'	↓			
↓	213	215	2'	↓	↓			
1519	215	216	2'	215-220	27.3			
↓	216	218	2'	5'	↓			
↓	218	220	2'	↓	↓			
1602	220	222	2'	220-222	26.1			
1426	222	224	2'	222-225	30.5			
↓	224	226	2'	↓	↓			
↓	226	228	2'	8'	↓			
↓	228	230	2'	↓	↓			
0800	230	232	2'	4'	31.4			
↓	232	234	2'	↓	↓			



Project Number: 62735DM02.1017

Start Time/Date:

Completion Time/Date:

Final Depth:

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0845	234	238	234-240	2'	25.7			
↓	236	238	↓	2'	↓			
↓	238	240	↓	2'	↓			
0920	240	242	2' 240-245	2'	32.7			
↓	242	244	2'	↓	↓			
↓	244	245	1'	↓	↓			
0945	245	246	1' 245-	↓	↓			
↓	246	248	2' 250	30.4	↓			
↓	248	250	2'	↓	↓			
1035	250	252	2' 250-255	24.0	↓			
↓	252	254	2'	↓	↓			
↓	254	255	1'	↓	↓			
1120	255	256	1' 255-260	24.3	↓			
↓	256	258	2'	↓	↓			
↓	258	260	2'	↓	↓			

Project Number: 62735DM02.1017

Start Time/Date:

Completion Time/Date:

Final Depth:

Logged By:

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CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: *Cascade*

Start Time/Date:

12/12/18

Lead Driller: *Roger Rodriguez*

Completion Time/Date:

Drilling Method: *Sonic Coring*

Final Depth:

Boring/Well ID: *KAFB-126V2*

Logged By: *C. Montoya*

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of 10

J. Messenger

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
<i>0849</i>	<i>10</i>	<i>12</i>	<i>2</i>	<i>10-16</i>	<i>23.0</i>			
<i>↓</i>	<i>12</i>	<i>14</i>	<i>2</i>	<i>↓</i>	<i>↓</i>			
<i>↓</i>	<i>14</i>	<i>16</i>	<i>2</i>	<i>↓</i>	<i>↓</i>			
<i>0855</i>	<i>16</i>	<i>18</i>	<i>2</i>	<i>16-21</i>	<i>24.5</i>			
<i>↓</i>	<i>18</i>	<i>20</i>	<i>2</i>	<i>↓</i>	<i>↓</i>			
<i>↓</i>	<i>20</i>	<i>21</i>	<i>1</i>	<i>↓</i>	<i>↓</i>			
<i>0916</i>	<i>21</i>	<i>22</i>	<i>1</i>	<i>21-26</i>	<i>24.1</i>			
<i>↓</i>	<i>22</i>	<i>24</i>	<i>2</i>	<i>↓</i>	<i>↓</i>			
<i>↓</i>	<i>24</i>	<i>26</i>	<i>2</i>	<i>↓</i>	<i>↓</i>			
<i>0923</i>	<i>26</i>	<i>28</i>	<i>2</i>	<i>26-31</i>	<i>24.3</i>			
<i>↓</i>	<i>28</i>	<i>30</i>	<i>2</i>	<i>↓</i>	<i>↓</i>			
<i>↓</i>	<i>30</i>	<i>31</i>	<i>1</i>	<i>↓</i>	<i>↓</i>			
<i>0939</i>	<i>31</i>	<i>32</i>	<i>1</i>	<i>31-36</i>	<i>24.4</i>			
<i>↓</i>	<i>32</i>	<i>34</i>	<i>2</i>	<i>↓</i>	<i>↓</i>			
<i>↓</i>	<i>34</i>	<i>36</i>	<i>2</i>	<i>↓</i>	<i>↓</i>			
<i>0950</i>	<i>36</i>	<i>38</i>	<i>2</i>	<i>36-41</i>	<i>24.4</i>			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Boring/Well ID: KAPB-10682

Logged By:

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0950	38	40	2	36-41	27.4			
└	40	41	1	└	└			
1005	41	42	1	41-46	24.4			
└	42	44	2	└	└			
└	44	46	2	└	└			
1017	46	48	2	46-51	24.7			
└	48	50	2	└	└			
└	50	51	1	└	└			
1040	51	52	1	51-56	23.4			
└	52	54	2	└	└			
└	54	56	2	└	└			
1049	56	58	2	56-61	25.0			
└	58	60	2	└	└			
└	60	61	1	└	└			
1110	61	62	1	61-66	25.1			
└	62	64	2	└	└			
└	64	66	2	└	└			

CORE TEMPERATURE LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Boring/Well ID: <u>CAPB-106V2</u>					Logged By:		Page <u>13</u> of <u>10</u>		
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments	
1120	66	68	2	66-71	23.2				
↓	68	70	2	↓	↓				
↓	70	71	1	↓	↓				
1140	71	72	1	71-76	24.4				
↓	72	74	2	↓	↓				
↓	74	76	2	↓	↓				
1153	76	78	2	76-81	28.9				
↓	78	80	2	↓	↓				
↓	80	81	1	↓	↓				
1413	81	82	1	81-86	22.6				
↓	82	84	2	↓	↓				
↓	84	86	2	↓	↓				
1430	86	88	2	86-91	25.4			Driller, lost Bottom 3ft down hole, will attempt to recover disturbed core	
1448	88	90	2	88-91	67.9			Driller successfully recovered disturbed core. High temps are due to core being retrieved several times	
↓	90	91	1	↓	↓				
1500	91	92	1	91-96	24.7			Added one gal of water	
↓	92	94	2	↓	↓				



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-106V2

Logged By: C. Montoya

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1500	94	96	2	91-96	24.7			
1541	96	98	2	96-100	59.9			Core lost Down hole several times, High Temps expected, Disturbed core
1	98	100	-	-	-	-	-	No Recovery
1600	100	102	2	100-105	48.5 57.2			
1	102	104	2	1	38.8			
1	104	105	1	1	48.5 57.2			
1640	105	106	1	1	37.8			
1	106	108	2	1	1			
1	108	110	2	1	1			
12/13/19 0808	110	112	2	110-115	25.7			
1	112	114	2	1	1			
1	114	115	1	1	1			
0820	115	116	1	115-120	25.4			
1	116	118	2	1	1			
1	118	120	2	1	1			
0853	120	122	2	120-126	29.0			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-106VA

Logged By: Carlos Montoya Page 15 of 10

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0853	122	124	2	120-126				
↓	124	126	2	↓				
0910	126	128	2	126-130	25.7			
↓	128	130	2	↓	↓			
0936	130	132	2	130-136	27.7			
↓	132	134	2	↓	↓			
↓	134	136	2	↓	↓			
0959	136	138	2	136-140	30.3			
↓	138	140	2	↓	↓			
1010	140	142	2	140-146	29.5			
↓	142	144	2	↓	↓			
↓	144	146	2	↓	↓			
1045	146	148	2	146-150	31.1			
↓	148	150	2	↓	↓			
1100	150	152	2	150-156	27.4			
↓	152	154	2	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-106V2

Logged By: Carlos Montoya Page 16 of 10

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1100	154	156	2	150-152	27.4			
1122	156	158	2	156-158	26.2			
1140	158	160	2	158-163	20.8			
1	160	162	2		23.9			
1	162	163	1		25.4			
1210	163	164	1	163-170	30.9			
1	164	166	2					
1	166	168	2					
1	168	170	2					
1355	170	172	2	170-176	25.9			
1	172	174	2					
1	174	176	2					
1421	176	178	2	176-180	28.1			
1	178	180	2		26.2			
1439	180	182	2	180-186	27.4			
1	182	184	2					



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-106V2

Logged By: Carlos Montoya / Lane Andrews Page 17 of 10

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1439	184	186	2	180-186	27.4			
1535	186	187	2	186-187	24.1			
1	187	189	2	1	1			187-190' disturbed - fell at of core barrel 12-13-18
1559	189	190	1	189-190	28.8			189-191' disturbed - fell at core barrel
1	190	192	2	1	1			
1	192	194	2	1	1			
1	194	196	2	1	1			
1625	196	198	2	196-198	30.2			
12-14-18 0800	198	200	2	198-200	32.8			
1	200	202	2	1	1			
1	202	204	2	1	1			
1	204	206	2	1	1			
0900	206	208	2	206-208	24.3			
1	208	210	2	1	1			
1	210	212	2	1	1			
0932	212	214	2	212-214	25.6			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-106V2

Logged By: Lane Address

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0932	214	215	1	212-215	25.6			
0953	215	216	1	215-220	31.2			
↓	216	218	2	↓	23.3			
↓	218	220	2	↓	22.0			
1040	220	222	2	220-224	34.5			
↓	222	224	2	↓	↓			
↓	224	226	2	↓	↓			
				226-236				
1144	226	228	↑	2	32.2			
↓	228	230	810'	2	↑			
↓	230	232	↓	2	↓			
↓	232	234	↓	2	32.2			
↓	234	236	↓	2				
1330	236	238	2	236-246	42.9			
↓	238	240	2	↓	↓			
↓	240	242	2	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAP13106V2

Logged By: L.A.

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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
↓	242	244	2	236-246	↓			
↓	244	246	2	↓	↓			
↑	246	248	↑	2'	↑			
1408	248	250	4'	2'	27.5			
↓	250	252	↓	2'	↓			
1420	252	254	6'	2'	28.5			
↓	254	256	↓	2'	↓			
1456	256	258	256-260	2'	26.0			
↓	258	260	4'	2'	↓			
1521	260	262	260-266	2'	23.4			
↓	262	264	6'	2'	↓			
↓	264	266	↓	2'	↓			
1547	266	268	266-270	2'	25.5			
↓	268	270	↓	2'	↓			
1613	270	272	270-275	2'	23.9			
↓	272	274	5'	2'	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

KA+B-106V2

Logged By: Lane Address

Page 10 of 10

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1613	274	275	270-275 5'	1	23.9			
12-15-18 0808	275	276	275-280 5'	1'	28.4			
	276	278	5'	2'				
	278	280	1	2'				
0839	280	281	280-281 1'	1'	36.5			
0908	281	283	281-287 6'	2'	34.3			
	283	285	6'	2'	23.7			
	285	287	1	2'	22.9			
TD = 287'								
								

Project Number: 62735DM02.1017

Cascade

Start Time/Date:

Cascade
Roger Rodriguez

Completion Time/Date:

Final Depth:	
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KAFB-106247

Logged By: J.M., C.L.

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1-30-19
~~1-29-19~~ SM



CORE TEMPERATURE LOG

Project: Kirdland BFF

Project Number: 6273SDM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-106247

Logged By: CM / CPL

Page 2 of 18

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0920	36	38	36-46	2	26.7			
	38	40	10'					
	40	42						
	42	44						
↓	44	46	↓	↓	↓			
1003	46	48	46-56	2	19.9			
	48	50	10'					
	50	52						
	52	54						
↓	54	56	↓	↓	↓			
1020	56	58	56-66	2	21.5			
	58	60	10'					
	60	62						
	62	64						
↓	64	66	↓	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

KAFB-106247

Logged By: CRL

Page 3 of 18

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1035	66	68	66-76	2	22.4			
	68	70	10					
	70	72						
	72	74						
↓	76	76	↓	↓	↓			
1105	76	78	76-86	2	32.2			
	78	80	10'					
	80	82						
	82	84						
↓	84	86	↓	↓	↓			
1125	86	88	86-96	2	34.5			
	88	90	10'					
	90	92						
	92	94						
↓	94	96	↓	↓	↓			

CORE TEMPERATURE LOG								
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Drilling Company:				Start Time/Date:				
Lead Driller:				Completion Time/Date:				
Drilling Method: Sonic Coring				Final Depth:				
Boring/Well ID: KAFB-106247				Logged By: CRL				
Page 4 of 18								
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1148	96	98	96-104	2	38.7			
	98	100	8					
	100	102						
↓	102	104	↓	↓	↓			
1210	104	106	104-116	2	38.5			
	106	108	12'					
	108	110						
	110	112						
	112	114						
↓	114	116	↓	↓	↓			
1323	116	118	116-118	2	24.9			
1355	118	120	118-124	2	27.2			
	120	122	6'					
↓	122	124	↓	↓	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: **KAFB-106247**

Logged By: **CRL**

Page **5** of **18**

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1412	124	126	124-130	2	24.6			
↓	126	128	6'	↓	↓			
↓	128	130	↓	↓	↓			
1435	130	132	130-136	2	34.8			
↓	132	134	6	↓	↓			
↓	134	136	↓	↓	↓			
1455	136	138	136-142	2	32.9			
↓	138	140	6	↓	↓			
↓	140	142	↓	↓	↓			
1540	142	144	142-146	2	28.7			
↓	144	146	4	↓	↓			
1600	146	148	146-152	2	35.6			
↓	148	150	6'	↓	↓			
↓	150	152	↓	↓	↓			
1618	152	154	152-154	2	29.1			
↓	154	156	↓	↓	↓			

CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID: KAFB-106247

Logged By: CCL / JM

Page 6 of 18

[illegible]

 CORE TEMPERATURE LOG								
Project: Kirtland BFF				Project Number: 62735DM02.1017				
Drilling Company:				Start Time/Date:				
Lead Driller:				Completion Time/Date:				
Drilling Method: Sonic Coring				Final Depth:				
Boring/Well ID: KAFB-106247				Logged By: J.M.		Page 7 of 18		
Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1035	186	188	186-190	2'	28.5			
	188	190						
	190	192						
	192	194						
	194	196						
1110	196	198	196-206	2'	27.7			
	198	200						
	200	202						
	202	204						
	204	206						
1345	206	208	206-213	2'	23.5			
	208	210		2'				
	210	212		2'				
	212	213		1'				
1600	213	214	213-214	1'	19.6			
1625	214	216	214-216	2'				



Project Number: 62735DM02.1017

Start Time/Date:	
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Completion Time/Date:

Final Depth:	
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Logged By:

Page 9 of 18

[illegible]



Project Number: 62735DM02.1017

Start Time/Date:	
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Completion Time/Date:

Final Depth:

Logged By:

Page 2 of 18

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0940	246	248	246-256	2'	34.5			
	248	250						
	250	252						
	252	254						
	254	256						
1025	256	258	256-266	2'	44.6			
	258	260						
	260	262						
	262	264						
	264	266						
1145	266	268	266-276	2'	35.8			
	268	270						
	270	272						
	272	274						
	274	276						



Project Number: 62735DM02.1017

Start Time/Date:

Completion Time/Date:

Final Depth:	
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Logged By:

Page 10 of 18

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1410	276	278	276- 2	2'	30.4			
	278	280						
	280	282						
	282	284						
	284	286						
1500	286	288	286- 294	2'	46.4			
	288	290						
	290	292						
	292	294						
1555	294	296	294- 300	2'	46.9			
	296	298						
	298	300						
	300	302						
	302	304						
	304	306						



Project Number: 62735DM02.1017

Start Time/Date:

Completion Time/Date:

Final Depth:

Logged By:	
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Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0865	306	308	306 316	2'	53.0			
	308	310						
	310	312						
	312	314						
	314	316						
0850	316	318	316 326	2'	53.1			
	318	320						
	320	322						
	322	324						
	324	326						
1010	326	328	326 336	2'	36.1			
	328	330						
	330	332						
	332	334						
	334	336						

CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: **Sonic Coring**

Final Depth:

Boring/Well ID:

Logged By:

Page 12 of 18[illegible]

CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: **Sonic Coring**

Final Depth:

Boring/Well ID:

Logged By:

Page 13 of 18

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1535	366	368	366 376	2'	40.1			
	368	370						
	370	372						
	372	374						
	374	376						
1640	376	378	376 386	2'	38.5			
	378	380						
	380	382						
	382	384						
	384	386						
1720	386	388	386 396	2'	36.3			
	388	390						
	390	392						
	392	394						
	394	396						



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

Page 14 of 18

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
2-3-19 0830	396	398	396-406	2'	48.3			
	398	400						
	400	402						
	402	404						
	404	406						
0925	406	408	406-416	2'	41.1			
	408	410						
	410	412						
	412	414						
	414	416						
1425	416	418	416-420	2'	51.2			416-418 NO RECOVERY
	418	420						418-426 highly disturbed
	420	422						
	422	424						
	424	426						
	426	428						



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

Page 15 of 18

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1425	428	430	426-430	2'	51.2			
1550	430	431	430-435	1'	65.3			430-433' highly disturbed
↓	431	433	↓	2'	↓			
↓	433	435	↓	2'	↓			
2-4-19 0810	435	437	435-441	2'	21.2			
↓	437	439	↓	↓	↓			
↓	439	441	↓	↓	↓			
0905	441	442	441-450	1'	31.2			
↓	442	444	↓	2'	↓			
↓	444	446	↓	2'	↓			
↓	446	448	↓	2'	↓			
↓	448	450	↓	2'	↓			
1005	450	452	450-453	2'	55.5			
↓	452	453	↓	1'	↓			
1125	453	454	453-456	1'	46.3			
↓	454	456	↓	2'	↓			



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

Page 16 of 18

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
1320	456	458	456-466	2'	34.9			
	458	460						
	460	462						
	462	464						
	464	466						
1430	466	468	466-470	2'	44.7			
	468	470						
1540	470	472	470-476	2'	27.4			
	472	474						
	474	476						
0840	476	478	476-486	2'	42.5			
	478	480						
	480	482						
	482	484						
	484	486						



CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: Sonic Coring

Final Depth:

Boring/Well ID:

Logged By:

Page 17 of 18

Time	Interval top (ft bgs)	Interval bottom (ft bgs)	Core run (ft bgs)	Core recovery (ft/ft)	Temperature (°C)	Penetration Rate (ft/min)	Water injection rate (gpm)	Comments
0935	486	488	486-496	2'	34.7			
	488	490						
	490	492						
	492	494						
	494	496						
	496	498	496-500	2'				
	498	500						
	500	502						
	502	504						
	504	506						
1030	496	498	496-500	2'	34.3			
	498	500						
1150	500	501	2' 34.4					
	501	502						
	504	506						
	506	508						

see next page

CORE TEMPERATURE LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method: **Sonic Coring**

Final Depth:	
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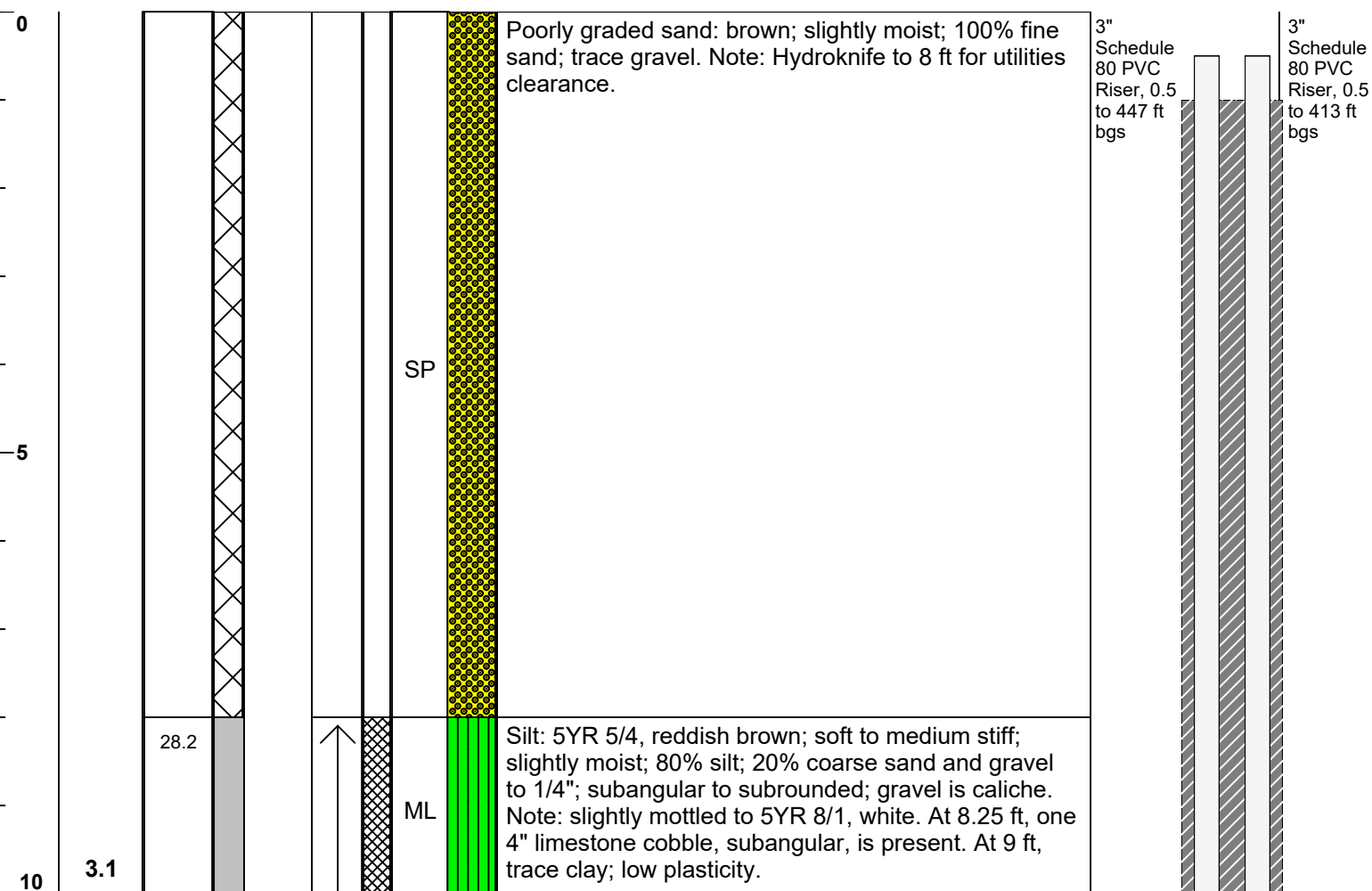
Boring/Well ID:

Logged By:

Page 18 of 18[illegible]

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

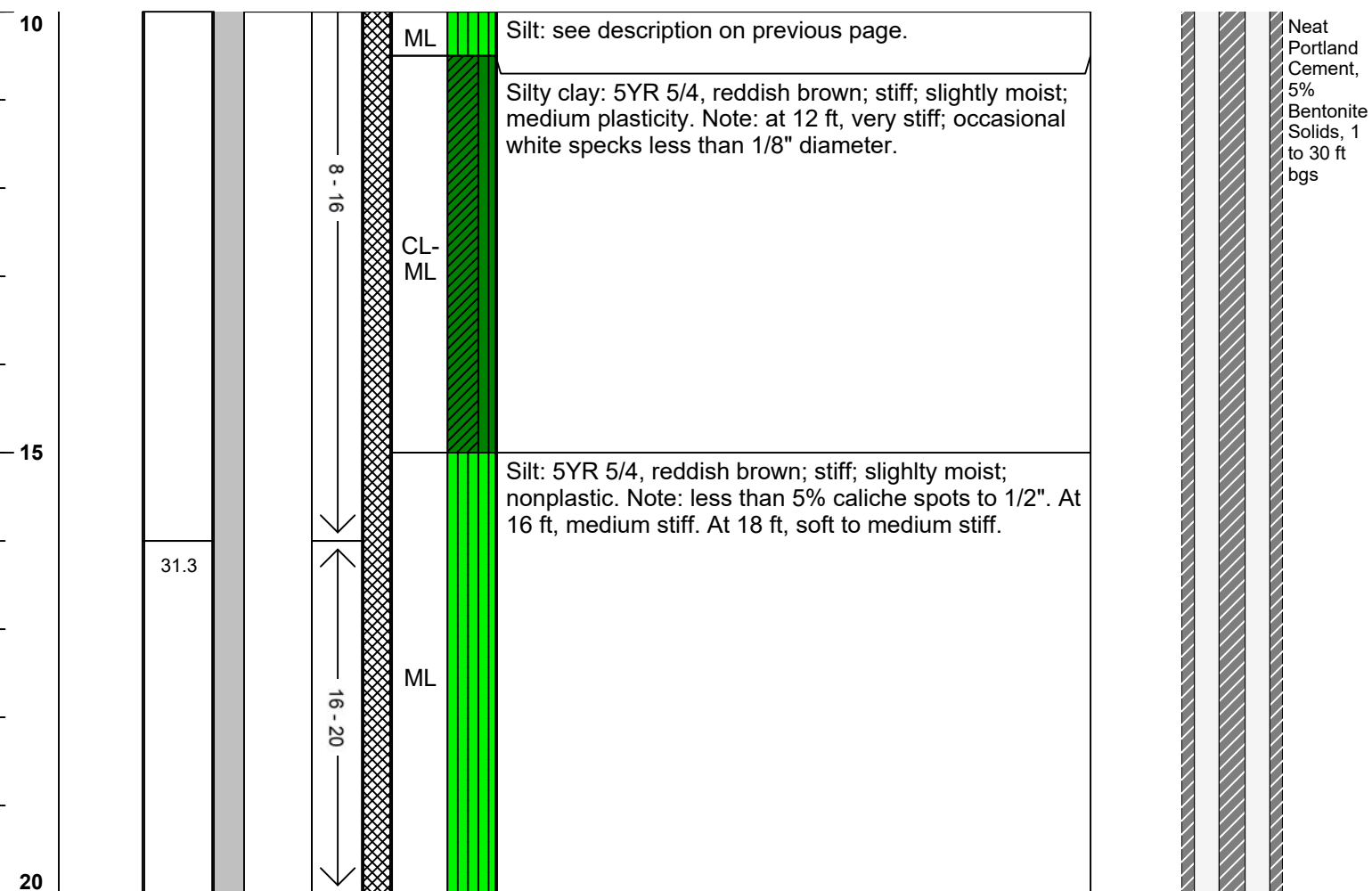
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1014**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/27/18**

Completion Date: **2/18/2019**

WELL LOG

Well ID: **KAFB-106S1**

Page: **3 of 51**

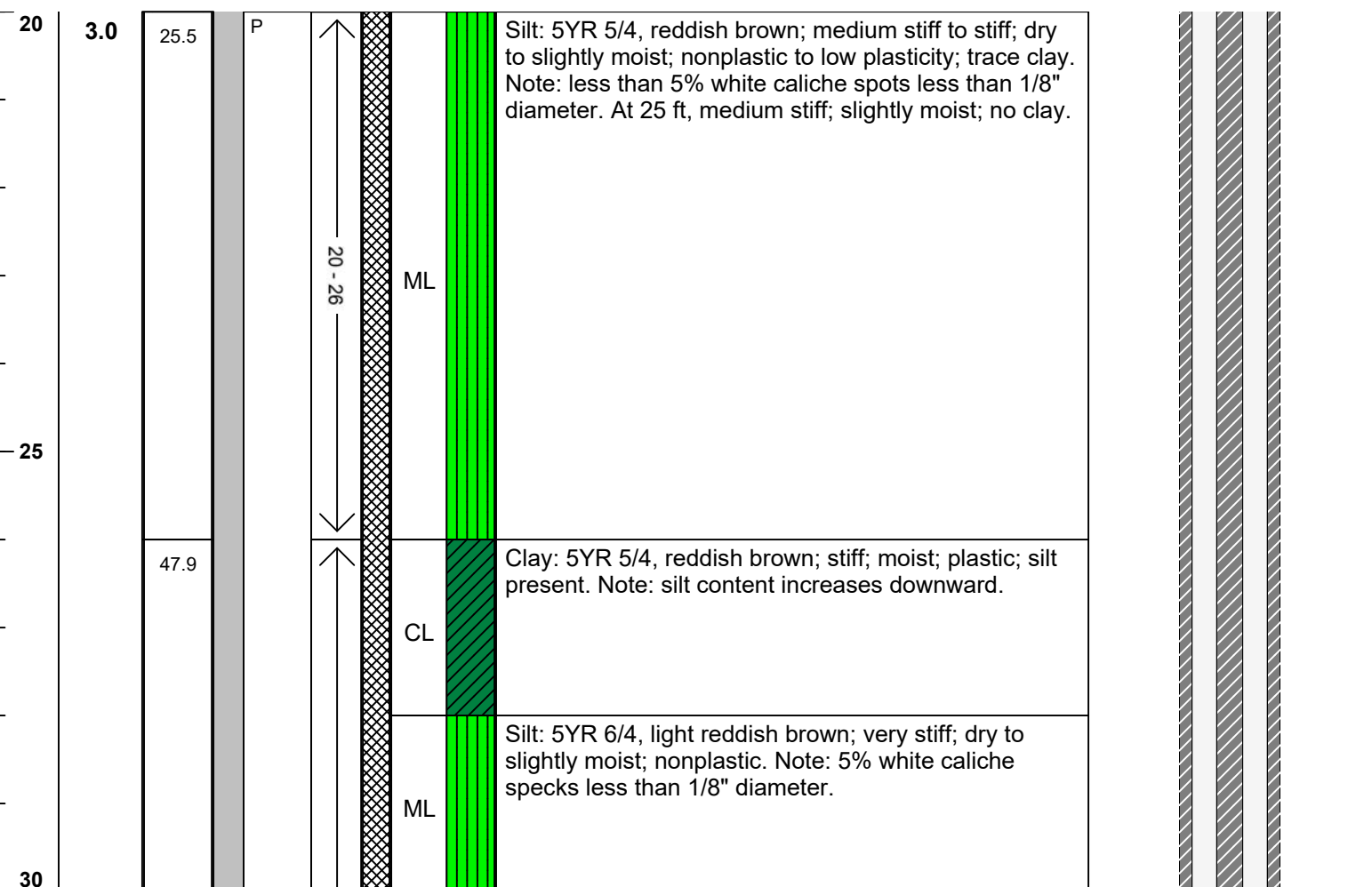
Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **L. Andress, J. Messenger**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **469.8**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite,**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Project: **62735DM02.1014**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/27/18**

Completion Date: **2/18/2019**

WELL LOG

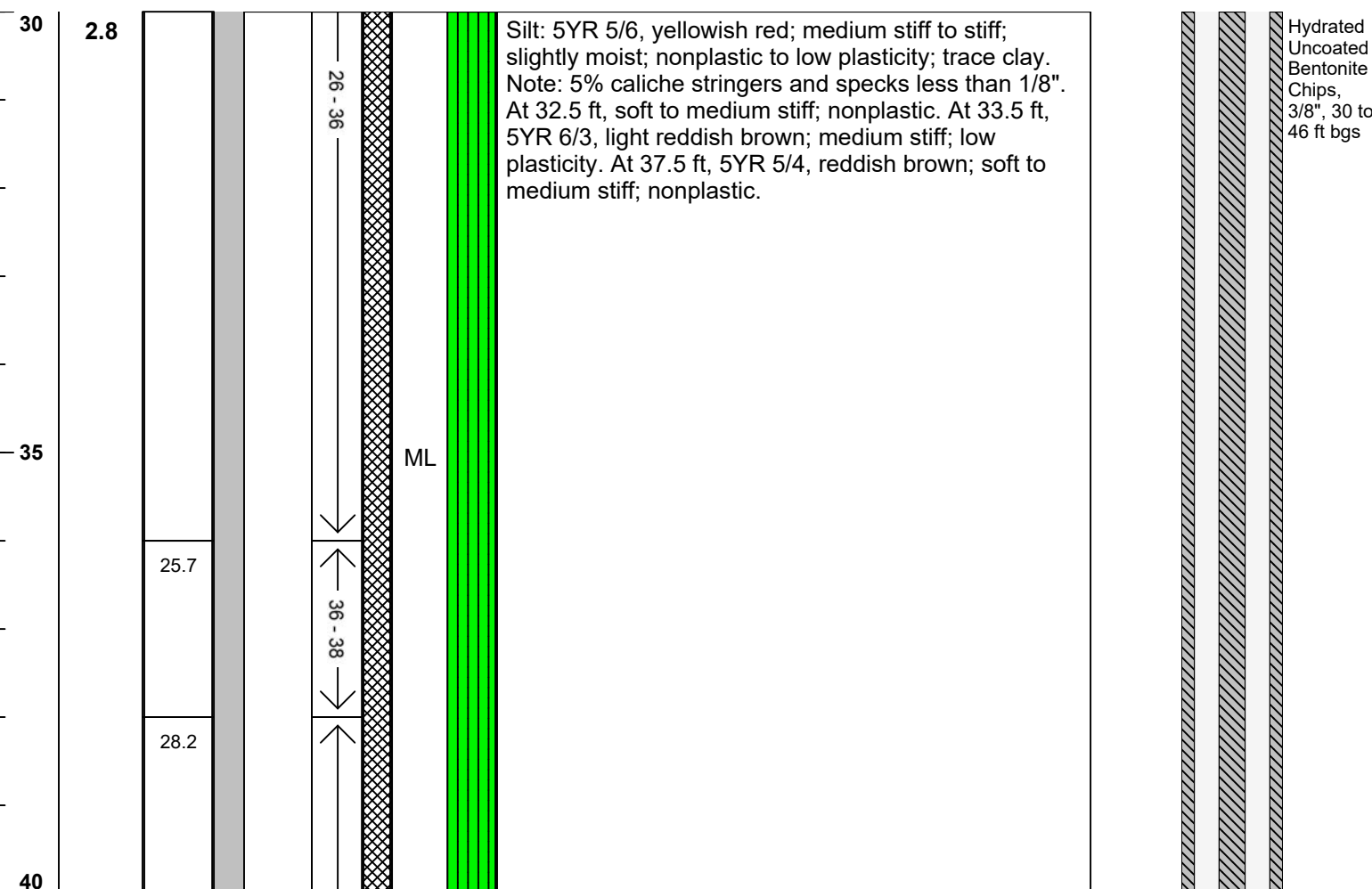
Well ID: **KAFB-106S1**

Page: **4 of 51**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

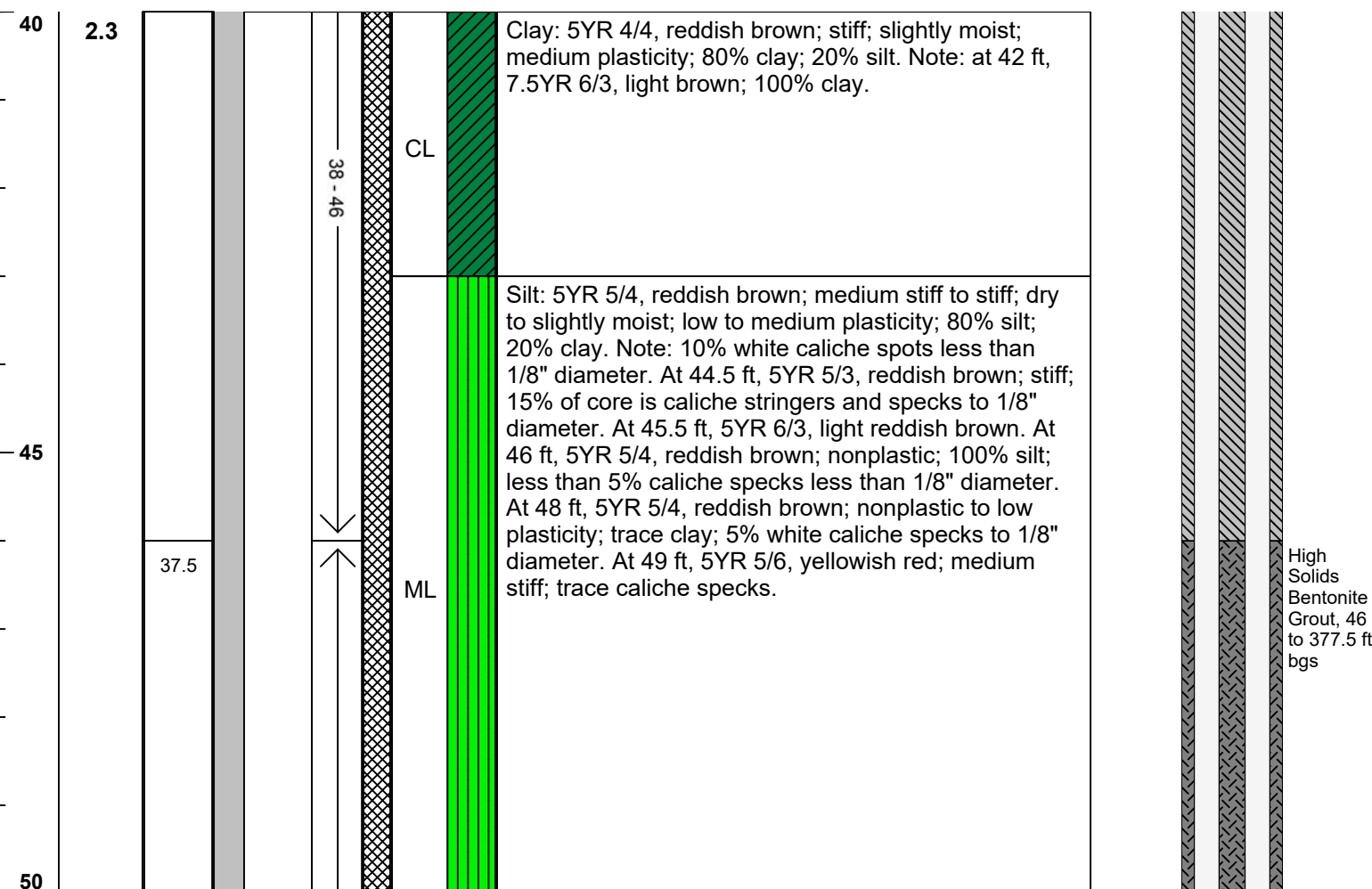
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

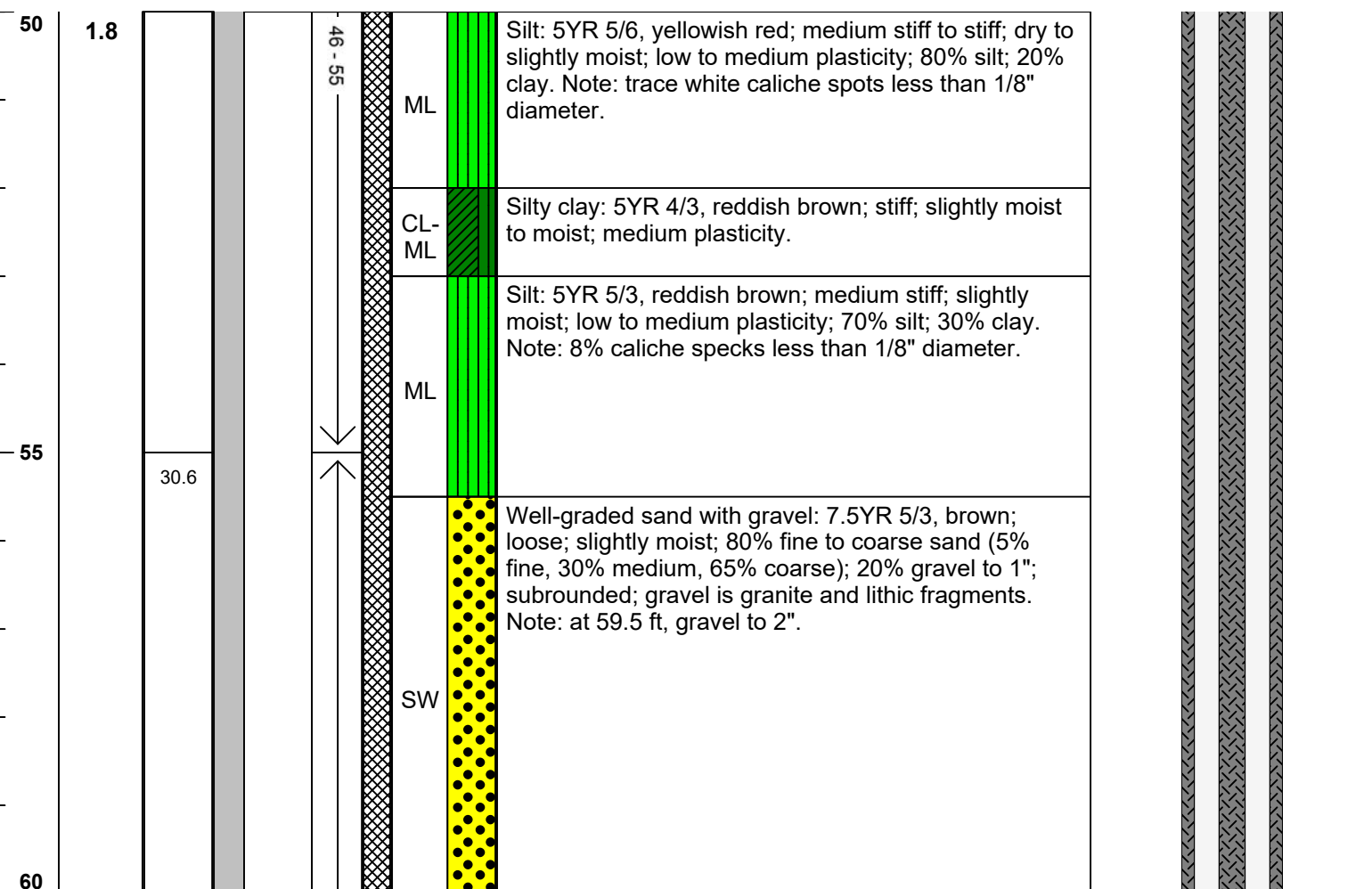
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

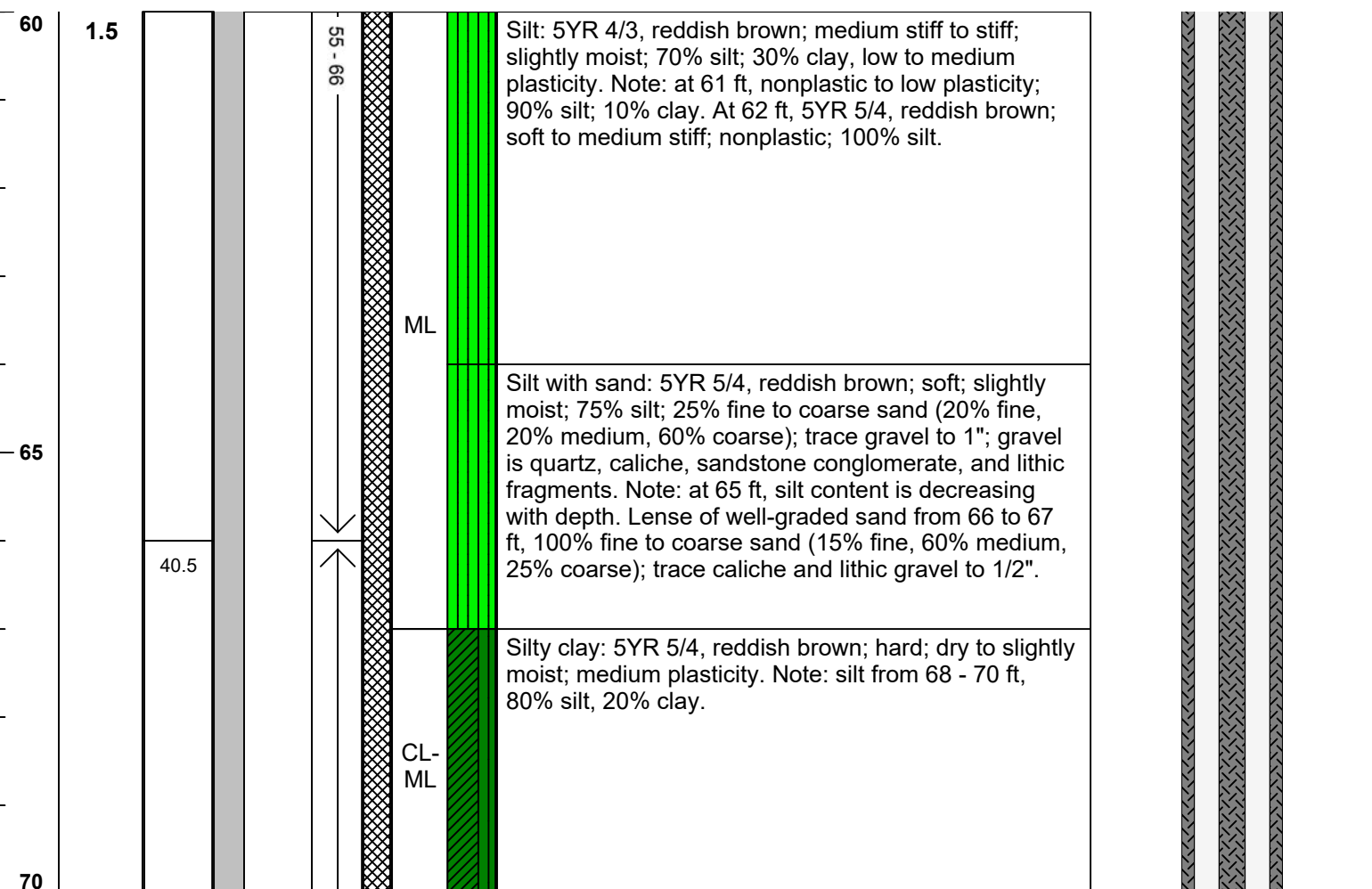
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

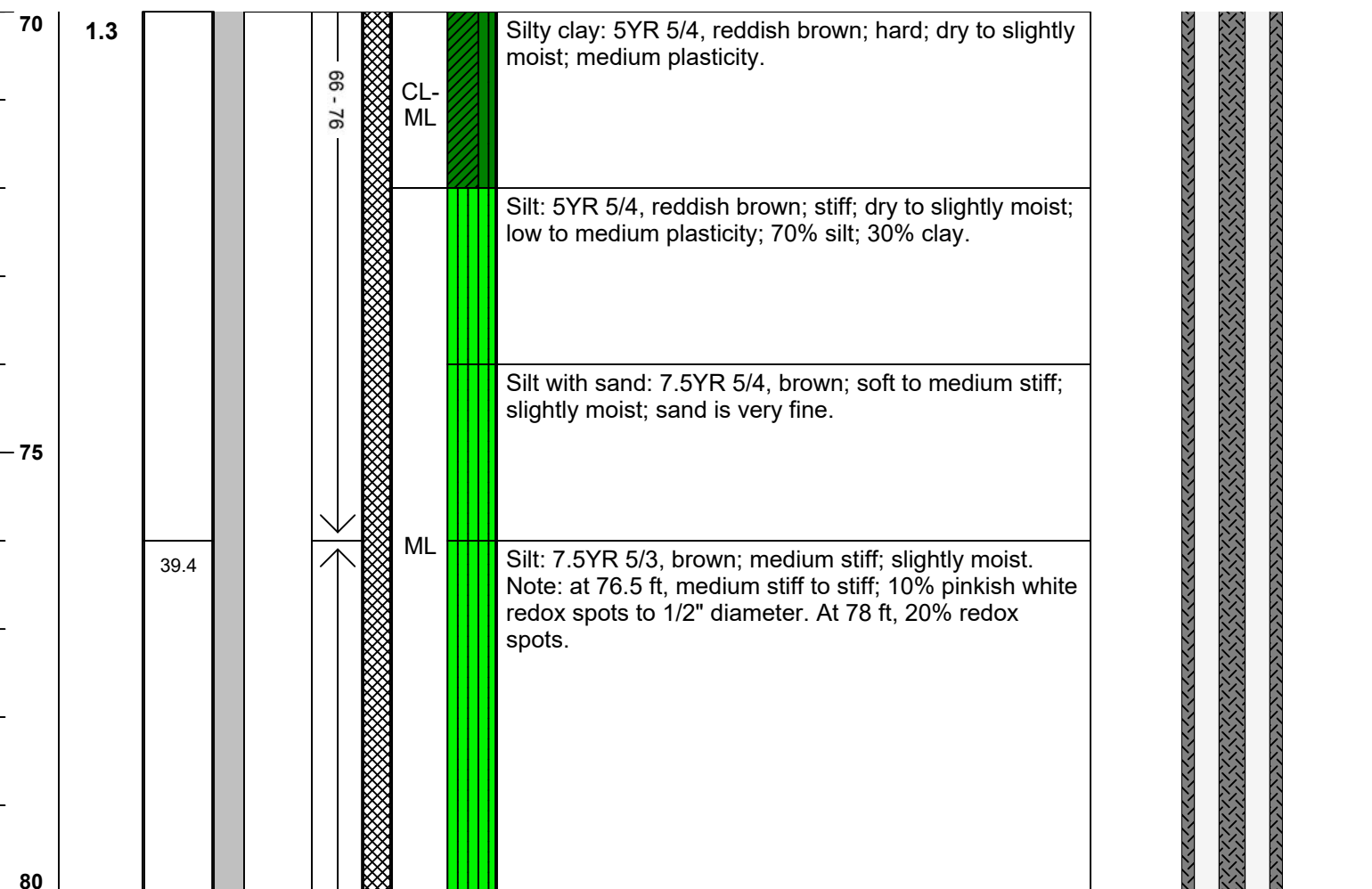
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
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USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

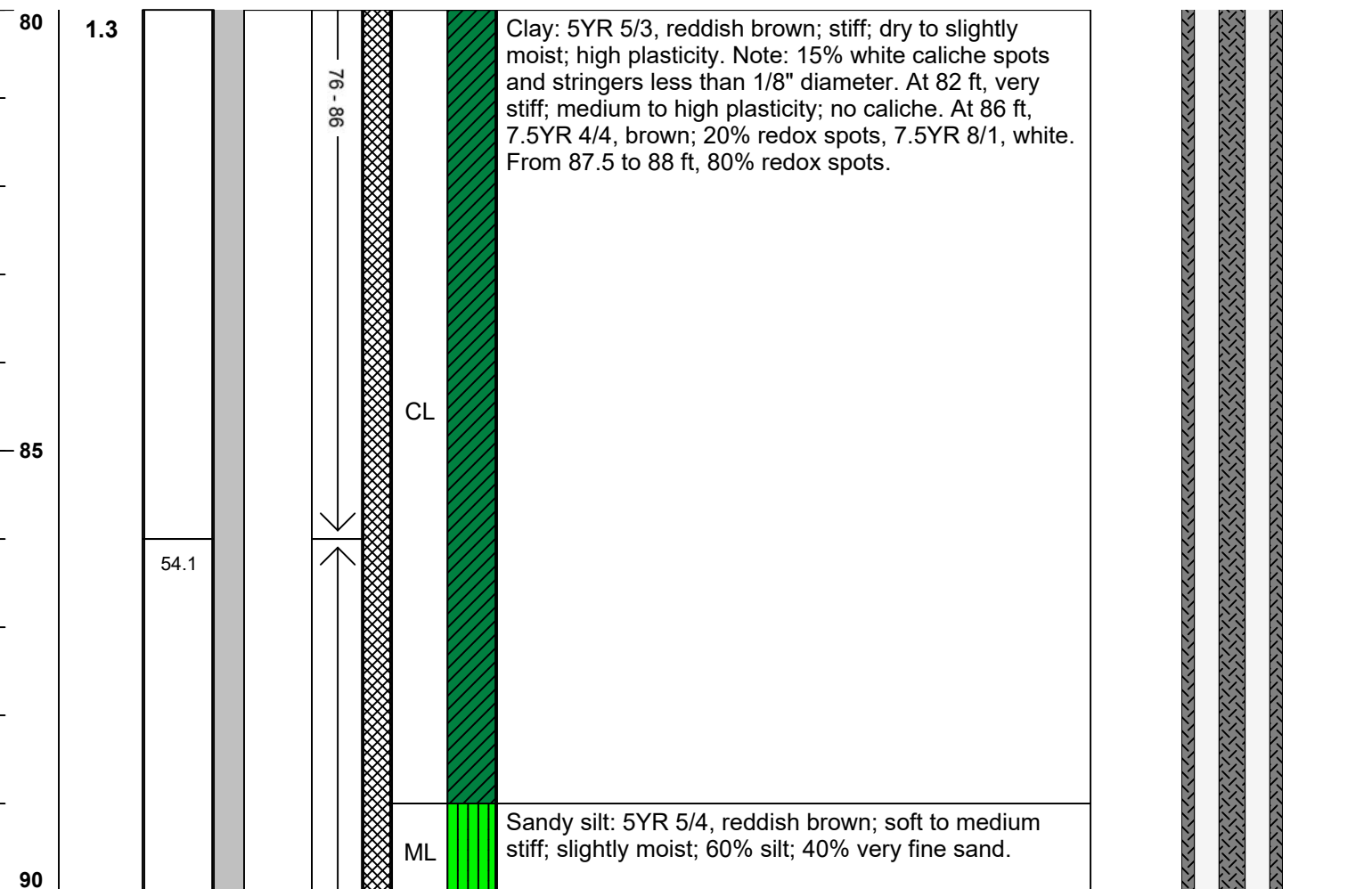
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

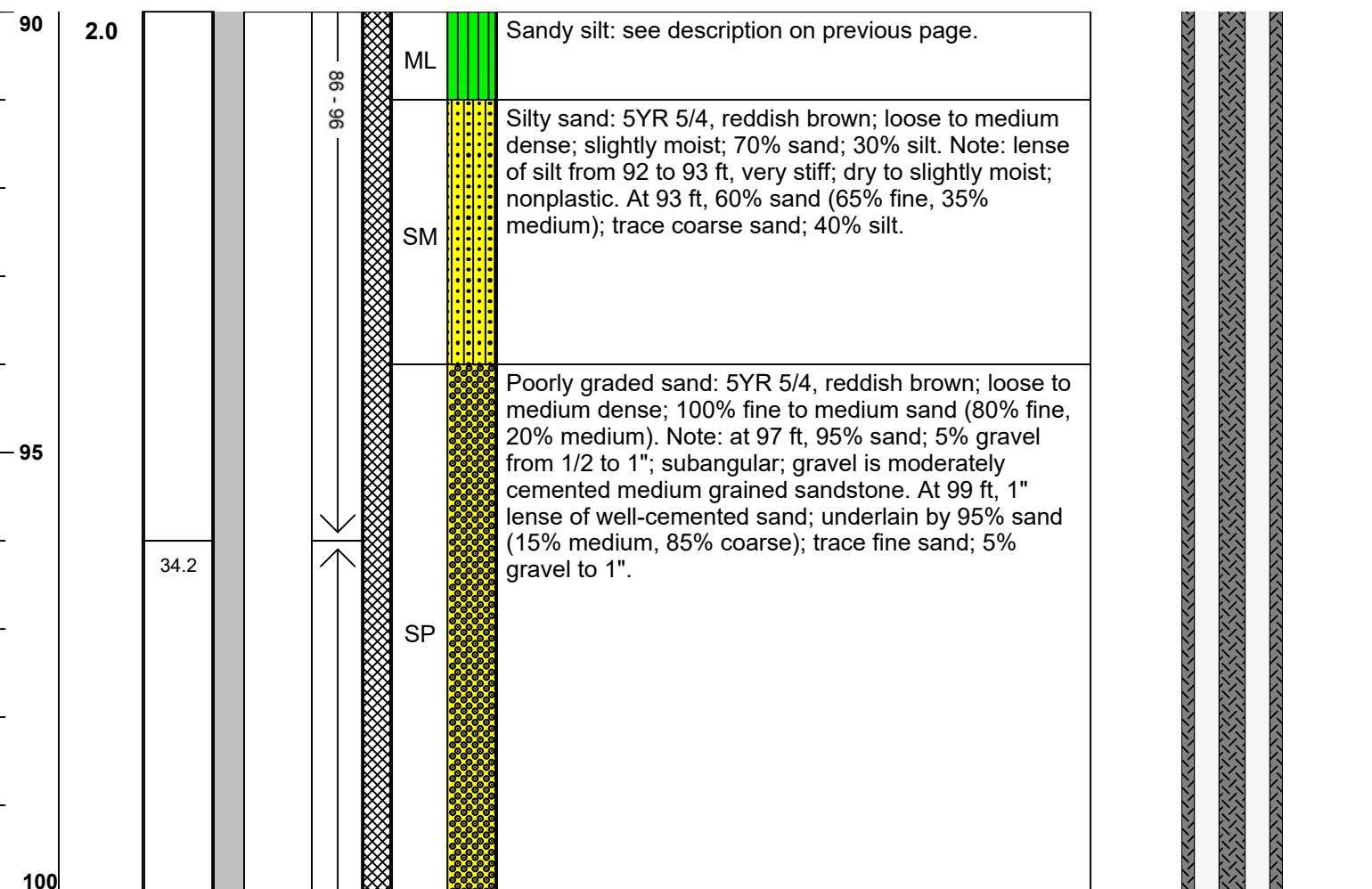
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

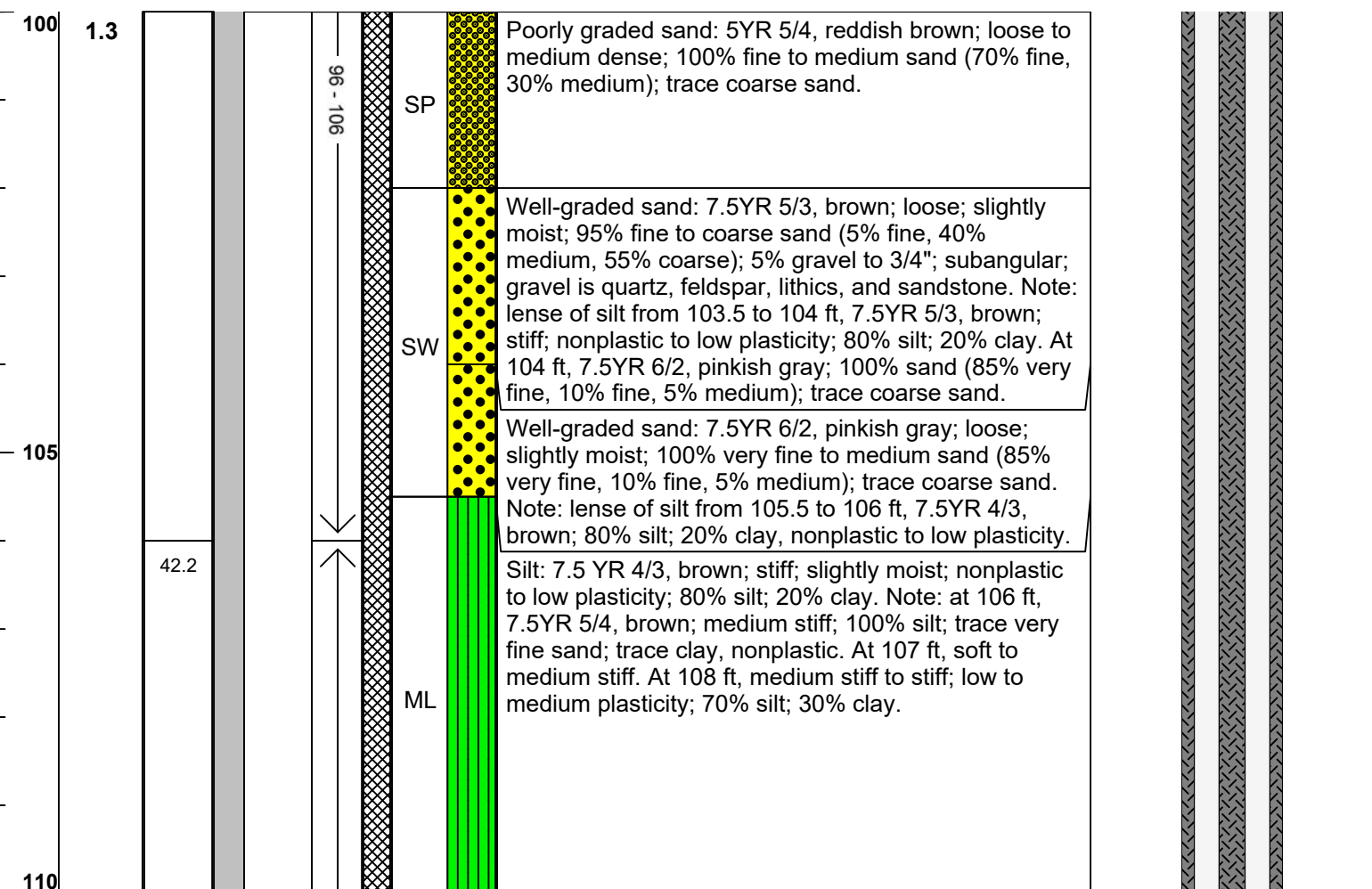
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

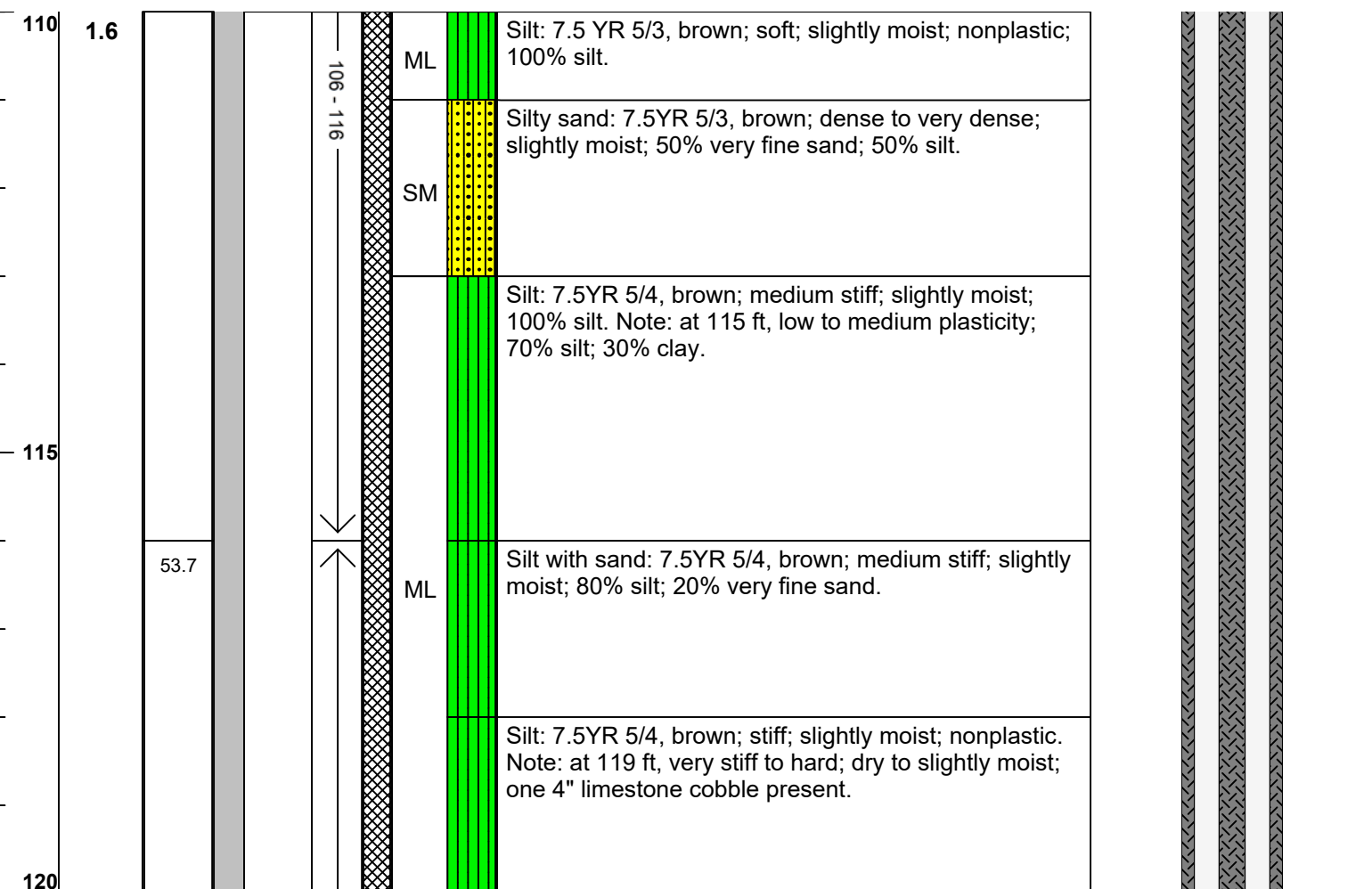
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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(1) (2)



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UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

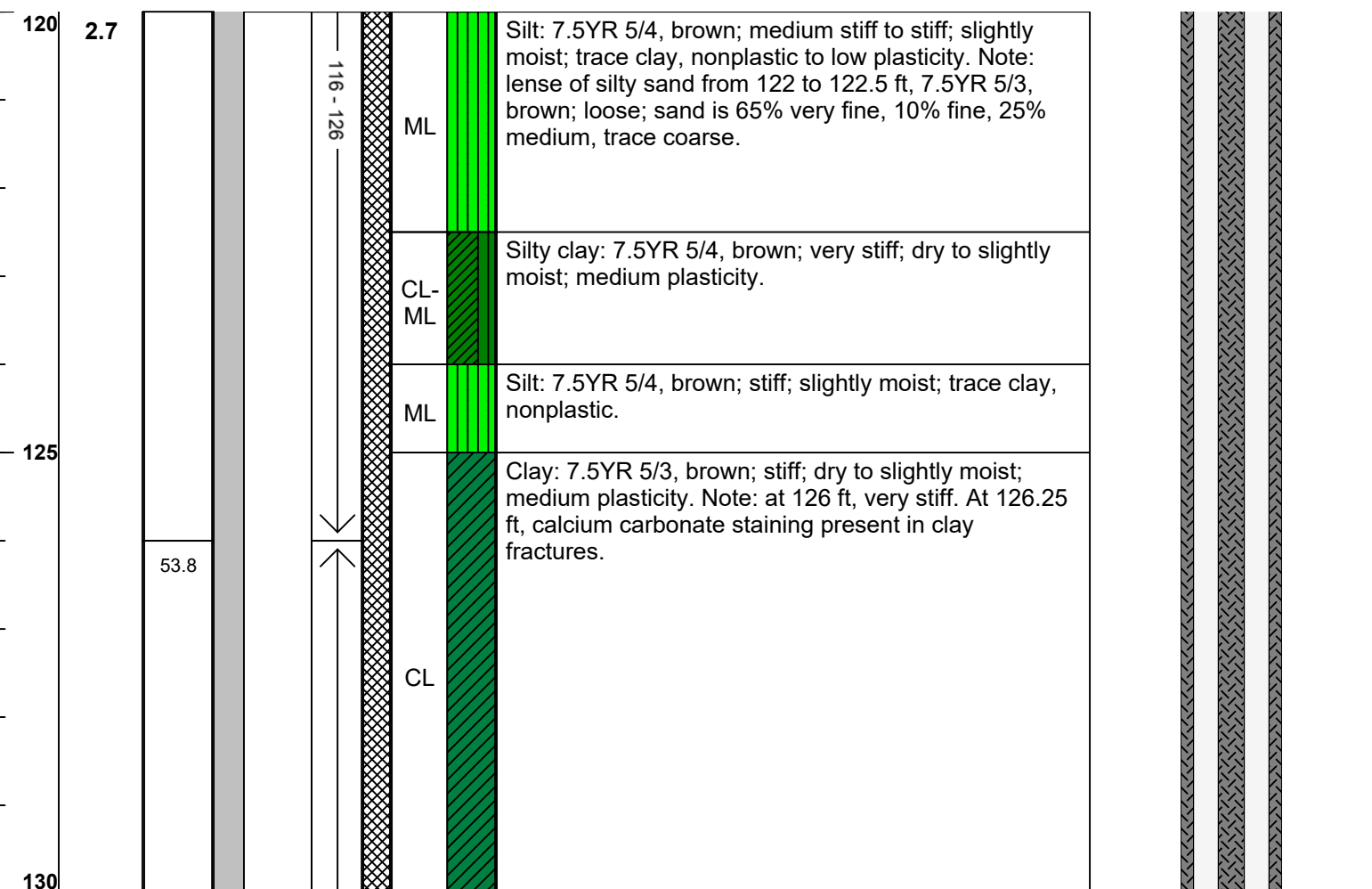
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(1) (2)



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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

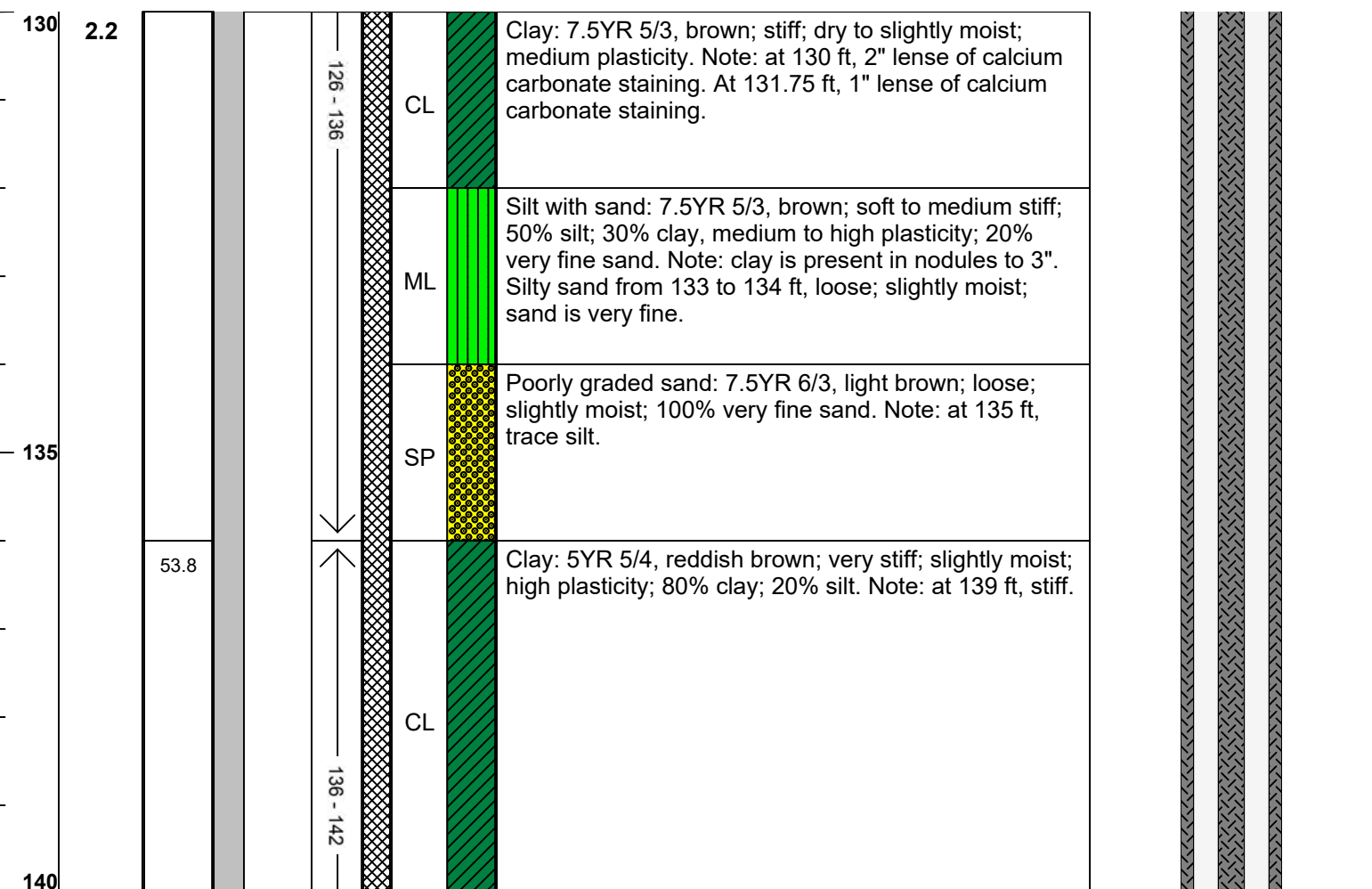
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(1) (2)



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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

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(1) (2)

140	6.6		P, V					CL	Clay: 5YR 5/4, reddish brown; very stiff; dry to slightly moist; high plasticity; 60% clay; 40% silt. Note: at 141 ft, medium stiff; slightly moist.	
		86.7			142 - 146			ML	Sandy silt: 7.5YR 7/2, pinkish gray; soft; dry; 60% silt; 40% fine to coarse sand (15% fine, 70% medium, 15% coarse).	
145								SW	Well-graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine to coarse sand.	
		39.5						CL	Clay: 7.5YR 6/3, light brown; very stiff; dry; medium plastic; 80% clay, 20% silt. Note: at 146 ft, 7.5YR 6/4, light brown; soft to stiff; low plasticity; 70% clay nodules to 3"; 30% silt. Lense of clayey sand with silt from 148 to 149 ft, 7.5YR 6/4, light brown; loose; 60% very fine to medium sand (20% very fine, 70% fine, 10% medium); subangular to subrounded; 30% clay nodules; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
150								SM	Silty sand: 7.5YR 6/4, light brown; loose; 70% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 20% silt, nonplastic; 10% clay; sand is	

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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

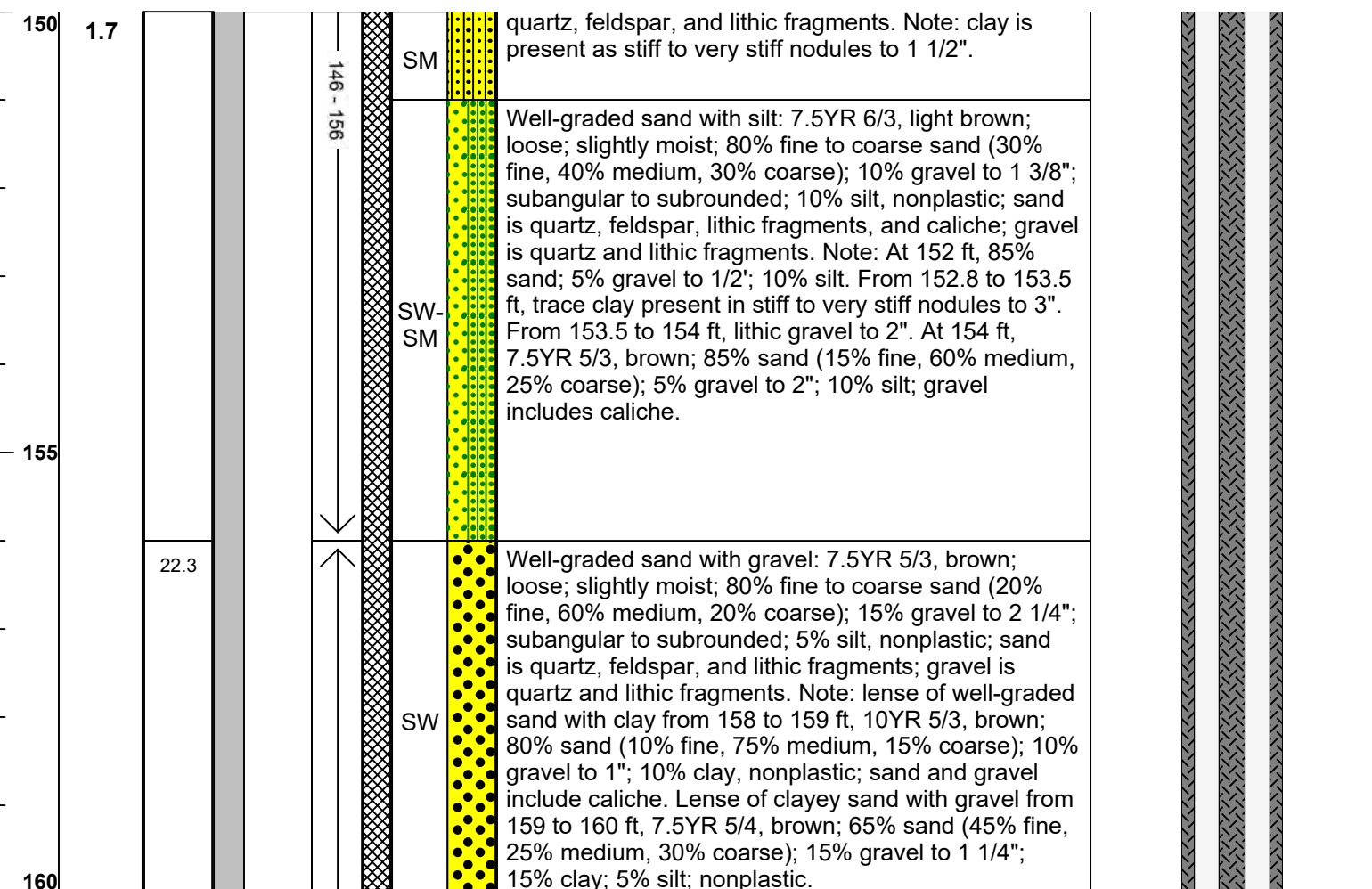
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

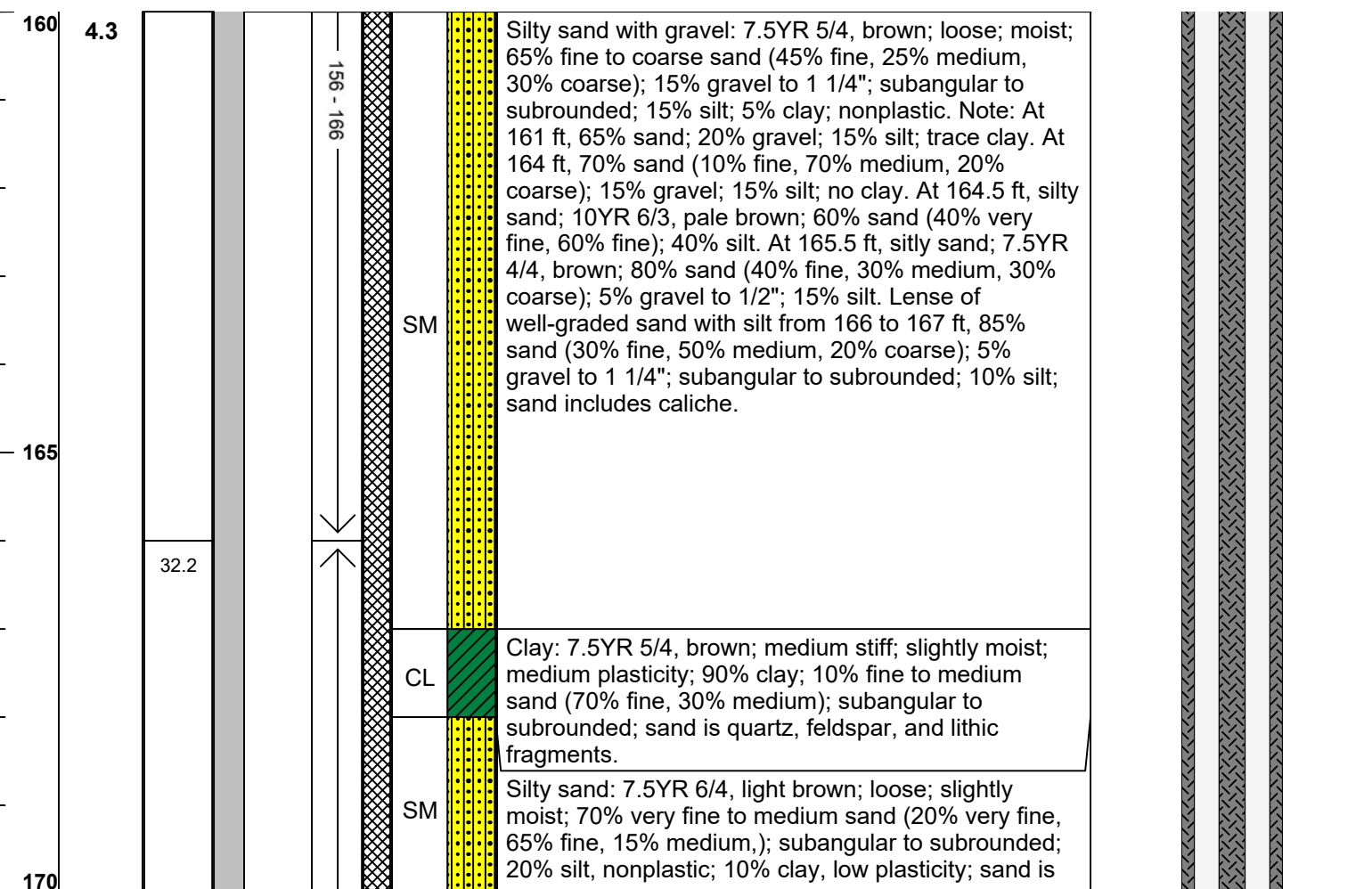
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

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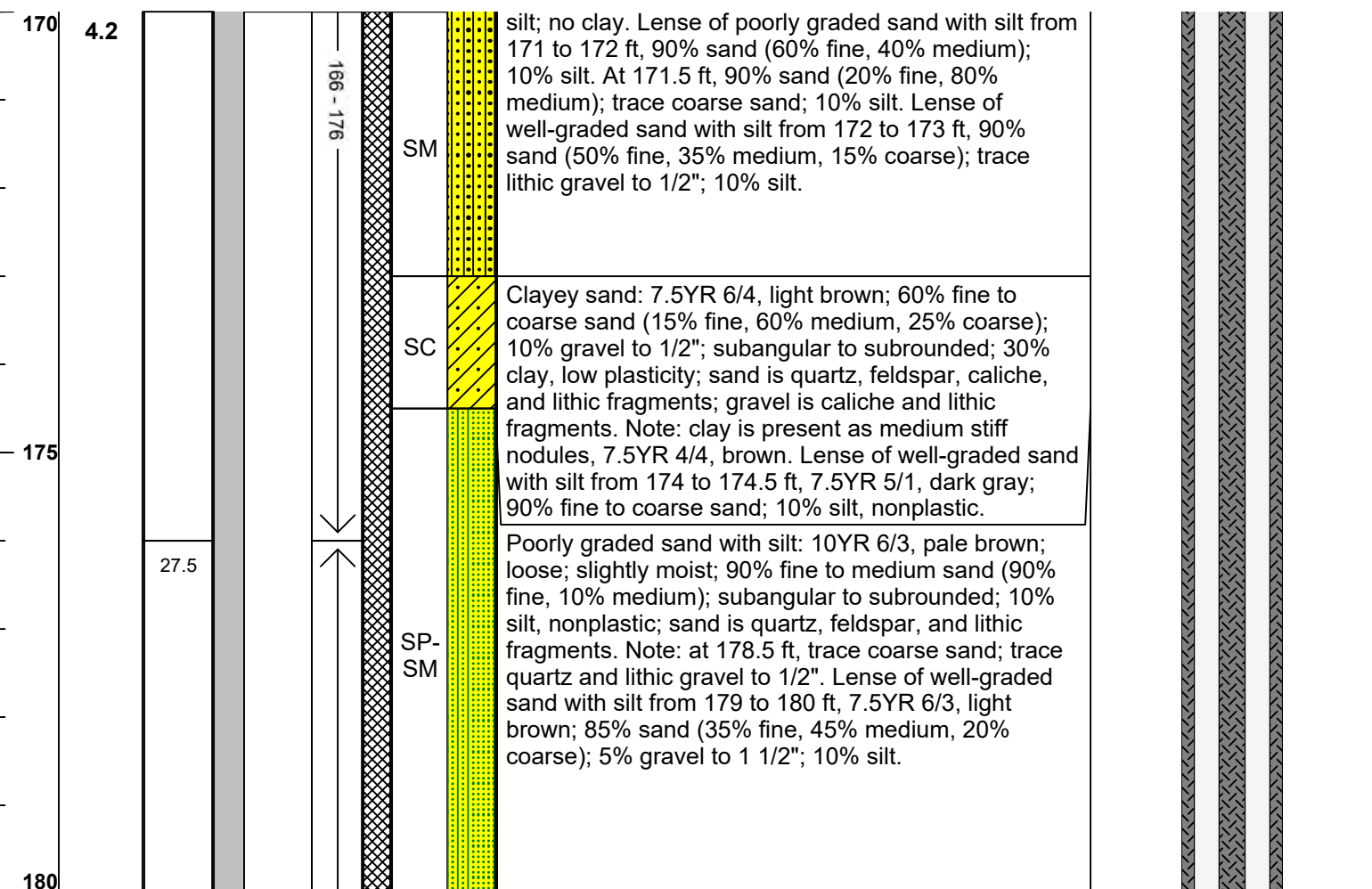
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



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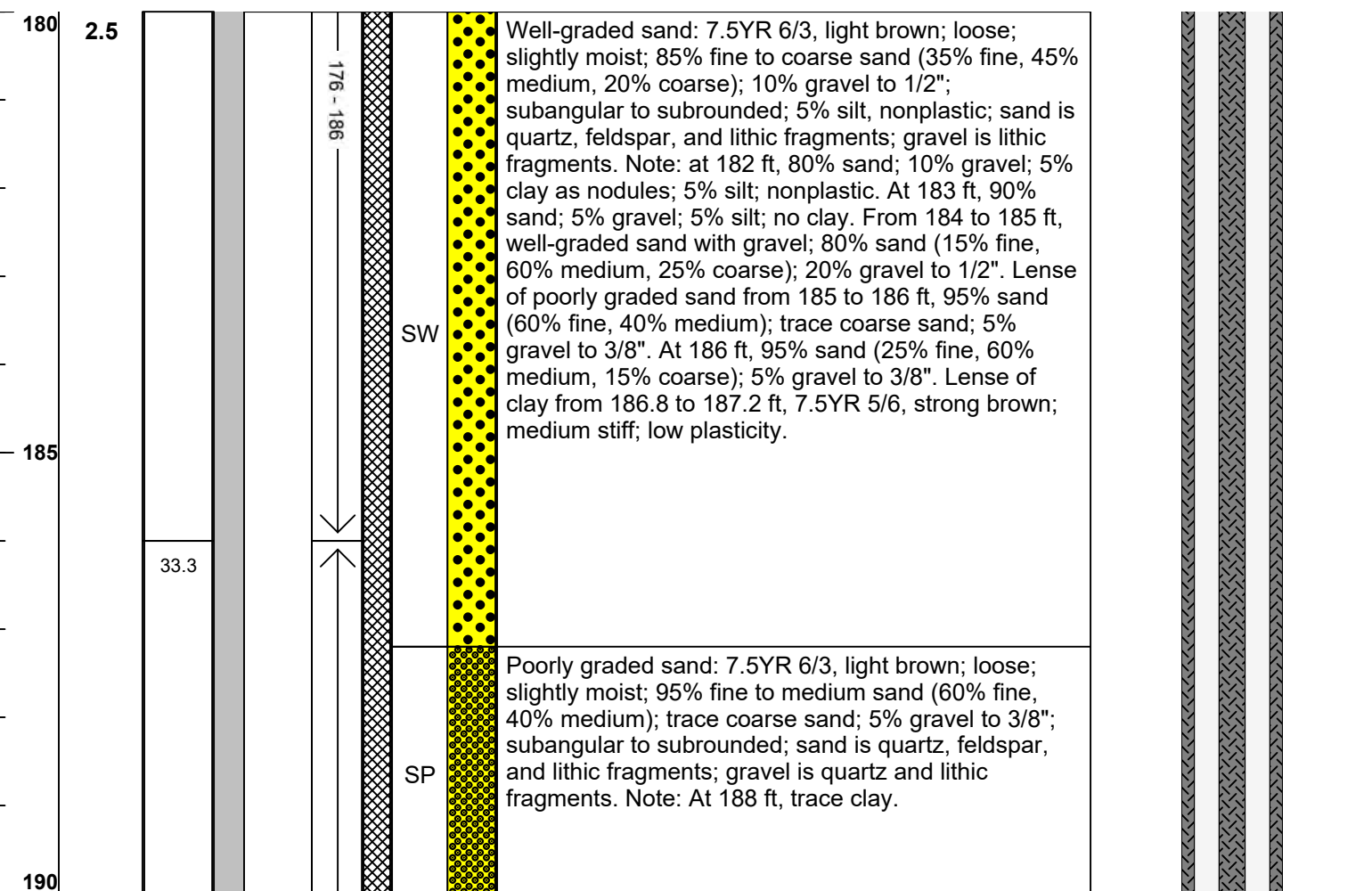
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

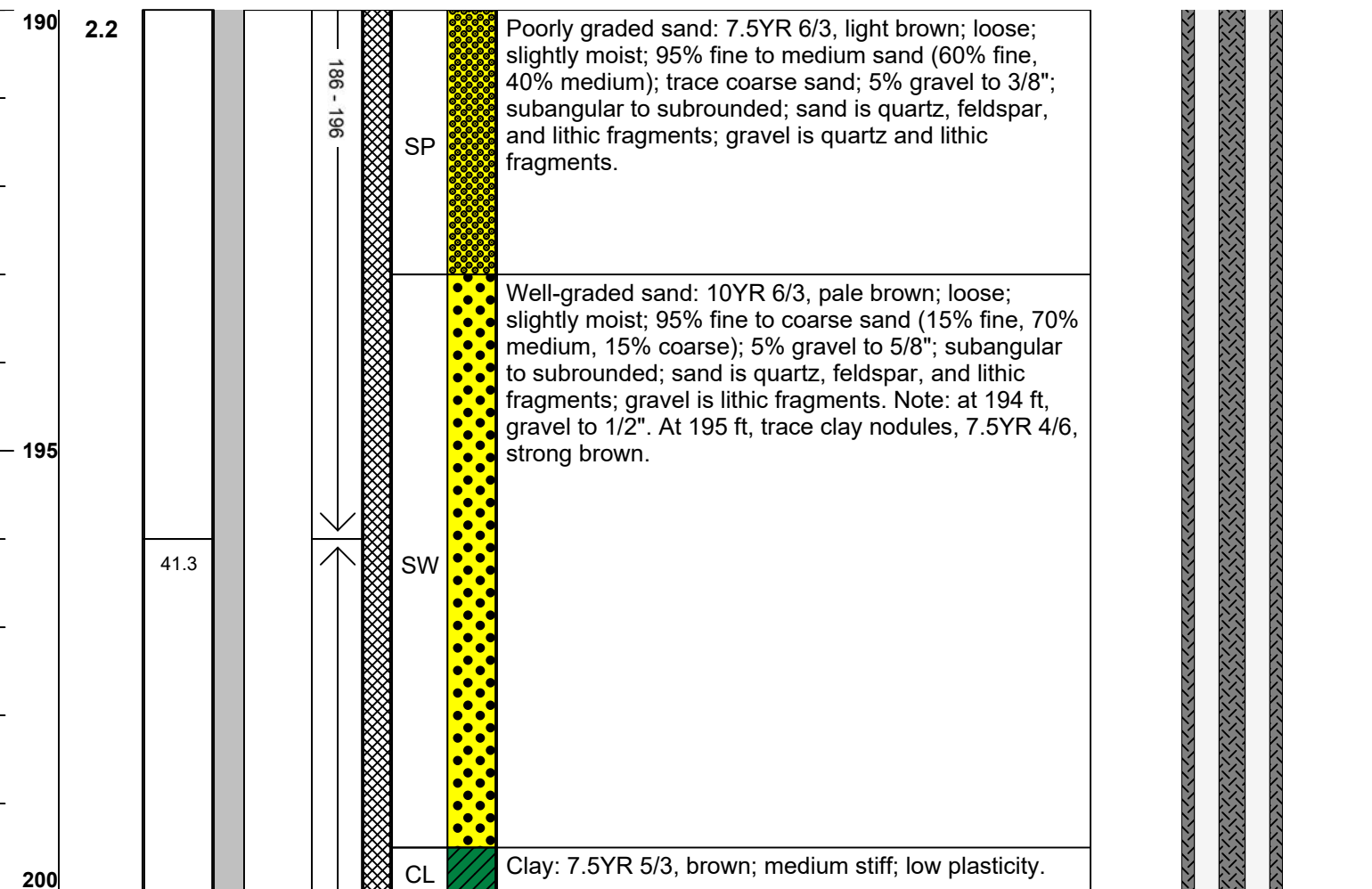
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										(1) (2)



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UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

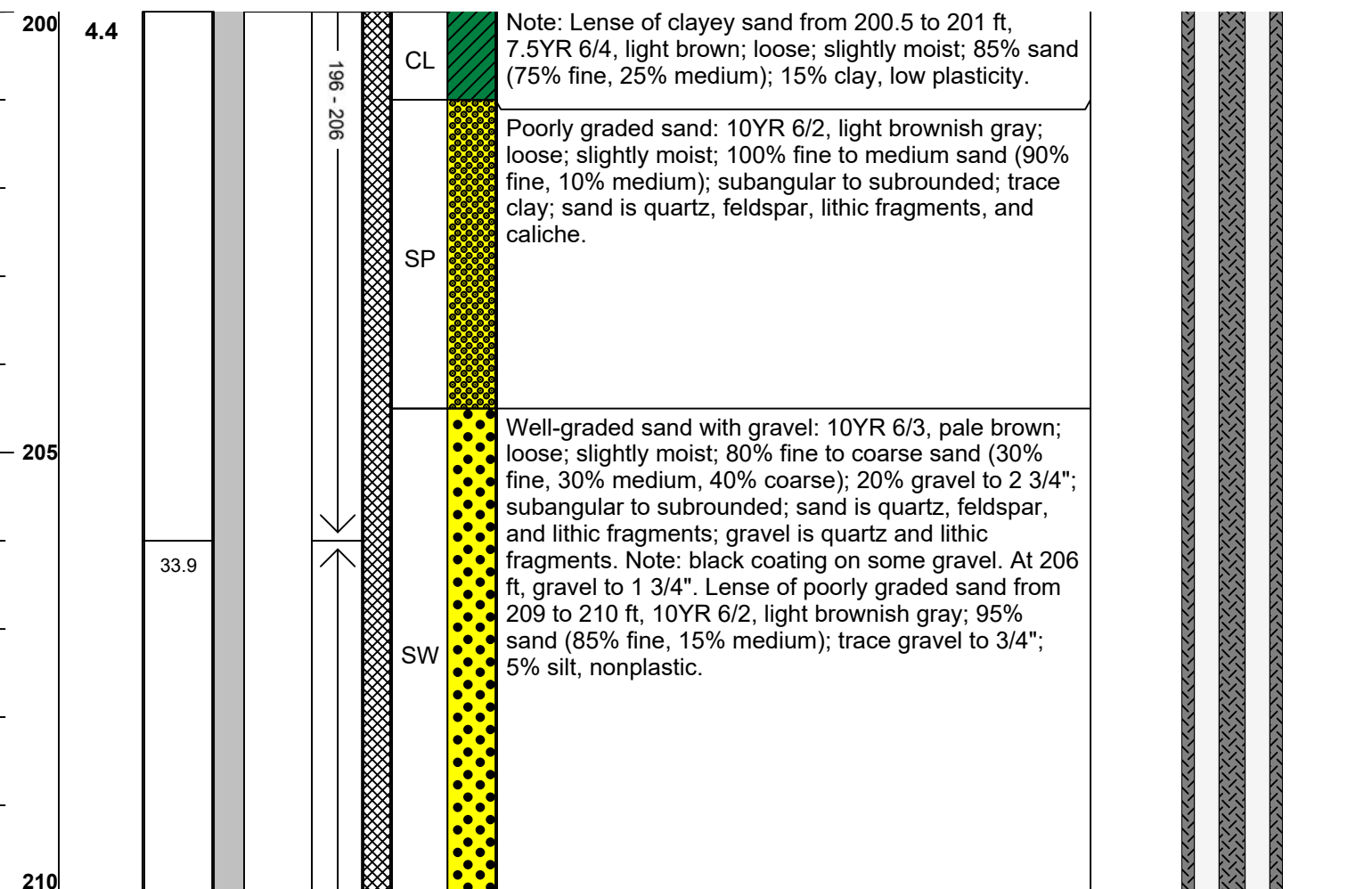
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1014**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/27/18**

Completion Date: **2/18/2019**

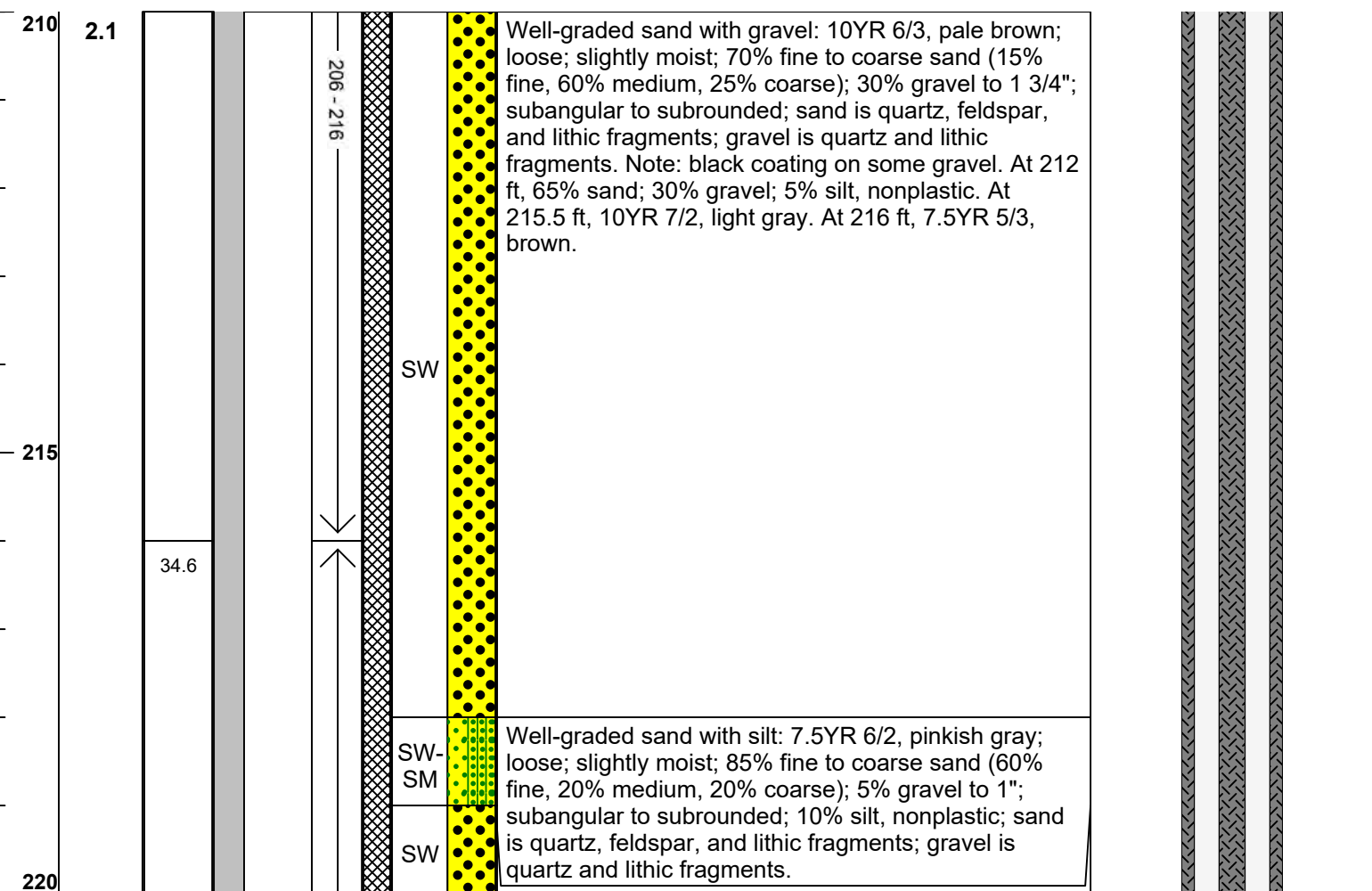
WELL LOG

Well ID: **KAFB-106S1**

Page: **22 of 51**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

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bgs = below ground surface

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

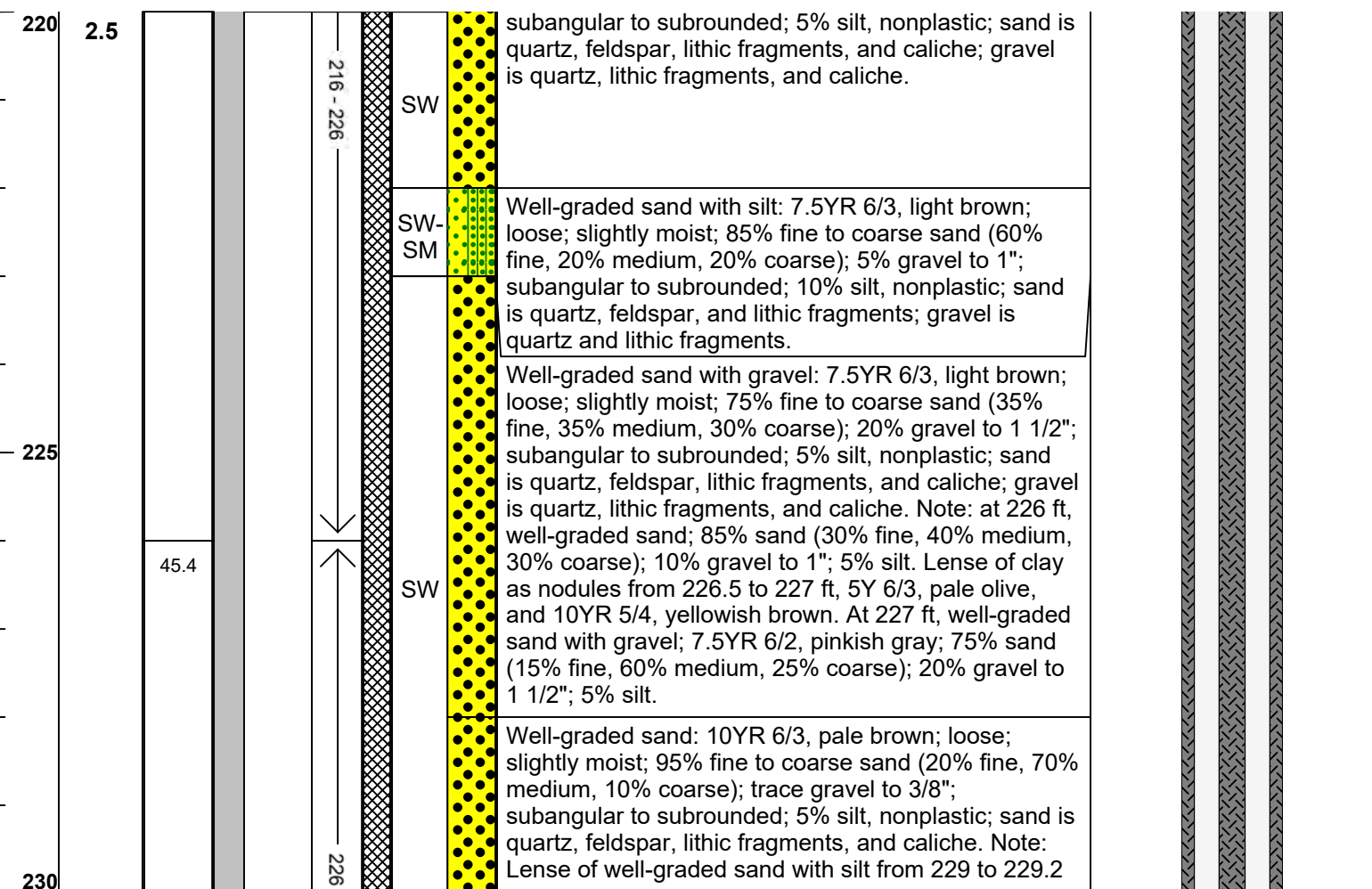
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

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∇ = Depth to water after completion

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USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

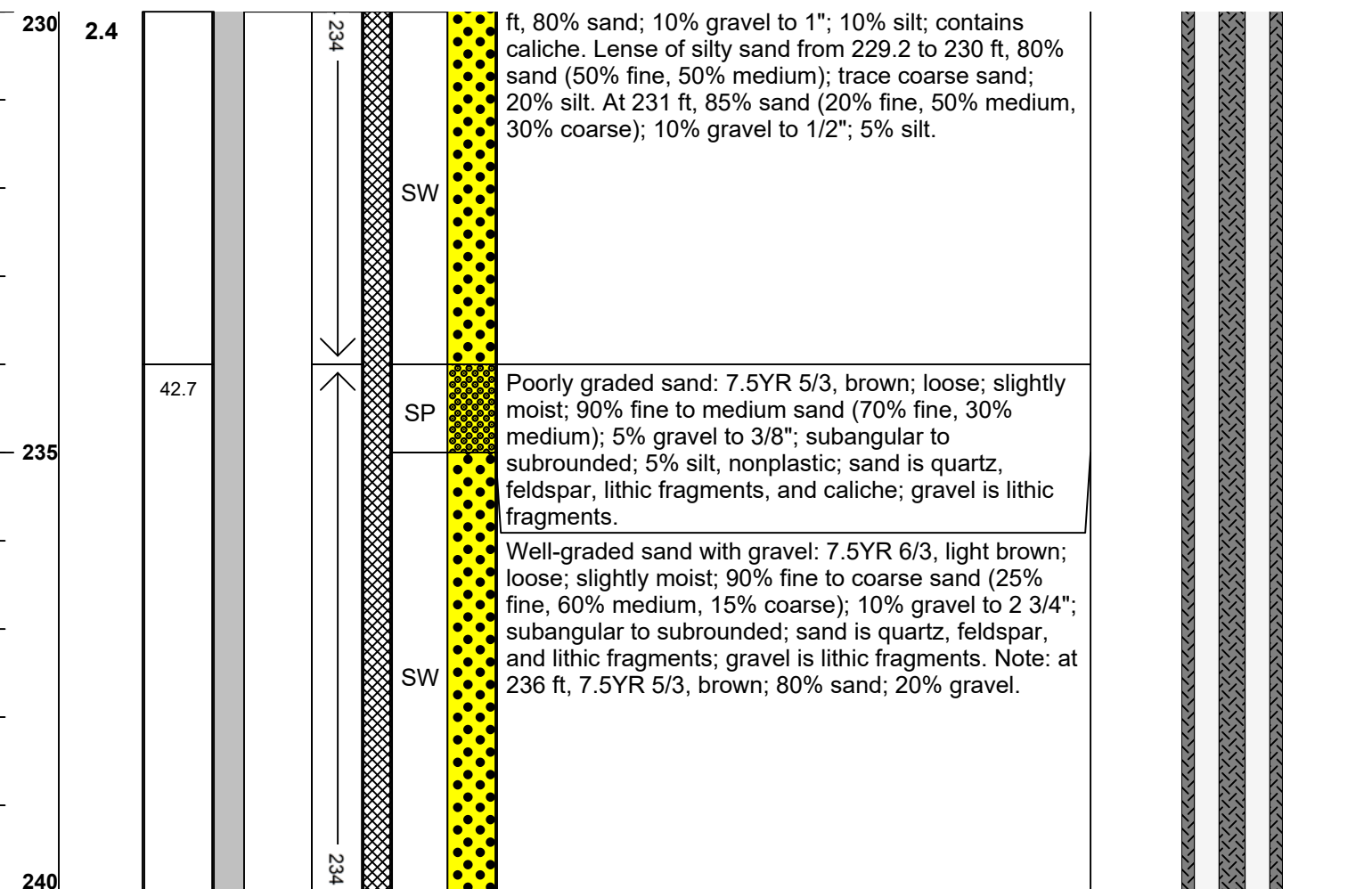
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

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DTW = depth to water

ft = feet

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

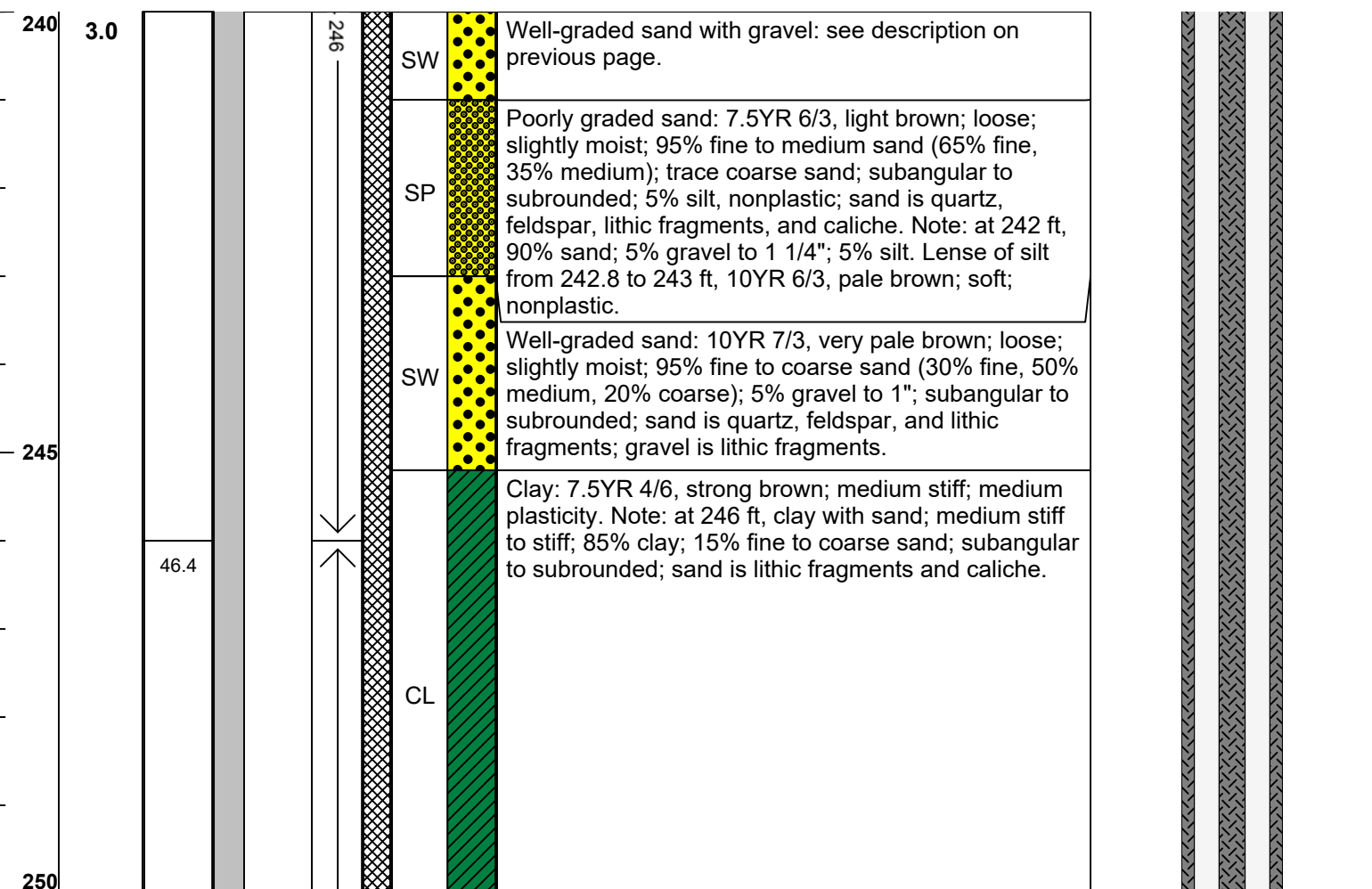
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
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Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

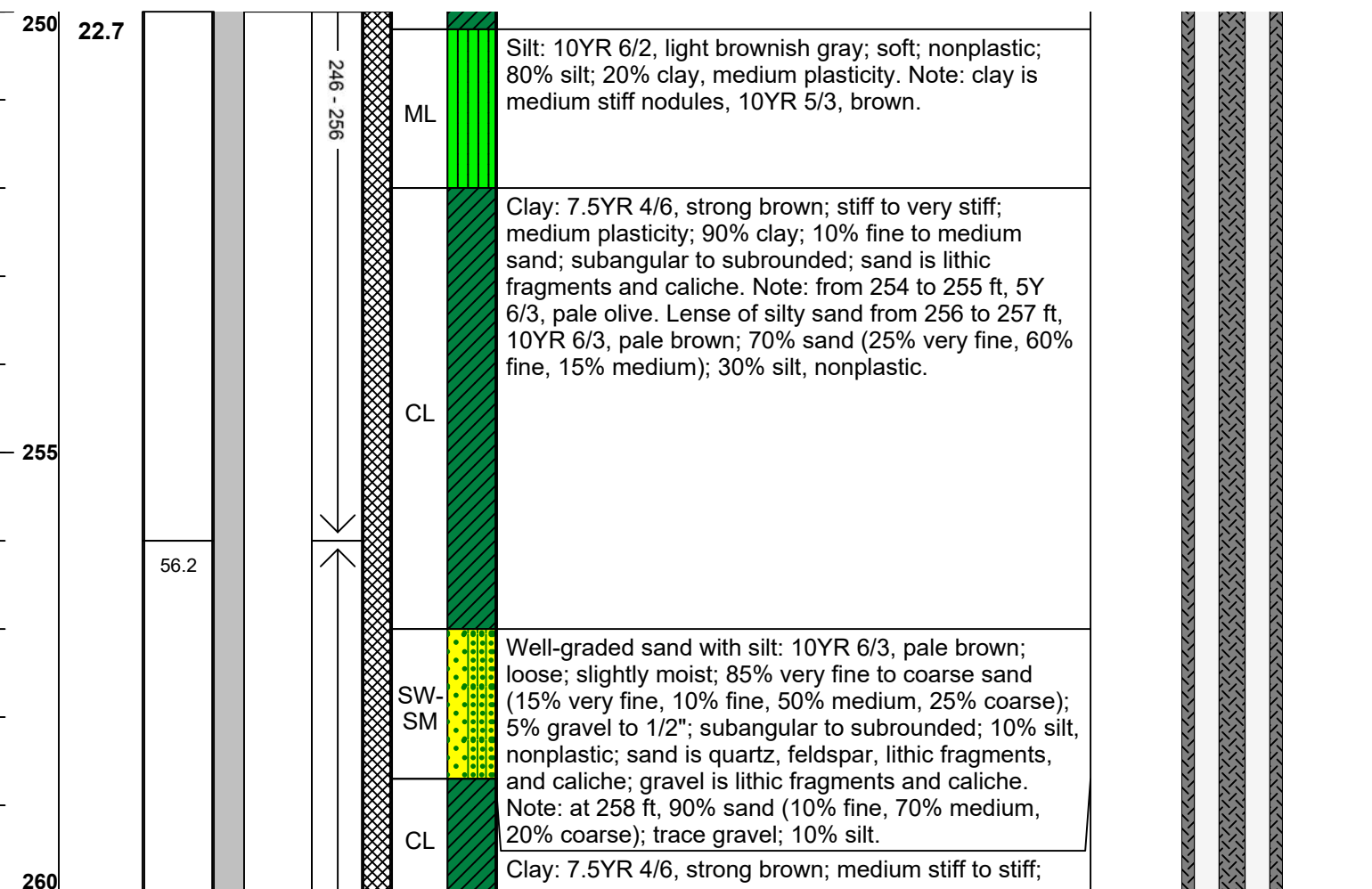
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

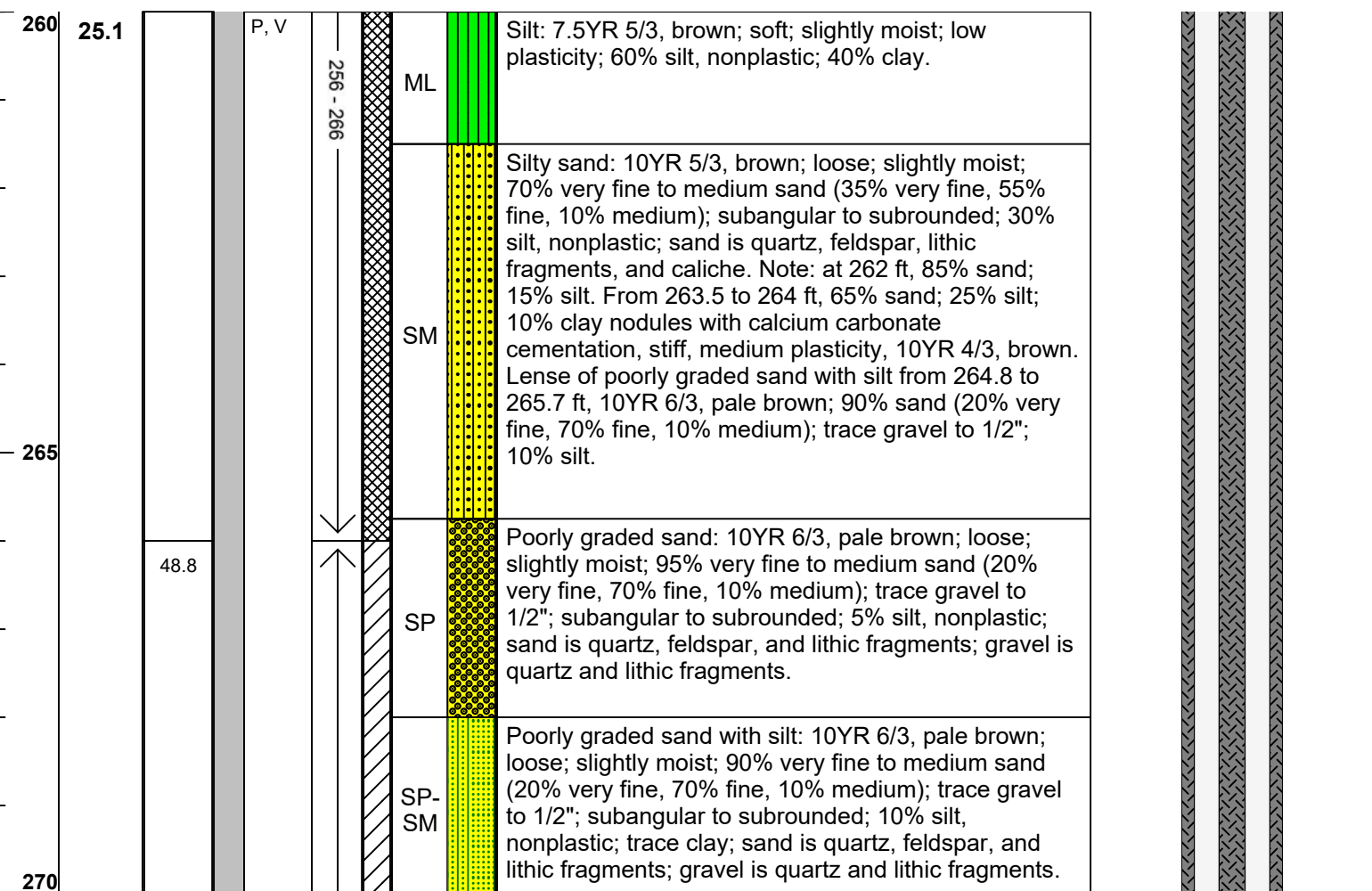
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

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Project: **62735DM02.1014**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/27/18**

Completion Date: **2/18/2019**

WELL LOG

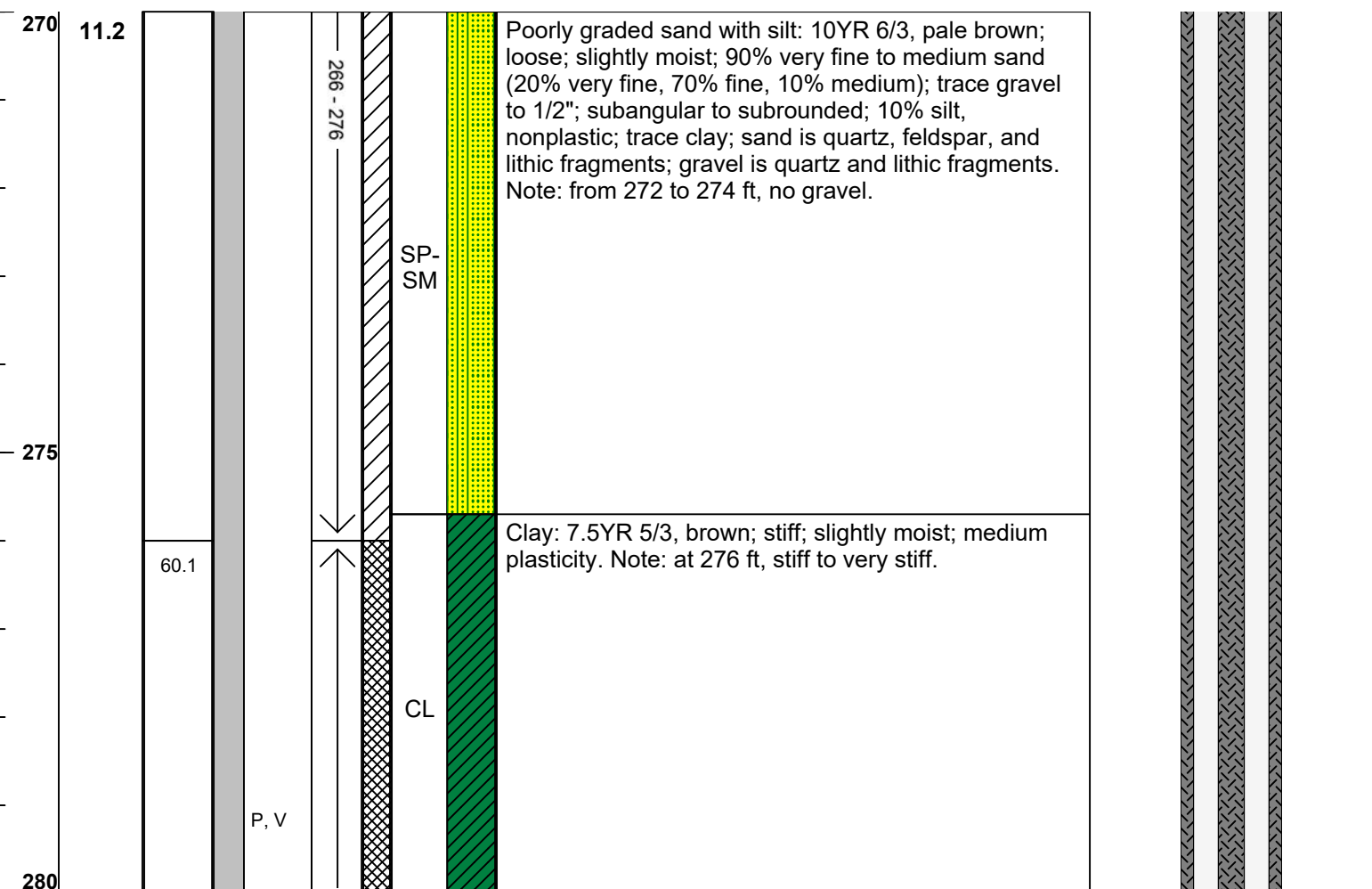
Well ID: **KAFB-106S1**

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

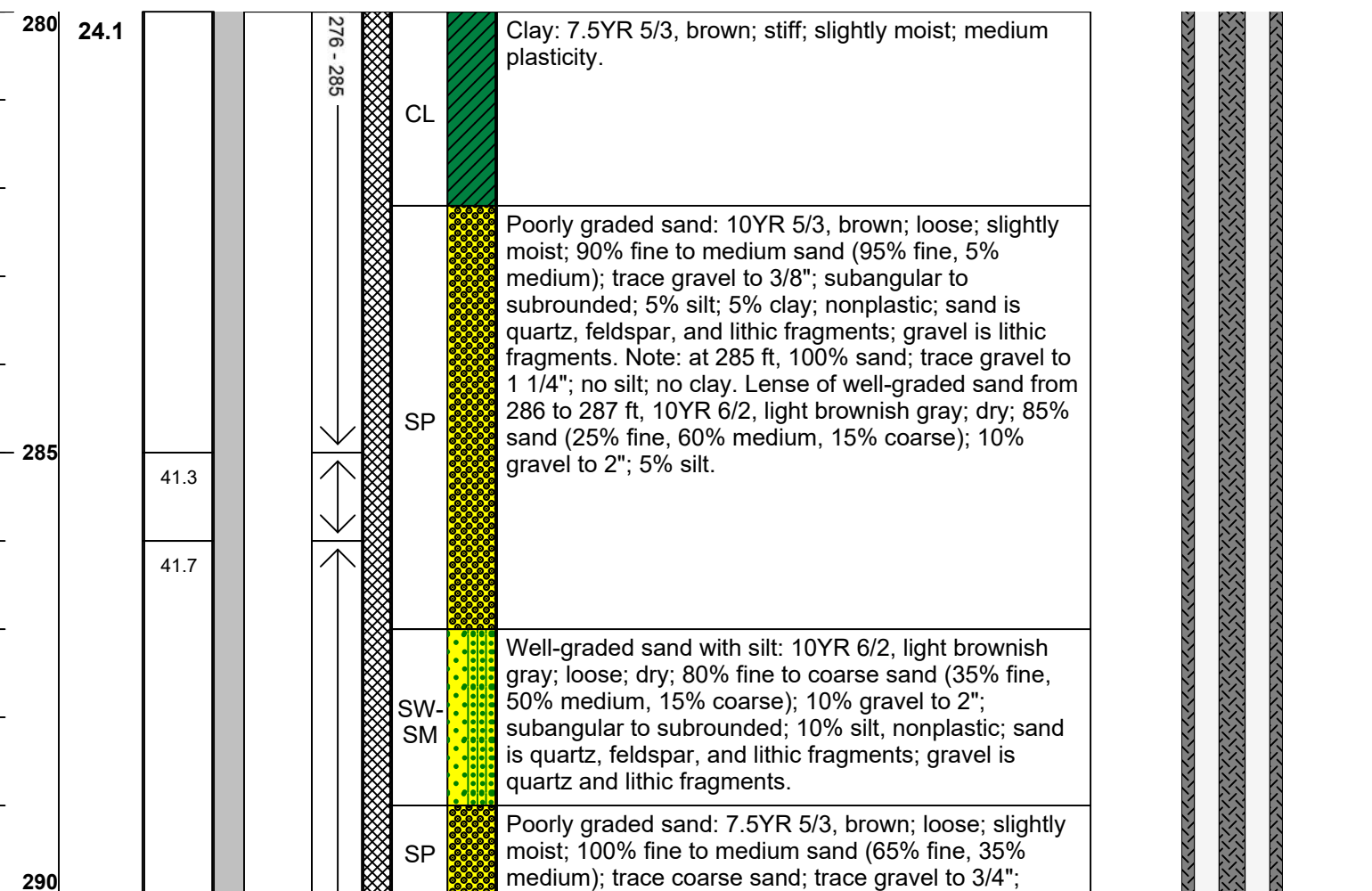
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

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**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1014**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/27/18**

Completion Date: **2/18/2019**

WELL LOG

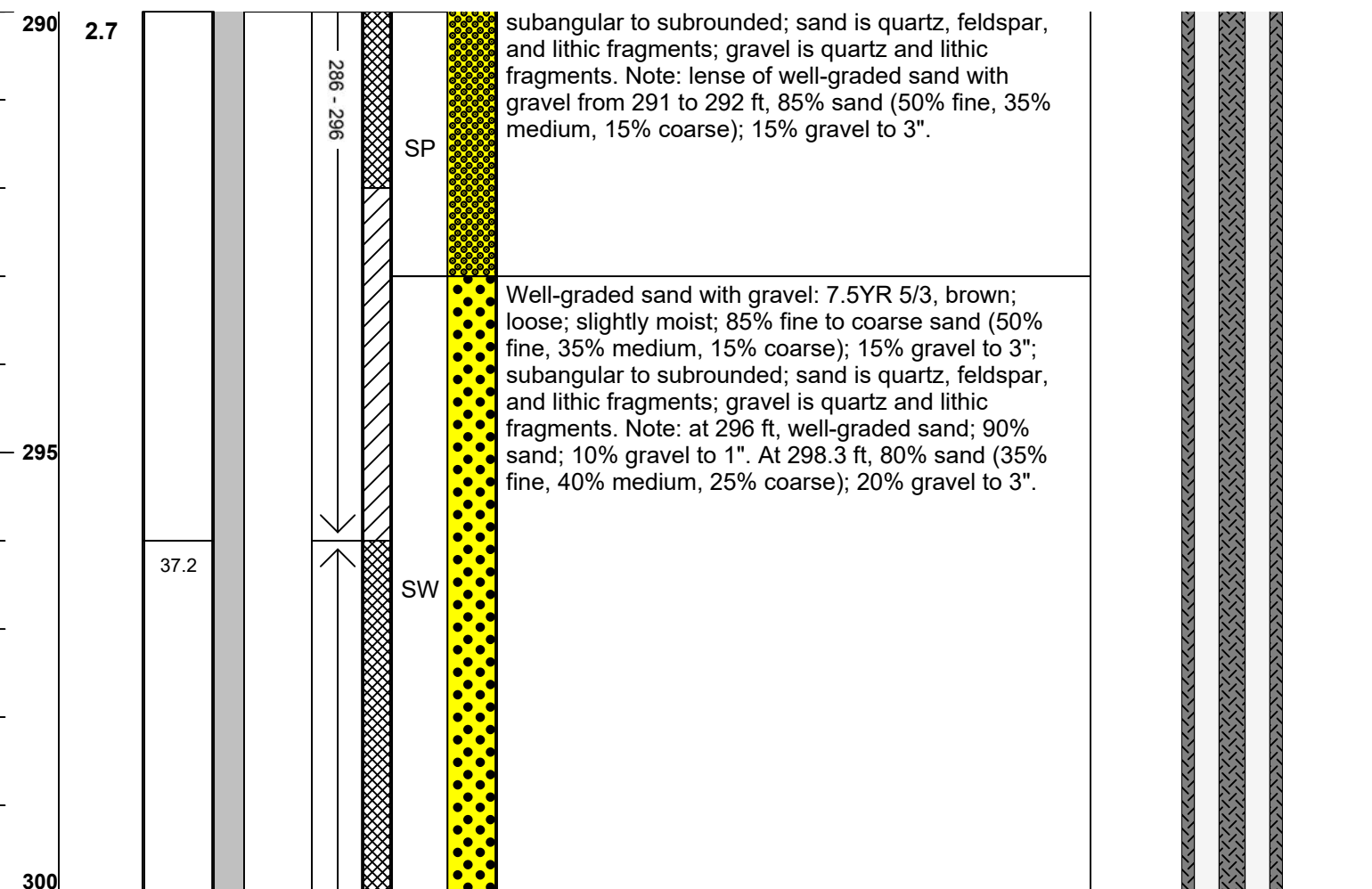
Well ID: **KAFB-106S1**

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

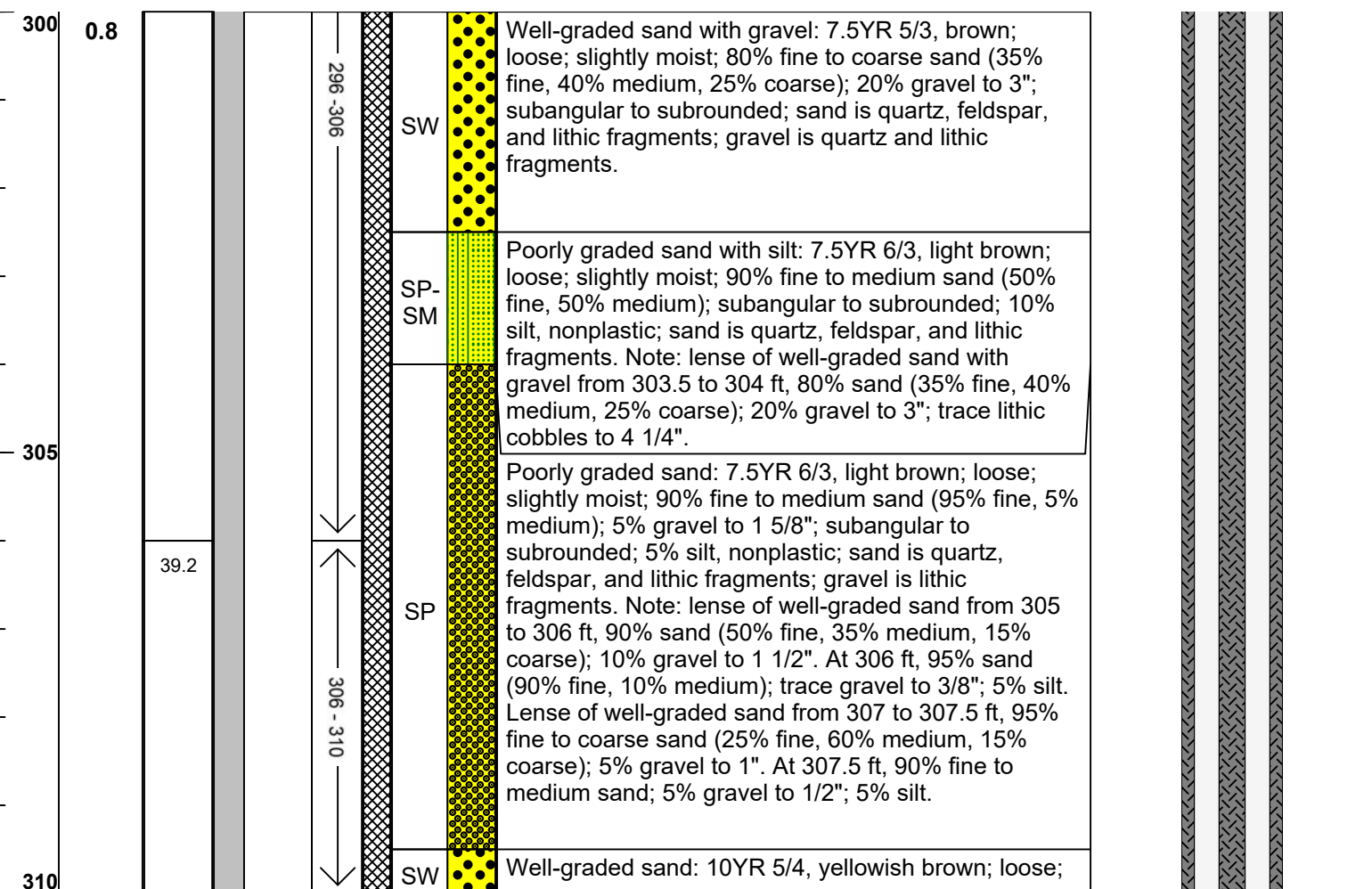
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
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Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

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Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

310	1.9	44.6							SW	slightly moist; 85% fine to coarse sand (65% fine, 25% medium, 10% coarse); 10% gravel to 2 3/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of well-graded sand with clay from 309.5 to 310 ft, 85% sand (45% fine, 35% medium, 20% coarse); 5% gravel to 5/8"; 10% clay.
									SM	Silty sand: 10YR 6/3, pale brown; loose; slightly moist; 70% very fine to fine sand (30% very fine, 70% fine); 10% gravel to 2"; subangular to subrounded; 20% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of clayey sand with gravel from 313.7 to 314.2 ft, 10YR 5/2, grayish brown; 70% sand (50% fine, 20% medium, 30% coarse); 15% gravel to 1 1/2"; 15% clay nodules, medium stiff, low plasticity, 7.5YR 5/4, brown.
315									SW-SC	
		50.4							SW	@ 314.2 ft - Well-graded sand with clay and gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (65% fine, 20% medium, 15% coarse); 20% gravel to 3"; trace cobbles to 4 3/8"; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments; cobbles are lithic fragments. @ 316 ft - Well-graded sand: 10YR 5/3, brown; loose; moist; 85% fine to coarse sand (60% fine, 30% medium, 10% coarse); 10% gravel to 1 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 318 ft, 5% clay; no silt.
320										

Notes:

(1) Current Water Table Well

(2) Contingency Well

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UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

320	2.9					316 - 326		SW	Well-graded sand: 10YR 5/3, brown; loose; moist; 75% fine to coarse sand (20% fine, 60% medium, 20% coarse); 20% gravel to 2 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: lense of clay from 321.8 to 322 ft; 7.5YR 5/6, strong brown; very stiff; medium plasticity. At 322 ft, gravel to 2 1/2". Lense of poorly graded sand from 324 to 325 ft, 90% sand (50% fine, 50% medium); trace coarse sand; 5% gravel to 1"; 5% silt.	
325								CL	Clay: 7.5YR 5/4, brown; stiff to very stiff; medium plasticity.	
		28.3						SW	Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 90% fine to coarse sand (40% fine, 40% medium, 20% coarse); 10% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 327 ft, well-graded sand with gravel; 80% sand (20% fine, 40% medium, 40% coarse); 20% gravel to 1". At 328 ft, 75% sand; 20% gravel; trace cobbles to 4"; 5% silt.	
330								SC	Clayey sand: 10YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (40% fine, 50% medium, 10% coarse); 5% gravel to 5/8"; subangular to	

Notes:

(1) Current Water Table Well

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Driller: Roger Rodriquez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

330	3.6								@ 330 ft - Well-graded sand: 10YR 5/3, brown; loose; slightly moist; 95% fine to coarse sand (60% fine, 30% medium, 10% coarse); 5% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: at 334 ft, well-graded sand with gravel; 85% sand (50% fine, 30% medium, 20% coarse); 15% gravel to 2".	
					326 - 336			SW		
335										
		38.4						SC	Clayey sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 40% fine to coarse sand (10% fine, 60% medium, 30% coarse); 35% gravel to 1 1/4"; subangular to subrounded; 25% clay, low plasticity; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
								SW-SC	Well-graded sand with clay and gravel: 10YR 6/3, pale brown; loose; slightly moist; 75% fine to coarse sand (10% fine, 80% medium, 10% coarse); 15% gravel to 1 5/8"; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
340										

Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

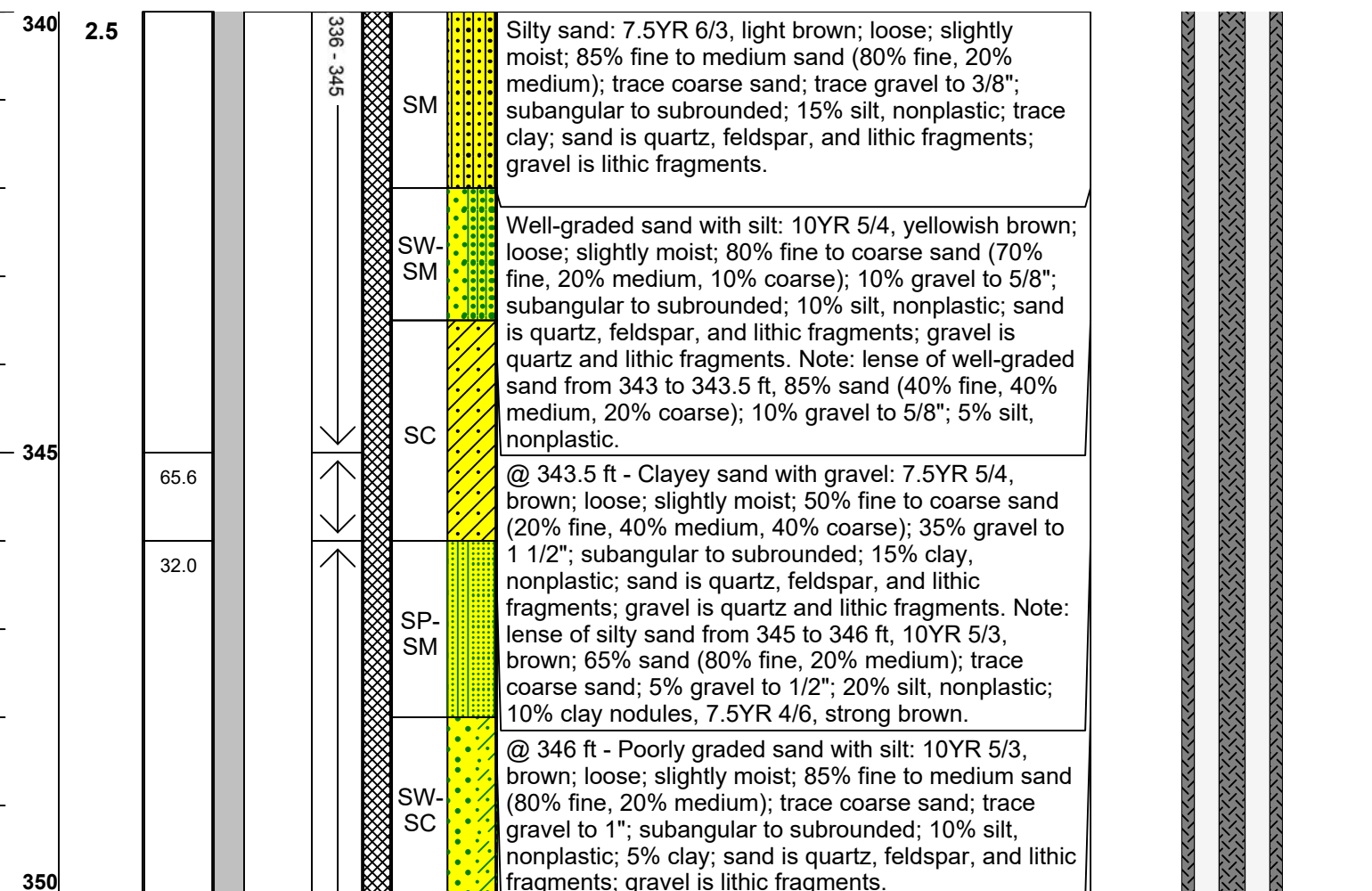
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

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(2) Contingency Well

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ft = feet

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

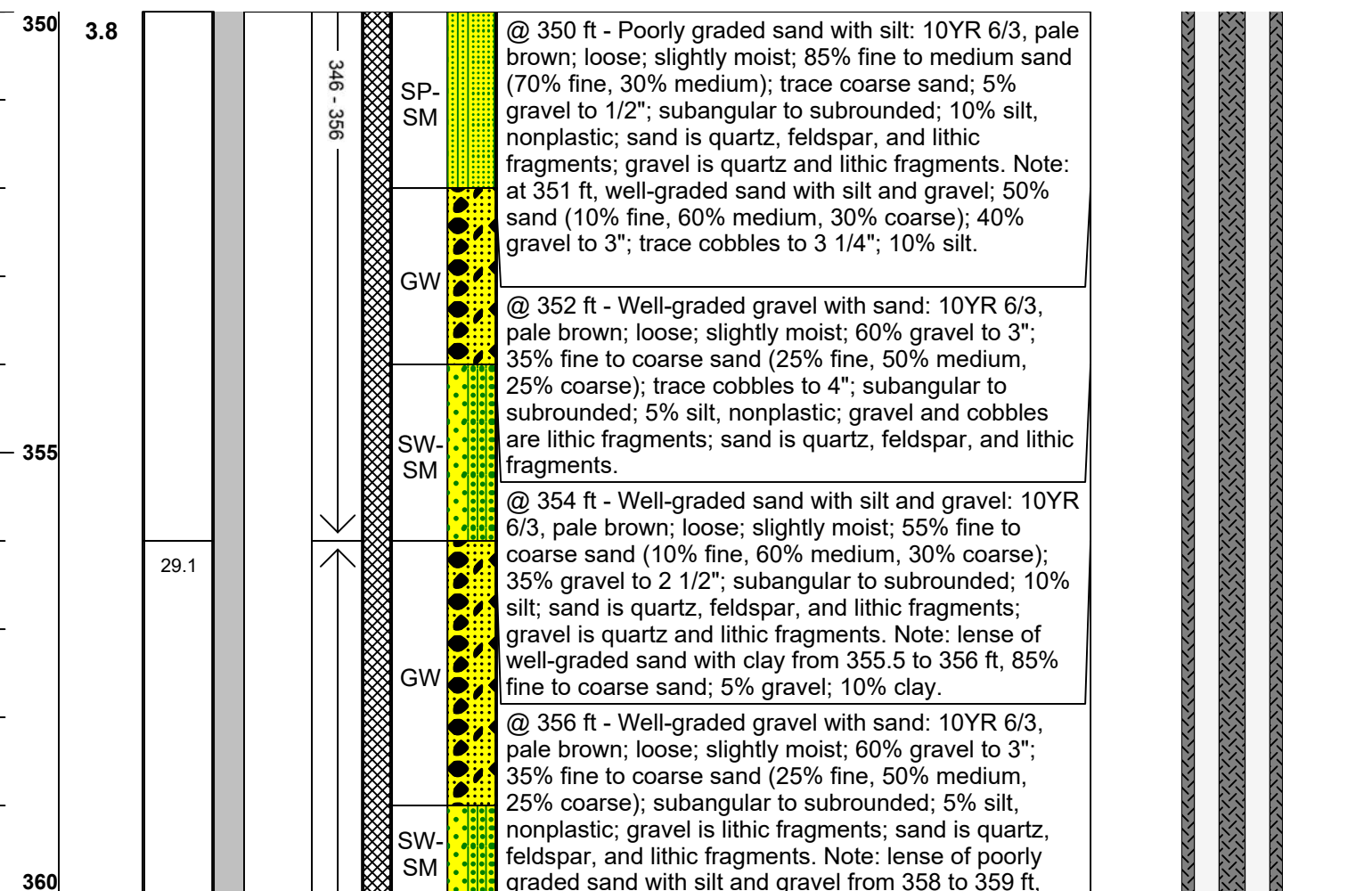
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

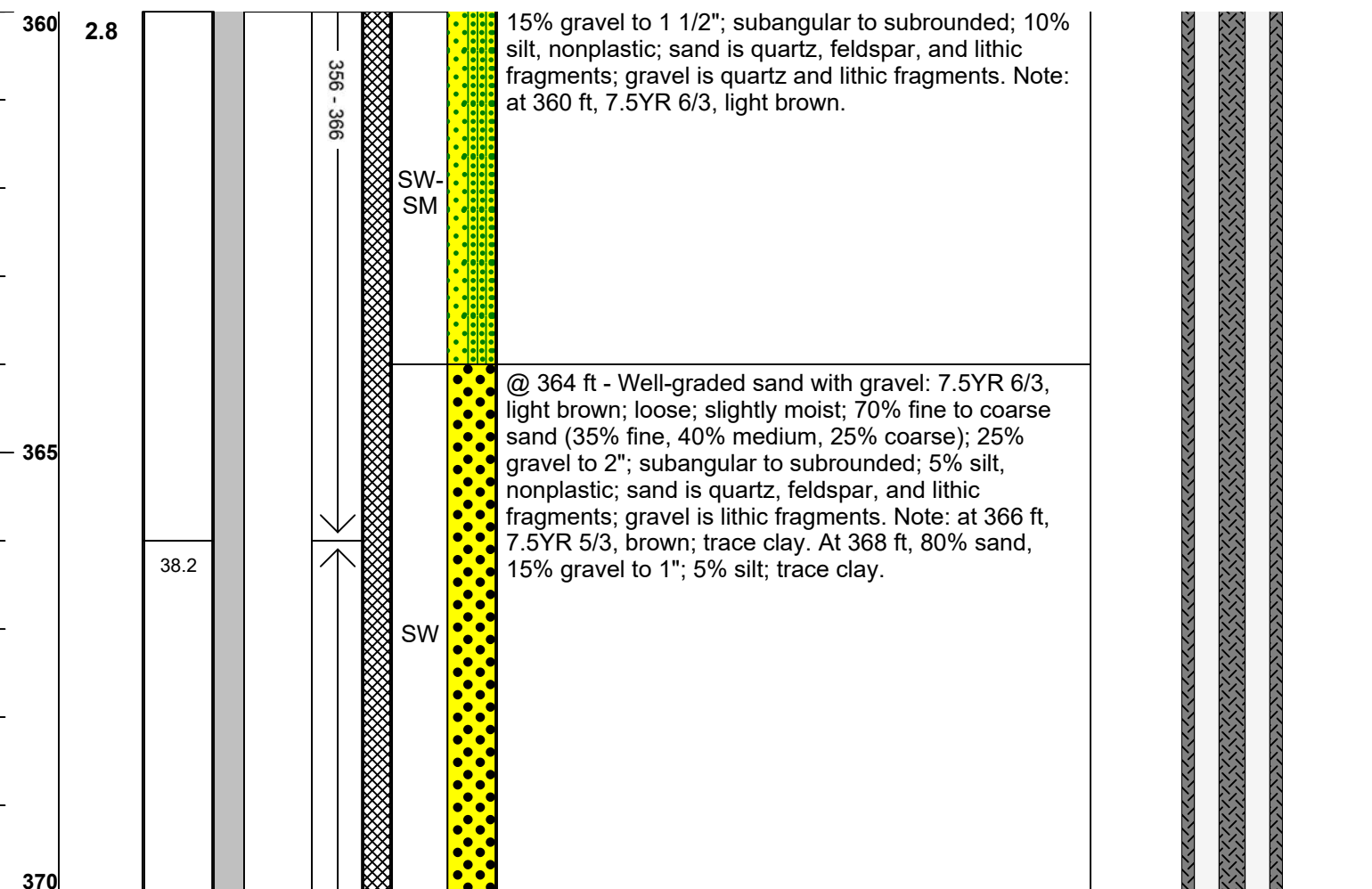
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

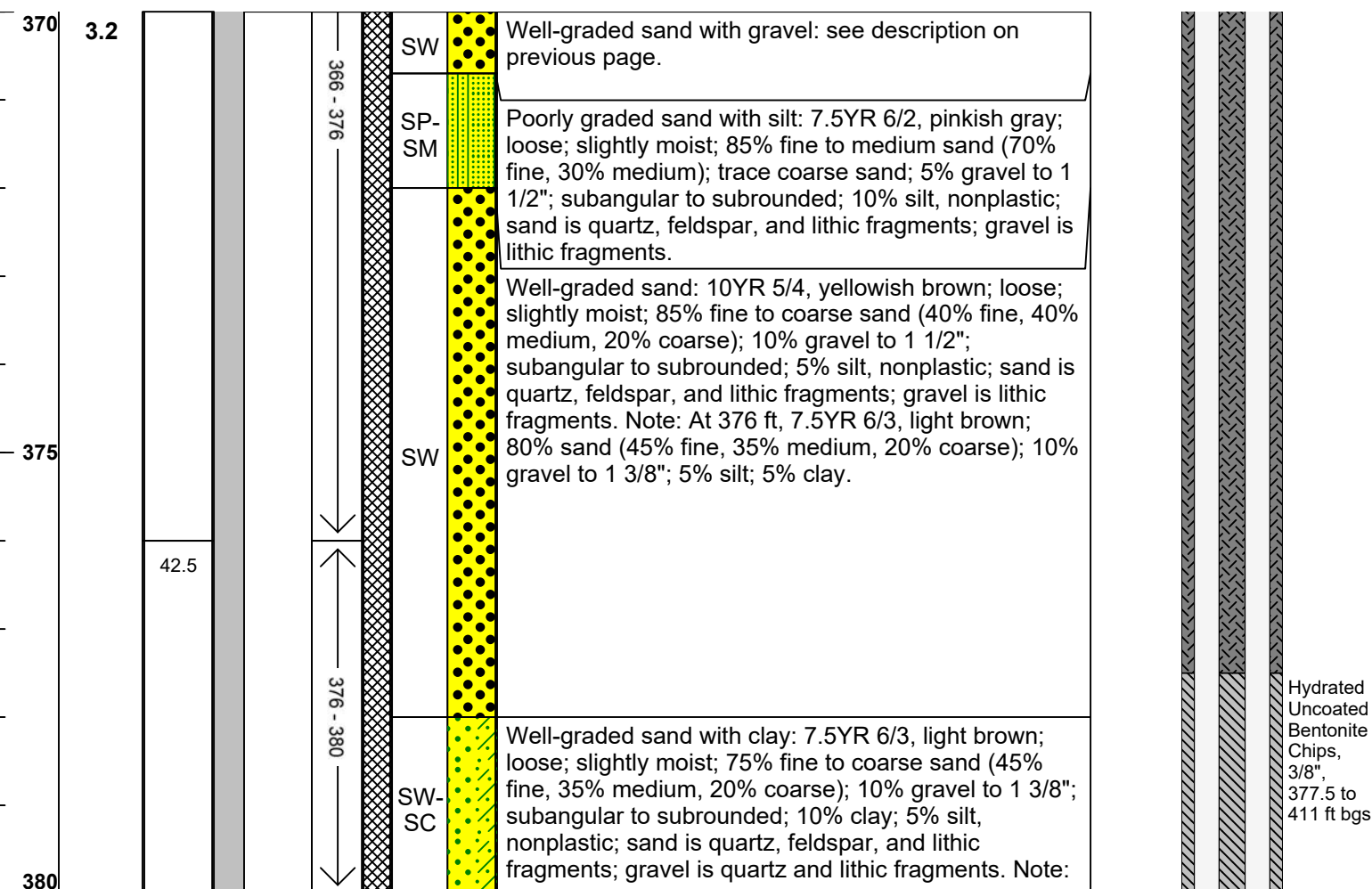
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1014**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/27/18**

Completion Date: **2/18/2019**

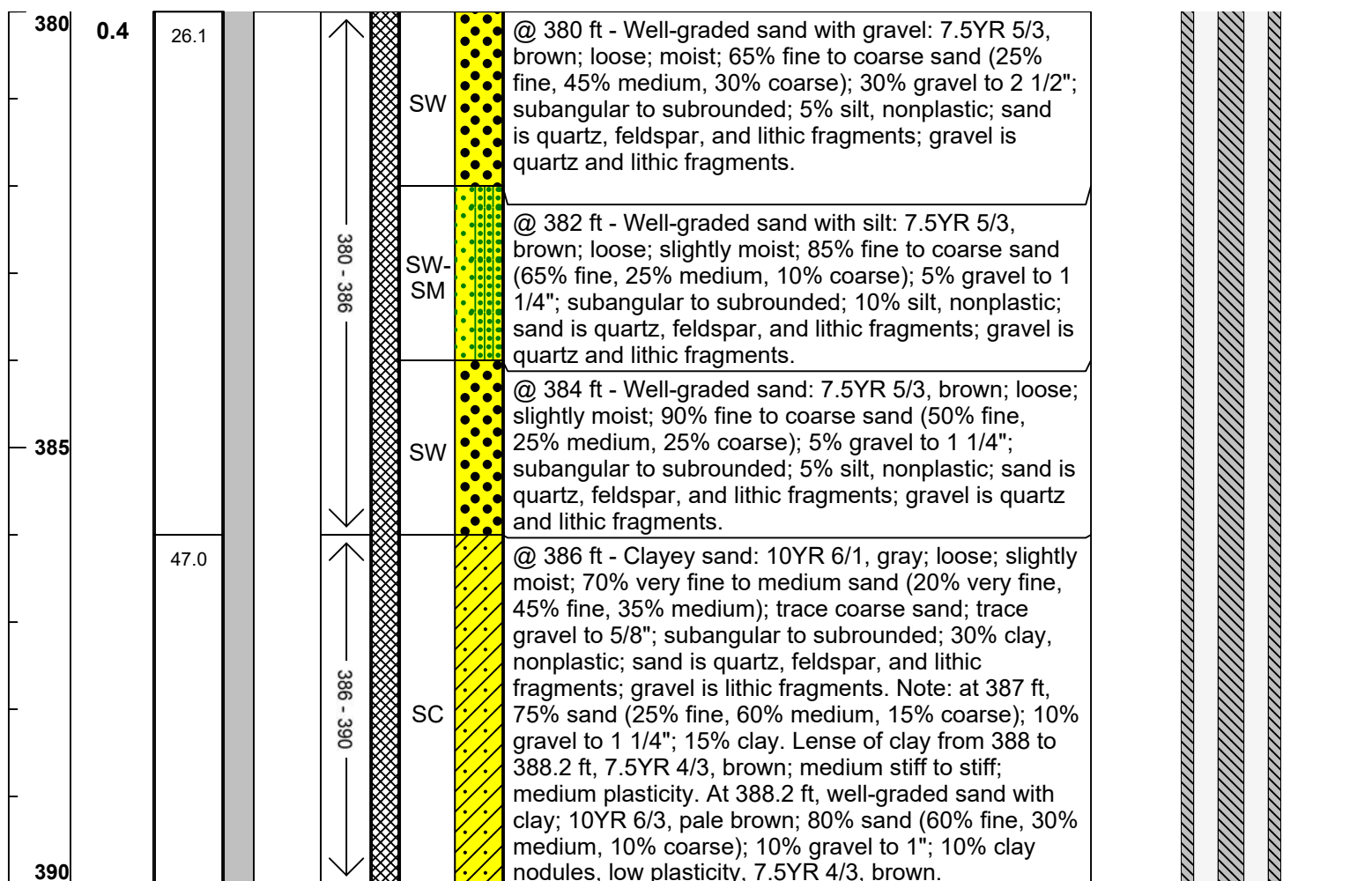
WELL LOG

Well ID: **KAFB-106S1**

Page: **39 of 51**

Drilling Company: Cascade								Boring Depth (ft): 510 ft		Screen Material: 3" Sch. 80 PVC	
Drilling Method: Sonic Coring								Boring Diameter (in): 7"		0.010" Slot Screen	
Drill Bit: Sonic Core Barrel, 6" ID								Well Diameter: 3" ID		Seal Material(s): Cement, Bentonite,	
Driller: Roger Rodriquez								DTW After Completion (ft bgs): 469.8		High Solids Bentonite Grout	
Geologist: L. Andress, J. Messenger								Riser Material: 3" Sch. 80 PVC		Filter Pack: 10/20 Silica Sand	
Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description		Completion Details

(1) (2)



Notes:

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

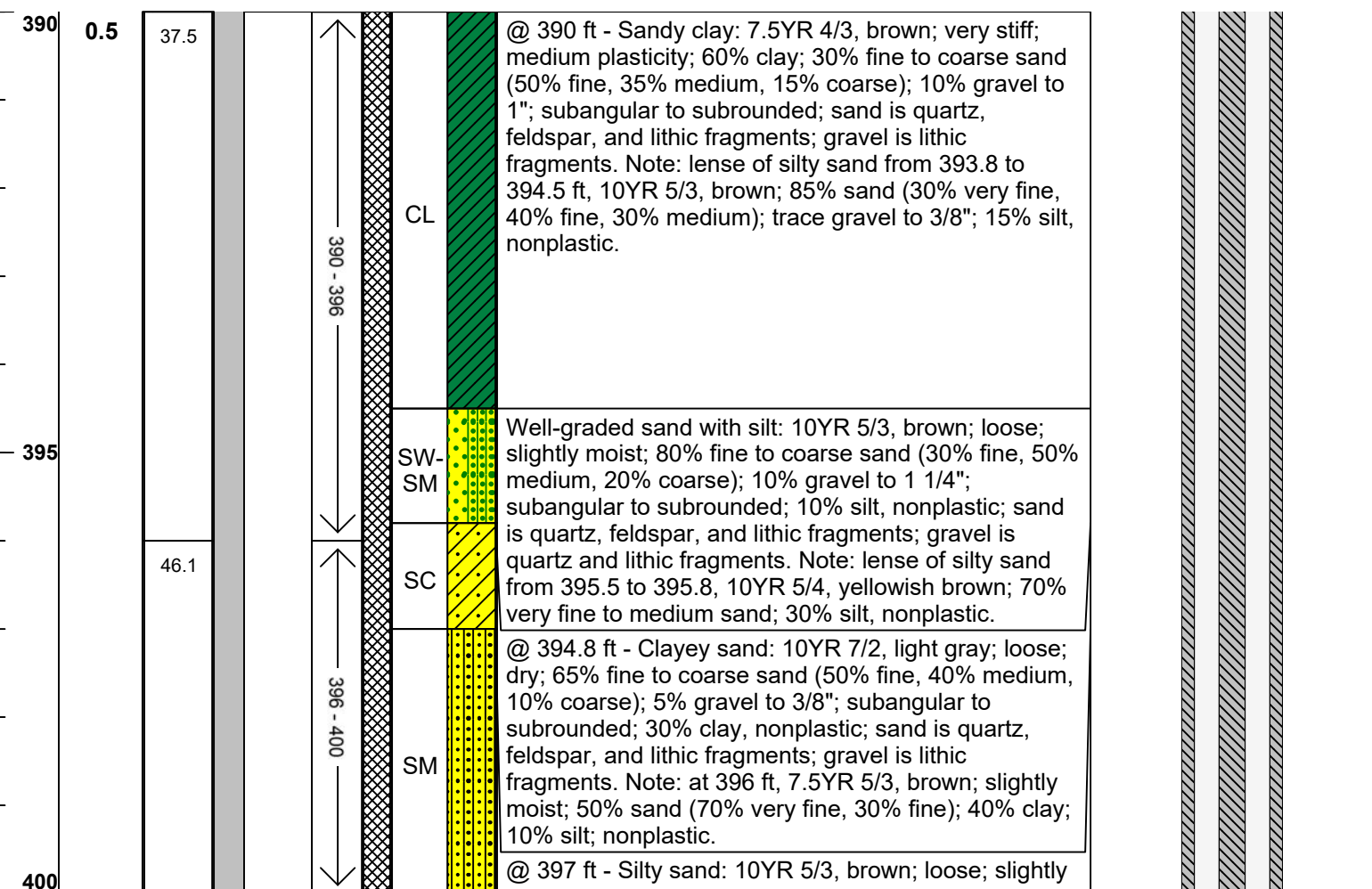
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

(1) Current Water Table Well

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

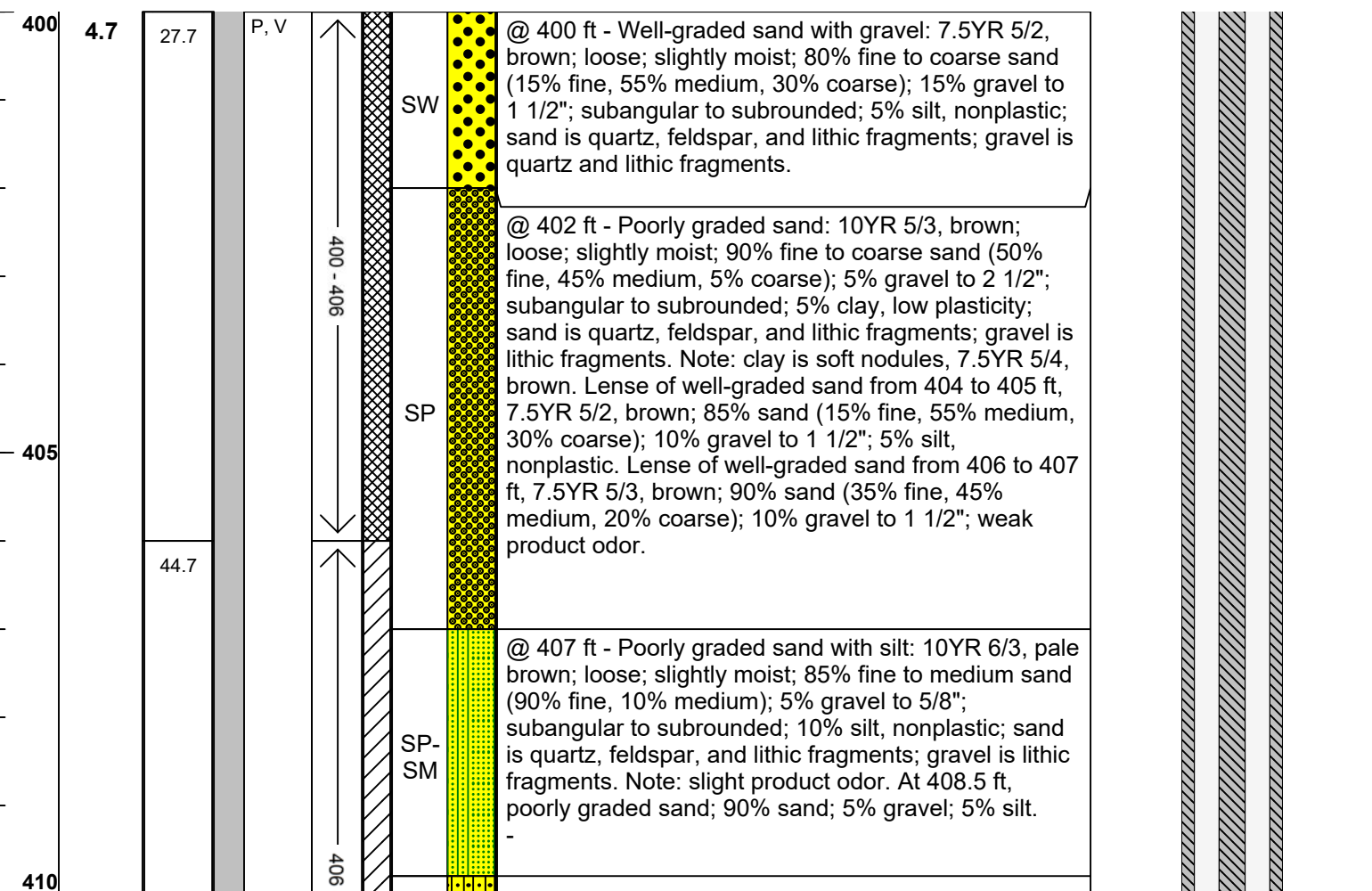
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

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USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

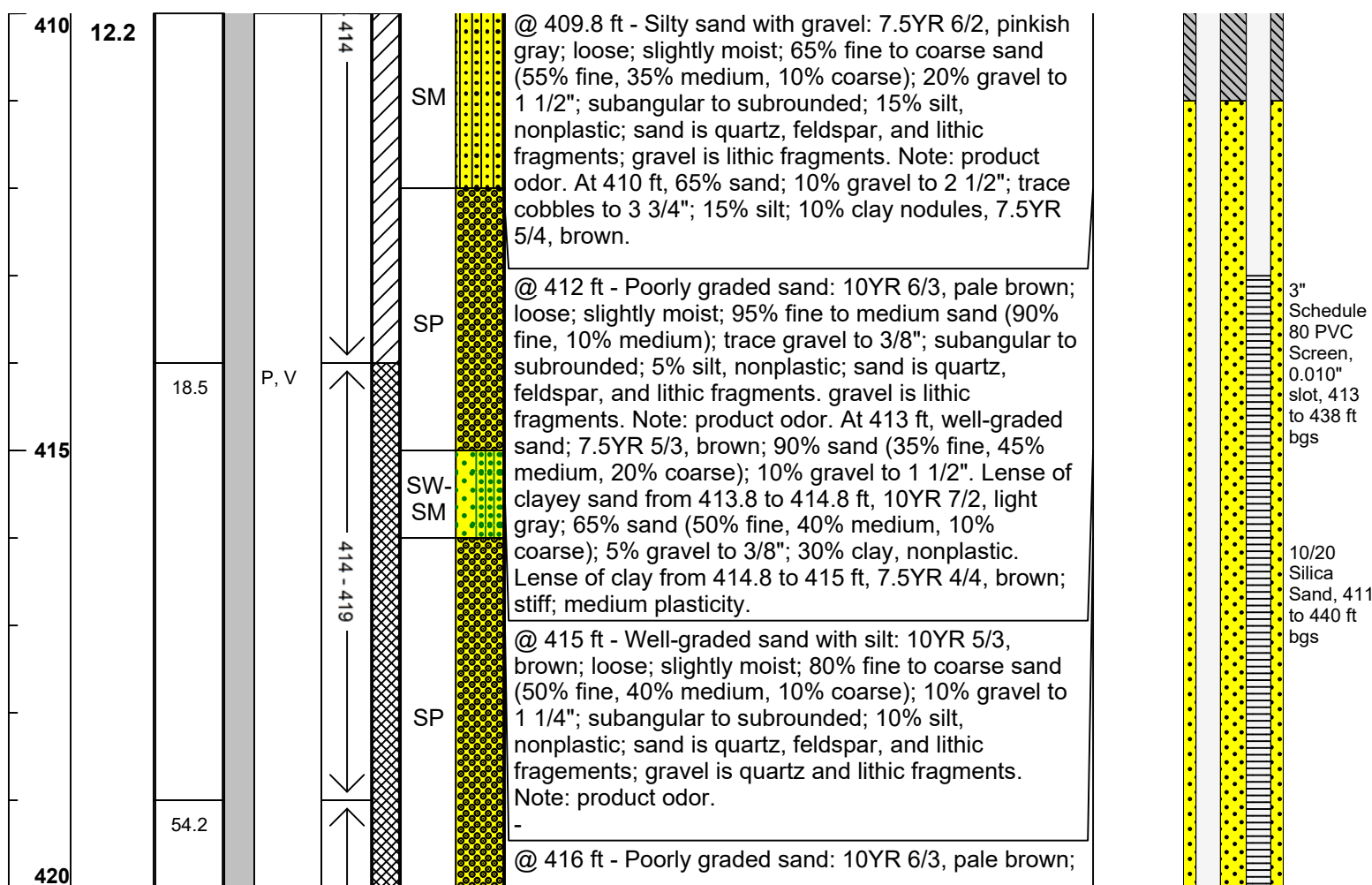
UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

WELL LOG

Well ID: **KAFB-106S1**

Page: 42 of 51

Drilling Company: Cascade									Boring Depth (ft): 510 ft			Screen Material: 3" Sch. 80 PVC		
Drilling Method: Sonic Coring									Boring Diameter (in): 7"			0.010" Slot Screen		
Drill Bit: Sonic Core Barrel, 6" ID									Well Diameter: 3" ID			Seal Material(s): Cement, Bentonite,		
Driller: Roger Rodriguez									DTW After Completion (ft bgs): 469.8			High Solids Bentonite Grout		
Geologist: L. Andress, J. Messenger									Riser Material: 3" Sch. 80 PVC			Filter Pack: 10/20 Silica Sand		
Depth (ft)	PI/D (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description				Completion Details	



Notes:

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(2) Contingency Well
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ppmv = parts per million by volume
USCS = Unified Soil Classification

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

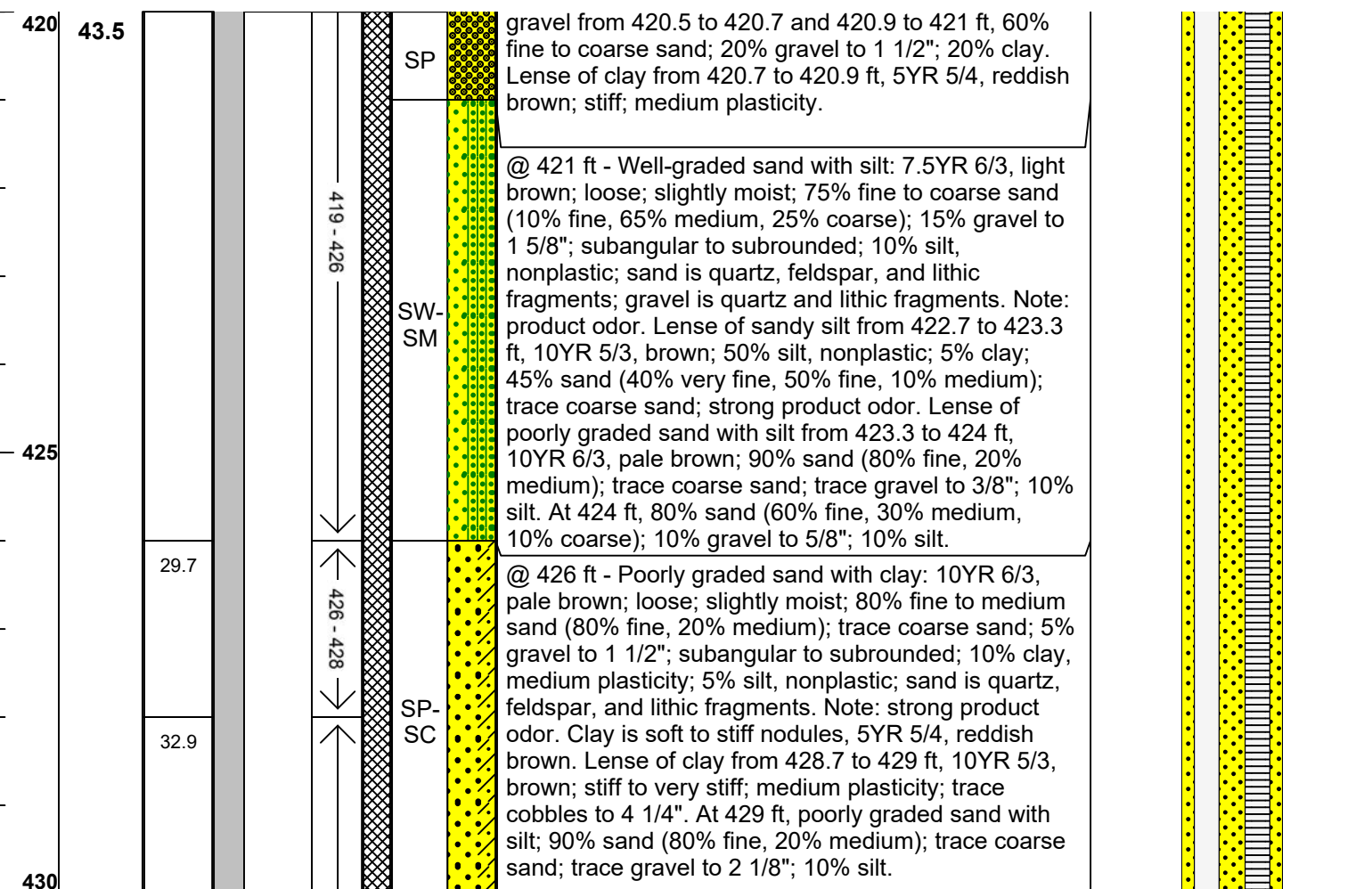
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

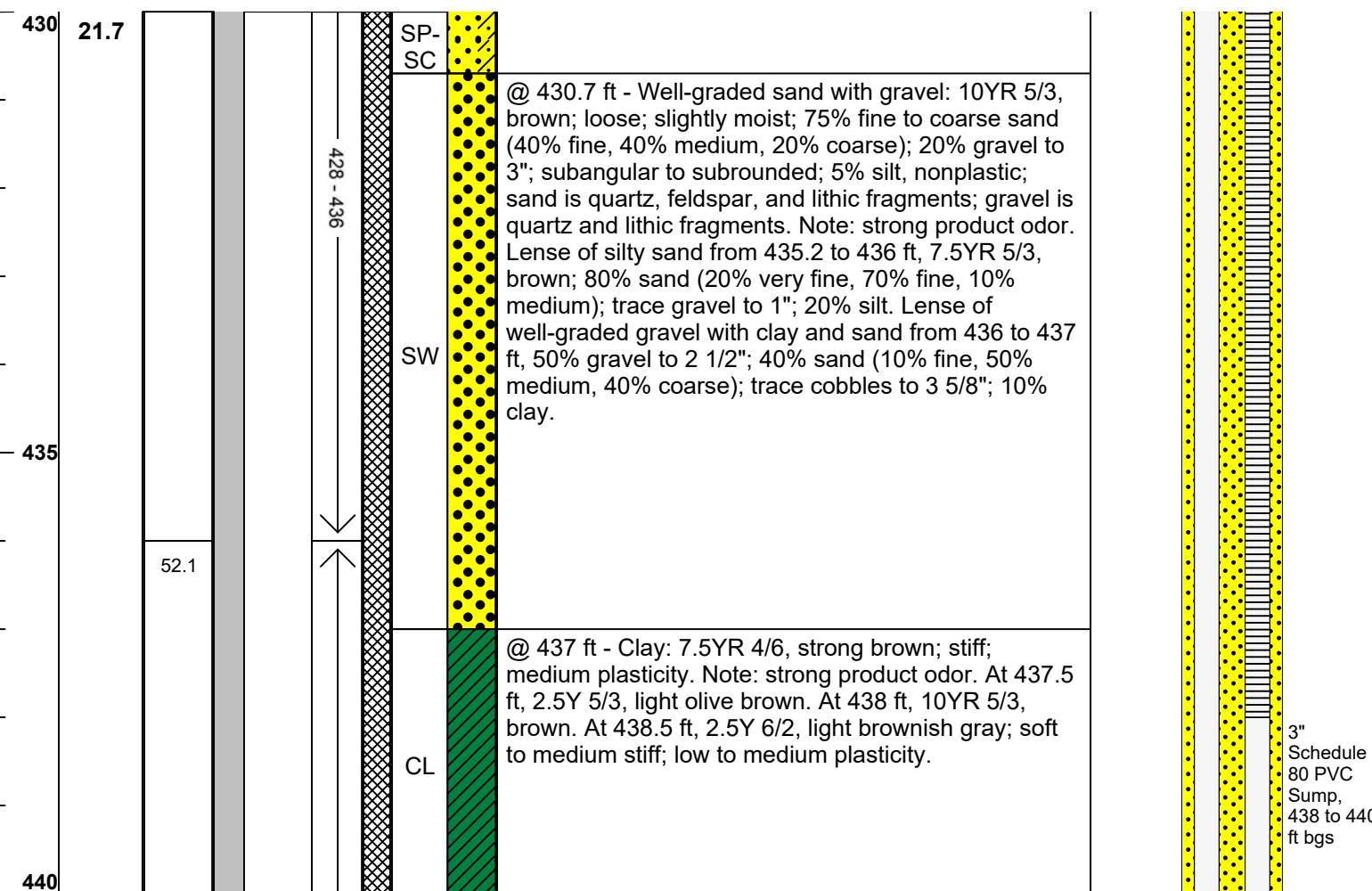
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

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- ID = inner diameter
- ppmv = parts per million by volume
- USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

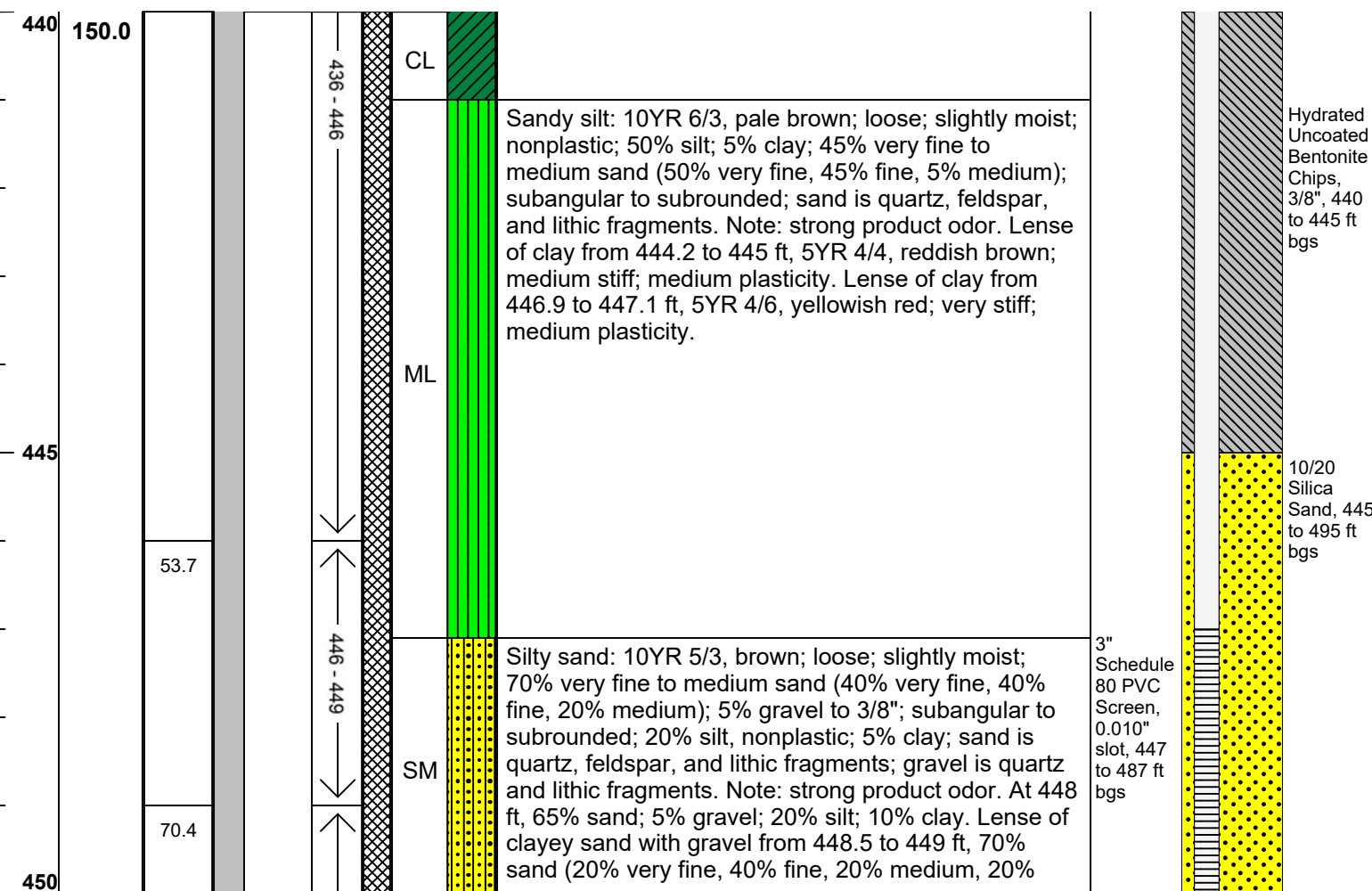
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

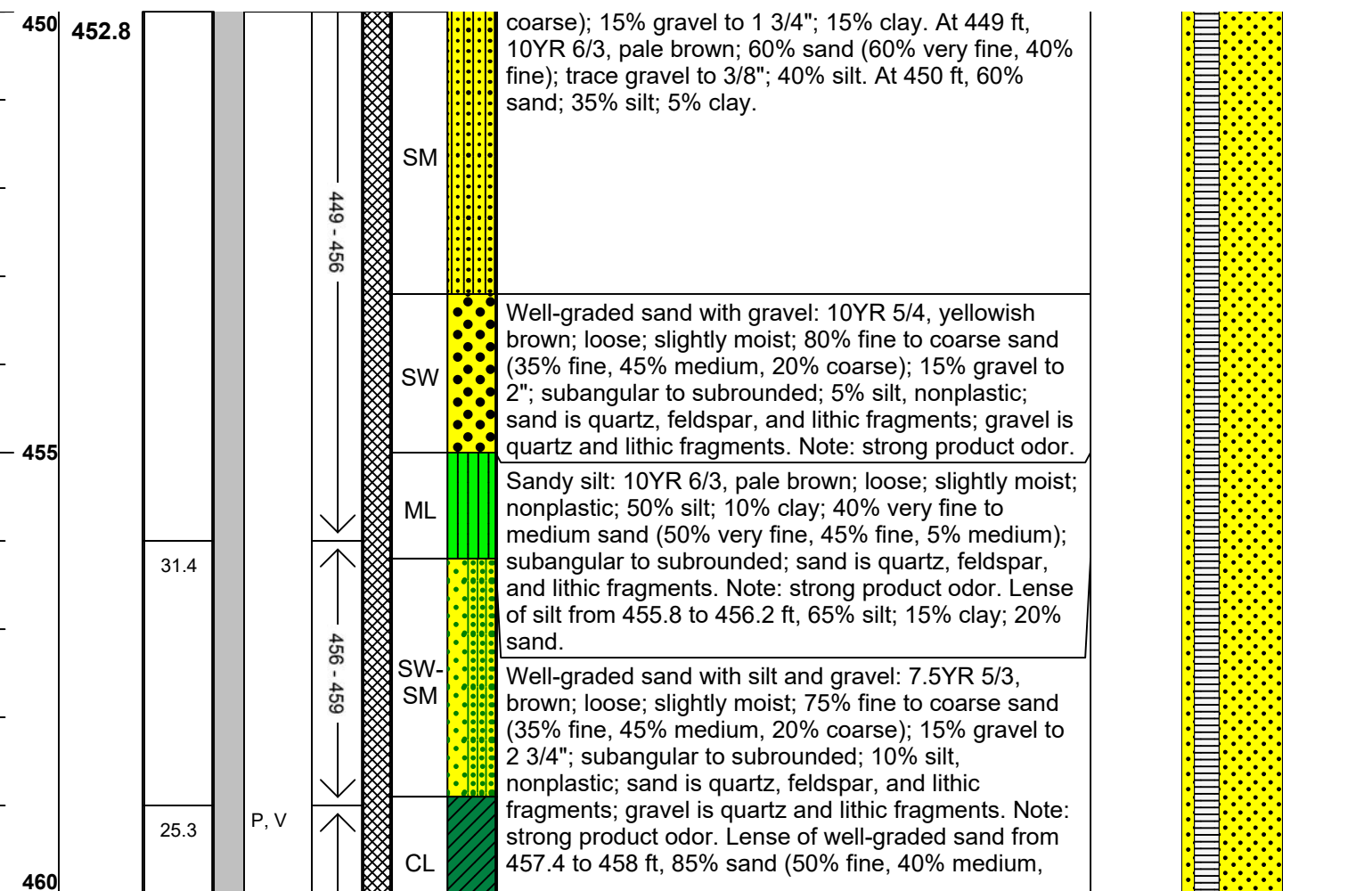
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

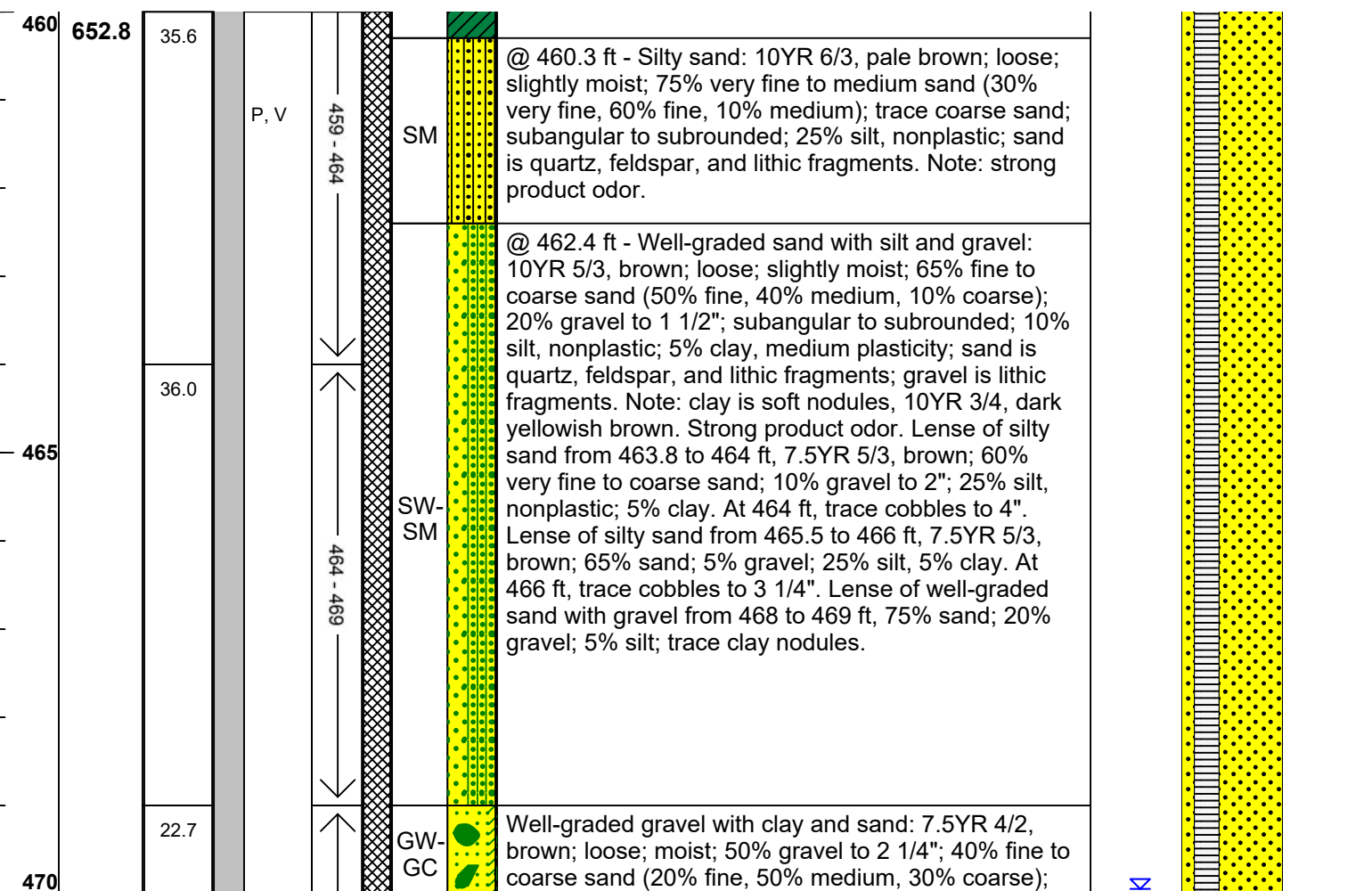
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

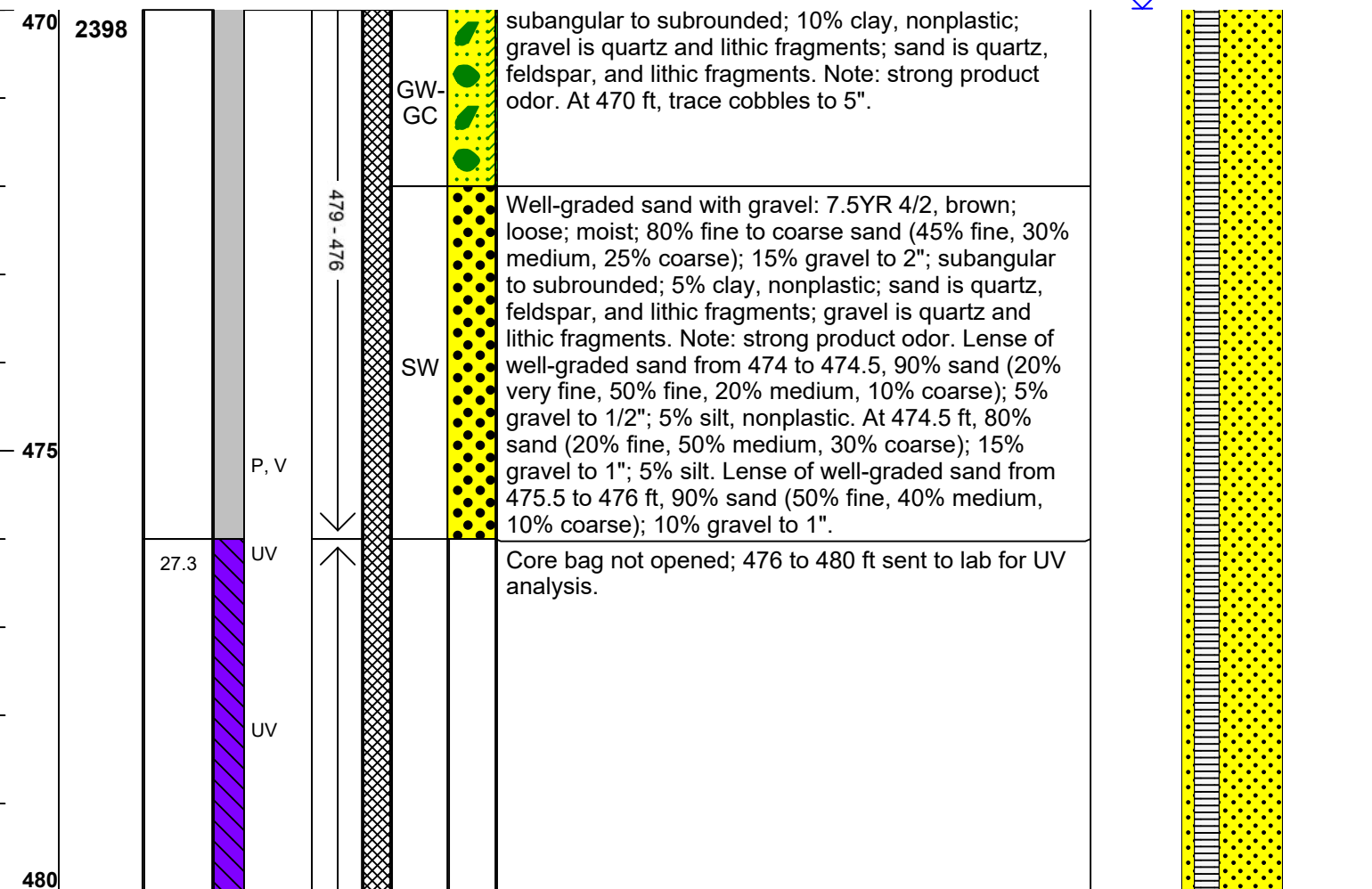
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

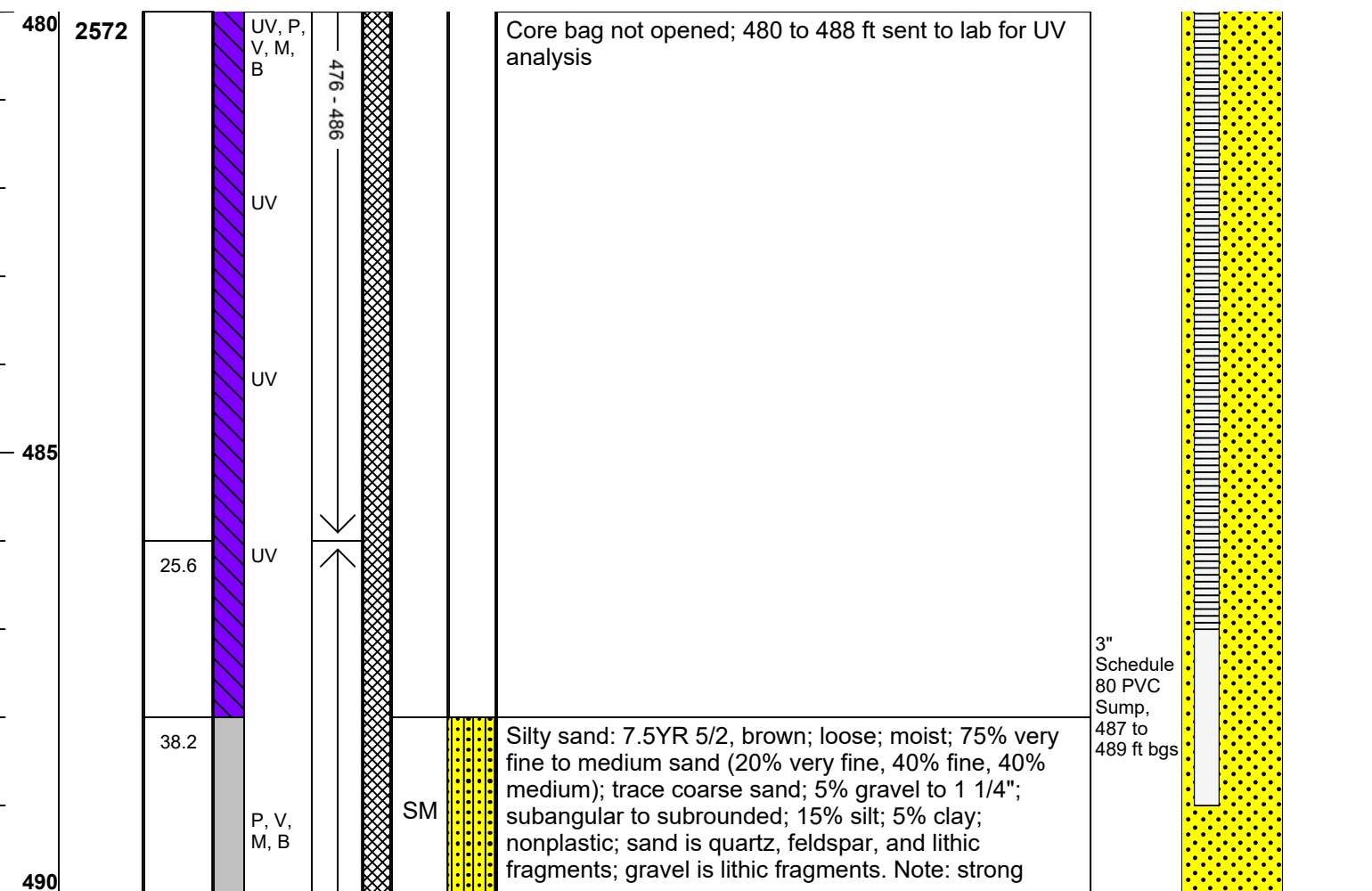
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

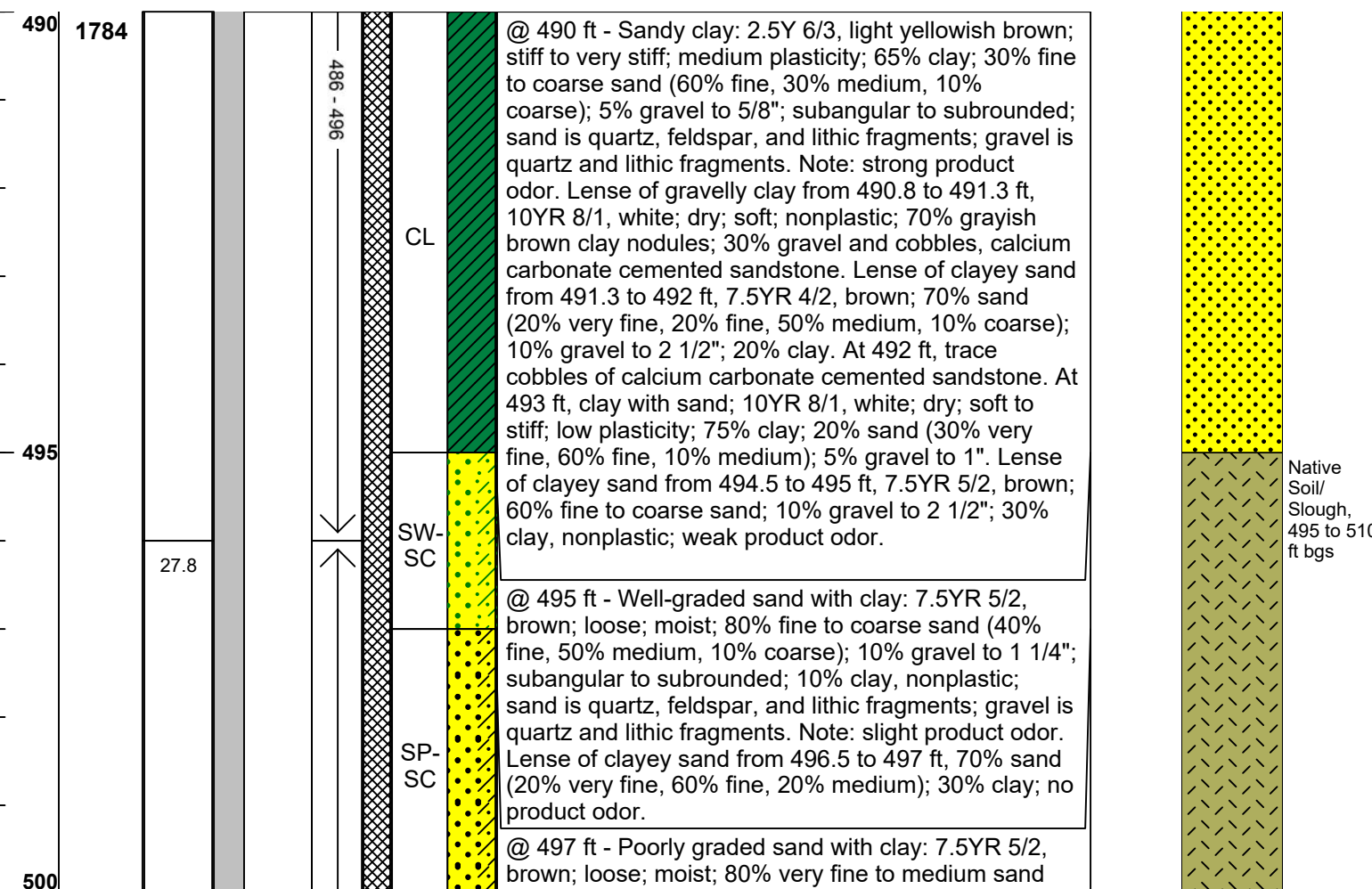
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

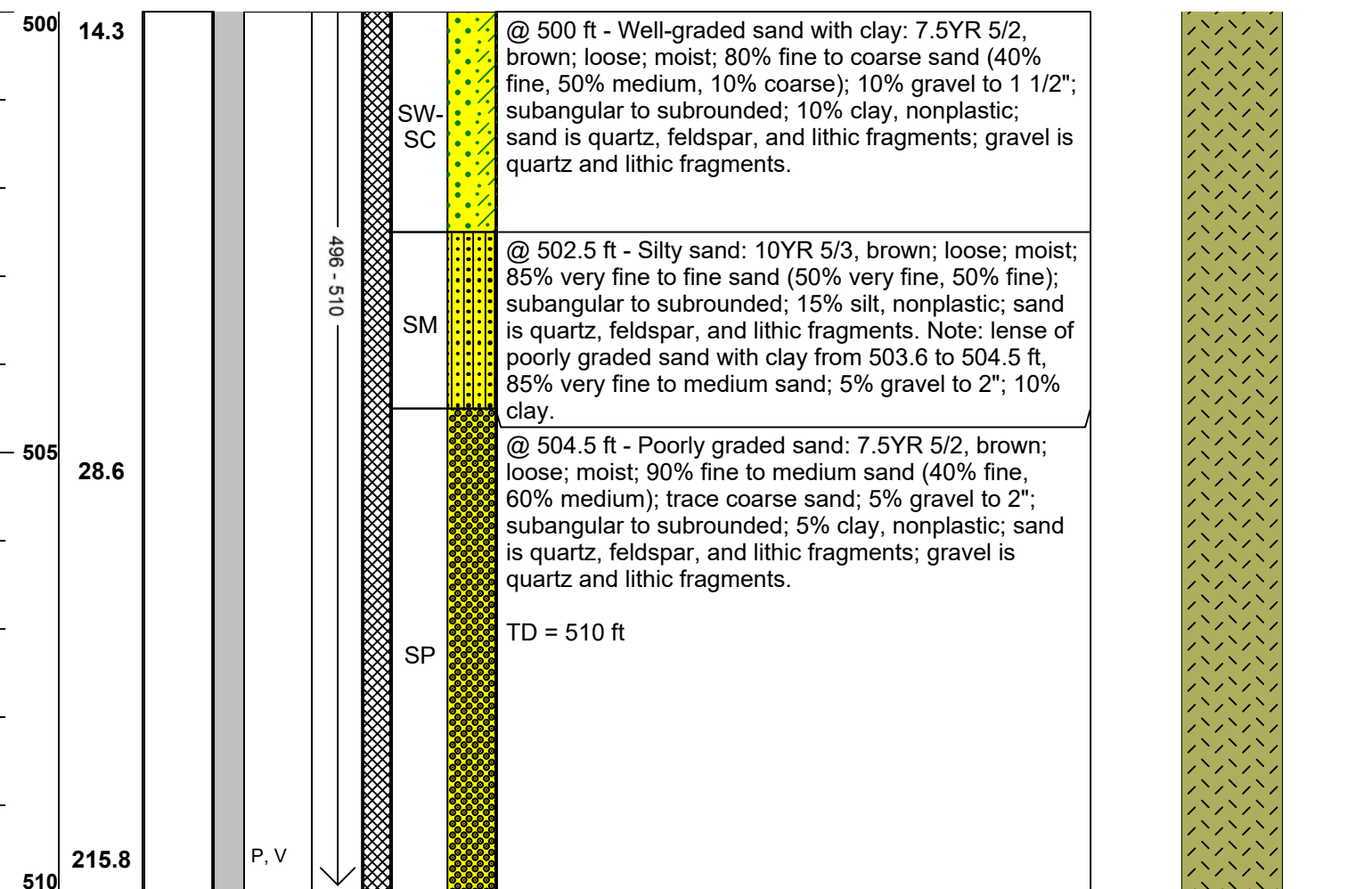
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 469.8	High Solids Bentonite Grout
Geologist: L. Andress, J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

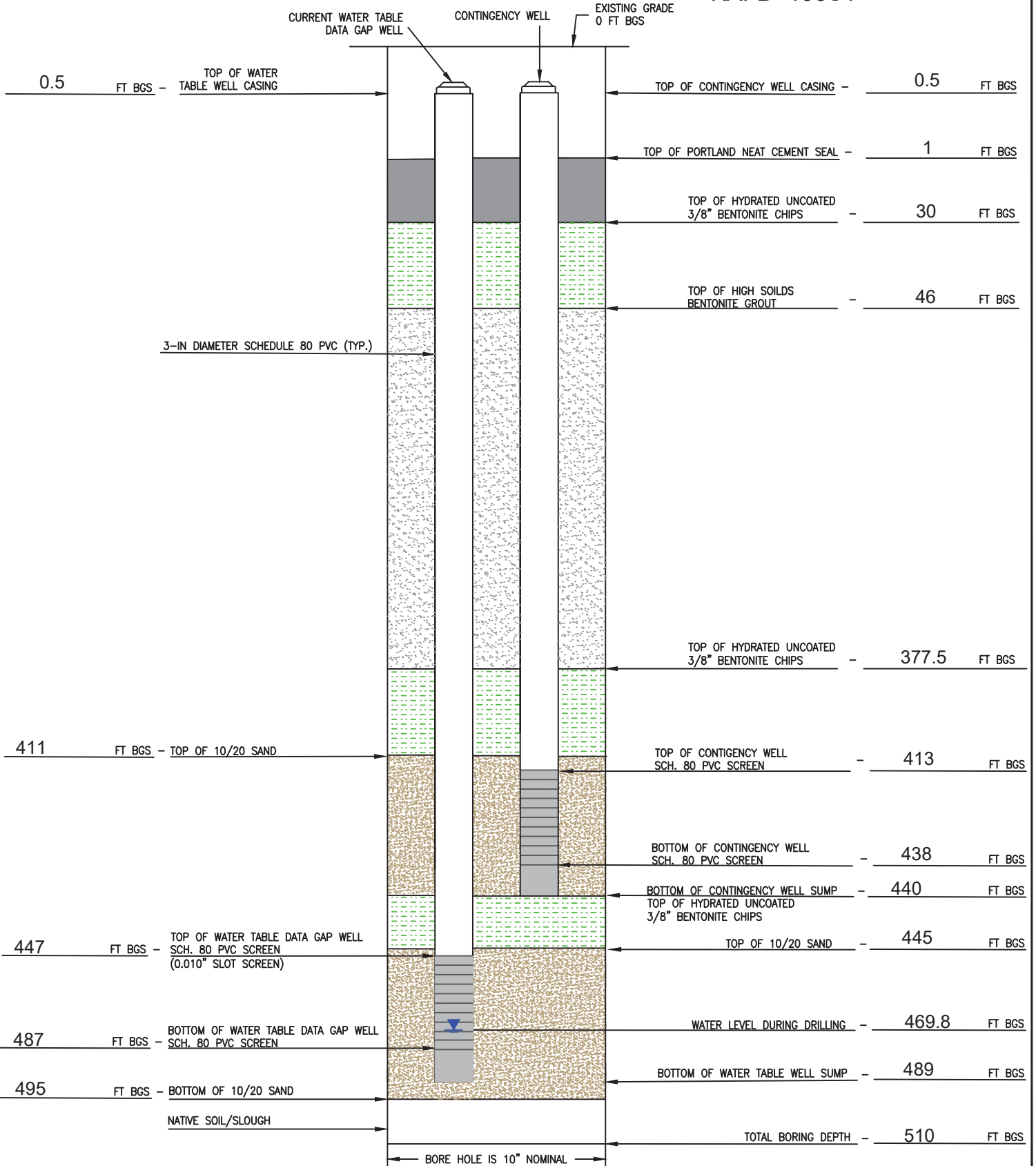
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S1



NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

PROJECT NO.:
62735DM02.1017

WELL ID:
KAFB-106S1

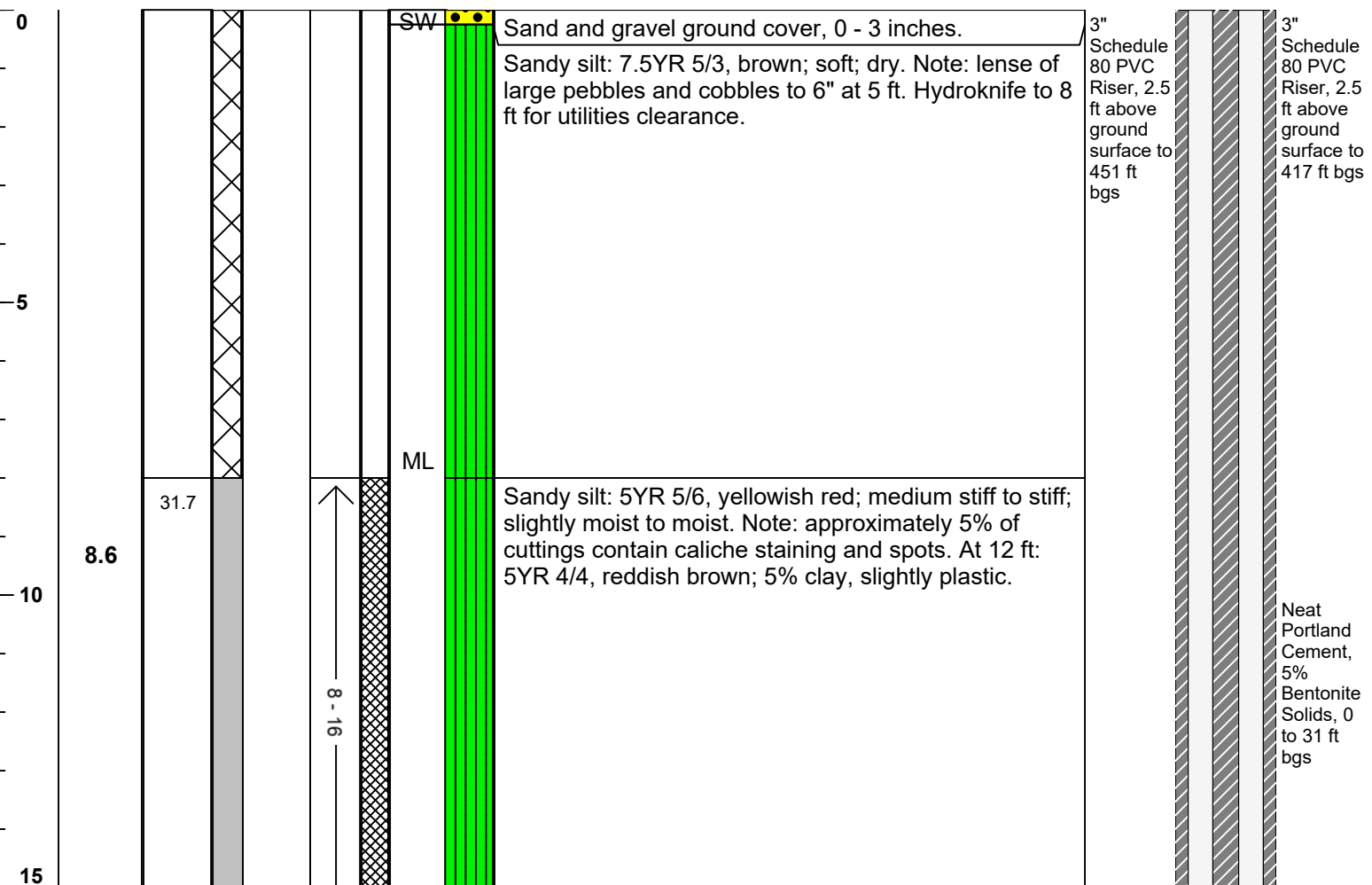
INSTALLATION START DATE/TIME:
18OCT18
GEOLOGIST: L. Andress/
J. Messenger

INSTALLATION END DATE/TIME:
18FEB19
DRILLER: R. Rodriguez

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

- (1) Current Water Table Well
- (2) Contingency Well
- ☒ = Depth to water after completion
- UV = ultraviolet fluorescence
- NA = Not Applicable
- bgs = below ground surface
- DTW = depth to water
- ft = feet
- ID = inner diameter
- ppmv = parts per million by volume
- USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/6/18**

Completion Date: **11/21/18**

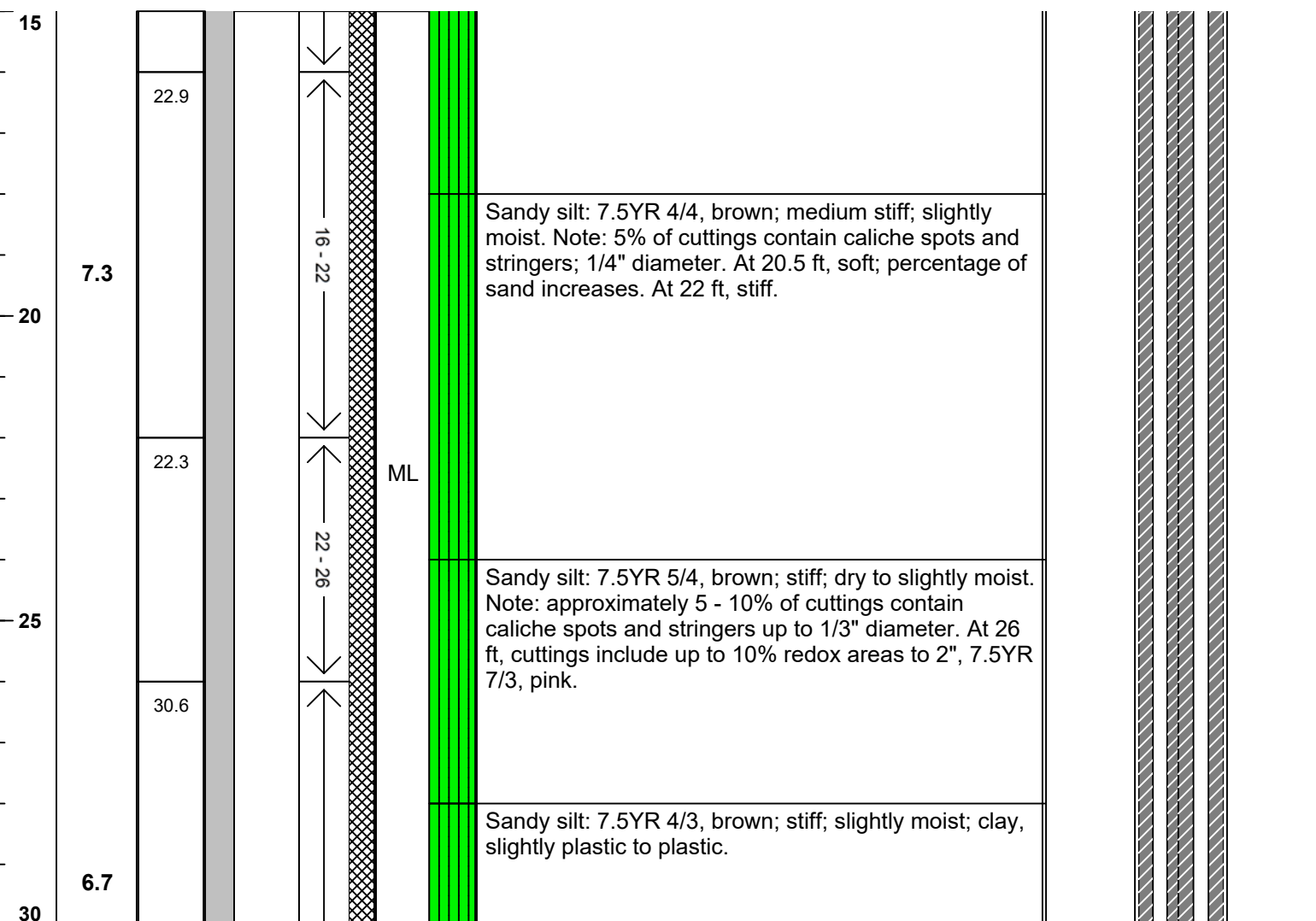
WELL LOG

Well ID: **KAFB-106S2**

Page: **2 of 35**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	None
	Interval Fluoresced

Core Recovery	
	No Recovery
	Complete
	Disturbed Core

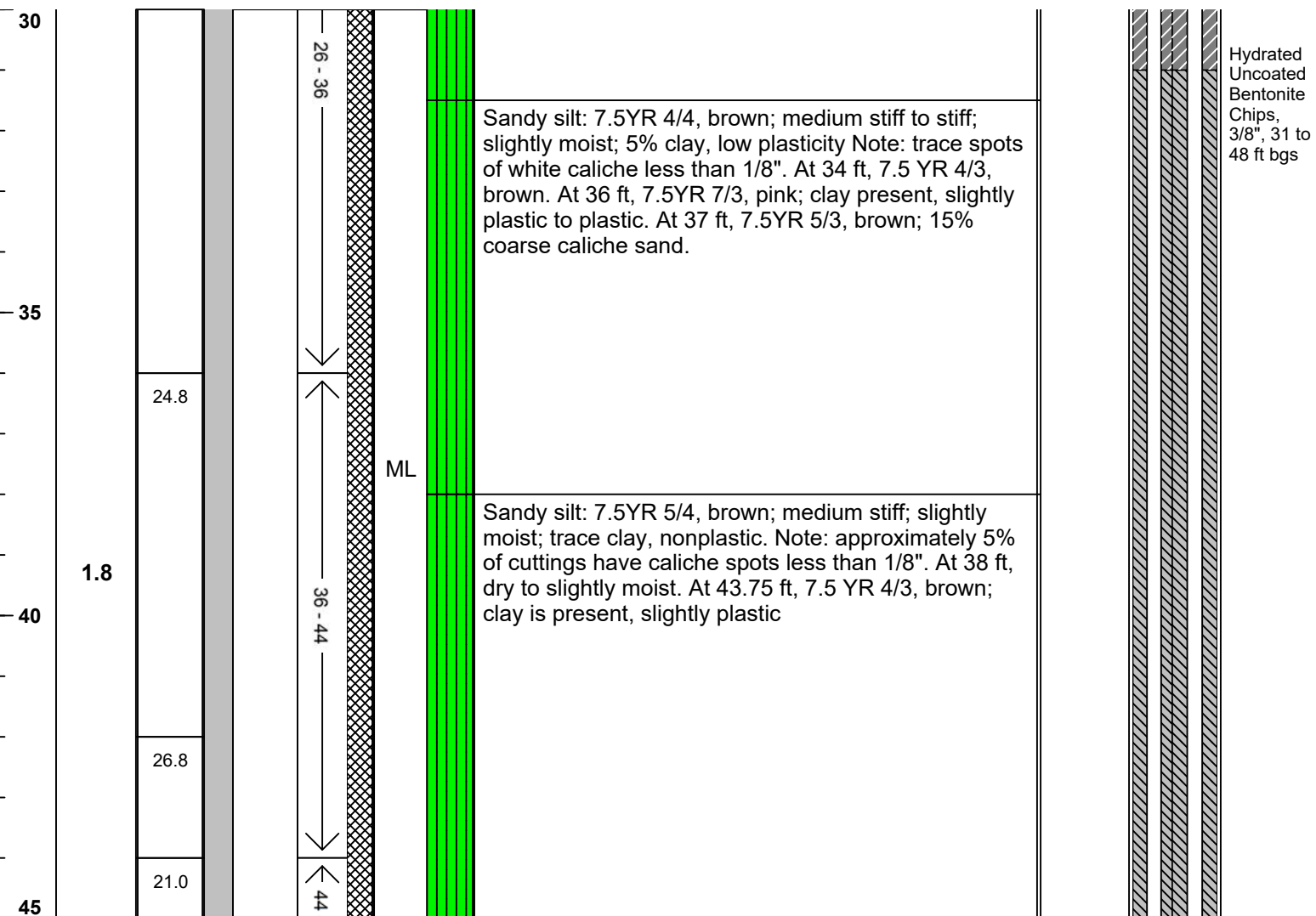
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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Driller: Roger Rodriquez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/6/18**

Completion Date: **11/21/18**

WELL LOG

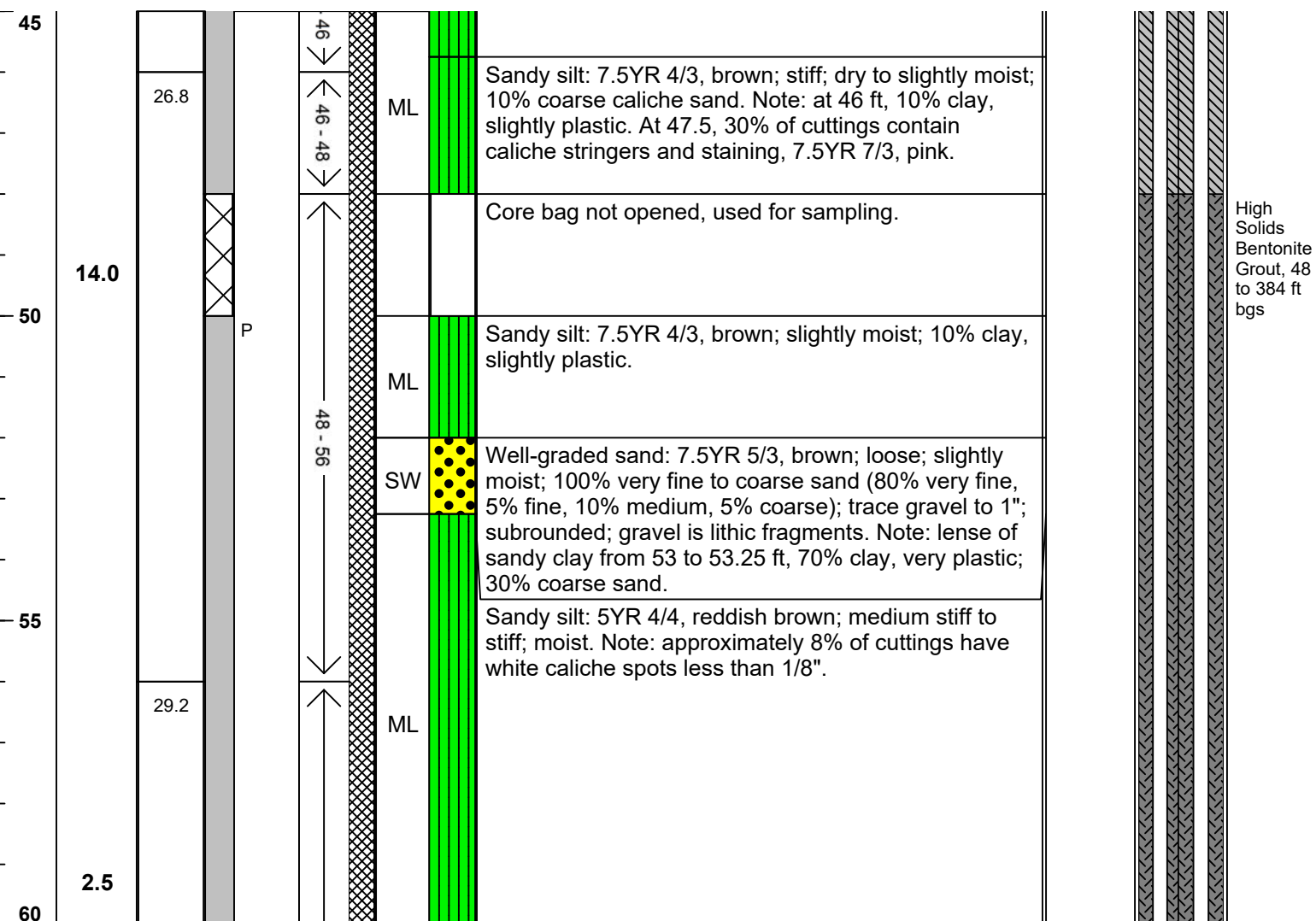
Well ID: **KAFB-106S2**

Page: **4 of 35**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

- (1) Current Water Table Well
- (2) Contingency Well
- ☒ = Depth to water after completion
- UV = ultraviolet fluorescence
- NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

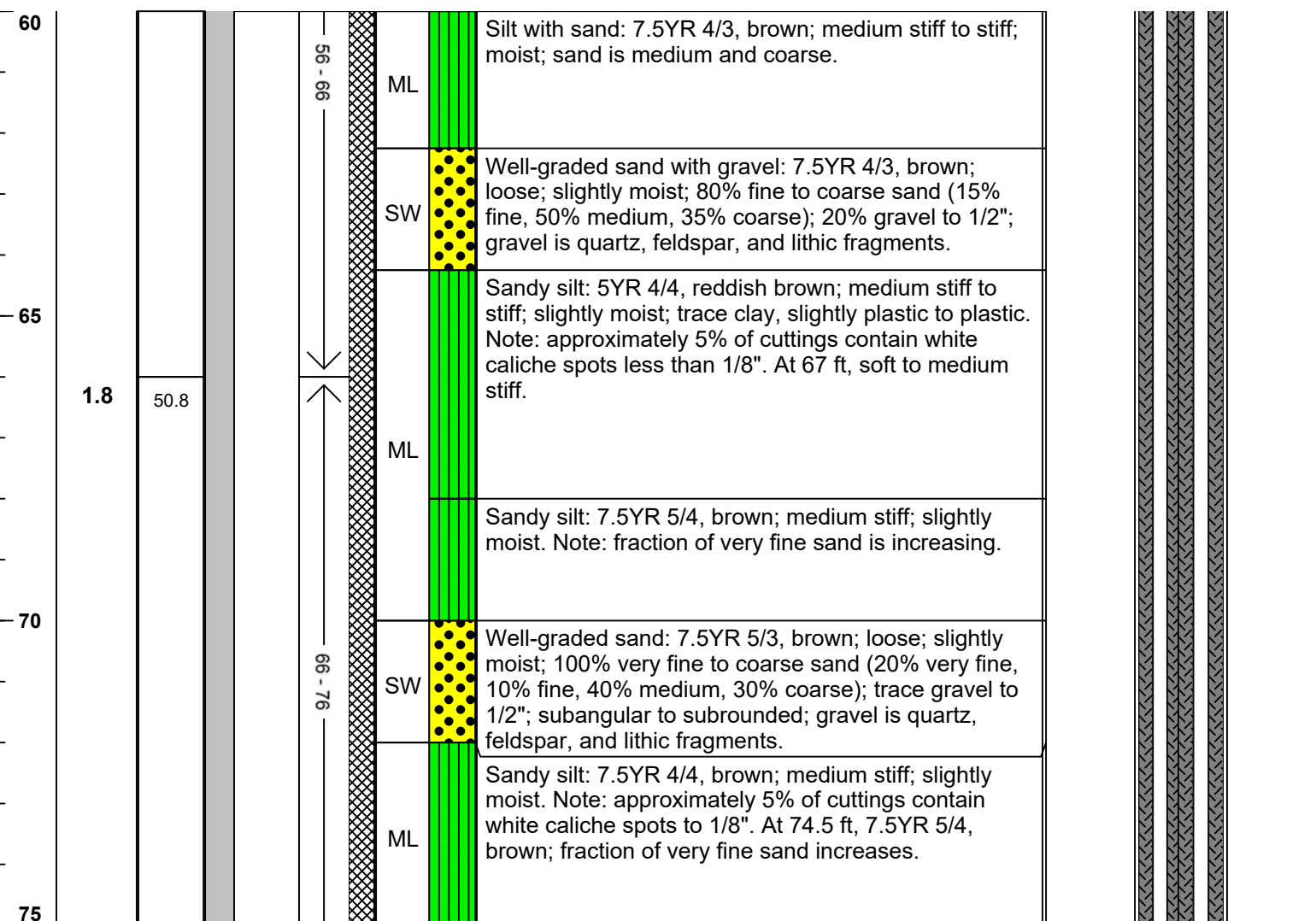
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Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

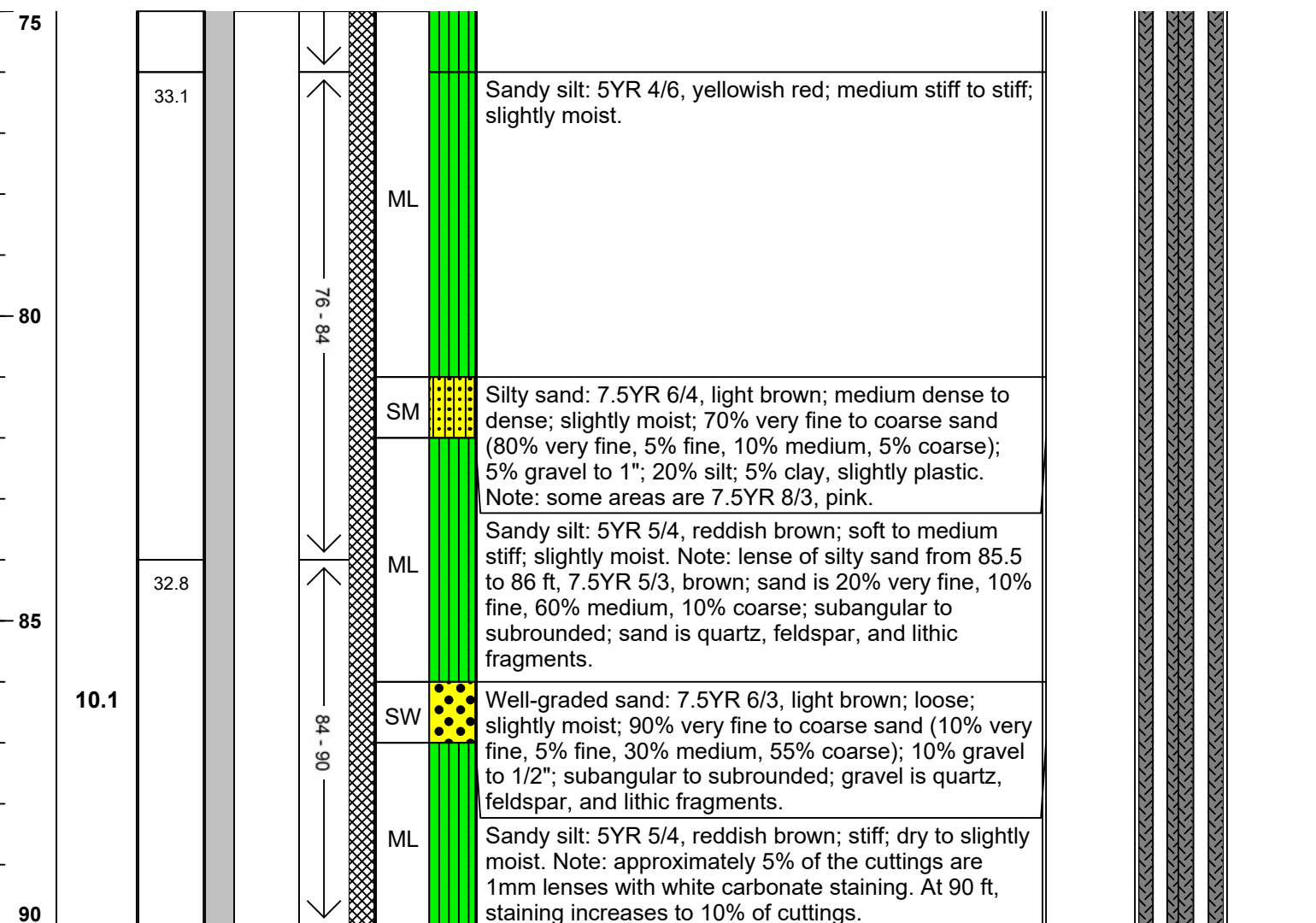
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

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Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

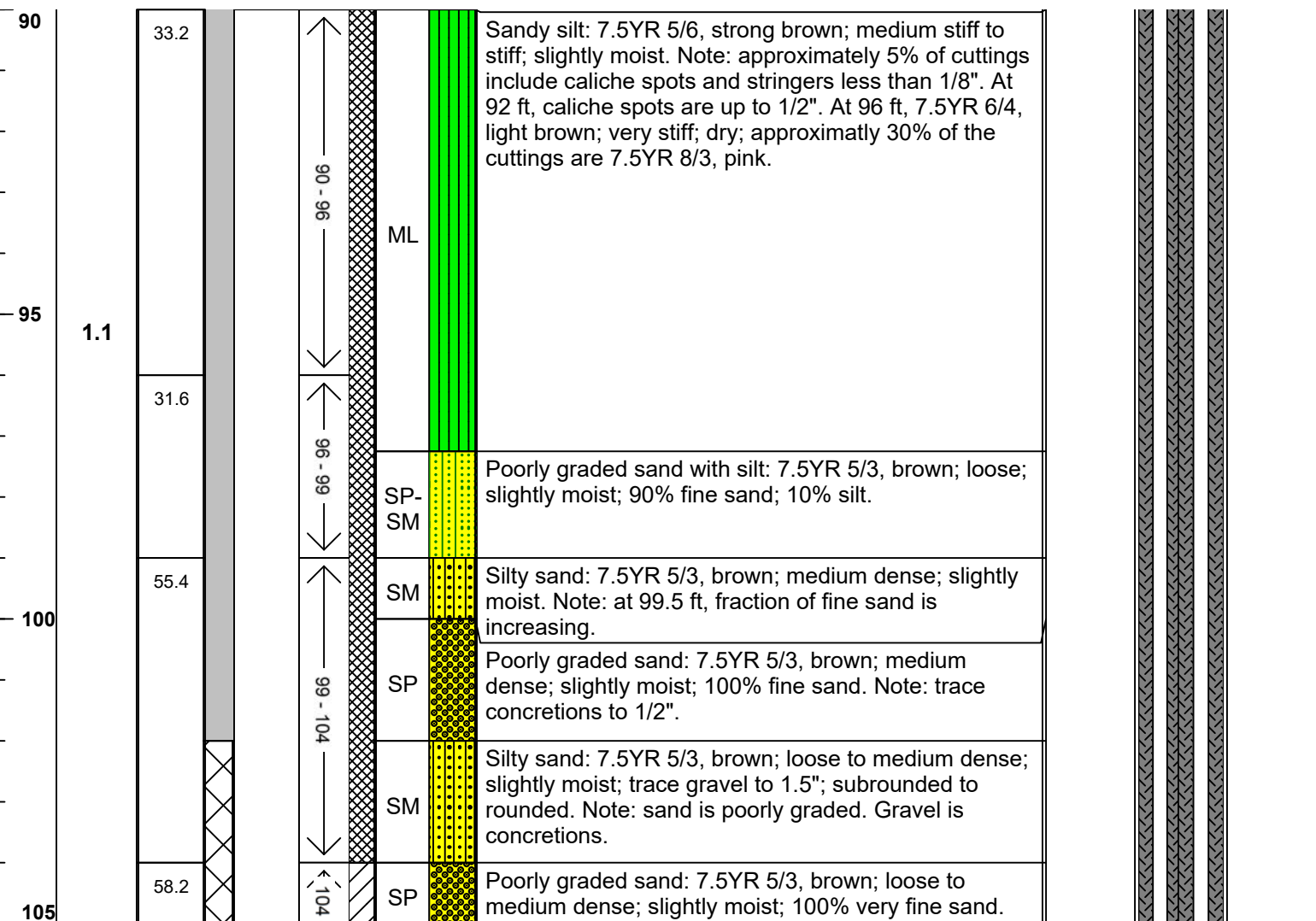
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

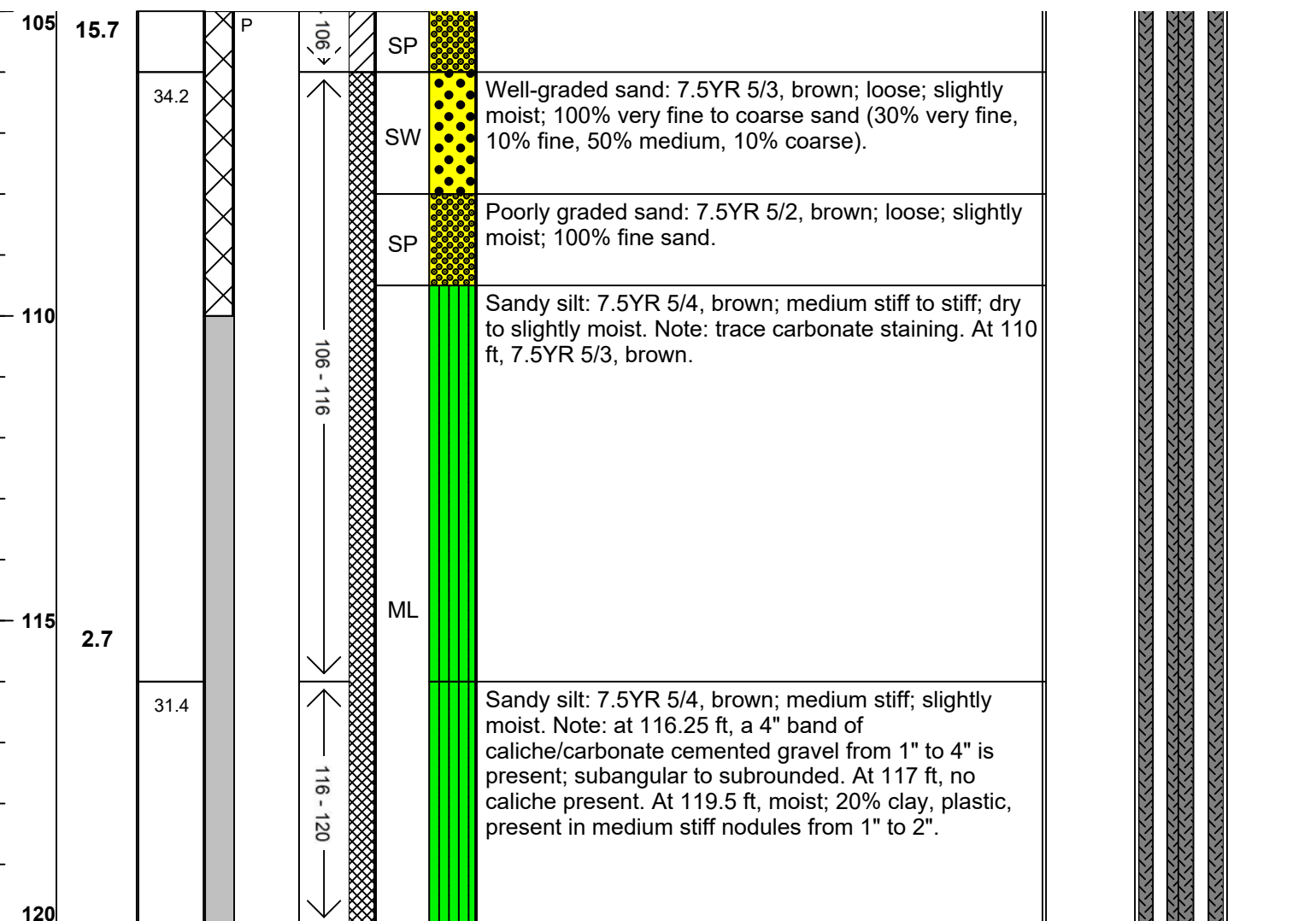
Following coring, the borehole was overdrilled using ARCH for well installation

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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

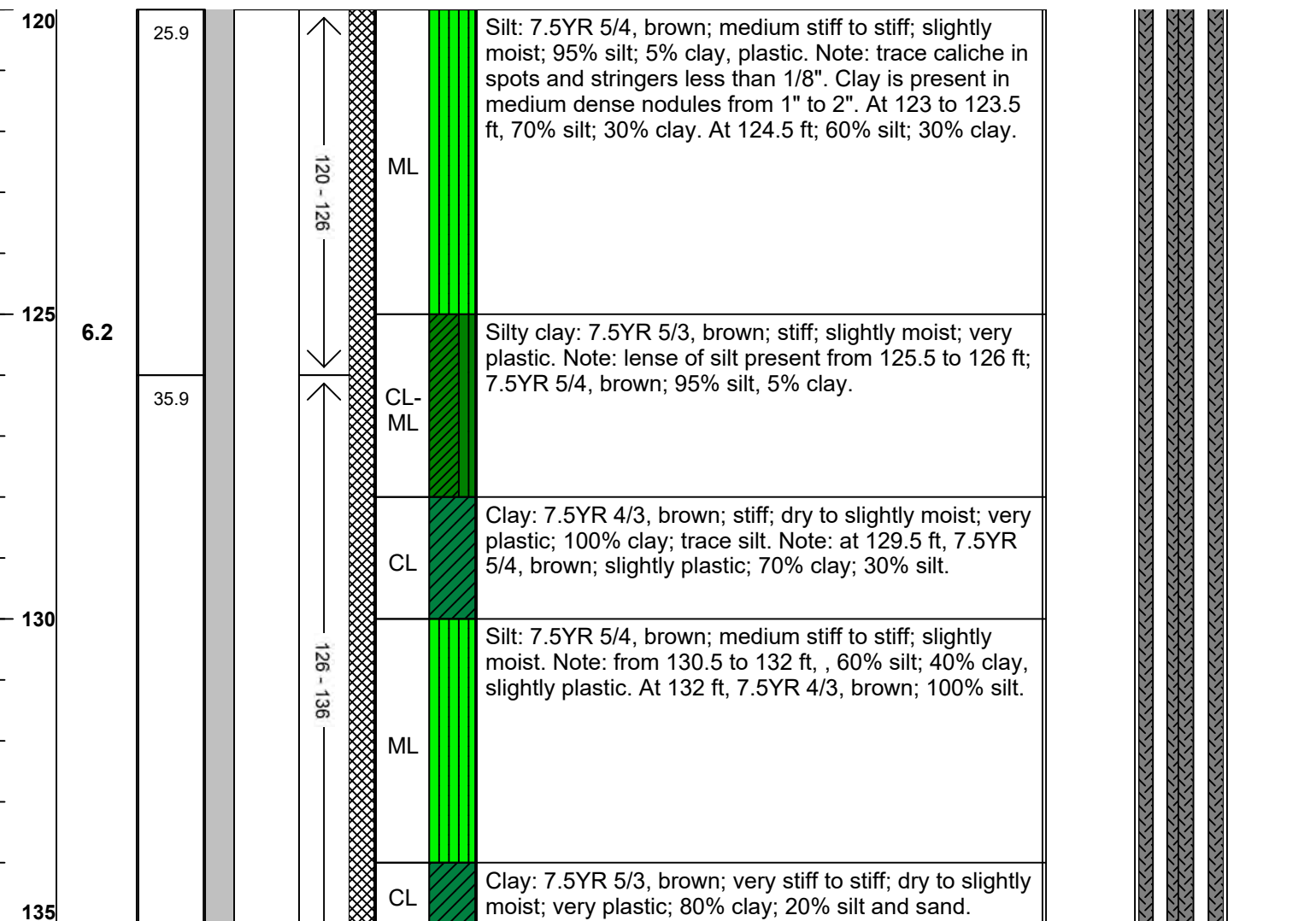
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

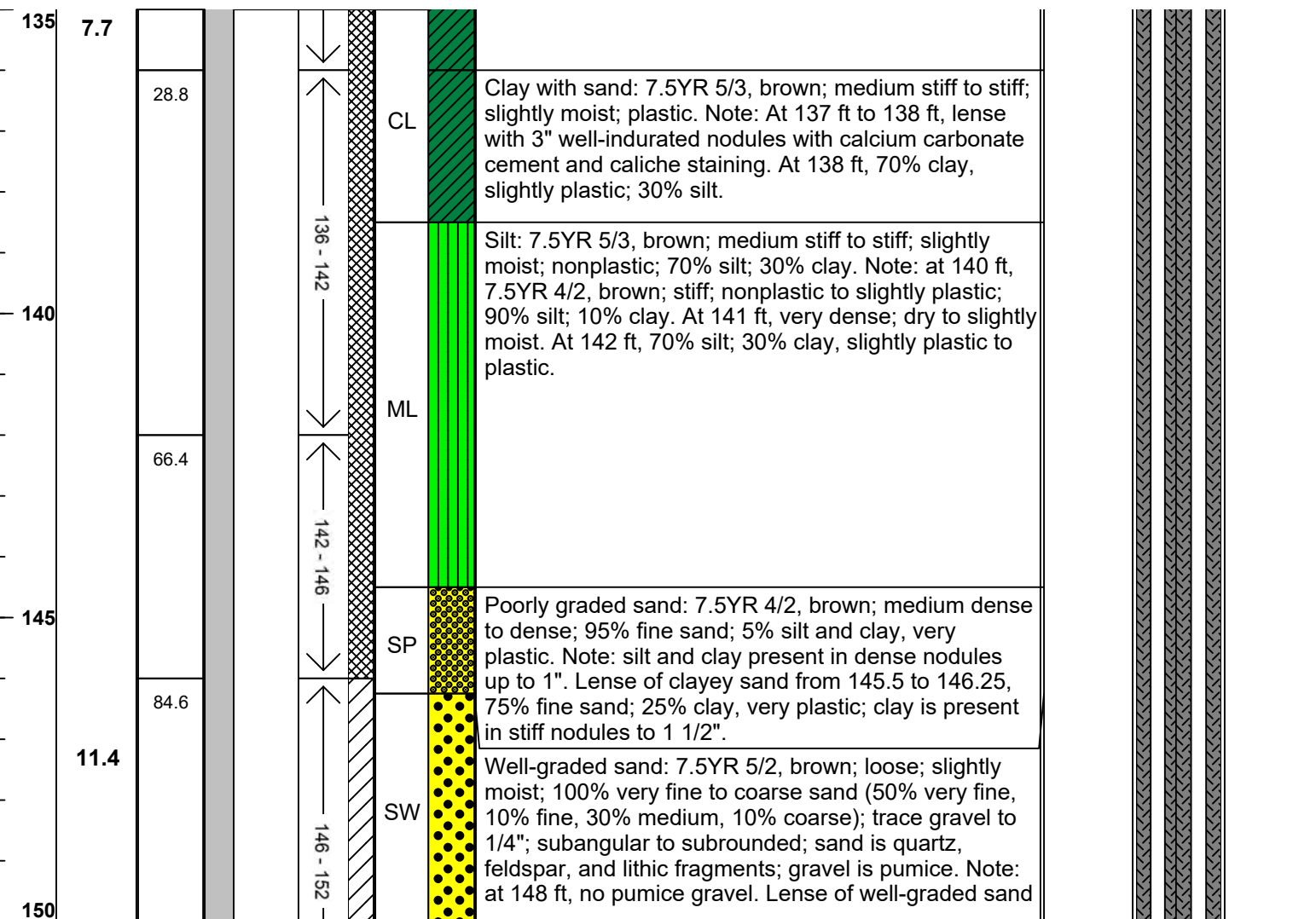
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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Driller: Roger Rodriquez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/6/18**

Completion Date: **11/21/18**

WELL LOG

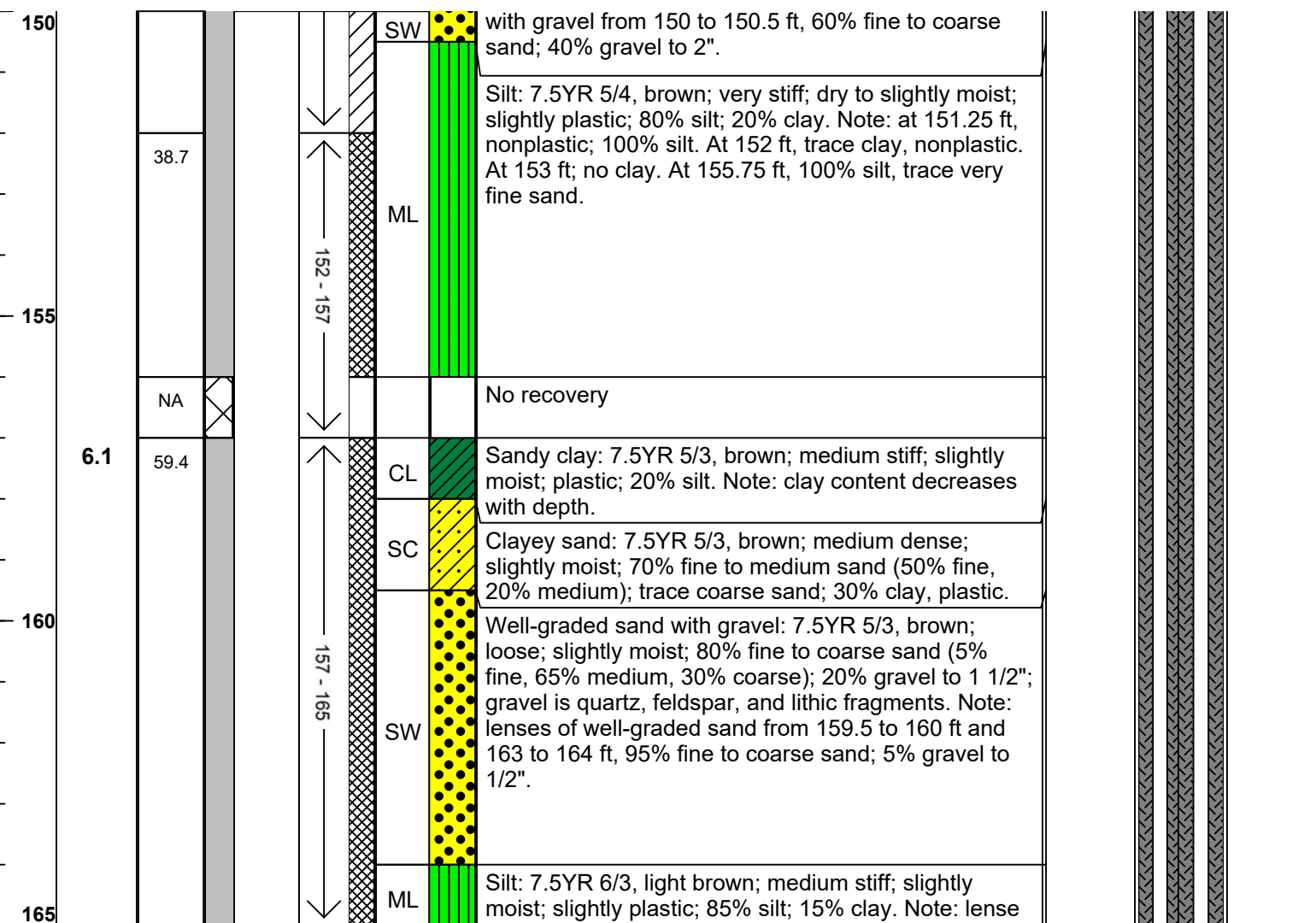
Well ID: **KAFB-106S2**

Page: **11 of 35**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

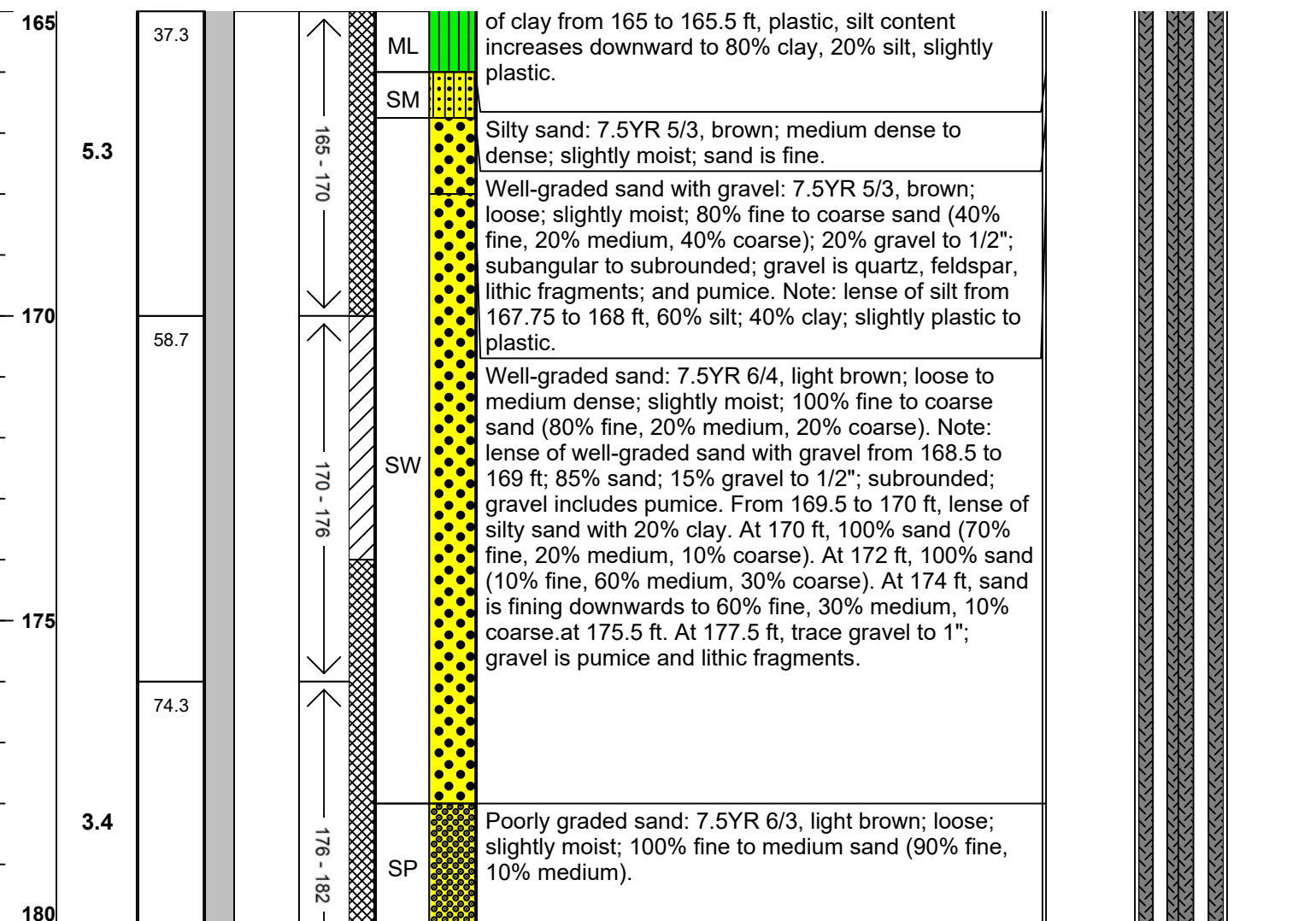
Following coring, the borehole was overdrilled using ARCH for well installation

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

WELL LOG

Well ID: **KAFB-106S2**

Page: 13 of 35

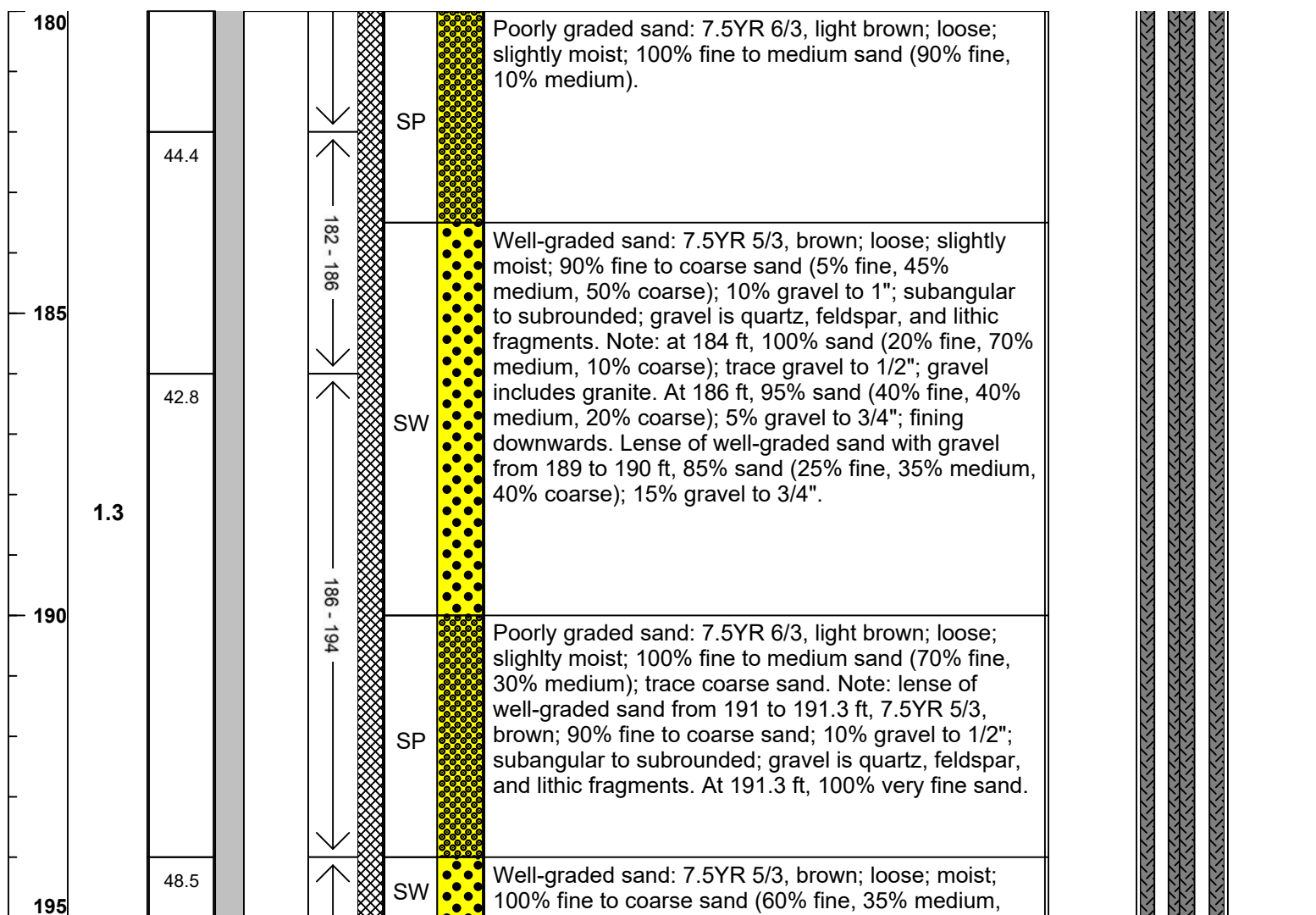
Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress, B. Bockisch, C. Landers**

Boring Depth (ft): **510 ft**
 Boring Diameter (in): **7"**
 Well Diameter: **3" ID**
 DTW After Completion (ft bgs): **475.77**
 Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite,**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1)	(2)
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Notes:

- (1) Current Water Table Well
- (2) Contingency Well

s_w = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test



Not Tested



Interval Fluoresced



None

Core Recovery



No Recovery



Disturbed Core



Complete

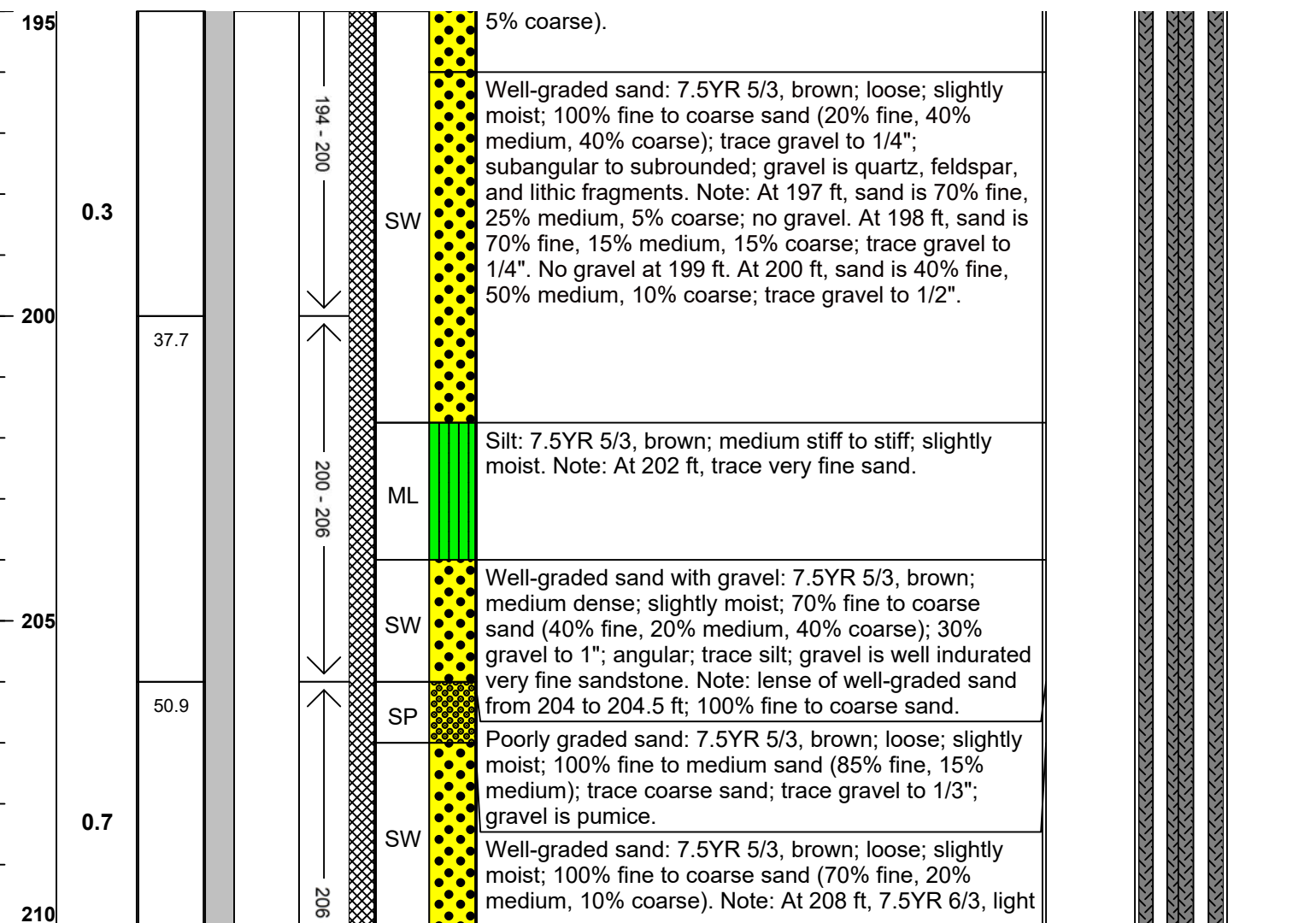
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

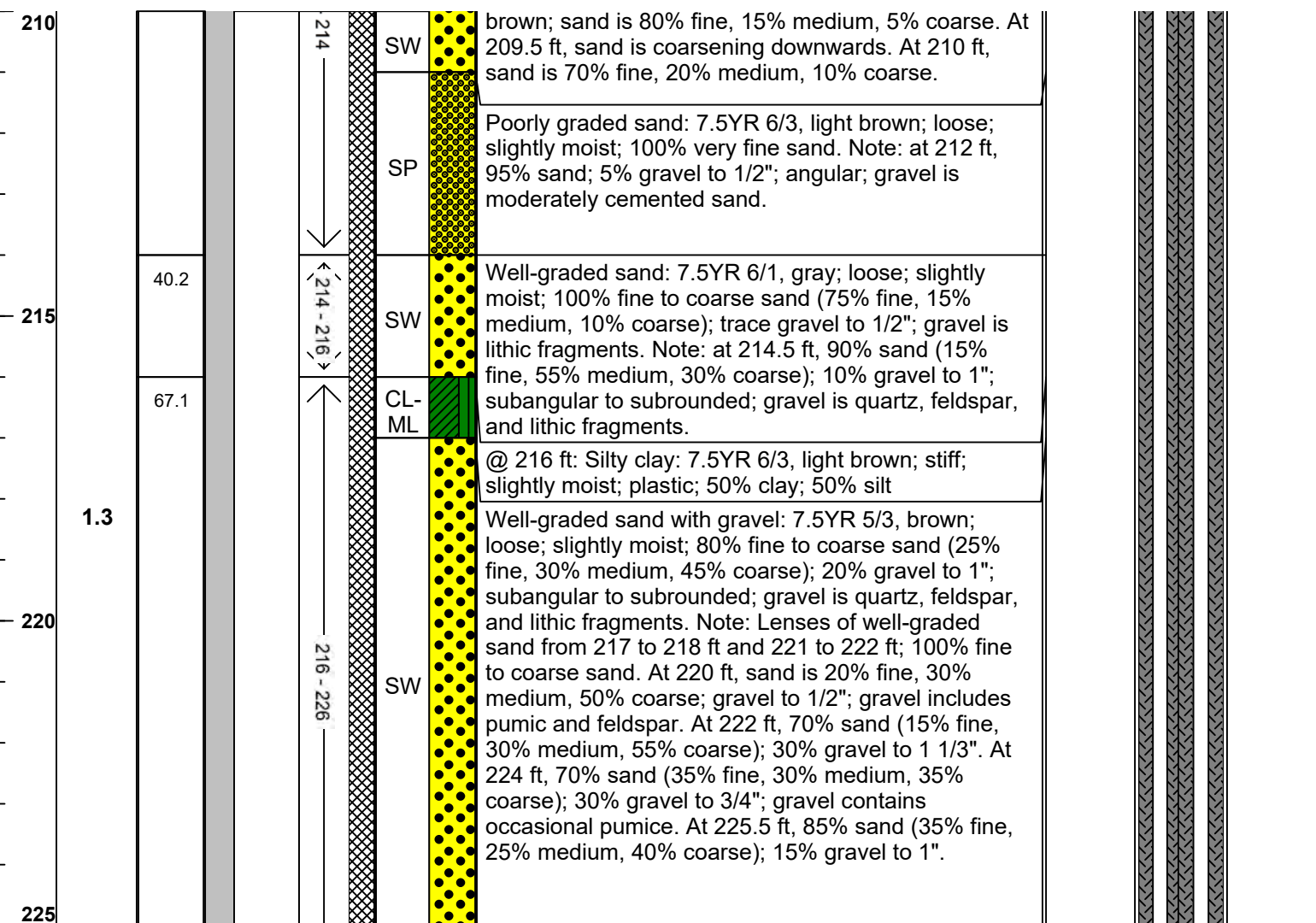
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

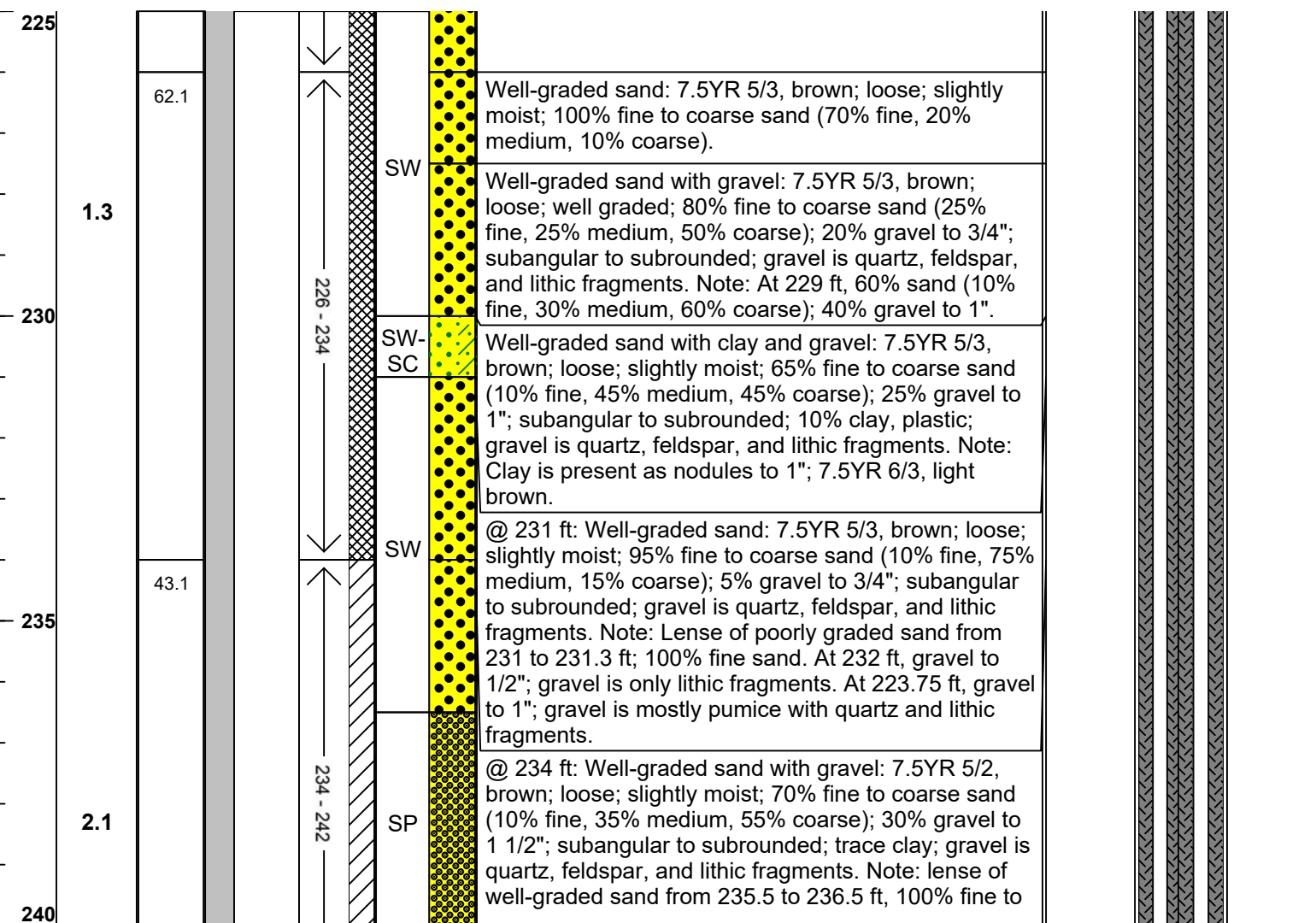
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Driller: Roger Rodriquez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

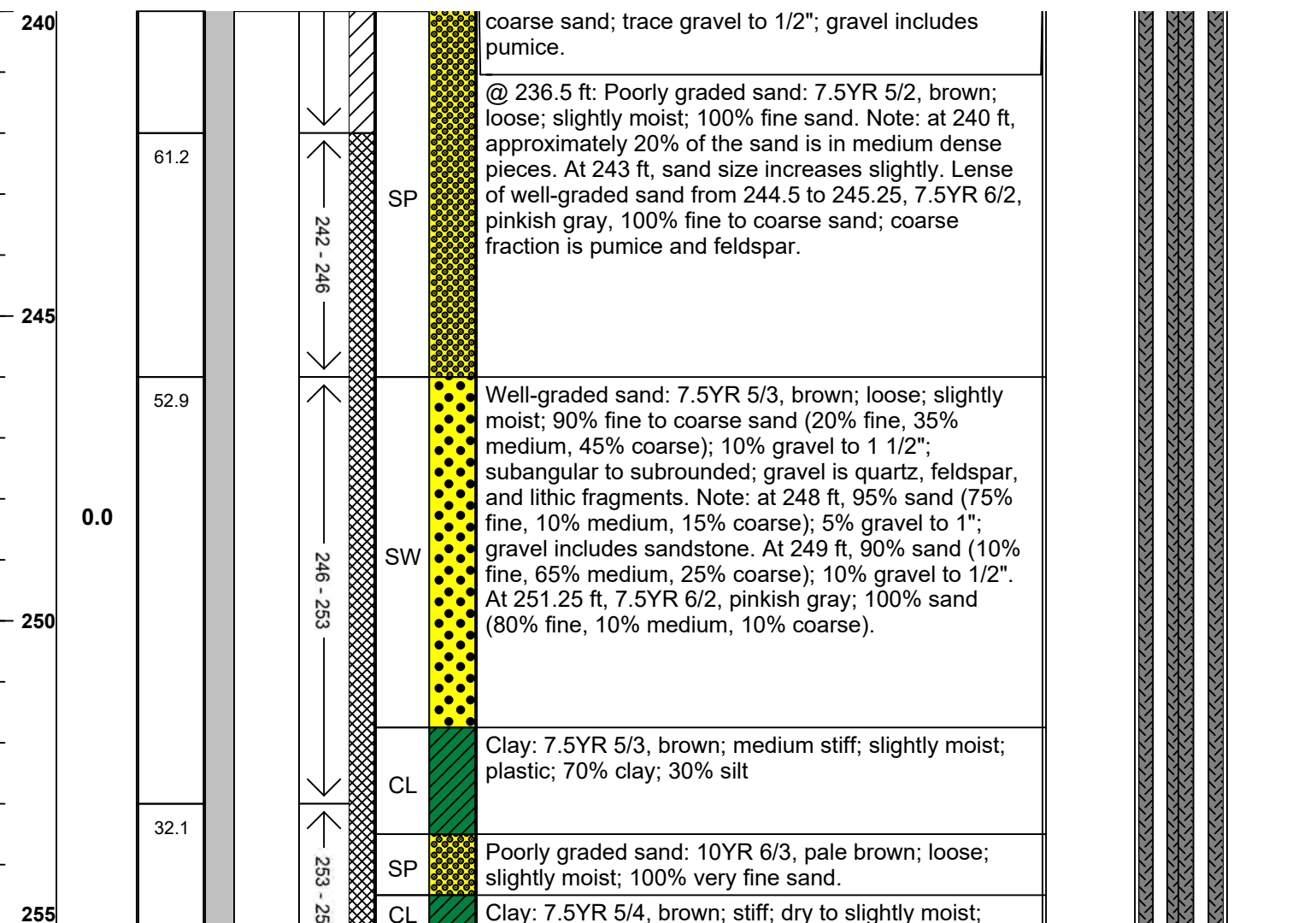
Following coring, the borehole was overdrilled using ARCH for well installation

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Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

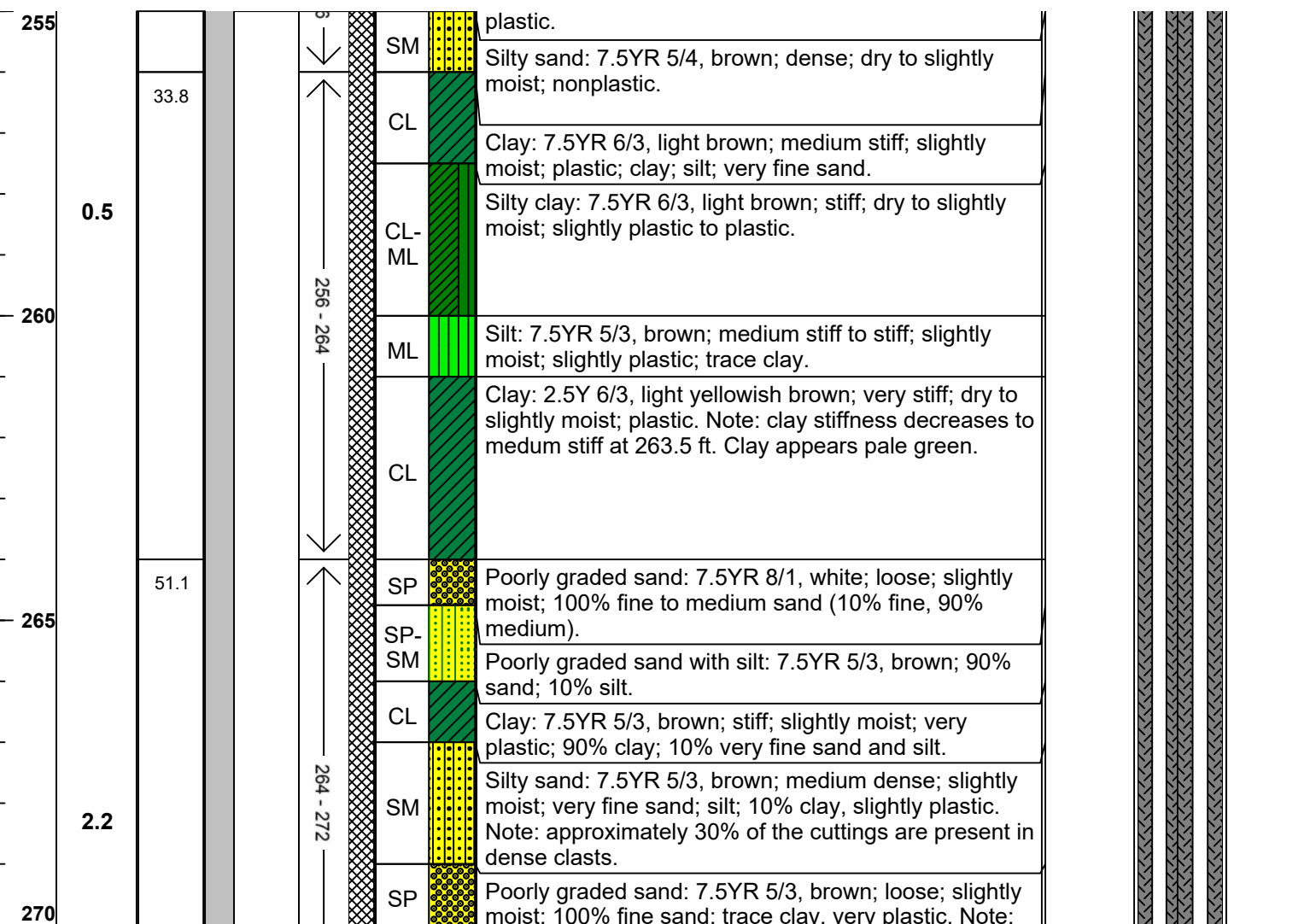
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Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

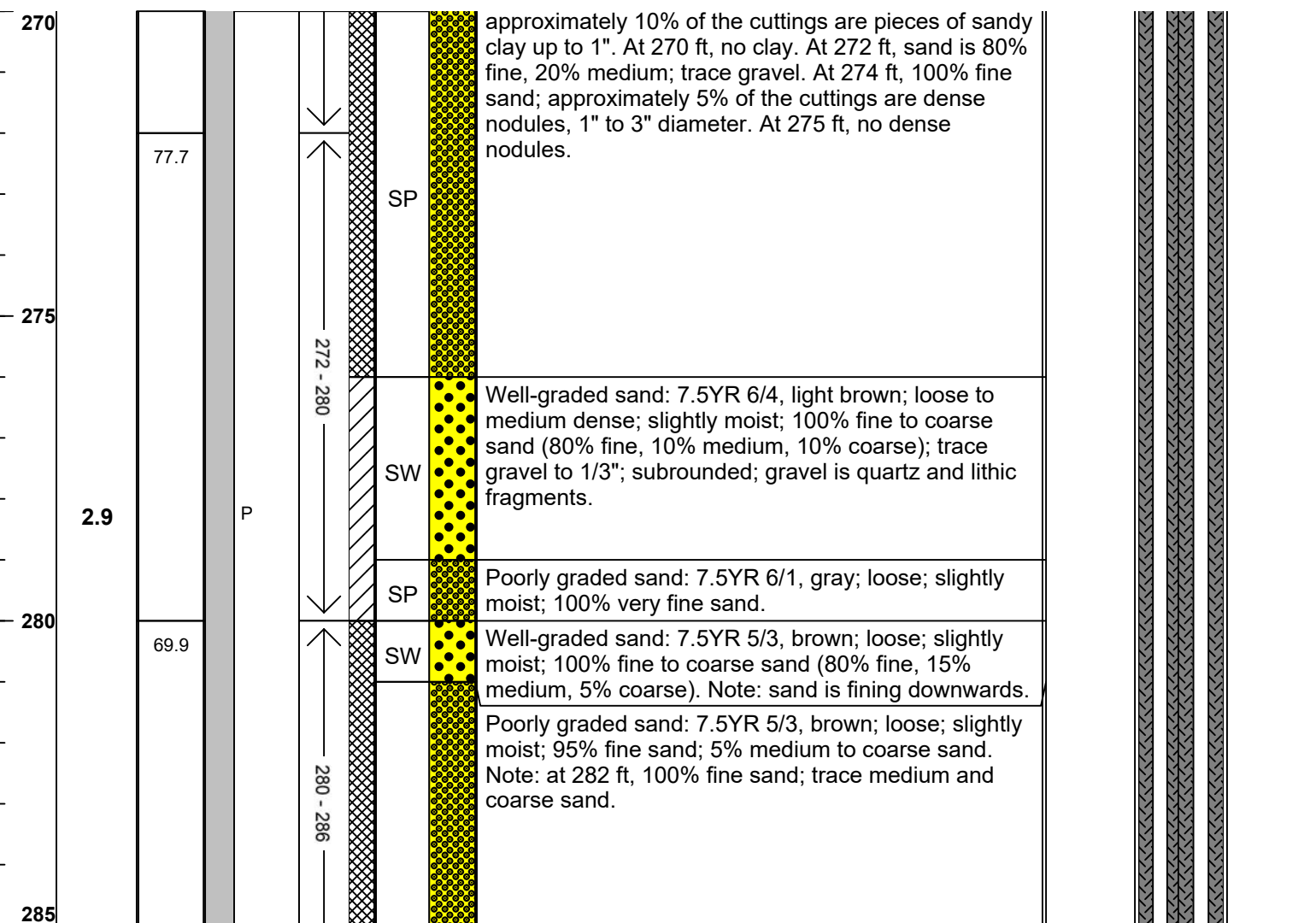
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

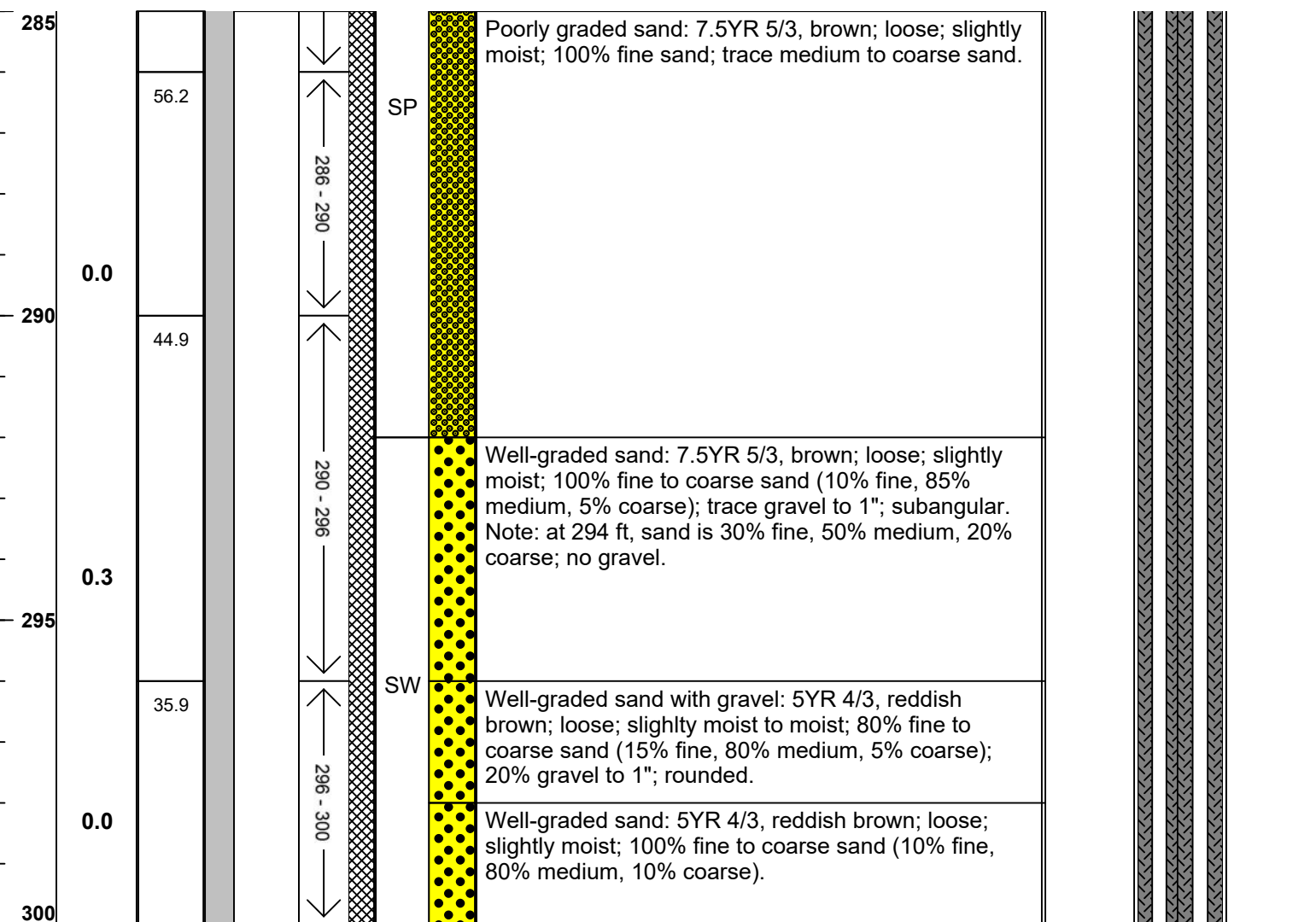
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Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
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Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

- (1) Current Water Table Well
- (2) Contingency Well
- ∇ = Depth to water after completion
- UV = ultraviolet fluorescence
- NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

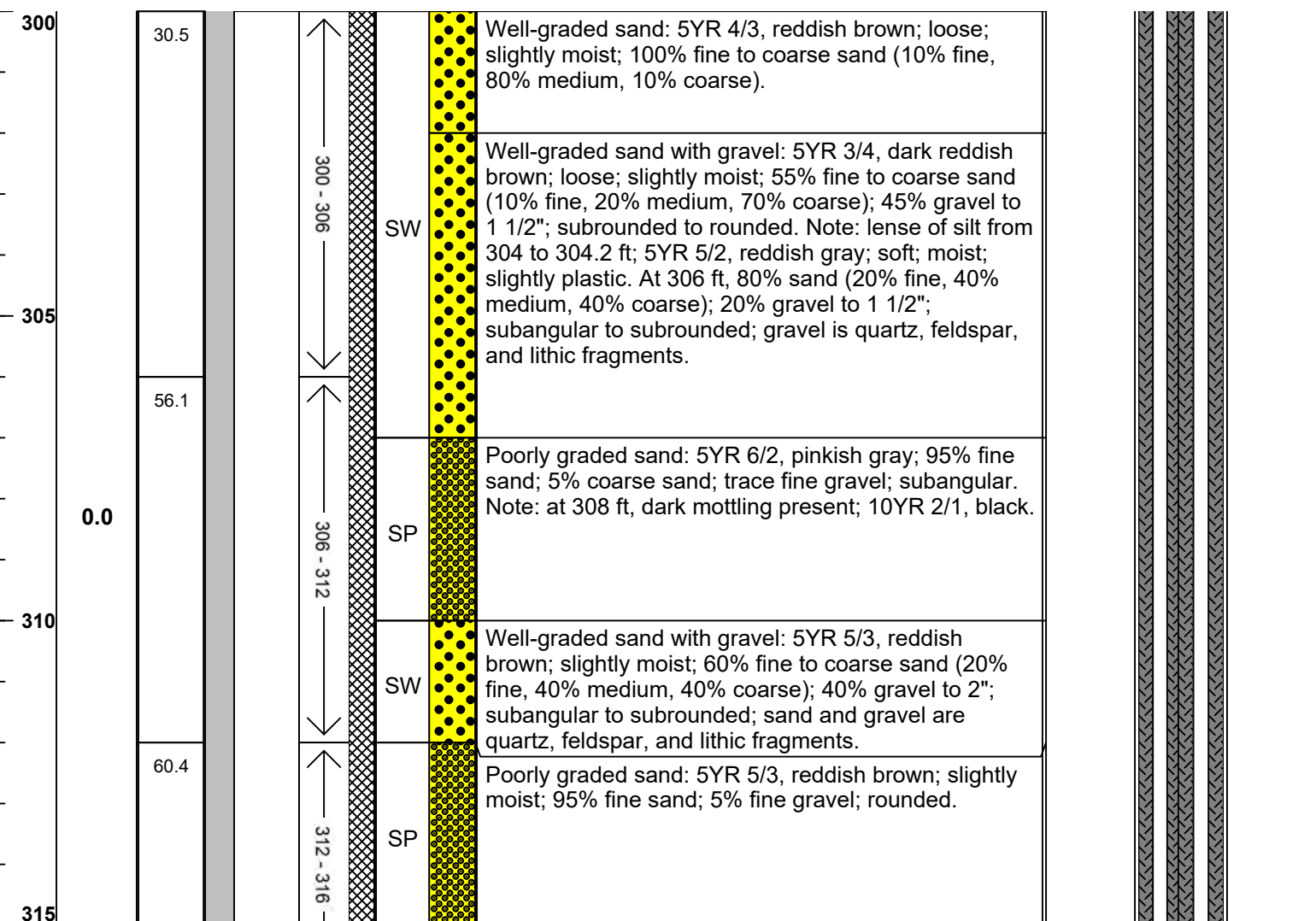
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

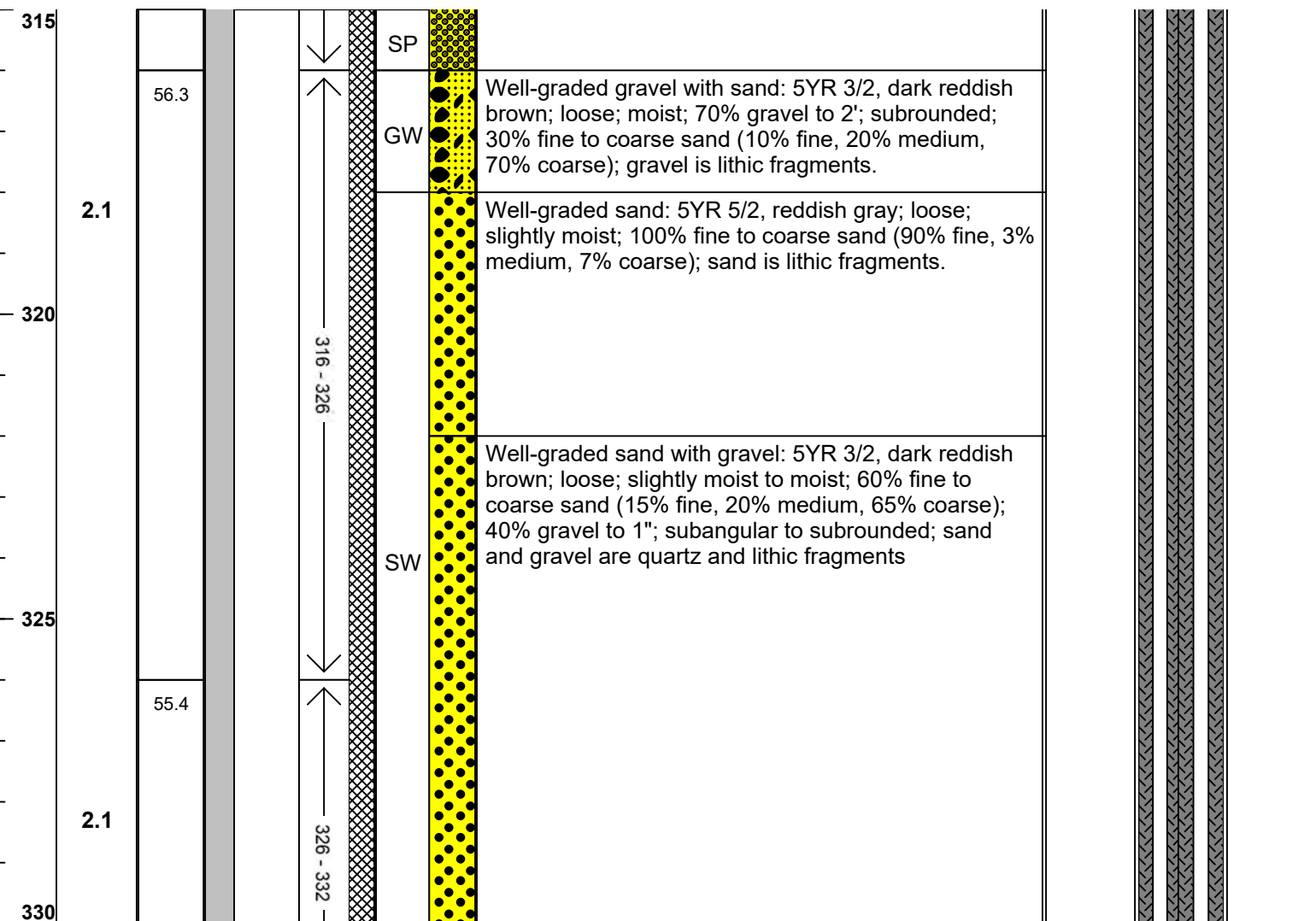
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

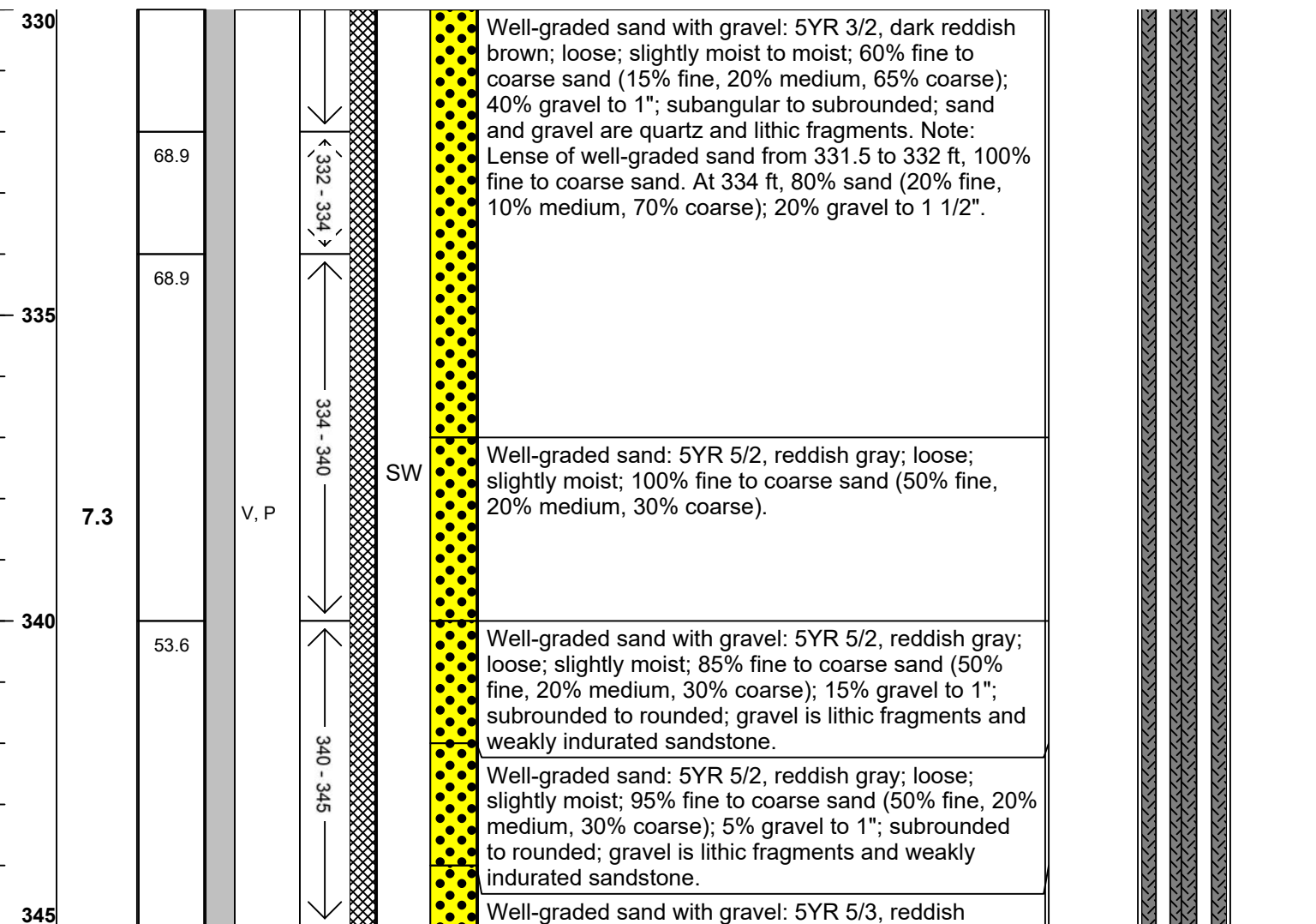
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Driller: Roger Rodriquez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
 (2) Contingency Well
 ▽ = Depth to water after completion
 UV = ultraviolet fluorescence
 NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

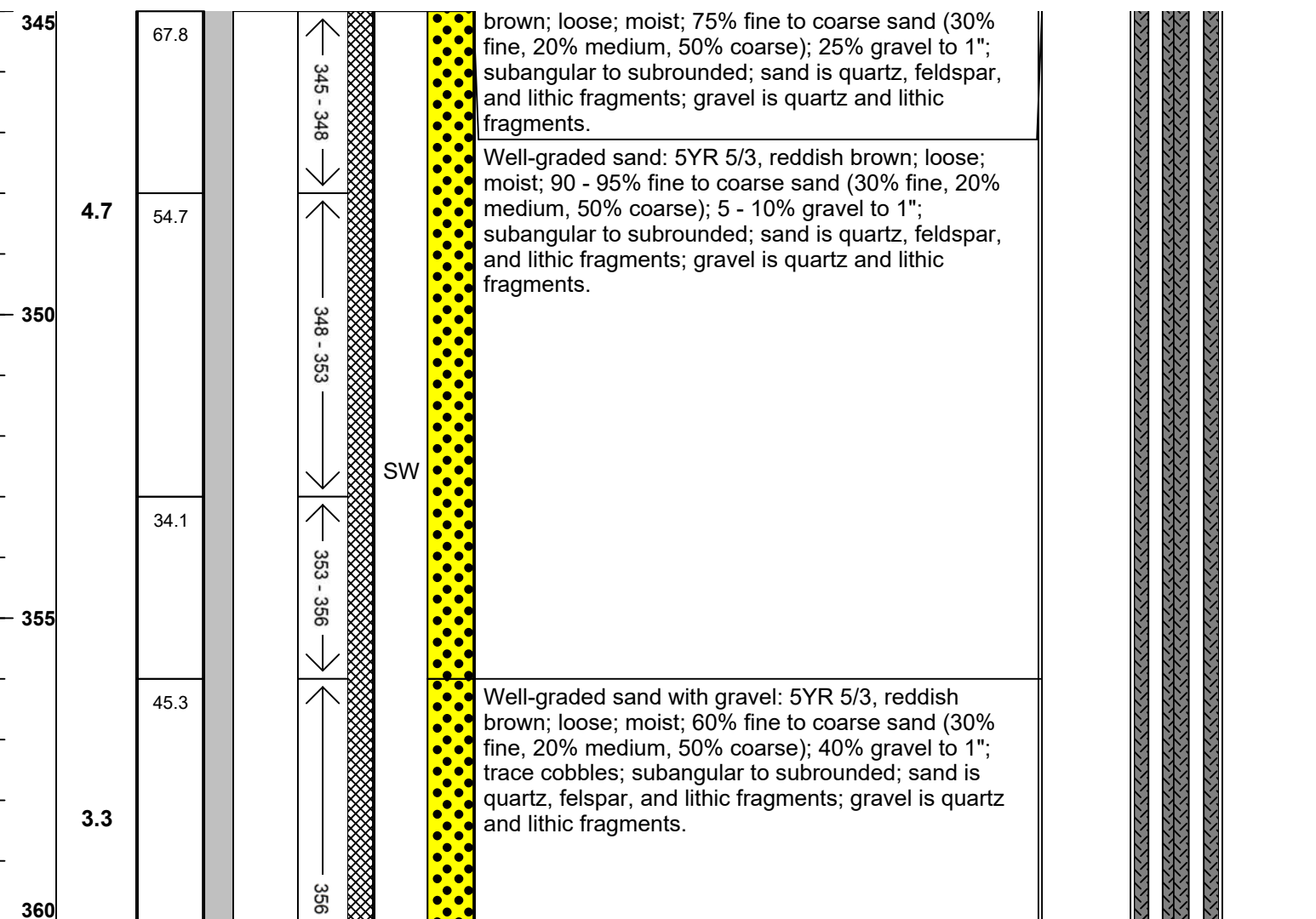
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Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/6/18**

Completion Date: **11/21/18**

WELL LOG

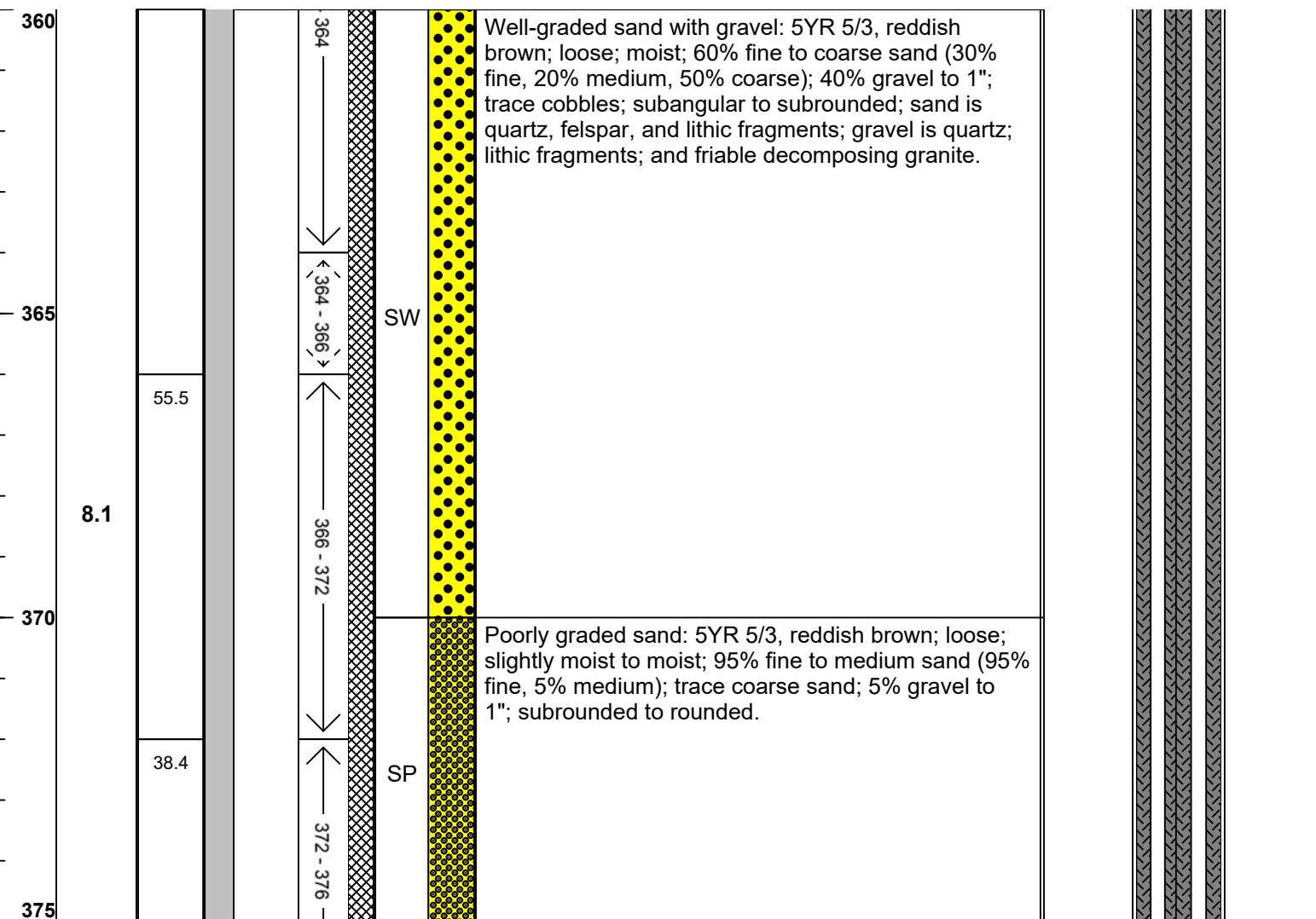
Well ID: **KAFB-106S2**

Page: **25 of 35**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

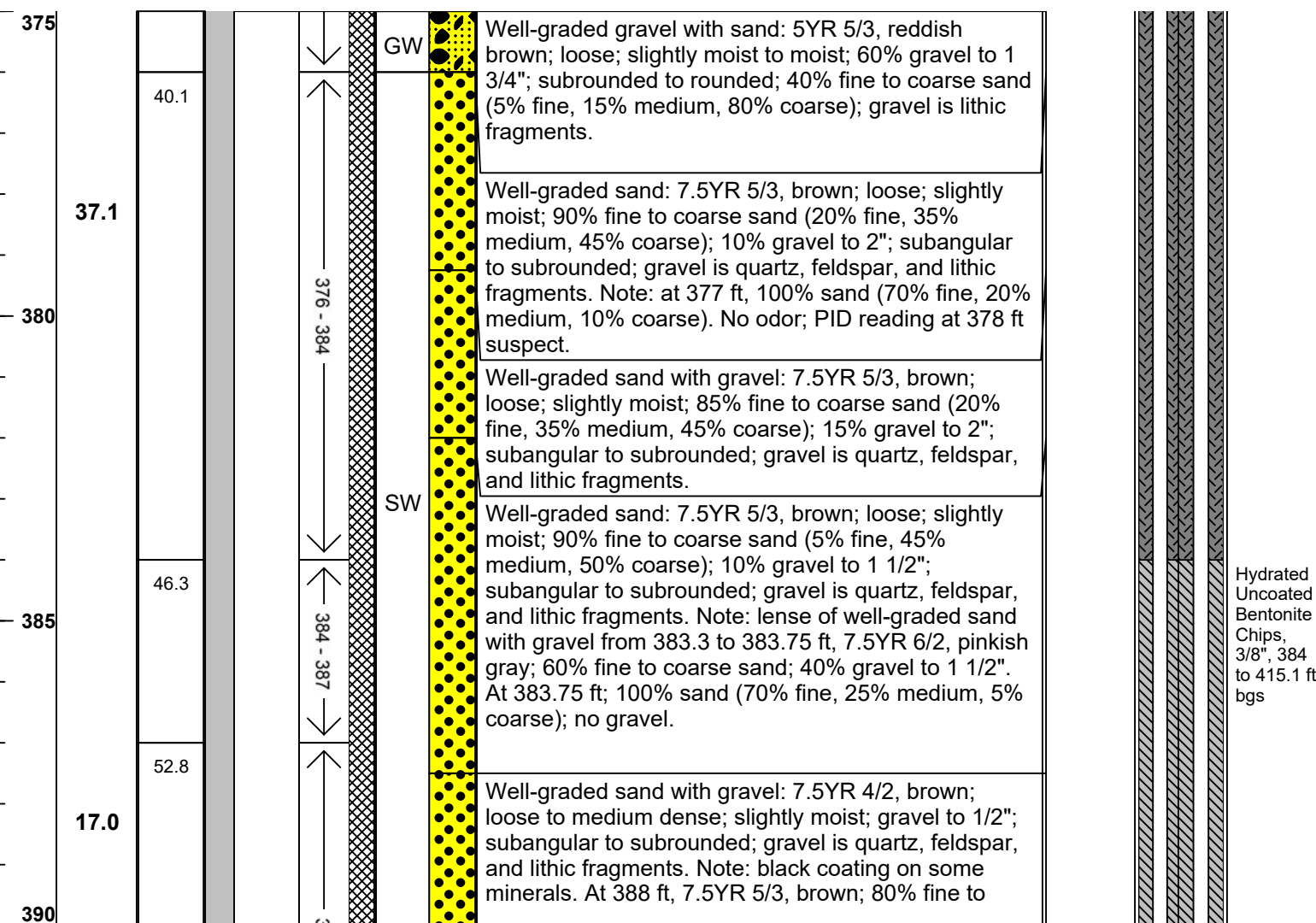
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

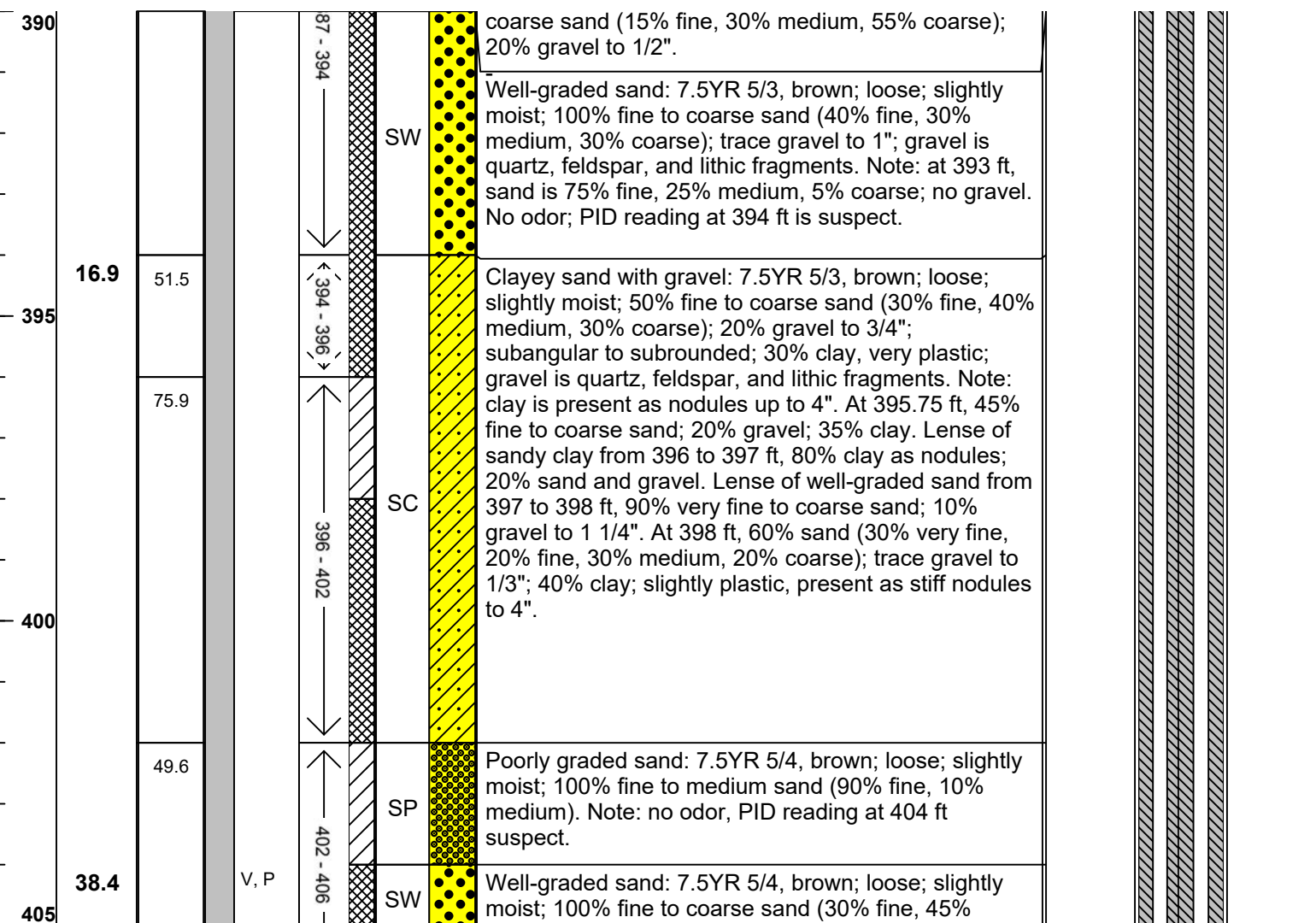
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

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UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

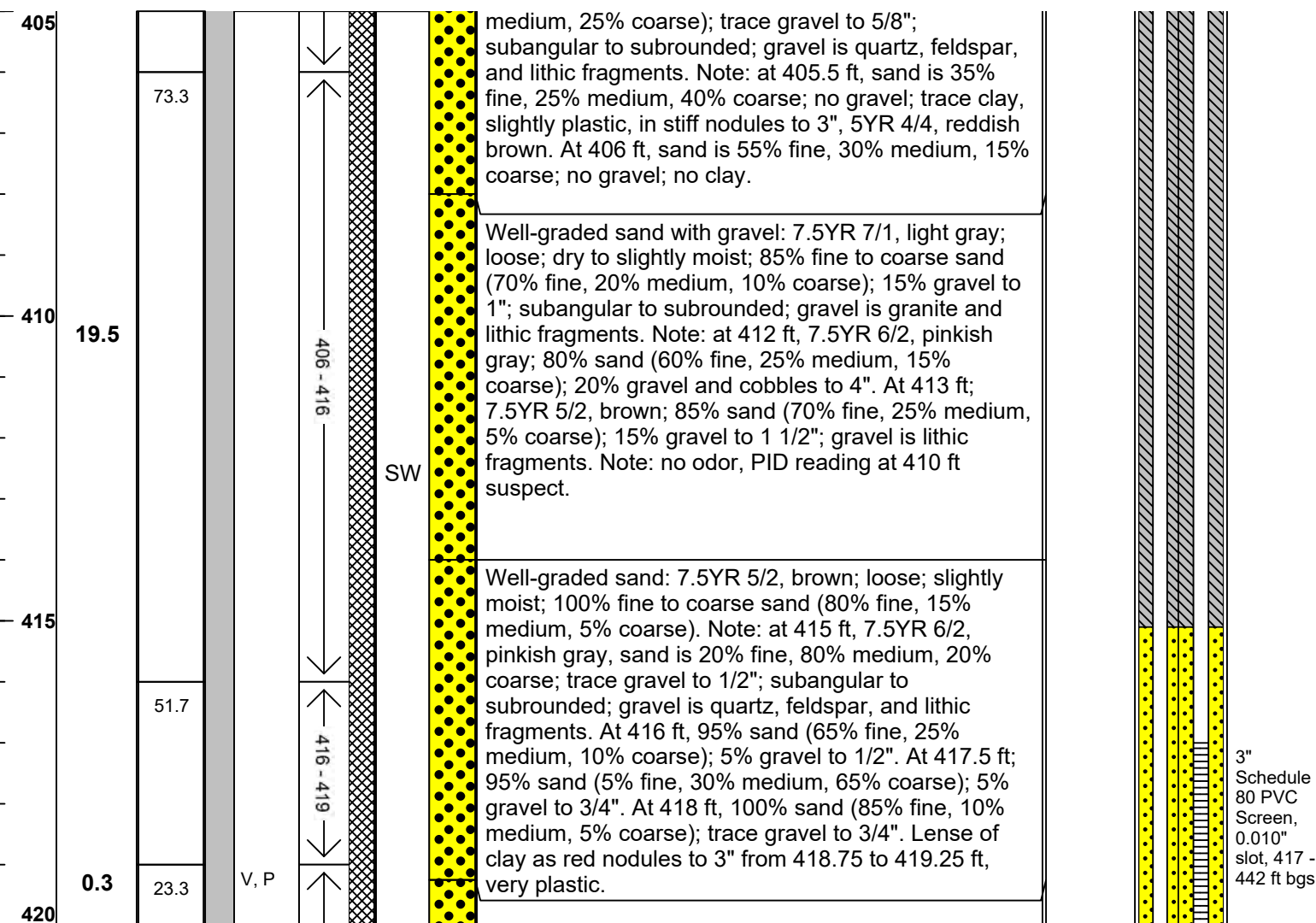
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Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

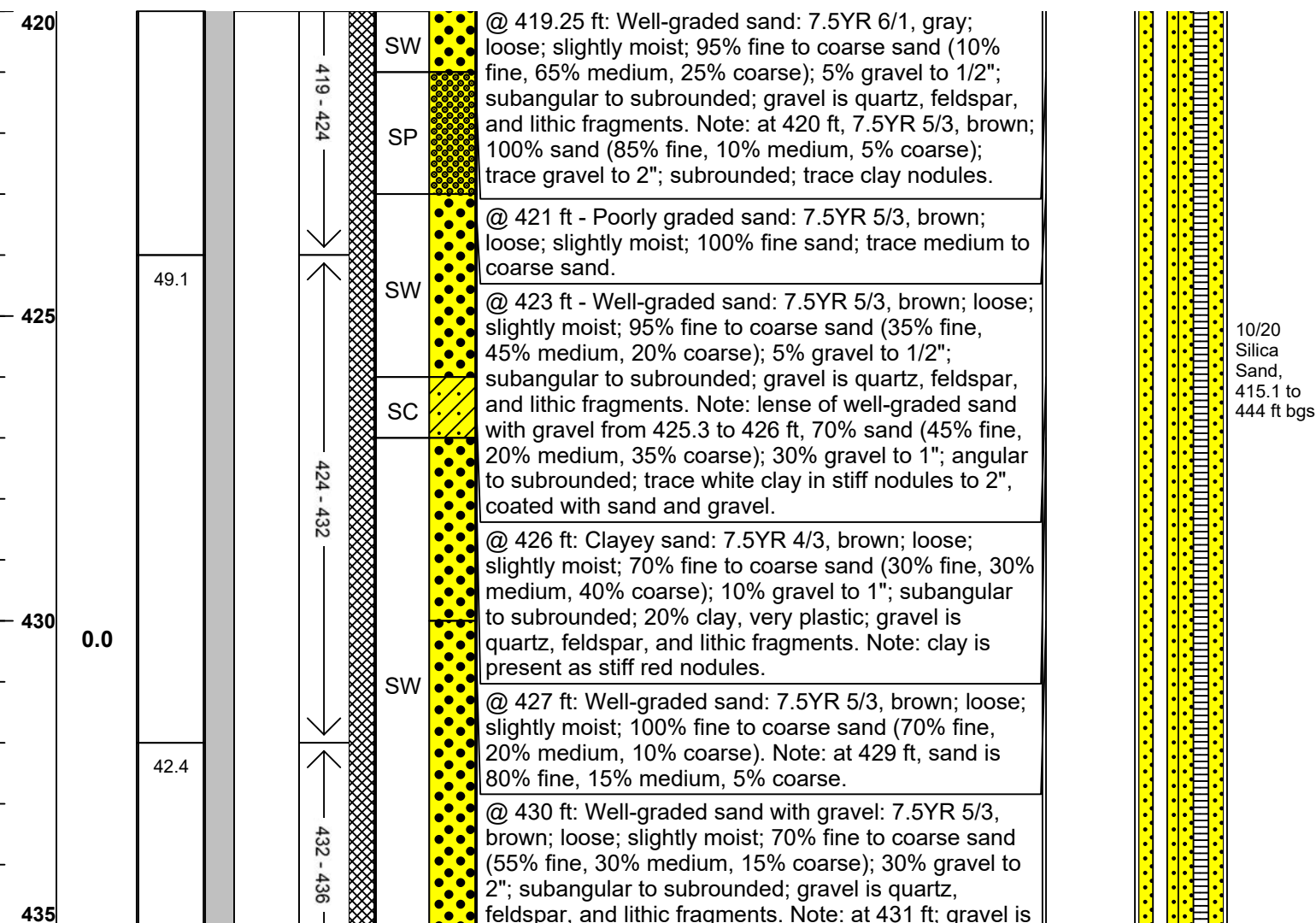
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/6/18**

Completion Date: **11/21/18**

WELL LOG

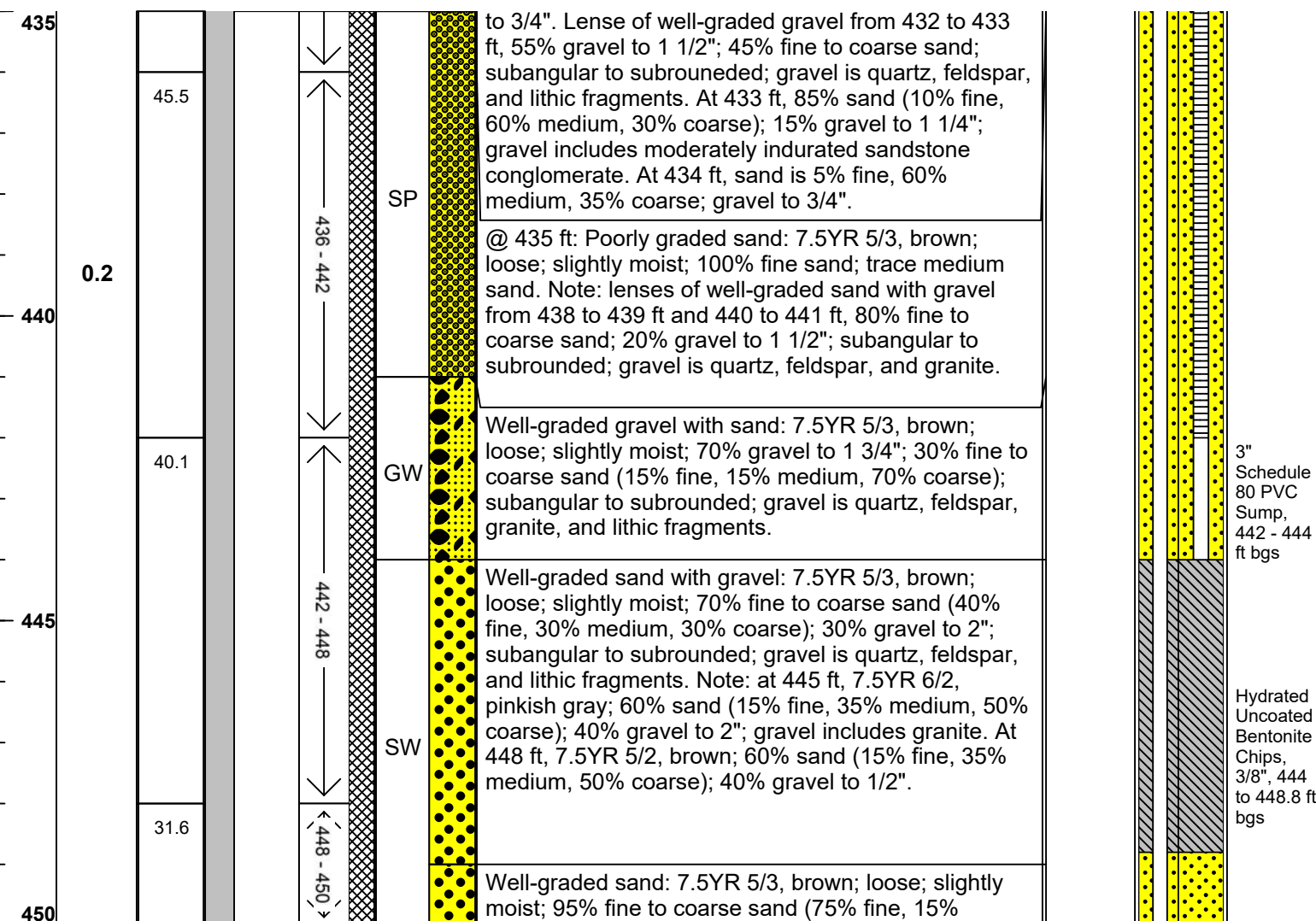
Well ID: **KAFB-106S2**

Page: **30 of 35**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/6/18**

Completion Date: **11/21/18**

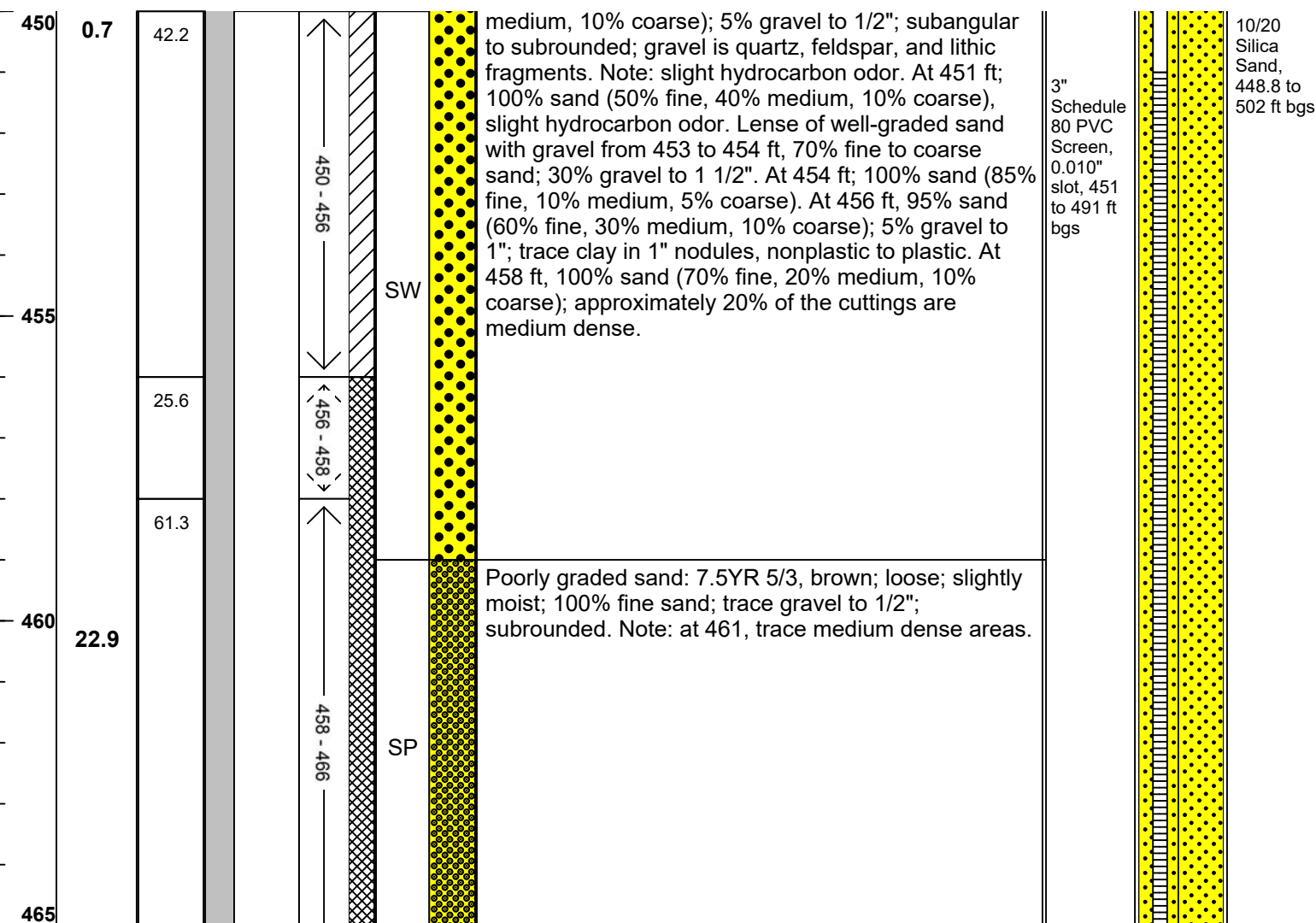
WELL LOG

Well ID: **KAFB-106S2**

Page: **31 of 35**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

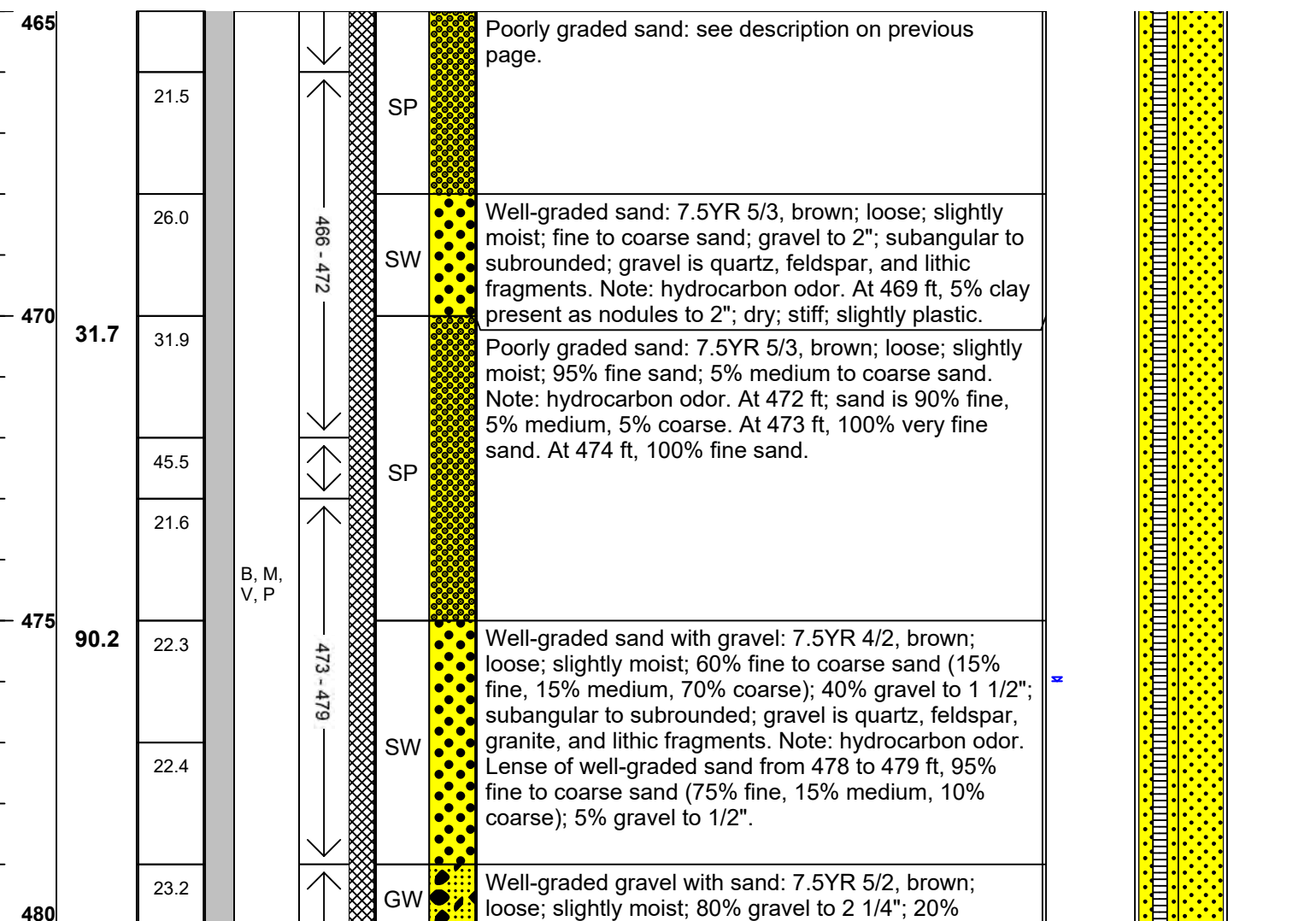
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

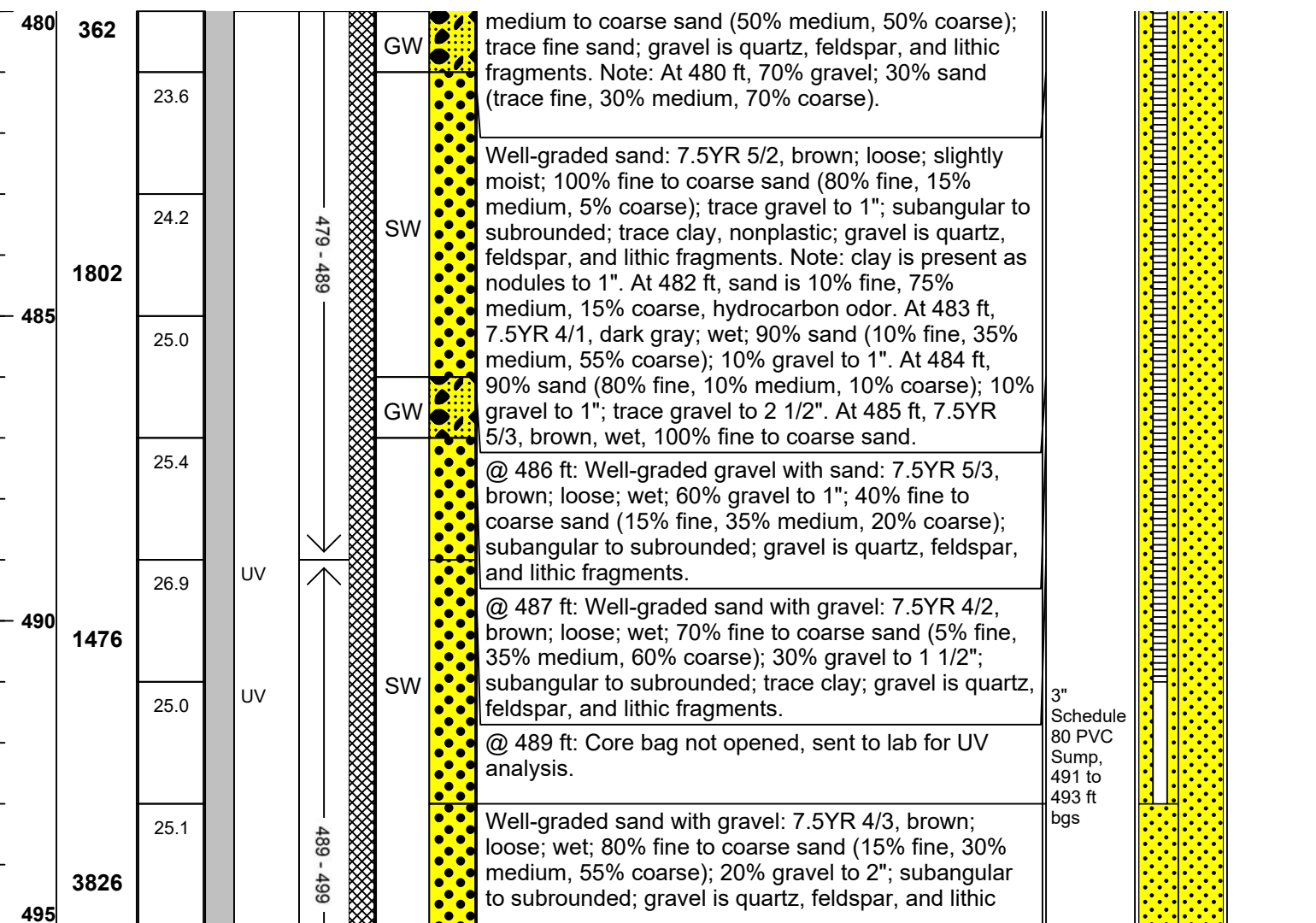
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

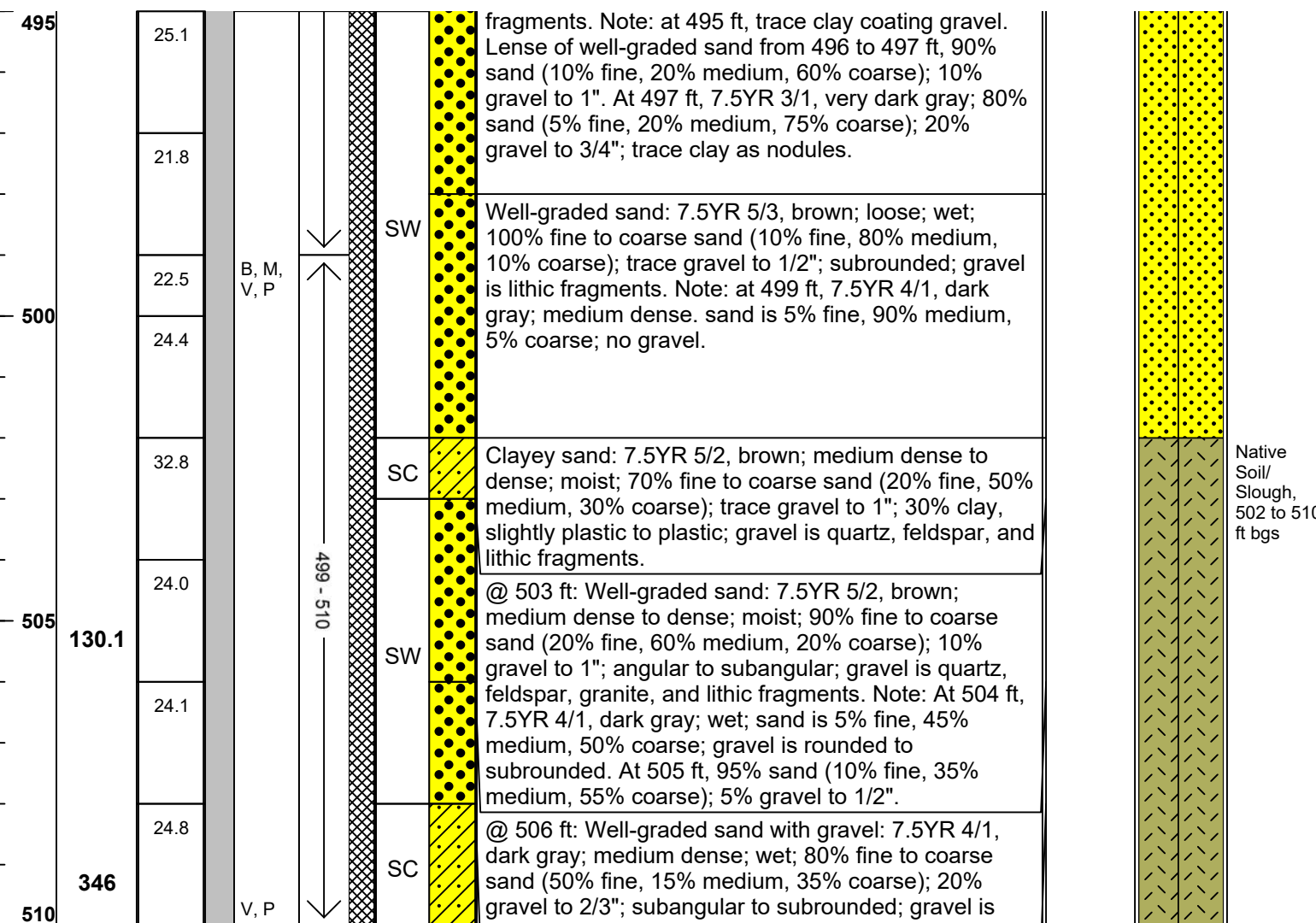
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
 (2) Contingency Well
 ▽ = Depth to water after completion
 UV = ultraviolet fluorescence
 NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **11/6/18**

Completion Date: **11/21/18**

WELL LOG

Well ID: **KAFB-106S2**

Page: **35 of 35**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 475.77	High Solids Bentonite Grout
Geologist: L. Andress, B. Bockisch, C. Landers	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

510

quartz, feldspar and lithic fragments.

@ 508 ft: Clayey sand: 7.5YR 4/1, dark gray; medium dense; wet; 75% fine to coarse sand (10% fine, 55% medium, 35% coarse); 5% gravel; subangular to subrounded; 20% clay, nonplastic; gravel is quartz, feldspar, and lithic fragments. Note: trace nodules of silty sand to 1" present. At 509 ft, one 3" cobble present; subrounded; lithic fragment.

Total depth = 510 ft bgs

Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



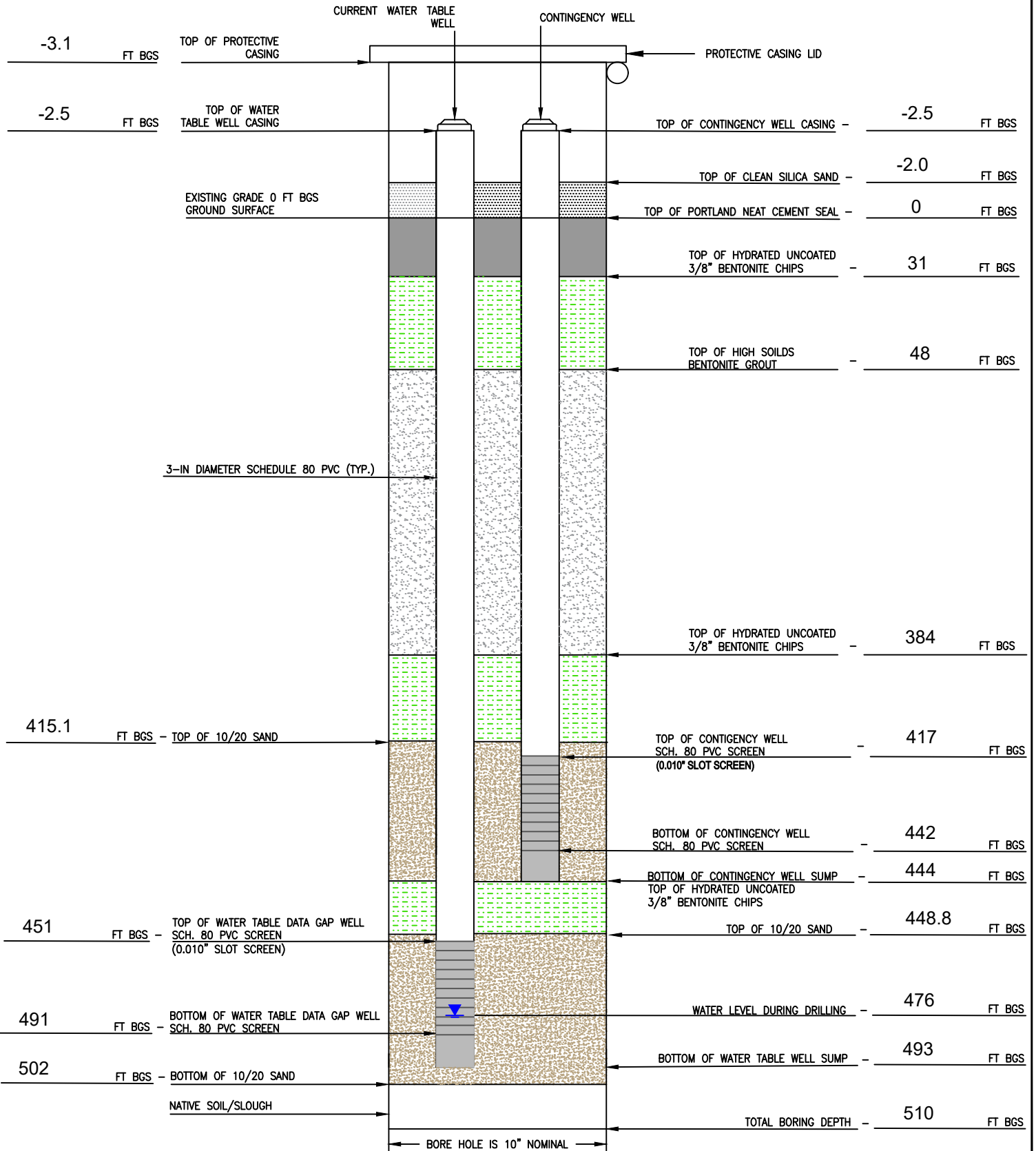
Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S2



NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

PROJECT NO.:
62735DM02.1017

WELL ID:
KAFB-106S2

INSTALLATION START DATE/TIME:
05OCT18
GEOLOGIST: L. Address,
B. Bockisch, C. Landers

INSTALLATION END DATE/TIME:
21NOV18
DRILLER:
R. Rodriguez



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

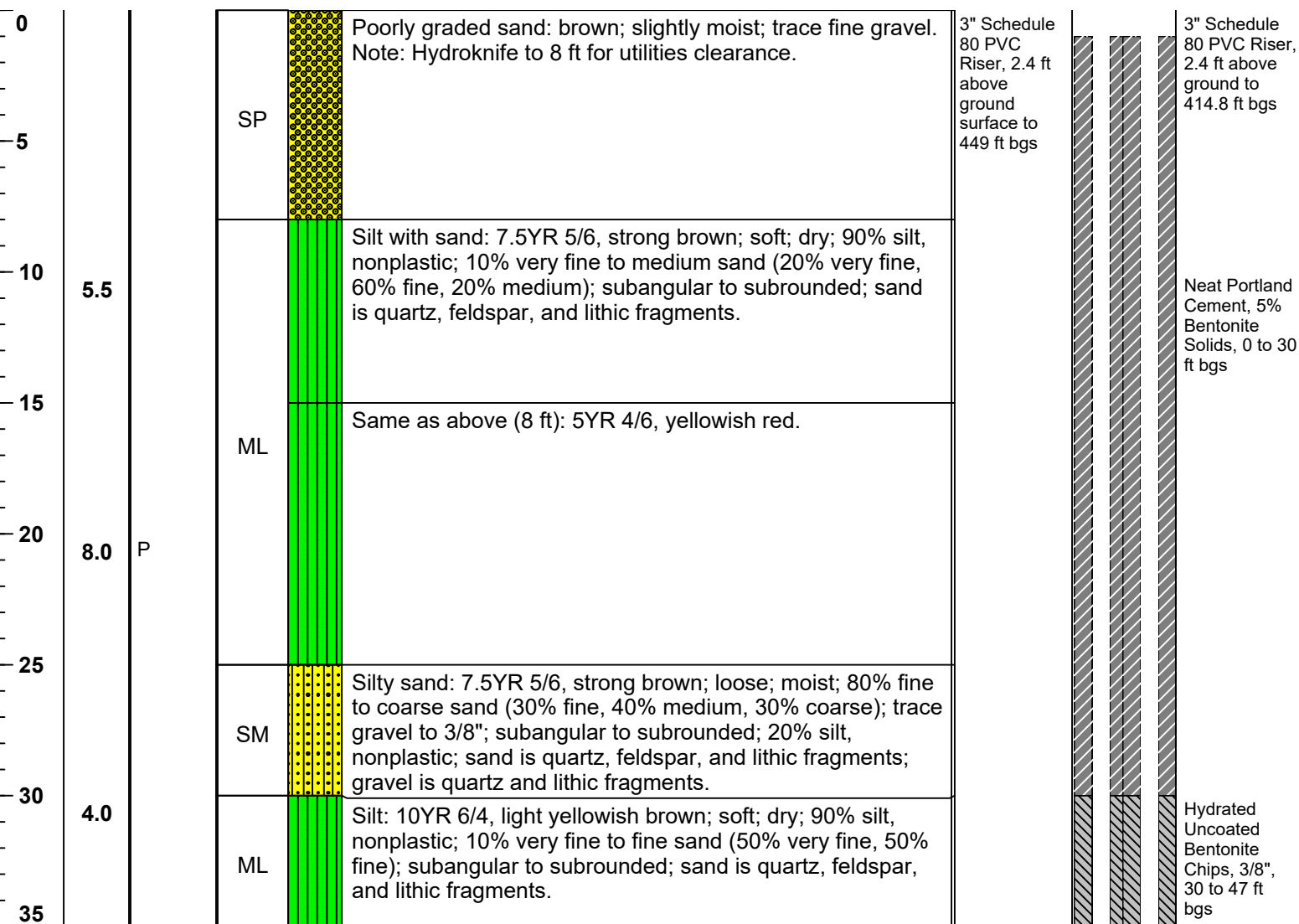
WELL LOG

Well ID: **KAFB-106S3**

Page: **1 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
						(1) (2)



Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

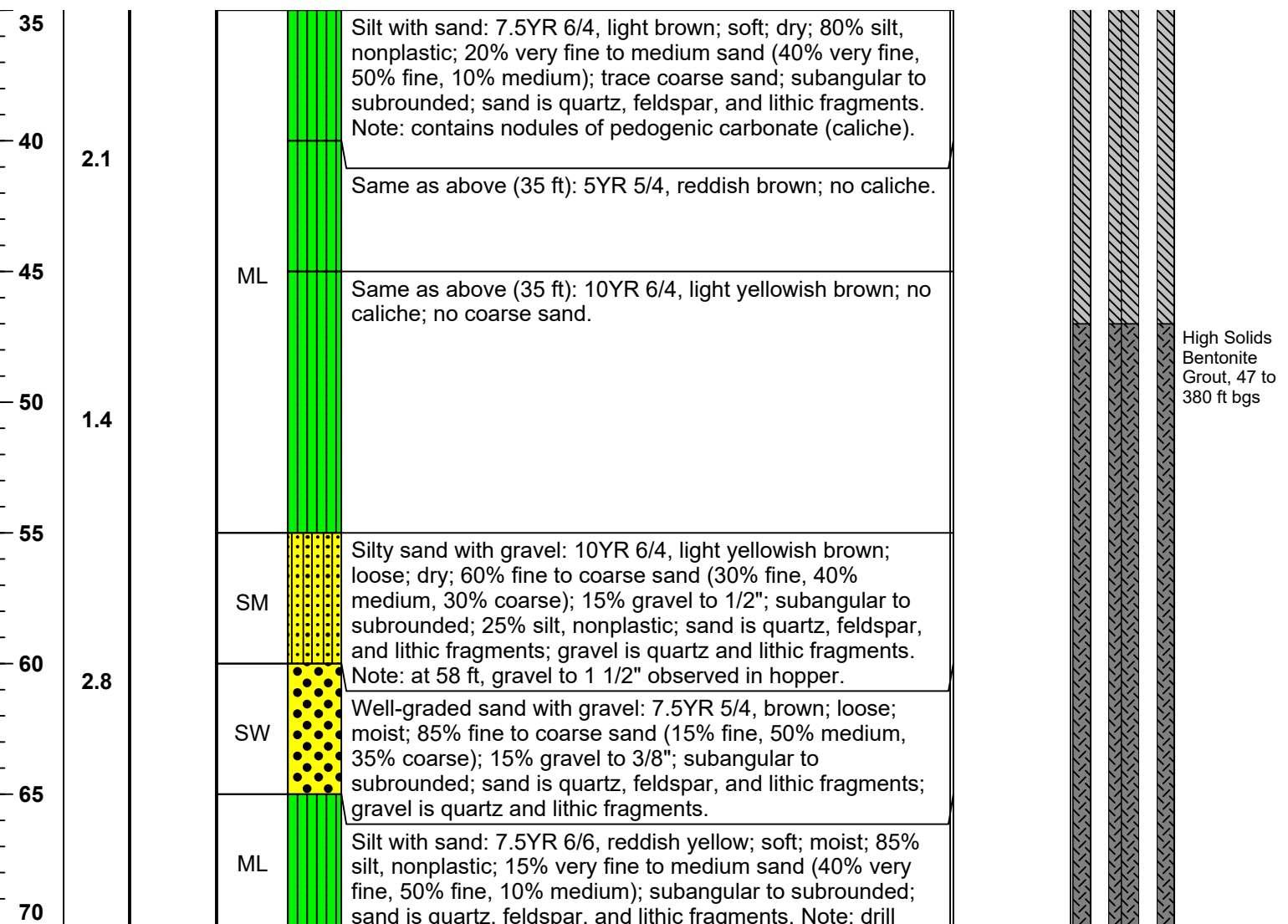
Well ID: **KAFB-106S3**

Page: **2 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well

(2) Contingency Well

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Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

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**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**

Page: **3 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

70	4.5		SW-SM		chatter at 69 ft.	
					Well-graded sand with silt: 5YR 5/4, reddish brown; loose; moist; 80% fine to coarse sand (40% fine, 40% medium, 20% coarse); 10% gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
75			SW			
					Well-graded sand with gravel: 5YR 5/4, reddish brown; loose; moist; 60% fine to coarse sand (10% fine, 50% medium, 40% coarse); 40% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
80	5.9		SP			
					Poorly graded sand: 10YR 6/4, light yellowish brown; loose; dry; 100% fine to medium sand (15% fine, 85% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
85			SM			
					Silty sand: 7.5YR 6/4, light brown; loose; dry; 60% very fine to medium sand (30% very fine, 60% fine, 10% medium); subangular to subrounded; 40% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
90	1.4					
			ML			
					Silt: 5YR 5/4, reddish brown; soft; moist; 75% silt, nonplastic; 15% clay, slightly plastic; 10% very fine to coarse sand (30% very fine, 50% fine, 10% medium, 10% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present as nodules.	
95						
					@ 95 ft: Sandy silt: 10YR 6/4, light yellowish brown; soft; moist; 65% silt, nonplastic; 35% very fine to coarse sand (15% very fine, 30% fine, 40% medium, 15% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
100	5.9		SP-SM			
					@ 100 ft: Poorly graded sand with silt: 10YR 6/4, light yellowish brown; loose; moist; 90% fine to medium sand	
105						

Notes: (1) Current Water Table Well

(2) Contingency Well

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T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**

Page: **4 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	----------------------	------	-----------	--------------------	-----------------------

(1) (2)

105				SP	(60% fine, 40% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
110	5.0				@ 105 ft: Poorly graded sand: 10YR 6/4, light yellowish brown; loose; moist; 95% fine to medium sand (60% fine, 40% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
115					Silt: 7.5YR 5/4, brown; soft; moist; 95% silt, nonplastic; 5% very fine to medium sand (65% very fine, 20% fine, 15% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
120	5.6			ML		
125					Same as above (110 ft): 7.5YR 5/6, strong brown.	
130	4.5				Same as above (110 ft): 7.5YR 5/6, strong brown; 90% silt; 10% sand; trace gravel to 1"; gravel is lithic fragments	
135						
140				SP	Poorly graded sand: 10YR 6/3, pale brown; loose; dry; 100% fine to medium sand (25% fine, 75% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; trace silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	

Notes: (1) Current Water Table Well

(2) Contingency Well

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Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

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**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**

Page: **5 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	----------------------	------	-----------	--------------------	-----------------------

(1) (2)

140	6.0				Silt: 7.5YR 4/6, strong brown; soft; moist; 100% silt, nonplastic; trace fine to medium sand (95% fine, 5% medium); trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
145					Same as above (140 ft): 7.5YR 5/6, strong brown; no gravel.	
150	5.6		ML			
155						
160	10.2	P			Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (50% fine, 30% medium, 20% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
165			SW		Same as above (160 ft): 100% fine to coarse sand; no gravel.	
170	8.3					
175			SW-SM		Well-graded sand with silt: 10YR 5/4, yellowish brown; 90% fine to coarse sand (50% fine, 35% medium, 15% coarse); trace gravel; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche.	

Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**

Page: **6 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	----------------------	------	-----------	--------------------	-----------------------

(1) (2)

175					SP	Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to medium sand (40% fine, 60% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, caliche, and lithic fragments.			
180	8.0				SW	Well-graded sand: 10YR 6/4, light yellowish brown; loose; moist; 100% fine to coarse sand (15% fine, 60% medium, 25% coarse); subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche.			
185					SP-SM	Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; moist; 90% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, caliche, and lithic fragments.			
190	8.2				SP	Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to medium sand (70% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, caliche, and lithic fragments.			
195					SP	Poorly graded sand: 7.5YR 5/4, brown; loose; moist; 95% very fine to medium sand (15% very fine, 70% fine, 15% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.			
200	5.6				SP-SM	Poorly graded sand with silt: 7.5YR 5/4, brown; loose; moist; 90% very fine to medium sand (15% very fine, 70% fine, 15% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.			
205					SP	Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to medium sand (70% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.			
210									

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**

Page: **7 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

210	6.0		SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to medium sand (80% fine, 20% medium); subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments.	
215						
220	7.9		SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to coarse sand (20% fine, 70% medium, 10% coarse); subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments.	
225						
230	8.3		SW-SM		Same as above (215 ft): 10YR 4/4, dark yellowish brown.	
235						
240	8.4	P	SW		Well-graded sand with silt and gravel: 10YR 3/4, dark yellowish brown; loose; moist; 60% fine to coarse sand (25% fine, 60% medium, 15% coarse); 30% gravel to 1 1/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
245						
			SW		Well-graded sand: 10YR 4/4 dark yellowish brown; loose; moist; 100% fine to coarse sand (15% fine, 70% medium, 15% coarse); trace gravel to 3/8"; subangular to subrounded; trace silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
			SW-SM		Well-graded sand with silt: 10YR 3/4, dark yellowish brown; loose; moist; 90% fine to coarse sand (20% fine, 60% medium, 20% coarse); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
					Note: drill chatter at 237 ft, gravel up to 1 1/4" observed.	
			SM		Silty sand: 10YR 5/4, yellowish brown; loose; moist; 85% fine to coarse sand (30% fine, 45% medium, 25% coarse); subangular to subrounded; 15% silt, nonplastic; sand is	

Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**

Page: **8 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

245					quartz, feldspar, caliche, and lithic fragments.	
					No cuttings returned.	
250	4.8		SM		Silty sand: 10YR 5/4, yellowish brown; loose; moist; 80% very fine to coarse sand (10% very fine, 50% fine, 25% medium, 15% coarse); trace gravel to 3/4"; subangular to subrounded; 20% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
255			SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% very fine to medium sand (10% very fine, 10% fine, 80% medium); trace coarse sand; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments.	
260	3.8		SC		Clayey sand: 7.5YR 4/3, brown; loose; moist; 65% very fine to coarse sand (30% very fine, 30% fine, 30% medium, 10% coarse); trace gravel to 1"; subangular to subrounded; 35% clay, soft, slightly plastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
265			SW-SC		Well-graded sand with clay: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (15% fine, 60% medium, 25% coarse); trace gravel to 1/2"; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and caliche; gravel is lithic fragments.	
270	4.0					
275			CL		Clay: 7.5YR 5/4, brown; medium stiff; slightly plastic; 100% clay; trace very fine to fine sand (80% very fine, 20% fine); sand is quartz and feldspar.	
280						

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

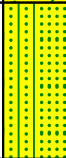
Well ID: **KAFB-106S3**

Page: **9 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

280	3.5		CL		Clay: 7.5YR 5/4, brown; medium stiff; slightly plastic; 100% clay; trace very fine to fine sand (80% very fine, 20% fine); sand is quartz and feldspar.	
285					Silt: 7.5YR 4/4, brown; soft; moist; nonplastic; 100% silt; trace very fine to medium sand (60% very fine, 30% fine, 10% medium); subangular to subrounded; sand is quartz and feldspar.	
290	3.4		ML		Same as above (285 ft): 60% silt; 30% clay, 10% sand.	
295					Same as above (285 ft): 60% silt; 30% clay, 10% sand. Note: drill chatter at 297 ft.	
300	5.5		SW-SC		Well-graded sand with clay: 10YR 5/3, brown; loose; dry; 90% fine to coarse sand (25% fine, 60% medium, 15% coarse); subangular to subrounded; 10% clay, slightly plastic; sand is quartz, feldspar, and lithic fragments. Note: clay is present as soft nodules.	
305			SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; moist; 90% fine to medium sand (60% fine, 40% medium); subangular to subrounded; 10% silt, nonplastic; trace clay, slightly plastic; sand is quartz, feldspar, and lithic fragments. Note: clay is present as soft nodules.	
310	5.7		SW		Well-graded sand: 10YR 5/4, yellowish brown; 90% fine to coarse sand (10% fine, 60% medium, 30% coarse); 10% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
315						

Notes: (1) Current Water Table Well

(2) Contingency Well

 = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**

Page: **10 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

315					Well-graded sand: 10YR 5/4, yellowish brown; 90% fine to coarse sand (25% fine, 60% medium, 15% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
320	5.0		SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (30% fine, 40% medium, 30% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: drill chatter at 323 ft.	
325			GW		Well-graded gravel with sand: 10YR 5/4, yellowish brown; loose; moist; 65% gravel to 1"; 35% fine to coarse sand (15% fine, 60% medium, 25% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: drill chatter at 328 ft.	
330	4.7		SW		Well-graded sand with gravel: 10YR 6/3, pale brown; loose; dry; 75% fine to coarse sand (30% fine, 40% medium, 30% coarse); 25% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: drill chatter at 333 ft.	
335			GW		Well-graded gravel with sand: 10YR 4/3, brown; loose; moist; 70% gravel to 1"; 30% fine to coarse sand (10% fine, 60% medium, 30% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
340	3.6		SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (15% fine, 70% medium, 15% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
345						
350						

Notes: (1) Current Water Table Well

(2) Contingency Well

⚡ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

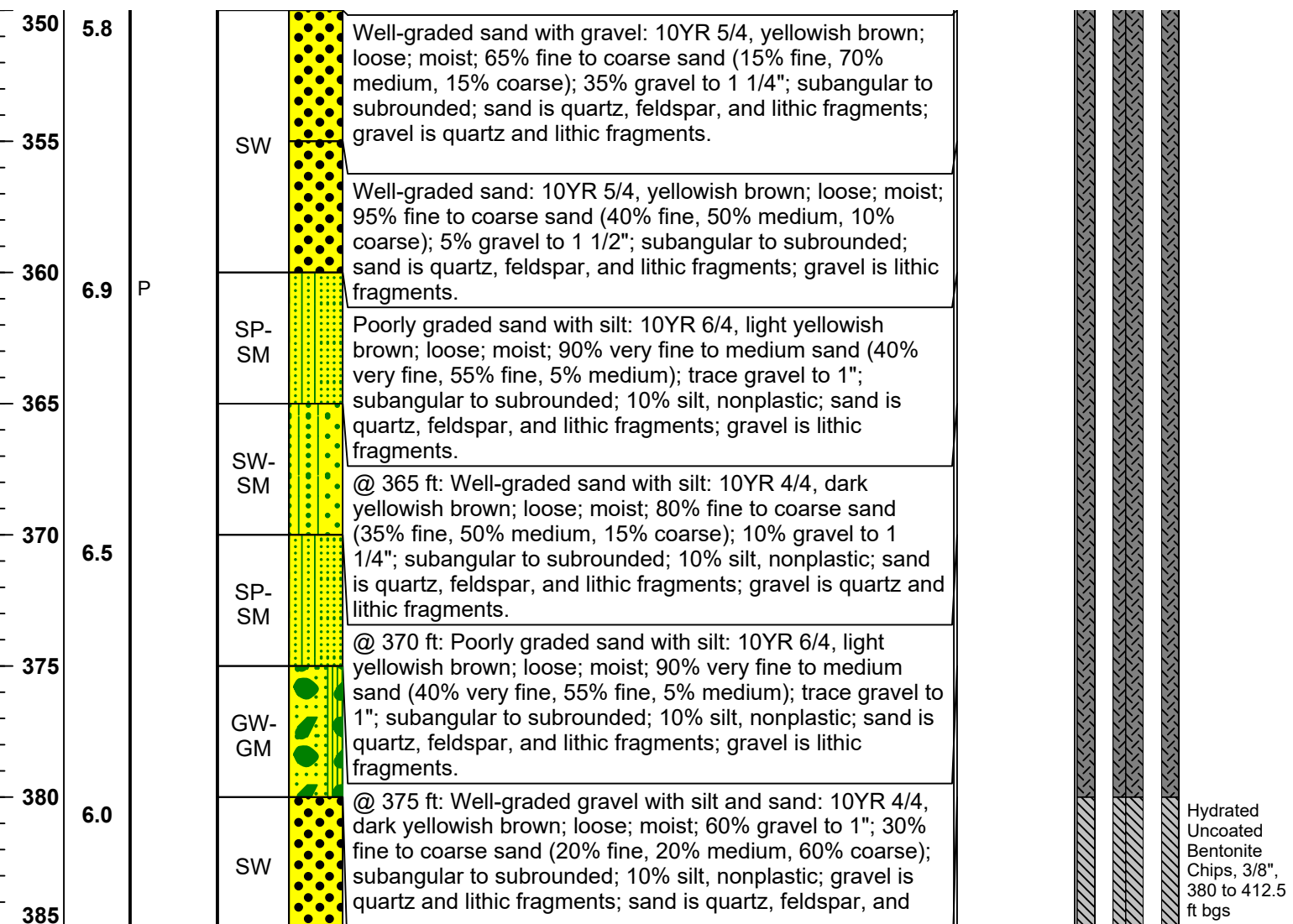
Well ID: **KAFB-106S3**

Page: **11 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**

Page: **12 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Driller: Mark Green, Forest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

385					lithic fragments.	
			SP		@ 380 ft: Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 75% fine to coarse sand (30% fine, 30% medium, 40% coarse); 25% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
390	6.4				@ 385 ft: Poorly graded sand: 10YR 6/3, pale brown; loose; dry; 100% fine to medium sand (15% fine, 85% medium); trace coarse sand; subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
			SW		@ 390 ft: Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (25% fine, 60% medium, 15% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
395					@ 400 ft: Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to medium sand (65% fine, 35% medium); trace coarse sand; 10% gravel to 1 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
400	2.3				End ARCH drilling at 400 ft, switch to sonic coring.	
405						
410						
415						
420						

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

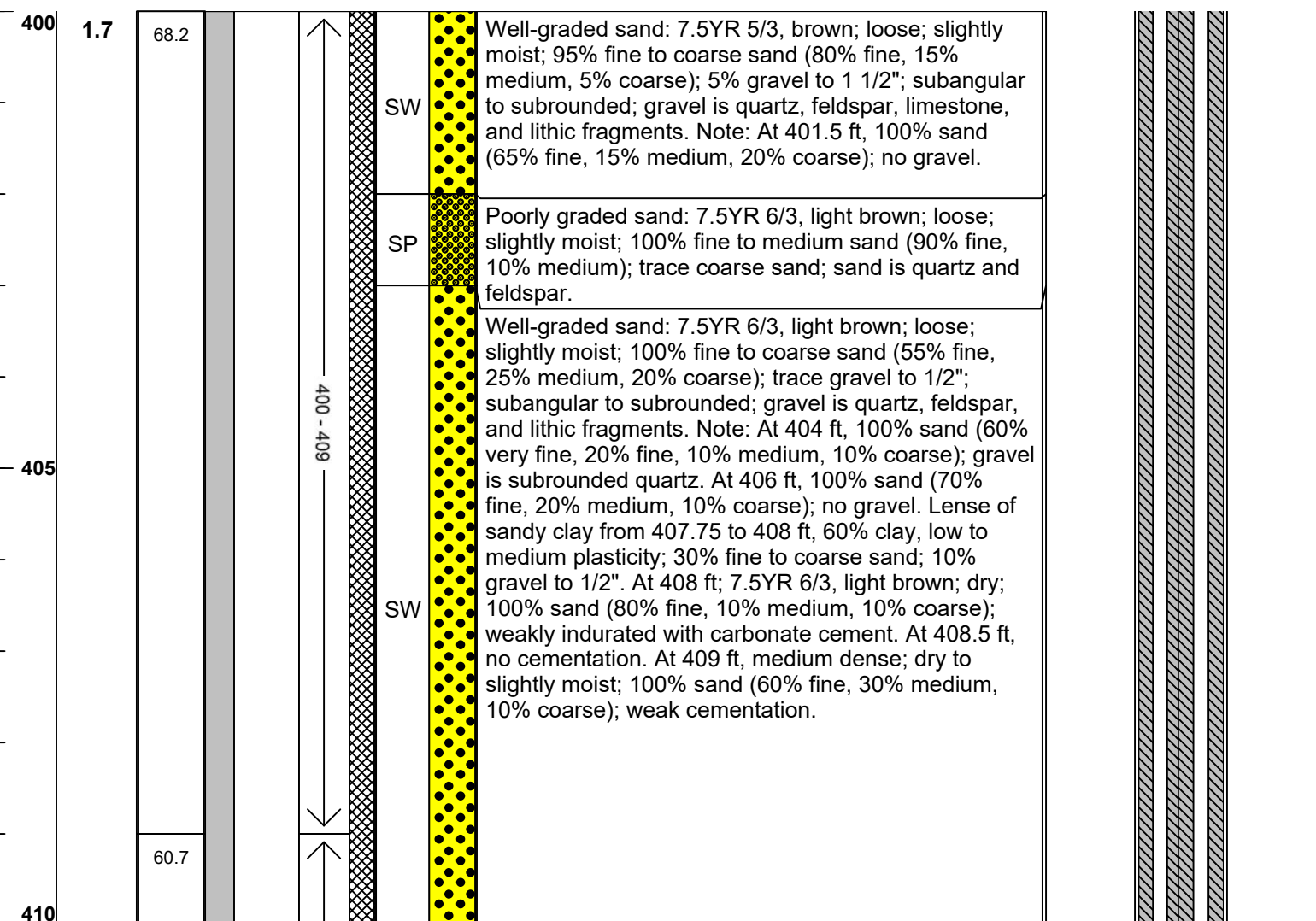
Well ID: **KAFB-106S3**

Page: **13 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

- (1) Current Water Table Well
- (2) Contingency Well
- ☒ = Depth to water after completion
- UV = ultraviolet fluorescence
- NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**

Page: **14 of 24**

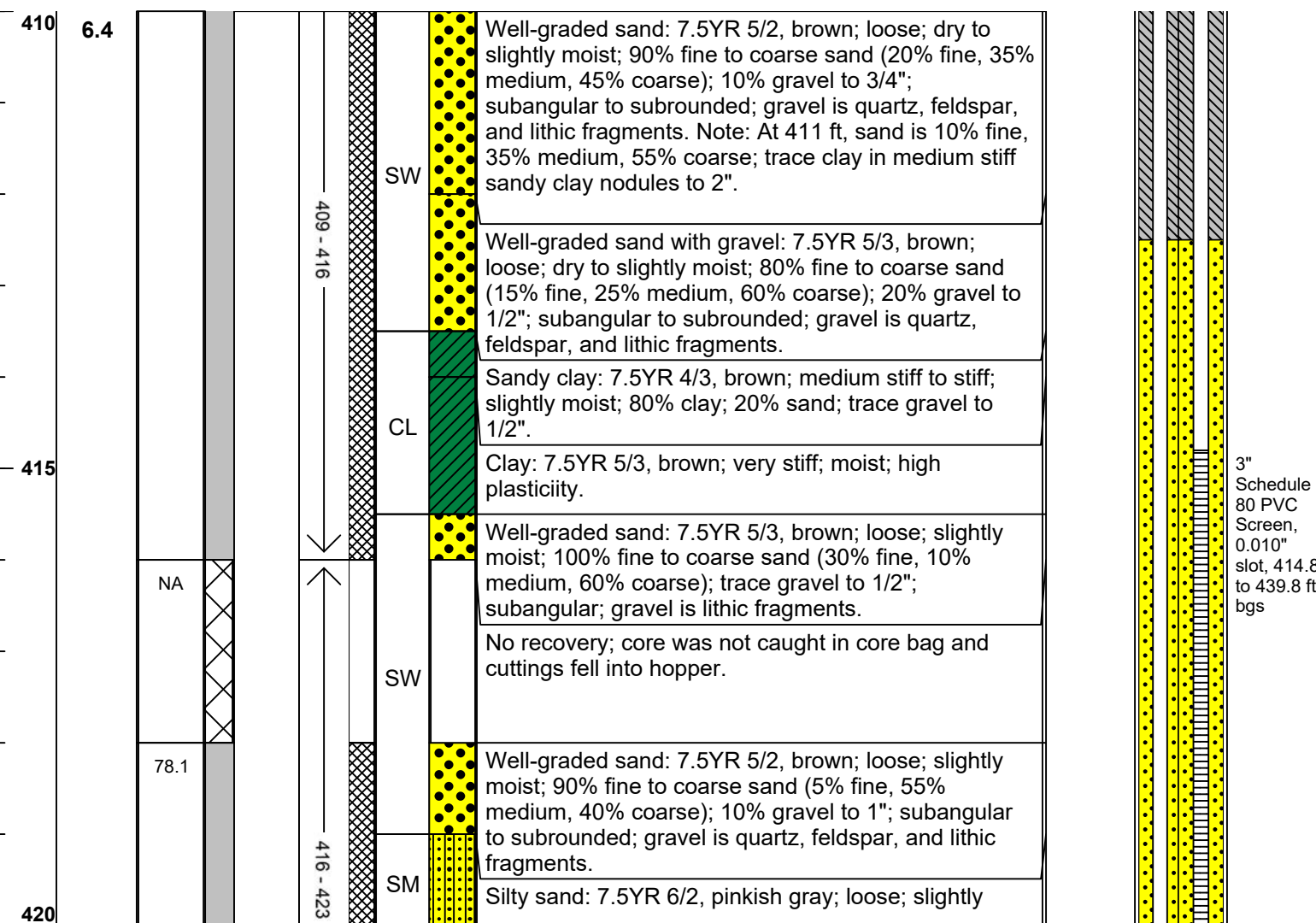
Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

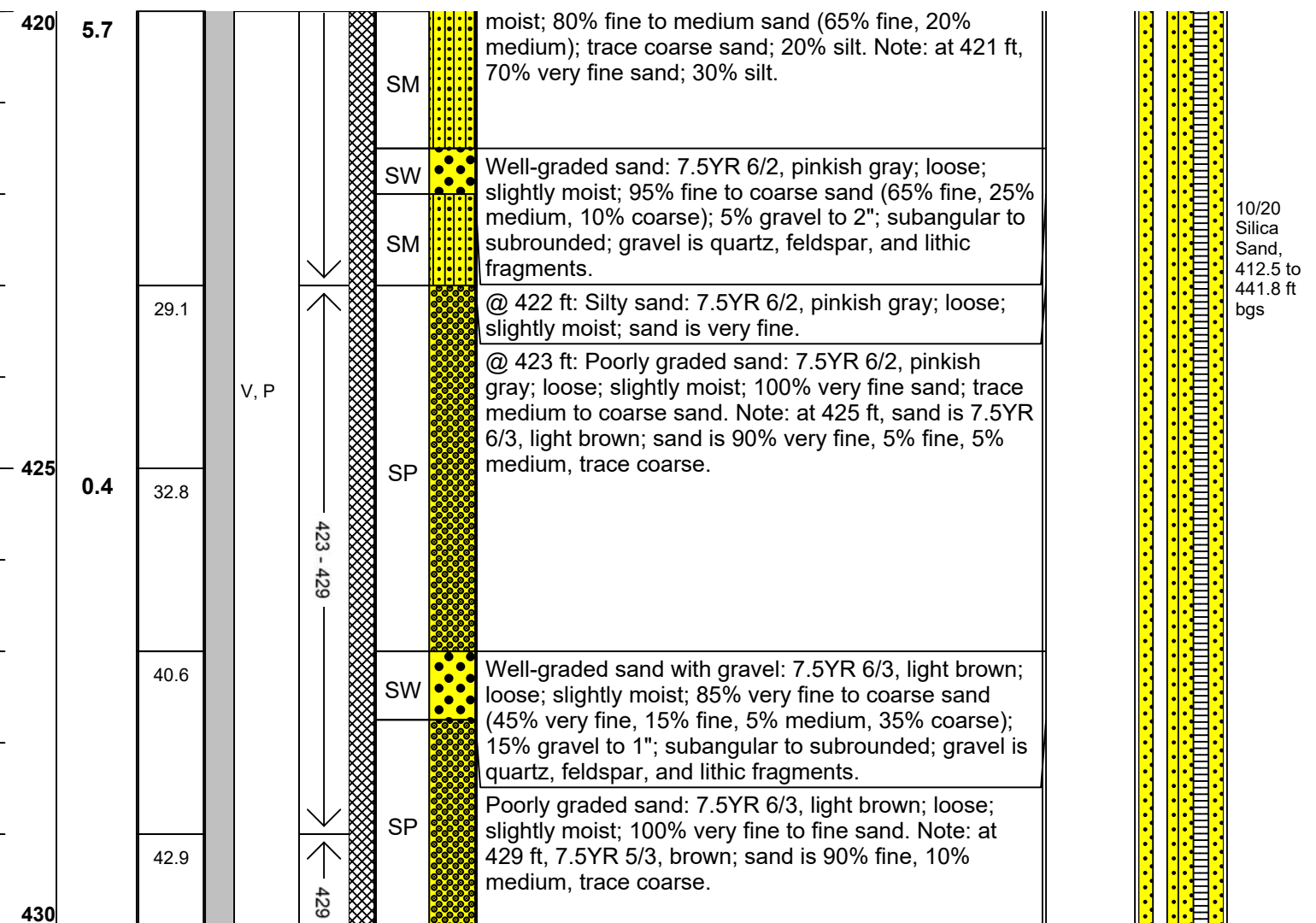
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

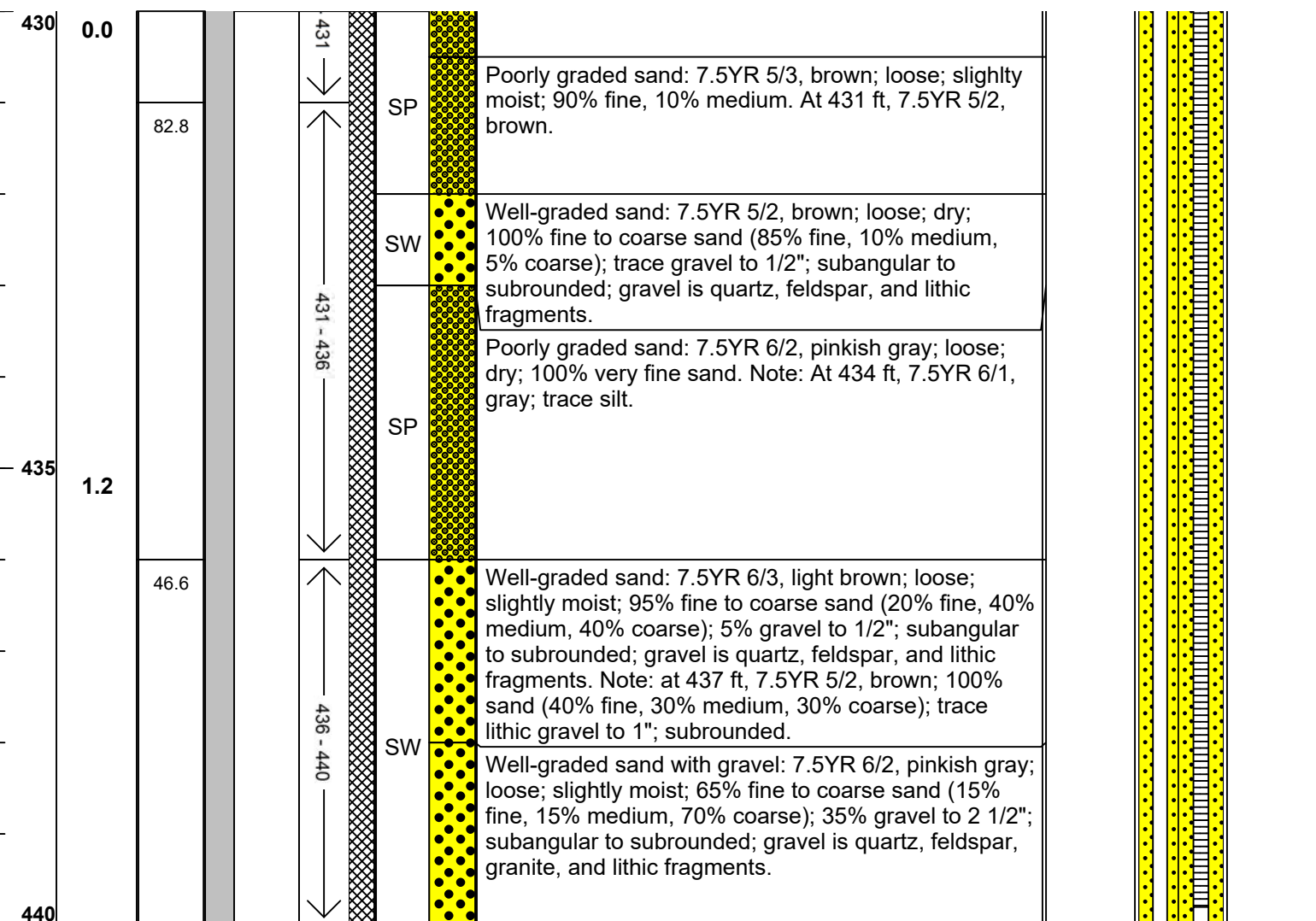
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

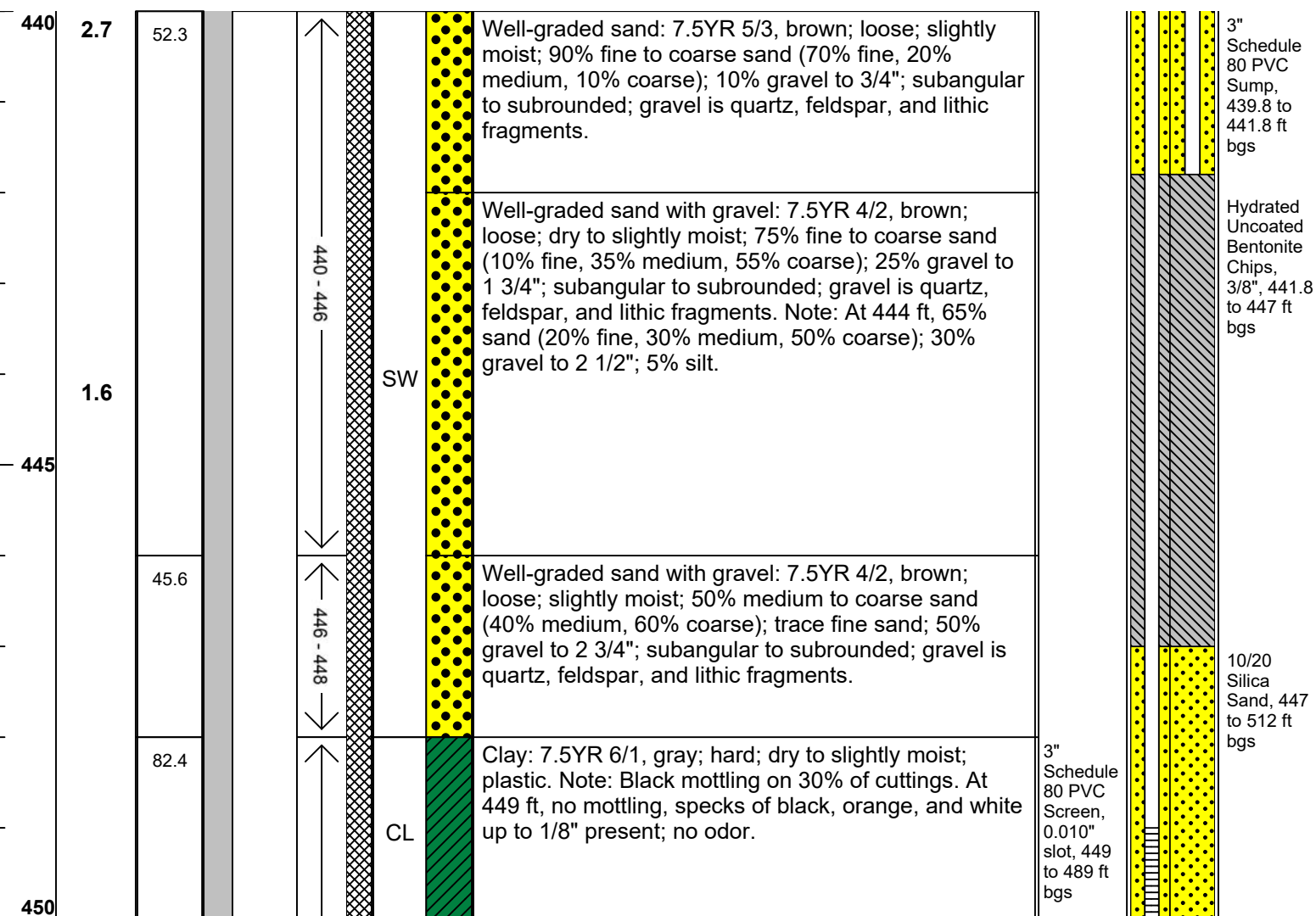
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

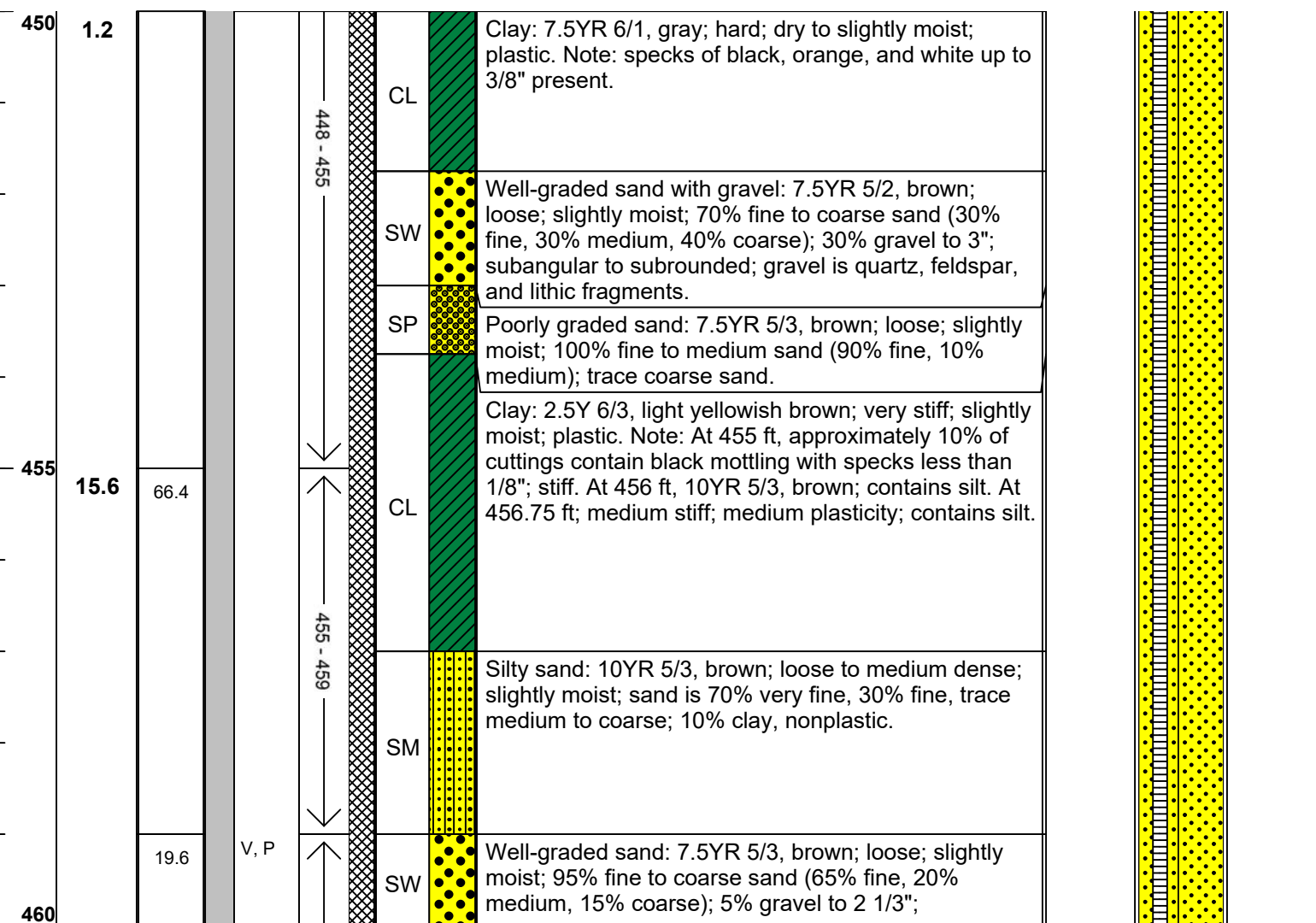
Well ID: **KAFB-106S3**

Page: **18 of 24**

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

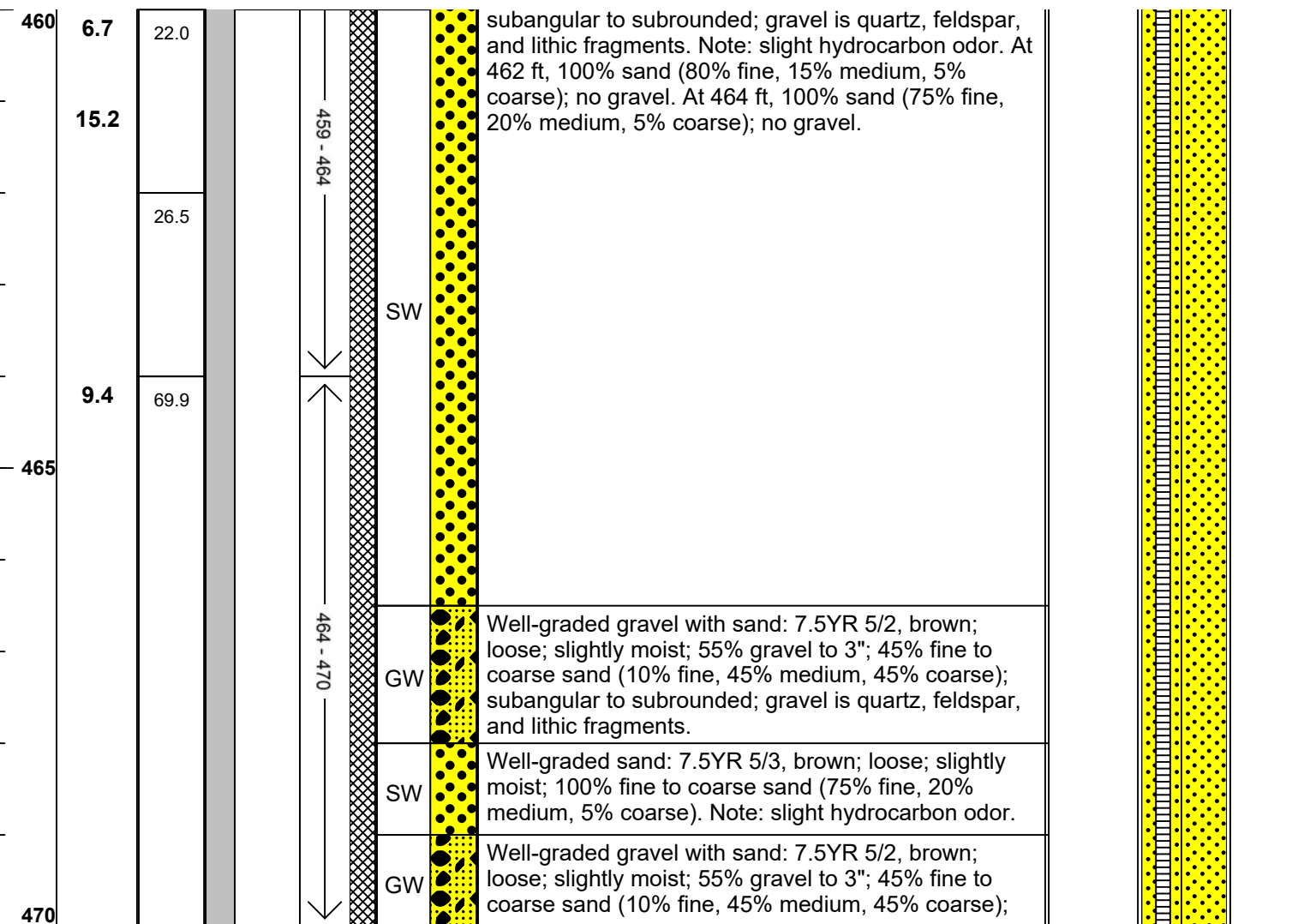
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

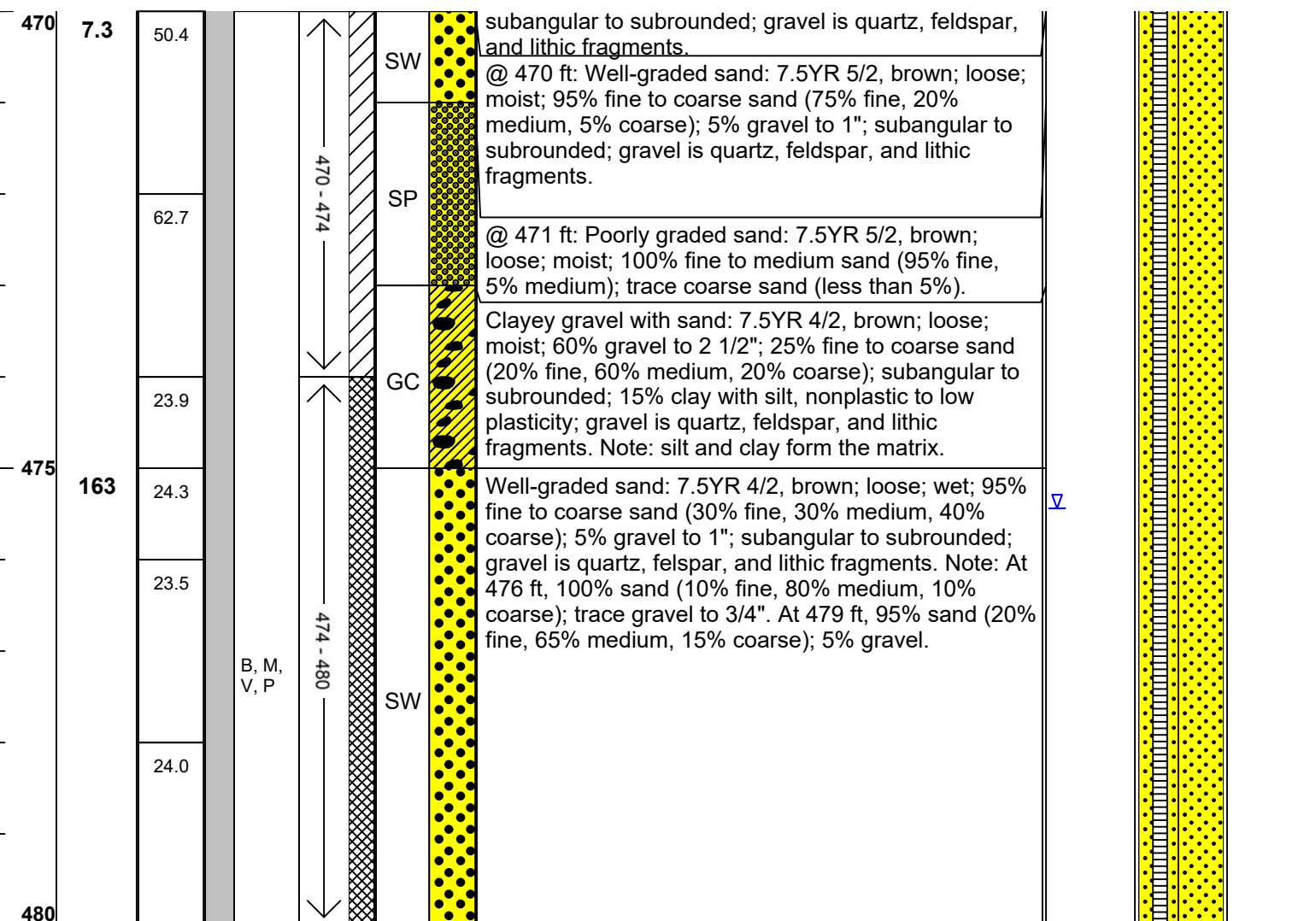
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

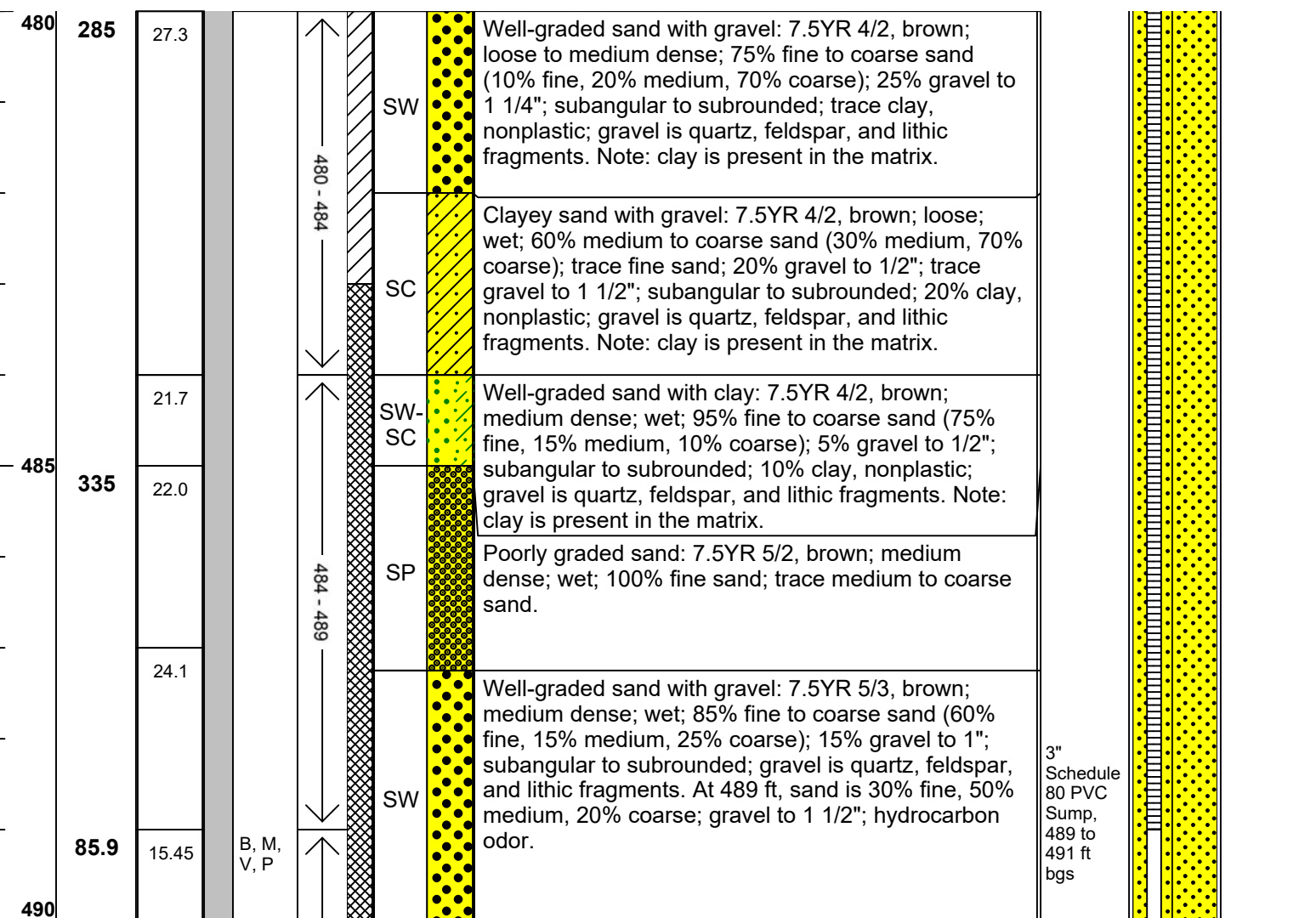
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes: (1) Current Water Table Well
 (2) Contingency Well
 ▽ = Depth to water after completion
 UV = ultraviolet fluorescence
 NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

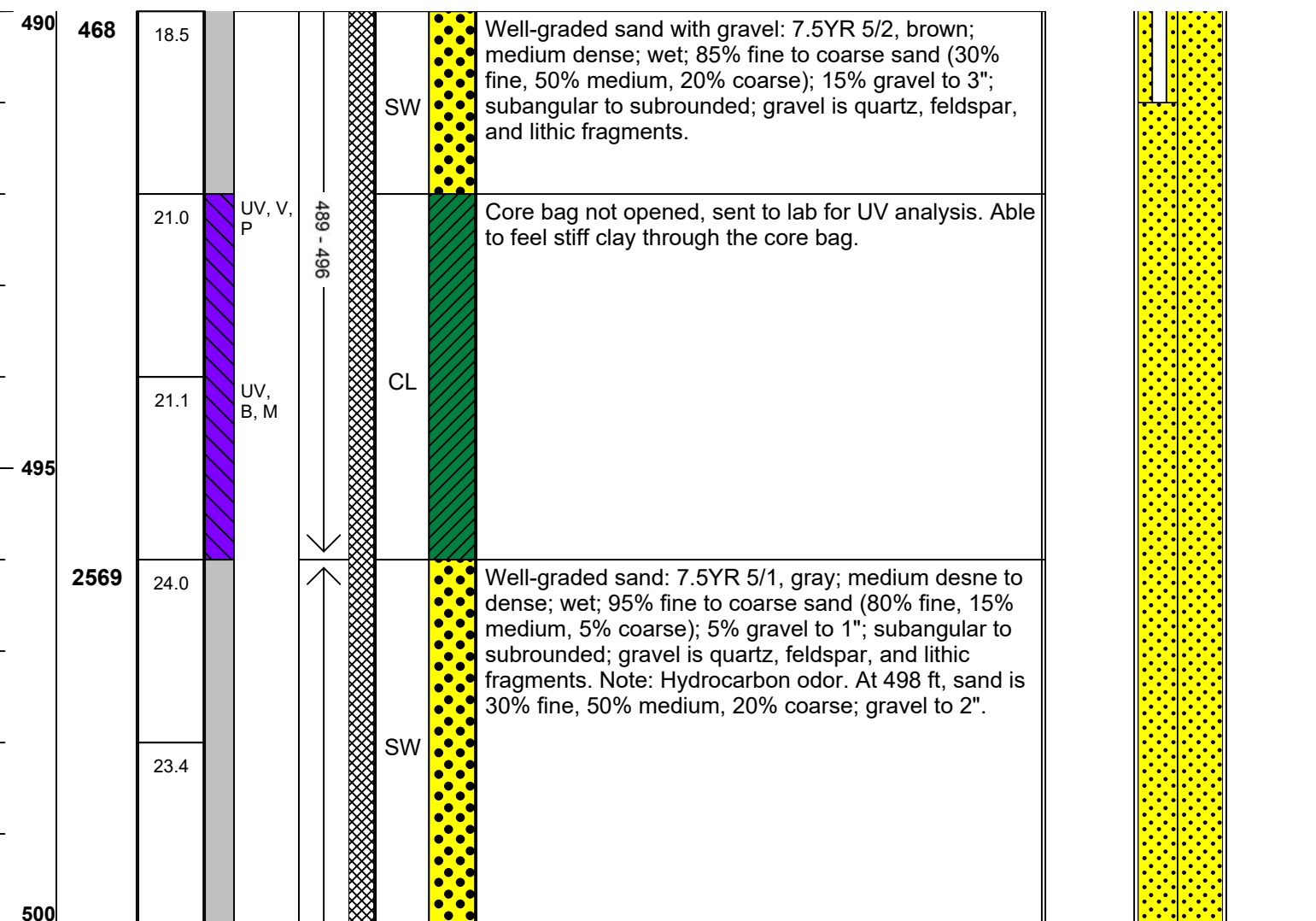
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 512	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.94	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)

500	260	24.5						SW	Well-graded sand: 7.5YR 4/1, dark gray; medium dense to dense; wet; 100% fine to coarse sand (80% fine, 15% medium, 5% coarse); trace gravel to 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithics. Note: Hydrocarbon and organic odors.	
		24.8						SC	Clayey sand: 7.5YR 4/2, brown; dense; wet; 65% fine to coarse sand (5% fine, 55% medium, 10% coarse); 5% gravel to 1"; subangular to subrounded; 30% clay, low plasticity; gravel is quartz, feldspar, and lithic fragments. Note: Hydrocarbon odor. Clay is dispersed in the matrix as orange and yellow streaks and specks up to 1/4" by 3".	
	175	24.4			496 - 512			SW	Well-graded sand: 7.5YR 5/2, brown; dense; wet; 85% fine to coarse sand (10% fine, 45% medium, 45% coarse); 15% gravel to 3"; trace cobbles to 3 1/2"; subangular to subrounded; trace clay; gravel is quartz, feldspar, and lithic fragments. Note: Clay is present in the matrix. Lense of clayey sand with gravel from 507.75 to 508 ft, 65% fine to coarse sand; 15% gravel to 1"; 20% clay in the matrix.	
505		23.8						SW-SC	Well-graded sand with clay: 7.5YR 5/2, brown; dense; wet; 80% fine to coarse sand (10% fine, 50% medium, 40% coarse); 10% gravel to 1"; trace gravel to 2 1/2"; subangular to subrounded; 10% clay, nonplastic; gravel is quartz, feldspar, and lithic fragments. Note: Clay is present in the matrix.	
510		22.4								

Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/18/18**

Completion Date: **11/29/18**

WELL LOG

Well ID: **KAFB-106S3**

Page: **24 of 24**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **L. Andress**

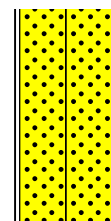
Boring Depth (ft): **512**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **474.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

510	35.1	23.2							Poorly graded sand: 7.5YR 4/2, brown; dense; wet; 100% fine to medium sand (70% fine, 30% medium).
				V, P				SP	Poorly graded sand with gravel: 7.5YR 4/2, brown; dense; wet; 85% medium to coarse sand (40% medium, 60% coarse); trace fine sand; 15% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Total depth = 512 ft bgs.



Notes:

(1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

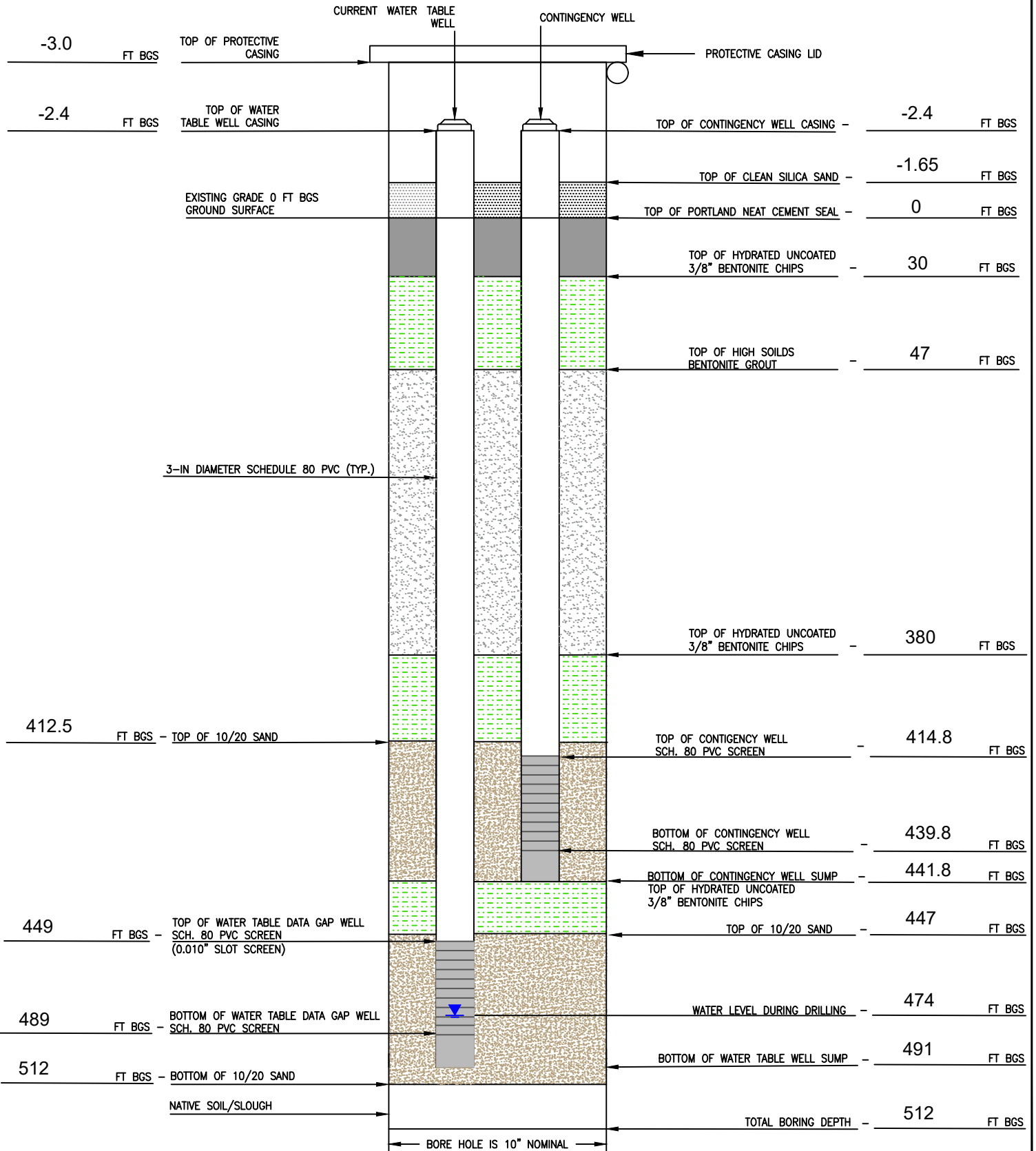
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S3



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

PROJECT NO.: 62735DM02.1018

WELL ID: KAFB-106S3

INSTALLATION START DATE/TIME: 18OCT18
GEOLOGIST: L.Andress, J.Messenger

INSTALLATION END DATE/TIME: 29NOV18
DRILLER: R. Rodriguez, M. Green, F. Chattin



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

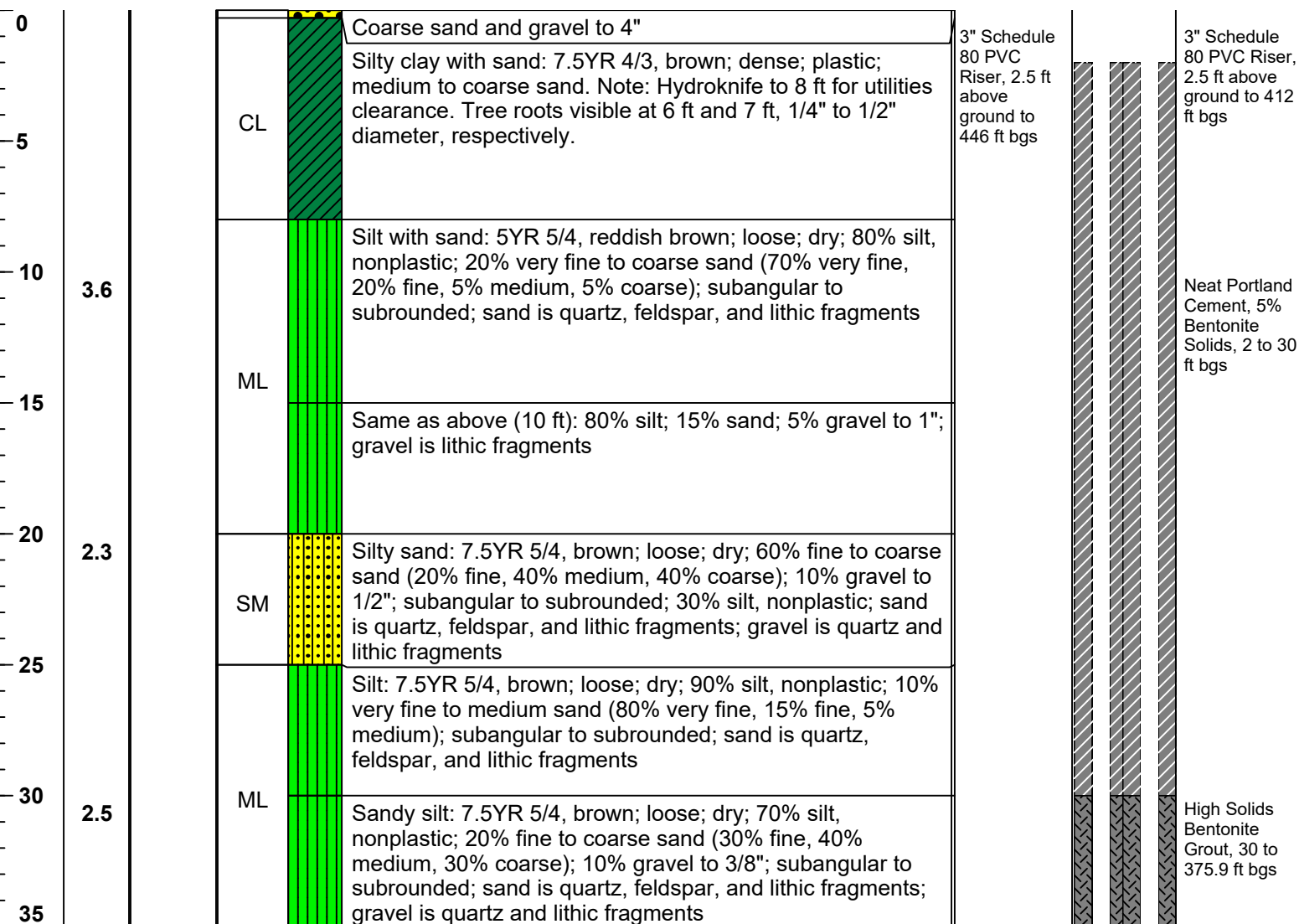
WELL LOG

Well ID: **KAFB-106S4**

Page: **1 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Ken Claw 10 1/2"	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Milltooth Tricone 8 1/2"	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Driller: Mark Green / Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
						(1) (2)



Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**

Page: **2 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Ken Claw 10 1/2"	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Milltooth Tricone 8 1/2"	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Driller: Mark Green / Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

35						
				ML	Sandy silt with gravel: 5YR 4/4, reddish brown; loose; dry; 65% silt, nonplastic; 20% fine to coarse sand (30% fine, 40% medium, 30% coarse); 15% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
40	5.0	P				
				SM	Silty sand: 7.5YR 6/4, light brown; loose; dry; 70% fine to coarse sand (30% fine, 40% medium; 30% coarse); 10% gravel to 1/2"; subangular to subrounded; 20% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
45					Same as above (40 ft): 7.5YR 5/4, brown; 60% sand; 10% gravel; 30% silt	
50	1.8				Same as above (40 ft): 60% sand; 10% gravel; 30% silt	
55						
				ML	Silt with sand: 5YR 4/4, reddish brown; loose; dry; 80% silt, nonplastic; 15% fine to coarse sand (40% fine, 40% medium, 20% coarse); 5% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
60	0.6				Same as above (55 ft): 7.5YR 5/4, brown	
65						
					Sandy silt: 7.5YR 5/4, brown; loose; dry; 70% silt, nonplastic; 20% fine to coarse sand (40% fine, 40% medium, 20% coarse); 10% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
70						

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**

Page: **3 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Ken Claw 10 1/2"	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Milltooth Tricone 8 1/2"	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Driller: Mark Green / Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

70	3.1			ML	Silt with sand: 7.5YR 5/4, brown; loose; dry; 85% silt, nonplastic; 15% fine to coarse sand (40% fine, 40% medium, 20% coarse); trace gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
75						
80	3.8				Same as above (70 ft): 80% silt; 15% sand; 5% gravel to 1"	
85						
90	0.2			SP	Poorly graded sand: 10YR 5/4, yellowish brown; loose; dry; 100% fine to medium sand (60% fine, 40% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
95					Same as above (85 ft): trace gravel to 3/8"; gravel is lithic fragments	
100	0.3			SW	Well-graded sand: 10YR 5/4, yellowish brown; loose; dry; 90% fine to coarse sand (40% fine, 40% medium, 20% coarse); 10% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
105				ML	Silt with sand: 7.5YR 4/6, strong brown; loose; dry; 85% silt, nonplastic; 15% fine to medium sand (60% fine, 40% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	

Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**

Page: **4 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Ken Claw 10 1/2"	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Milltooth Tricone 8 1/2"	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Driller: Mark Green / Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

105					Silt with sand: 7.5YR 5/4, brown; loose; dry; 80% silt, nonplastic; 15% fine to medium sand (60% fine, 40% medium); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
110	2.6	P	ML		Same as above (105 ft): 7.5YR 5/6, strong brown	
115						
120	0.0		SM		Silty sand: 7.5YR 5/6, strong brown; loose; dry; 70% fine to medium sand (80% fine, 20% medium); subangular to subrounded; 30% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
125			ML		Silt with sand: 7.5YR 4/6, strong brown; loose; dry; 70% silt, nonplastic; 10% clay, slightly plastic; 20% fine to medium sand (80% fine, 20% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: clay is present in nodules	
130			CL		Clay: 7.5YR 4/4, brown; soft; 100% clay, slightly plastic. Note: clay is present in nodules	
135					No cuttings returned	
140			SP		Poorly graded sand: 10YR 5/3, brown; loose; dry; 95% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 5% clay, slightly plastic, soft; sand is quartz, feldspar, and lithic fragments. Note: clay is present as nodules.	

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**

Page: **5 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Ken Claw 10 1/2"	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Milltooth Tricone 8 1/2"	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Driller: Mark Green / Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

140	0.0		SW		Well-graded sand: 10YR 5/3, brown; loose; dry; 100% fine to coarse sand (20% fine, 60% medium, 20% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
145			SW-SM		Well-graded sand with silt: 10YR 6/4, light yellowish brown; loose; dry; 90% fine to coarse sand (30% fine, 55% medium, 15% coarse); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
150	0.1		SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; dry; 100% fine to medium sand (50% fine, 50% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
155			SW		Well-graded sand: 10YR 6/4, light yellowish brown; loose; dry; 90% fine to coarse sand (20% fine, 60% medium, 20% coarse); 10% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
160	0.0				Same as above (155 ft): gravel to 5/8"	
165					Same as above (155 ft): gravel to 1 1/4"; sand is quartz, felspar, lithic fragments, and caliche	
170	0.0		SW-SM		Well-graded sand with silt: 10YR 6/4, light yellowish brown; loose; dry; 85% fine to coarse sand (25% fine, 50% medium, 25% coarse); 5% gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, caliche, and lithic fragments; gravel is quartz and lithic	
175						

Notes: (1) Current Water Table Well

(2) Contingency Well

= Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**

Page: **6 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Ken Claw 10 1/2"	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Milltooth Tricone 8 1/2"	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Driller: Mark Green / Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

175					fragments	
					Well-graded sand: 10YR 5/4, yellowish brown; loose; dry; 90% fine to coarse sand (30% fine, 50% medium, 20% coarse); 10% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, caliche, and lithic fragments; gravel is quartz, caliche, and lithic fragments	
180	0.0					
				SW	Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; dry; 85% fine to coarse sand (25% fine, 40% medium, 35% coarse); 15% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, caliche, and lithic fragments; gravel is quartz and lithic fragments	
185						
190	0.0				Same as above (180 ft): 80% sand (30% fine, 50% medium, 20% coarse); 20% gravel to 1"; no caliche in sand	
195						
				SP	Poorly graded sand with gravel: 10YR 6/4, light yellowish brown; loose; dry; 80% fine to medium sand (80% fine, 20% medium); 20% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
200	0.0					
				SP-SM	Poorly-graded sand with silt: 10YR 5/3, brown; loose; moist; 90% very fine to medium sand (15% very fine, 60% fine, 25% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
205						
				SW	Well-graded sand with gravel: 10YR 6/4, light yellowish brown; loose; dry; 85% fine to coarse sand (35% fine, 45% medium, 20% coarse); 15% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
210						

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**

Page: **7 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Ken Claw 10 1/2"	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Milltooth Tricone 8 1/2"	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Driller: Mark Green / Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

210	1.8				Well-graded sand: 10YR 6/4, light yellowish brown; loose; dry; 95% fine to coarse sand (15% fine, 70% medium, 15% coarse); 5% gravel to 1/2" subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
215					Same as above (210 ft): 10YR 5/4, yellowish brown; 90% sand (10% fine, 60% medium, 30% coarse); 10% gravel to 3/8"	
220	0.7		SW		Same as above (210 ft): 10YR 5/4, yellowish brown; 90% sand (10% fine, 60% medium, 30% coarse); 10% gravel to 1/2"	
225					Same as above (210 ft): 10YR 5/4, yellowish brown; 85% sand (30% fine, 40% medium, 30% coarse); 10% gravel to 1/2"; 5% silt, nonplastic	
230	0.8				Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to medium sand (20% fine, 80% medium); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche	
235			SP		Same as above (230 ft): 7.5YR 5/4, brown; 100% sand; no gravel. Note: drill chatter at 237 ft.	
240	0.7		GW		Well-graded gravel with sand: 75% gravel to 1"; 25% fine to coarse sand	
245			SP		Poorly graded sand with gravel: 10YR 6/3, pale brown; loose; dry; 80% fine to medium sand (90% fine, 10% medium); trace coarse sand; 20% gravel up to 1/2"; subangular to subrounded; sand is quartz, feldspar, and	

Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

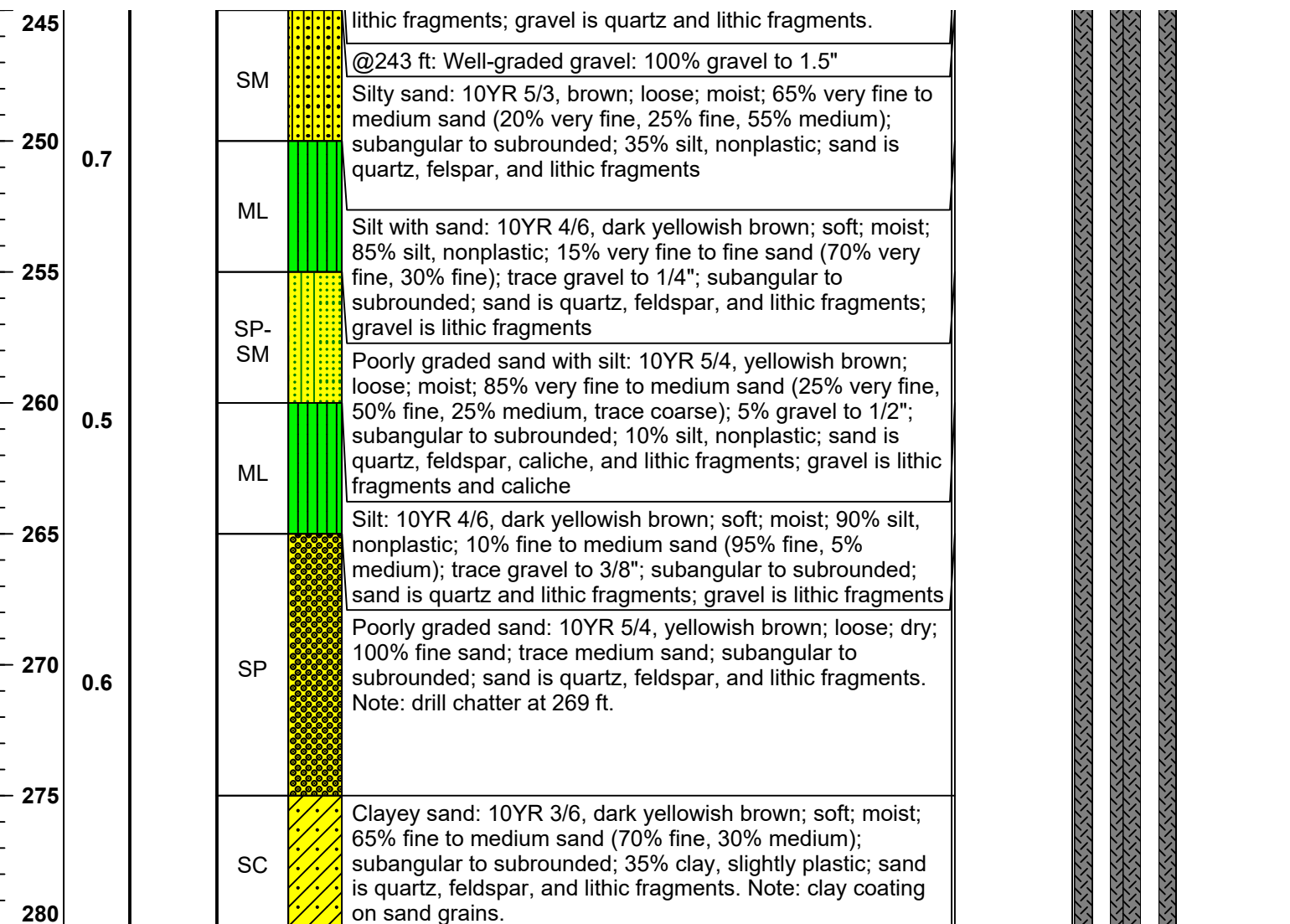
Well ID: **KAFB-106S4**

Page: **8 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Ken Claw 10 1/2"	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Milltooth Tricone 8 1/2"	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Driller: Mark Green / Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**

Page: **9 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Ken Claw 10 1/2"	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Milltooth Tricone 8 1/2"	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Driller: Mark Green / Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

280	1.1		SC		Clayey sand: 10YR 3/6, dark yellowish brown; soft; moist; 70% fine to medium sand (70% fine, 30% medium); subangular to subrounded; 30% clay, slightly plastic; sand is quartz, feldspar, and lithic fragments. Note: clay coating on sand grains. Drill chatter at 284 ft.	
285			SP-SM		Poorly graded sand with silt: 10YR 4/3, brown; loose; moist; 90% fine to medium sand (95% fine, 5% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
290	0.8		SW		Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 85% fine to coarse sand (40% fine, 40% medium, 20% coarse); 15% gravel to 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
295			SW		Same as above (290 ft): sand is 20% fine, 40% medium, 40% coarse; gravel to 1"	
300	2.1	P	GW		Well-graded sand with gravel: 10YR 6/4, light yellowish brown; loose; dry; 60% fine to coarse sand (10% fine, 40% medium, 50% coarse); 35% gravel to 1"; subangular to subrounded; 5% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: drill chatter at 304 ft.	
305			GW		Well-graded gravel with sand: 10YR 6/4, light yellowish brown; loose; dry; 80% gravel to 1 1/2"; 20% fine to coarse sand (30% fine, 35% medium, 35% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments	
310	0.7		GW		Same as above (305 ft): gravel to 2"	
315						

Notes: (1) Current Water Table Well

(2) Contingency Well

= Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**

Page: **10 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Ken Claw 10 1/2"	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Milltooth Tricone 8 1/2"	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Driller: Mark Green / Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

315					GW	Well-graded gravel with sand: 10YR 6/4, light yellowish brown; loose; dry; 70% gravel to 2"; 30% fine to coarse sand (30% fine, 35% medium, 35% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments		
320	0.3				SW	Well-graded sand: 10YR 4/4, dark yellowish brown; loose; moist; 90% fine to coarse sand (60% fine, 25% medium, 15% coarse); 10% gravel to 2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments		
325					SP	Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to medium sand (80% fine, 20% medium); trace coarse sand; 5% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments		
330	0.7							
335					GW	Well-graded gravel with sand: 10YR 5/4, yellowish brown; loose; moist; 60% gravel to 5/8"; 40% fine to coarse sand (25% fine, 35% medium, 40% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: drill chatter at 334 ft.		
340	0.7					Same as above (330 ft): 55% gravel; 45% sand. End ARCH drilling at 340 ft, switch to sonic coring.		
345								
350								

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**

Page: **11 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

340	3.1	25.9							Well-graded sand: 7.5YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (10% fine, 65% medium, 25% coarse); 10% gravel to 1 3/4"; trace cobbles to 4"; subangular to subrounded; gravel and cobbles are quartz, feldspar, granite, and lithic fragments. Note: sediments are coarsening downward.	
		27.8						SW	Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (10% fine, 40% medium, 50% coarse); 20% gravel to 2"; subangular to subrounded; trace silt; gravel is quartz, feldspar, and coarse sandstone conglomerate. Note: at 343 ft, sand is 10% fine, 50% medium, 40% coarse; gravel to 1/2". At 344 ft, 75% sand (10% fine, 55% medium, 35% coarse); 25% gravel to 2 1/2"; trace silt.	
345		41.6						SP	Poorly graded sand: 7.5YR 6/3, light brown; loose; slightly moist; 100% fine sand	
		33.6						SW	Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; slightly moist; 80% fine to coarse sand (25% fine, 25% medium, 50% coarse); 20% gravel to 2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: at 348 ft, 10YR 6/3, pale brown; 70% sand (15% fine, 30% medium, 55% coarse); 30% gravel to 3"; gravel is quartz, feldspar, and lithic fragments.	
350		38.1								

Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

350	3.8	34.4						SW	Well-graded sand with gravel: see description on previous pages	
								GW	Well-graded gravel with sand: 7.5YR 6/3, light brown; loose; slightly moist; 60% gravel to 3"; 20% fine to coarse sand (35% fine, 15% medium, 50% coarse); 10% cobbles to 4"; subangular to subrounded; 10% silt; gravel and cobbles are quartz, feldspar, and lithic fragments. Note: lense of silt with sand from 351.5 to 352 ft, 7.5YR 4/3, brown; dense; 70% silt, 5% clay; 25% fine sand. At 352 ft, 60% gravel; 40% sand (15% fine, 50% medium, 35% coarse); no cobbles; no silt.	
		34.8						SW	Well-graded sand with gravel: 7.5YR 6/3, light brown; loose; slightly moist; 85% fine to coarse sand (20% fine, 30% medium, 50% coarse); 15% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: lense of poorly graded sand from 363 to 363.5 ft, 70% medium to coarse sand (30% medium, 70% coarse); trace fine sand; 30% gravel to 2"; trace red clay nodules.	
355		39.7							Core bag not opened; saved for sampling	
		20.1						GW	Well-graded gravel with sand: 10YR 5/3, brown; loose; slightly moist; 60% gravel to 2"; 40% fine to coarse sand (15% fine, 25% medium, 60% coarse); subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
	2.1	22.4								
360										

Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

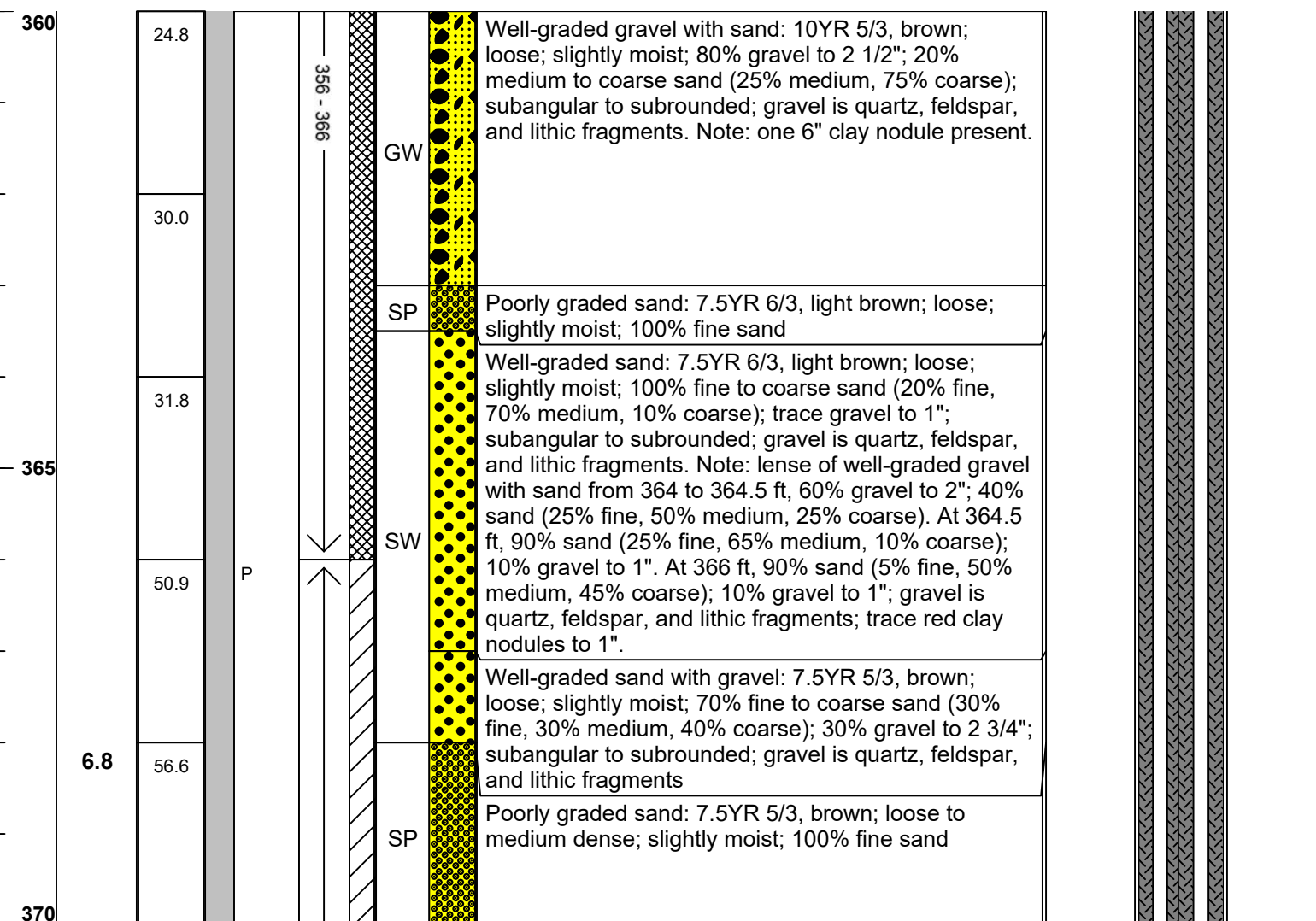
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
∇ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

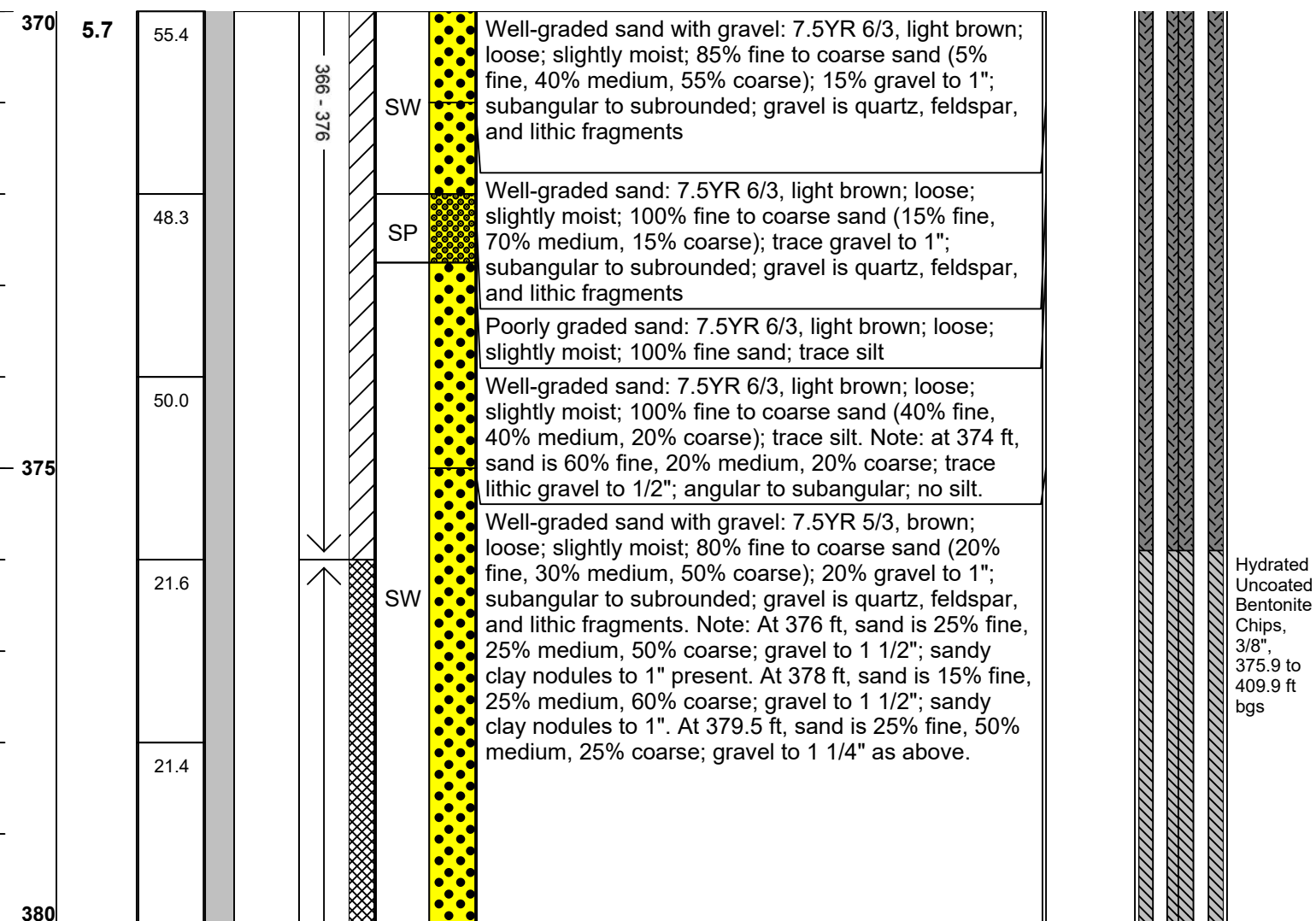
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

380	6.7	23.9							Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 85% fine to coarse sand (45% fine, 30% medium, 25% coarse); 15% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
		23.6							Core bag not opened, saved for sampling	
		28.0							Well-graded sand with gravel: 7.5YR 5/3, brown; loose; slightly moist; 50% fine to coarse sand (10% fine, 30% medium, 60% coarse); 50% gravel to 1 3/4"; subangular to subrounded; gravel is quartz, feldspar, granite, and lithic fragments. Note: At 385.5 ft, 90% sand (30% fine, 20% medium, 50% coarse); 10% gravel to 1". At 386 ft, 70% sand (20% fine, 30% medium, 50% coarse); 30% gravel to 2".	
385		24.7								
		27.1							Poorly graded sand: 10YR 5/2, grayish brown; loose; slightly moist; 100% fine sand	
	6.3									
390									Well-graded sand with gravel: 7.5YR 4/3, brown;	

Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

390	35.2								SW	loose; slightly moist; 80% fine to coarse sand (5% fine, 25% medium, 70% coarse); 20% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, lithic fragments; and coarse grained sandstone conglomerate. Note: from 391 to 391.75, sand and gravel are well-indurated with a calcium carbonate cement.	
	39.0								SP	Poorly graded sand: 7.5YR 5/3, brown; loose; slightly moist; 100% fine sand	
	37.8								SW	Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 15% medium, 55% coarse); 30% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and limestone. Note: sand is coarsening downwards.	
395	NA								SC	Clayey sand: loose; slightly moist; 80% fine to coarse sand; 20% clay, plastic. Note: clay is present in dense reddish brown nodules containing organic material	
	28.4									No recovery	
	46.0								SM	Silty sand: 7.5YR 4/2, brown; loose; slightly moist; 70% fine to coarse sand (20% fine, 60% medium, 20% coarse); 10% gravel to 3/4"; subangular to subrounded; 20% silt; gravel is quartz, feldspar, and lithic fragments	
									SW-SC		
400									SP	@ 398.25 ft: Well-graded sand with clay and gravel: 7.5YR 5/2, brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 35% medium, 35% coarse);	

Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

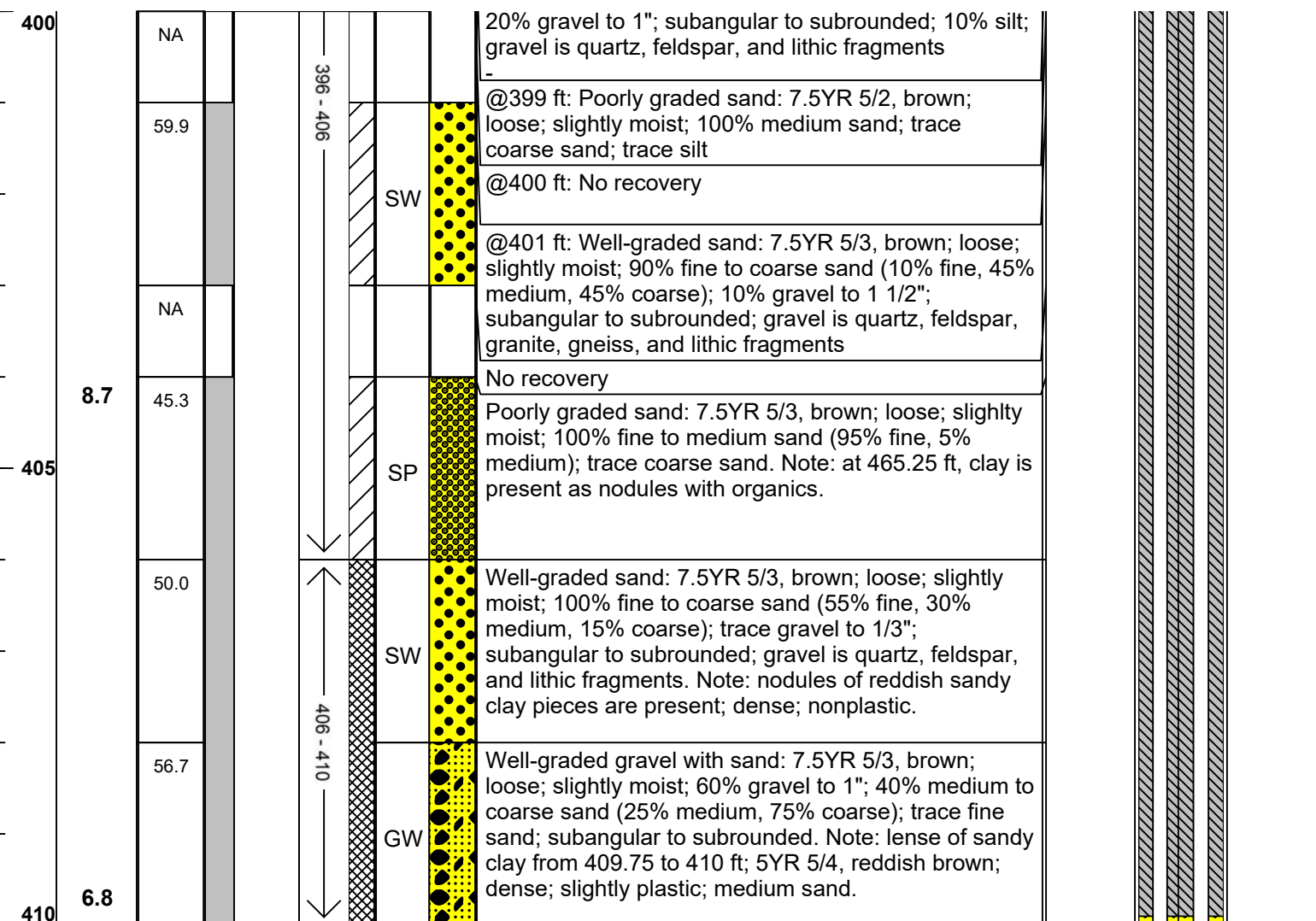
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

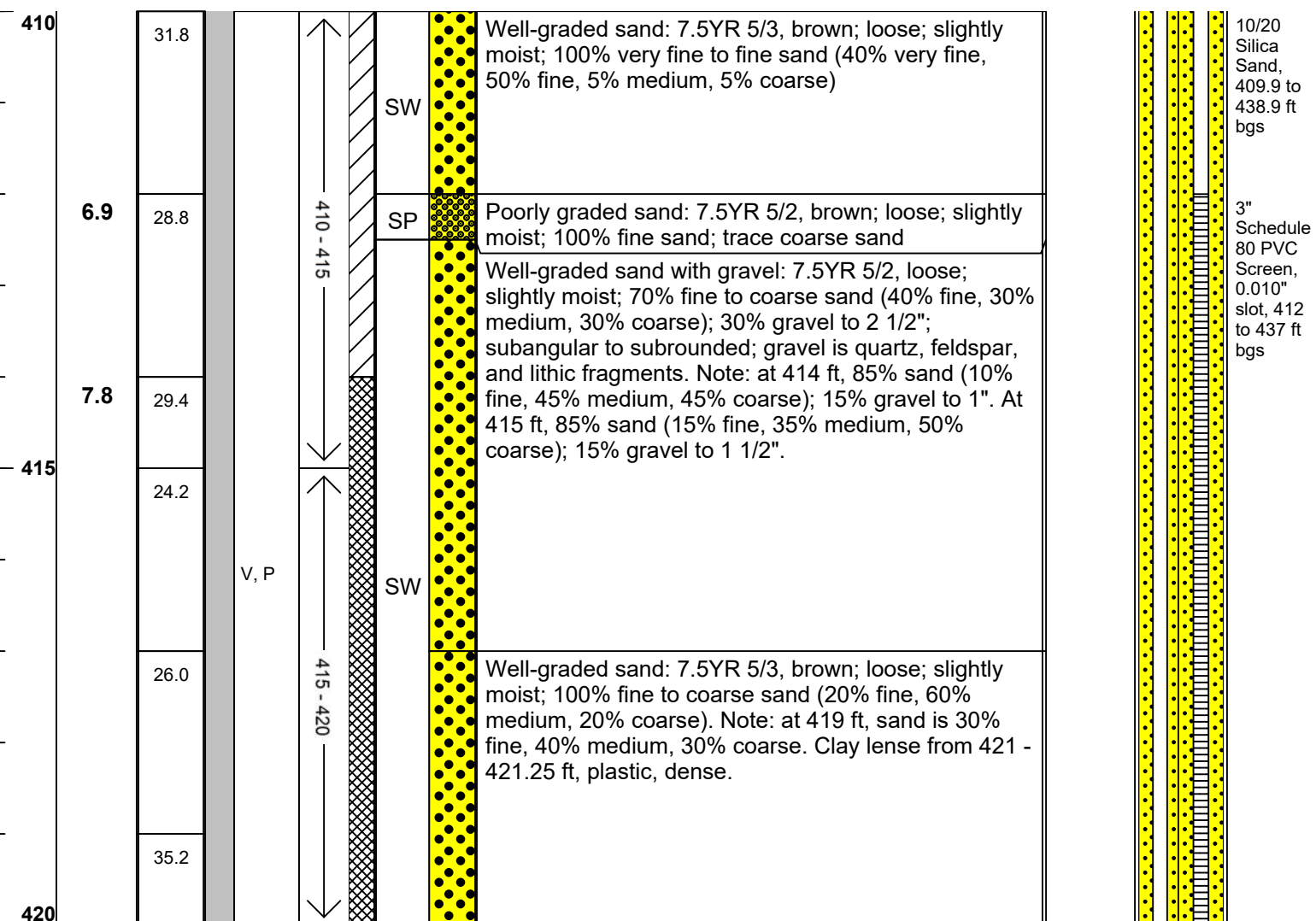
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/16/18**

Completion Date: **11/16/18**

WELL LOG

Well ID: **KAFB-106S4**

Page: **19 of 27**

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

420	7.7	49.6							Well-graded sand: see previous page for description.	
		53.6			420 - 426			SW	Well-graded sand with gravel: 7.5YR 6/2, pinkish gray; loose; slightly moist; 85% very fine to coarse sand (20% very fine, 10% fine, 30% medium, 40% coarse); 15% gravel; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments.	
		60.2							Well-graded sand: 7.5YR 5/2, brown; loose; slightly moist; 95% fine to coarse sand (10% fine, 40% medium, 50% coarse); 5% gravel; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 424 ft, 90% sand (10% very fine, 5% fine, 30% medium, 55% coarse); 10% gravel to 1 1/2". At 426 ft, 100% sand (40% very fine, 20% fine, 20% medium, 20% coarse)	
425		66.6								
		55.6			426 - 430			SP	Poorly graded sand with gravel: 7.5YR 5/2, brown; loose; slightly moist; 70% medium to coarse sand (30% medium, 70% coarse); 30% gravel to 2 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
								SW	Well-graded sand with gravel: 7.5YR 5/2, brown; loose; slightly moist; 75% fine to coarse sand (10% fine, 25% medium, 65% coarse); 25% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar,	
430										

Notes:

- (1) Current Water Table Well
- (2) Contingency Well
- ☒ = Depth to water after completion
- UV = ultraviolet fluorescence
- NA = Not Applicable

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

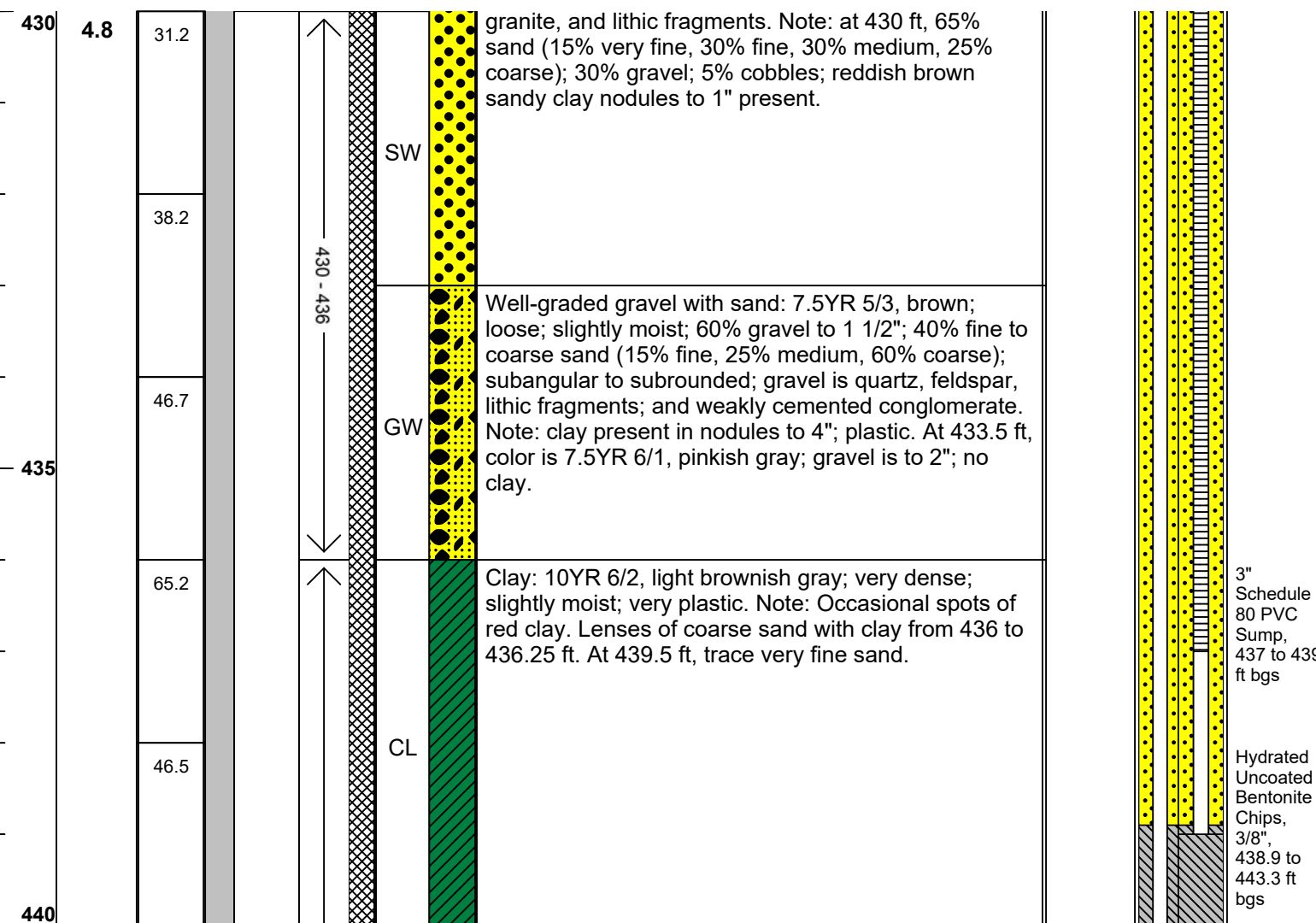
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

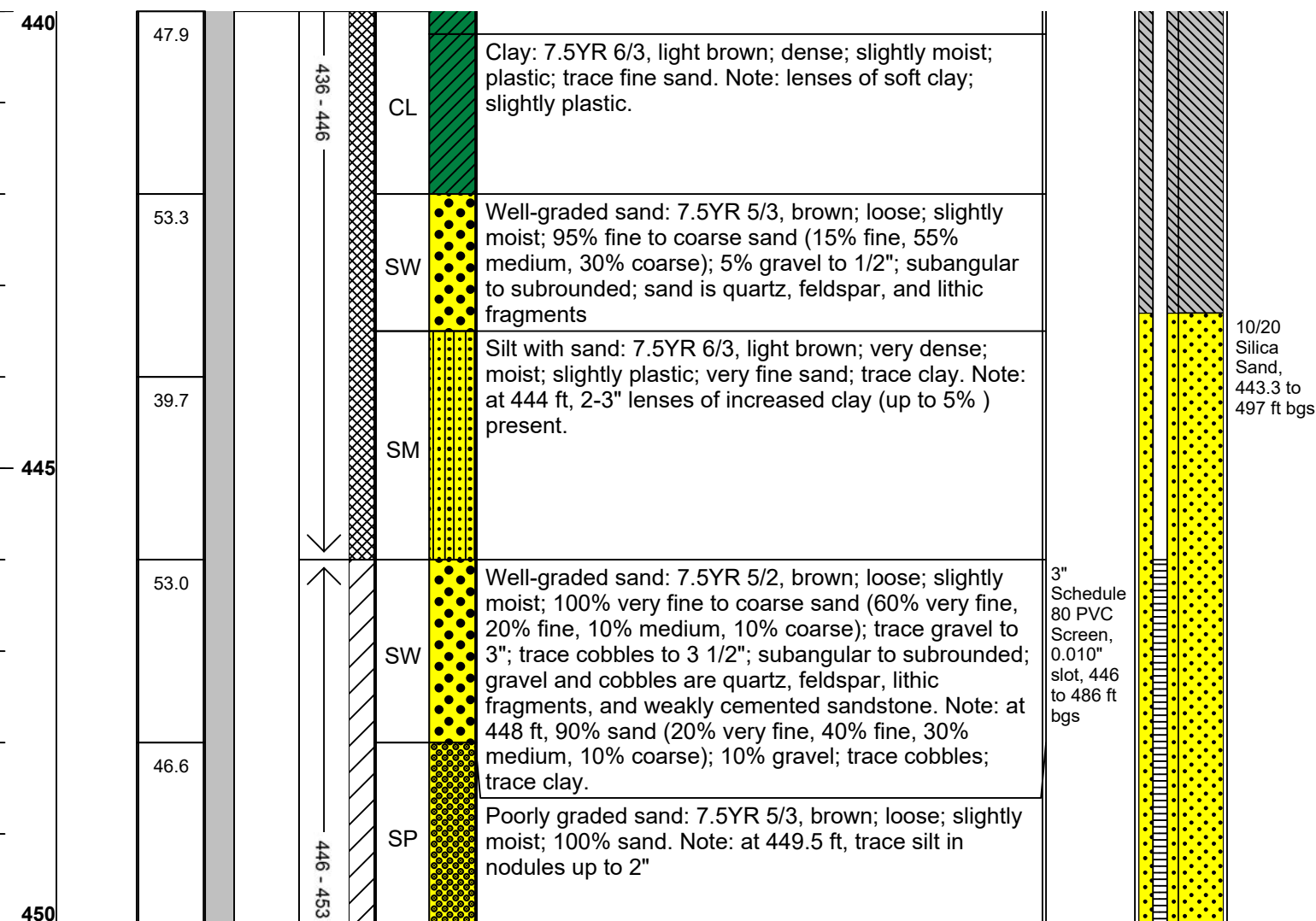
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

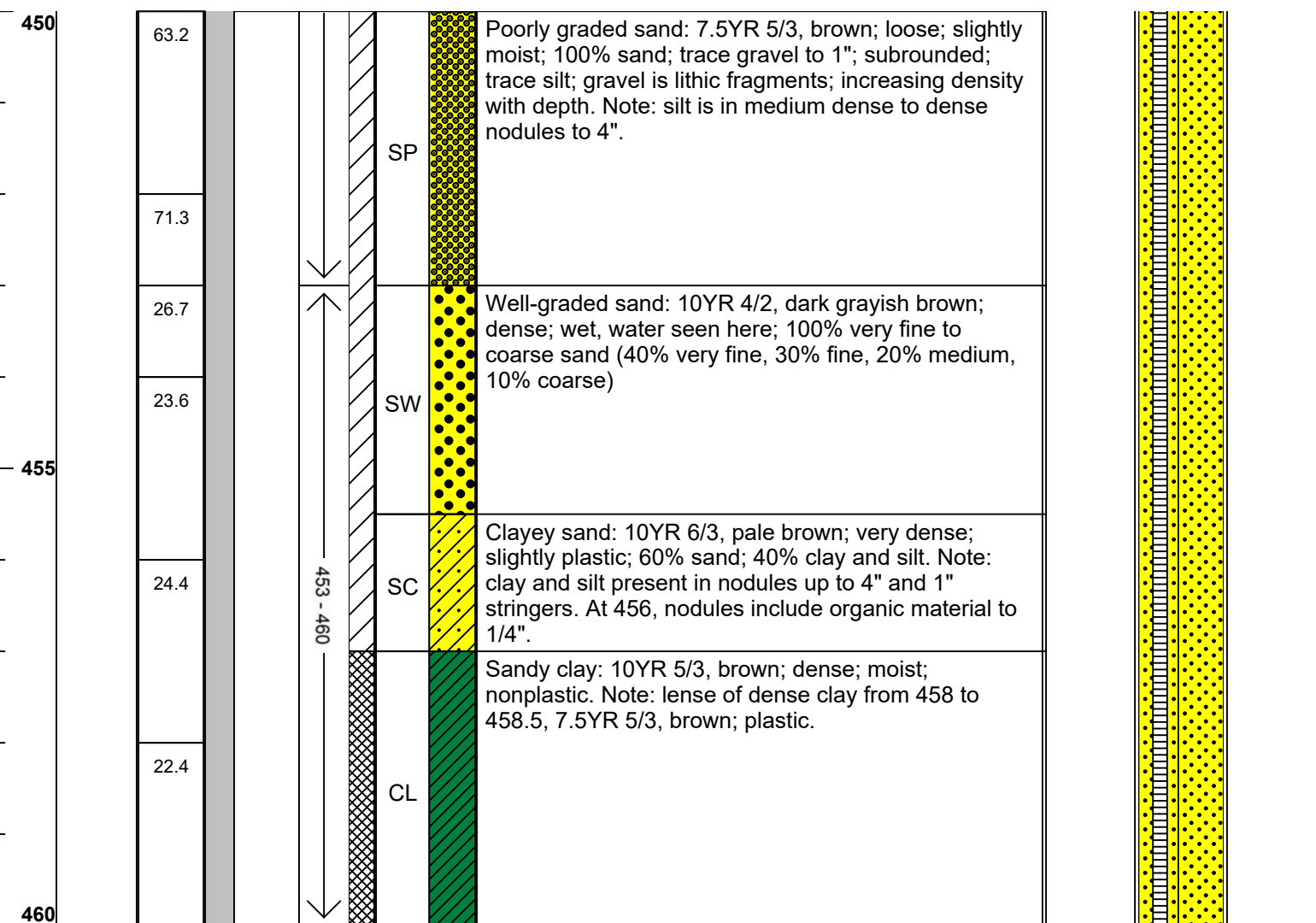
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

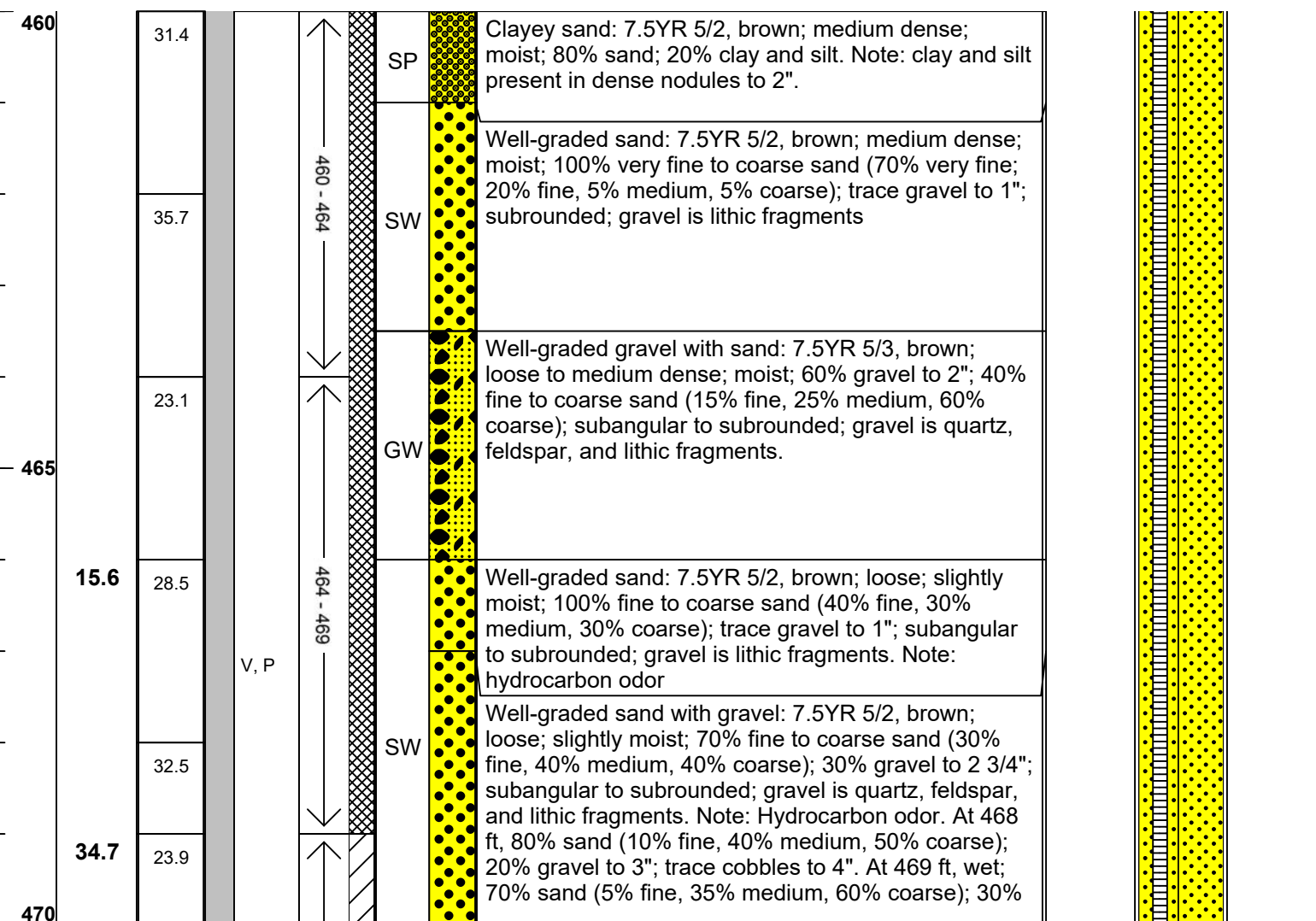
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)

470	52.8	23.9						SP	gravel to 1 1/2"; no cobbles; trace clay nodules.	
									Poorly graded sand: 7.5YR 4/2, brown; loose to medium dense; wet; 100% fine sand; trace medium to coarse sand. Note: hydrocarbon odor.	
		22.8						SW	Well-graded sand: 7.5YR 4/2, brown; loose to medium dense; wet; 100% fine to coarse sand (20% fine, 70% medium, 10% coarse); trace clay, slightly plastic. Note: Hydrocarbon odor. Clay is present as soft nodules up to 1/3". At 472 ft, 90% sand (30% fine, 35% medium, 35% coarse); 10% gravel to 2"; subangular to subrounded; gravel is quartz, feldspar, lithic fragments; and granite.	
		26.5						GW	Well-graded gravel with sand: 7.5YR 5/2, brown; loose; wet; 60% gravel to 2"; trace cobbles to 4"; 40% fine to coarse sand (15% fine, 15% medium, 70% coarse); subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: hydrocarbon odor.	
475								SW	Well-graded sand with gravel: 7.5YR 5/2, brown; loose; wet; 60% fine to coarse sand (15% fine, 25% medium, 60% coarse); 40% gravel to 1 1/2"; subangular to subrounded; trace clay; gravel is quartz, feldspar, and lithic fragments. Note: hydrocarbon odor. Clay is present as nodules.	
		21.2	UV						Core bag not opened, used for sampling.	
		21.4						GW	Well-graded gravel with sand: 7.5YR 5/2, brown; medium dense; wet; 65% gravel to 2"; 35% fine to coarse sand (15% fine, 30% medium, 55% coarse); subangular to subrounded; gravel is quartz, feldspar, granite, and lithic fragments. Note: hydrocarbon odor.	
	1432	21.9						SW	Well-graded sand with gravel: 7.5YR 5/2, brown;	
480										

Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

480	74.4			B, M					medium dense; wet; 60% fine to coarse sand (10% fine, 50% medium, 40% coarse); 40% gravel to 2 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: hydrocarbon odor. At 480.5 ft, 70% sand (15% fine, 55% medium, 30% coarse); 30% gravel to 1". At 481 ft, 80% sand (40% fine, 20% medium, 40% coarse); 20% gravel to 1"; subrounded to rounded.	
		22.7						SW		
								SW-SC	Well-graded sand with clay and gravel: 7.5YR 4/2, brown; medium dense; wet; 60% fine to coarse sand (20% fine, 15% medium, 65% coarse); 30% gravel to 2"; 10% clay, slightly plastic. Note: one cobble of sandstone conglomerate with calcium carbonate cement present, 4".	
		22.0								
	3271	22.4						SW	@483 ft: Well-graded sand: 7.5YR 4/1, dark gray; medium dense; wet; 100% fine to coarse sand (20% fine, 70% medium, 10% coarse); trace gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: strong hydrocarbon odor.	
485									@484 ft: Well-graded sand with gravel: 7.5YR 5/2, brown; dense; wet; 70% fine to coarse sand (40% fine, 30% medium, 30% coarse); 30% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments	
	3028	22.5							Core bag not opened, used for sampling.	
				G, UV						
		24.0						SW	Well-graded sand with gravel: 7.5YR 5/2, brown; dense; wet; 70% fine to coarse sand (10% fine, 20% medium, 70% coarse); 30% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: hydrocarbon odor. At 489.5 ft, 80% sand (15% fine, 55% medium, 30% coarse); 20% gravel to 1".	
490										

3" Schedule 80 PVC Sump, 486 to 488 ft bgs

Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

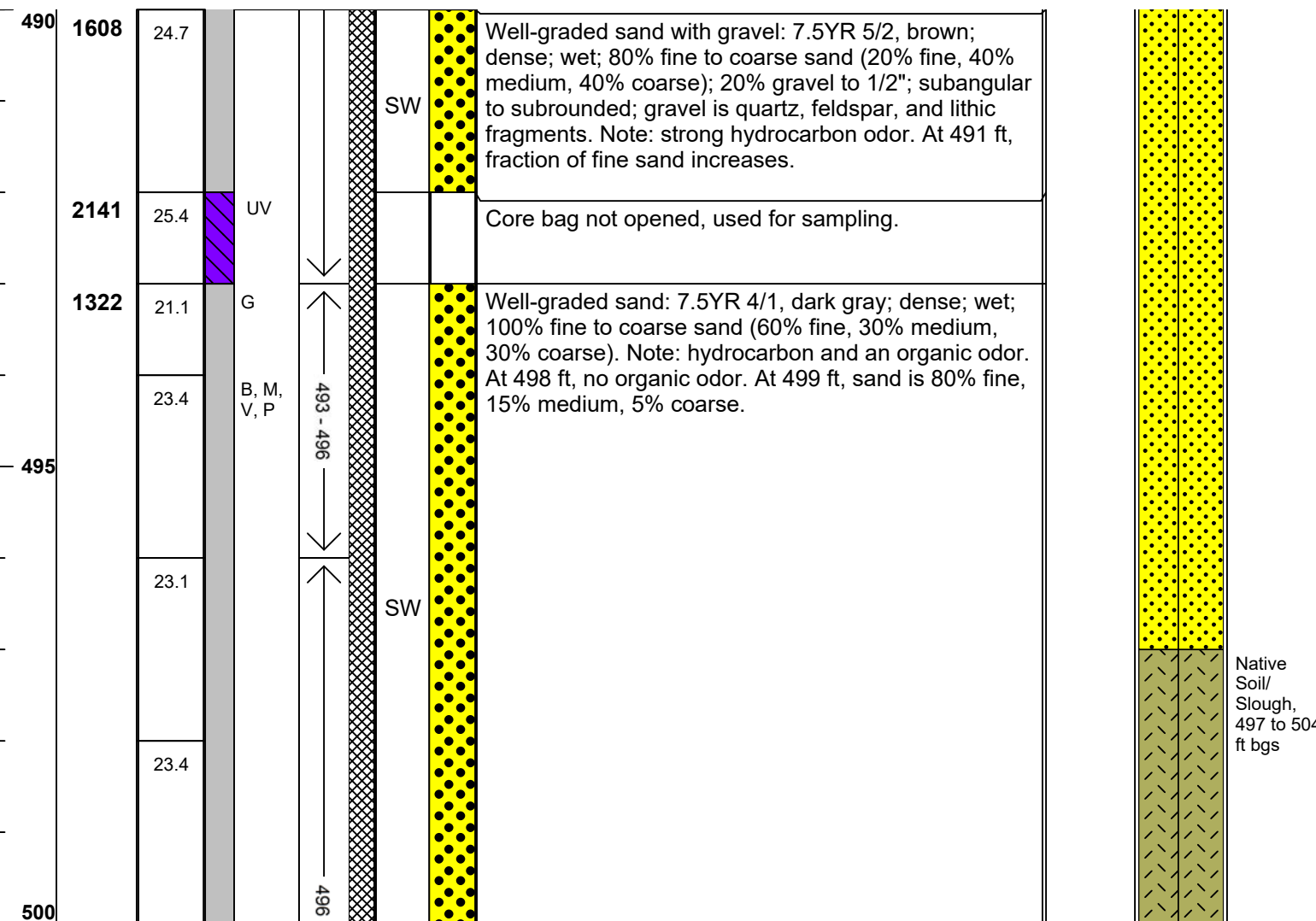
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 504	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: Sonic core bit (nominal 7" hole)	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.98	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

500	174.2	24.4			504				Well-graded sand: 7.5YR 4/2, brown; dense; wet; 90% fine to coarse sand (20% fine, 70% medium, 10% coarse); 10% gravel from 2" to 3"; trace cobbles to 4"; subangular to subrounded. gravel and cobbles are quartz, feldspar, and lithic fragments. Note: hydrocarbon odor.	
	73.2	25.8						SW	Core bag not opened, used for sampling.	

Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

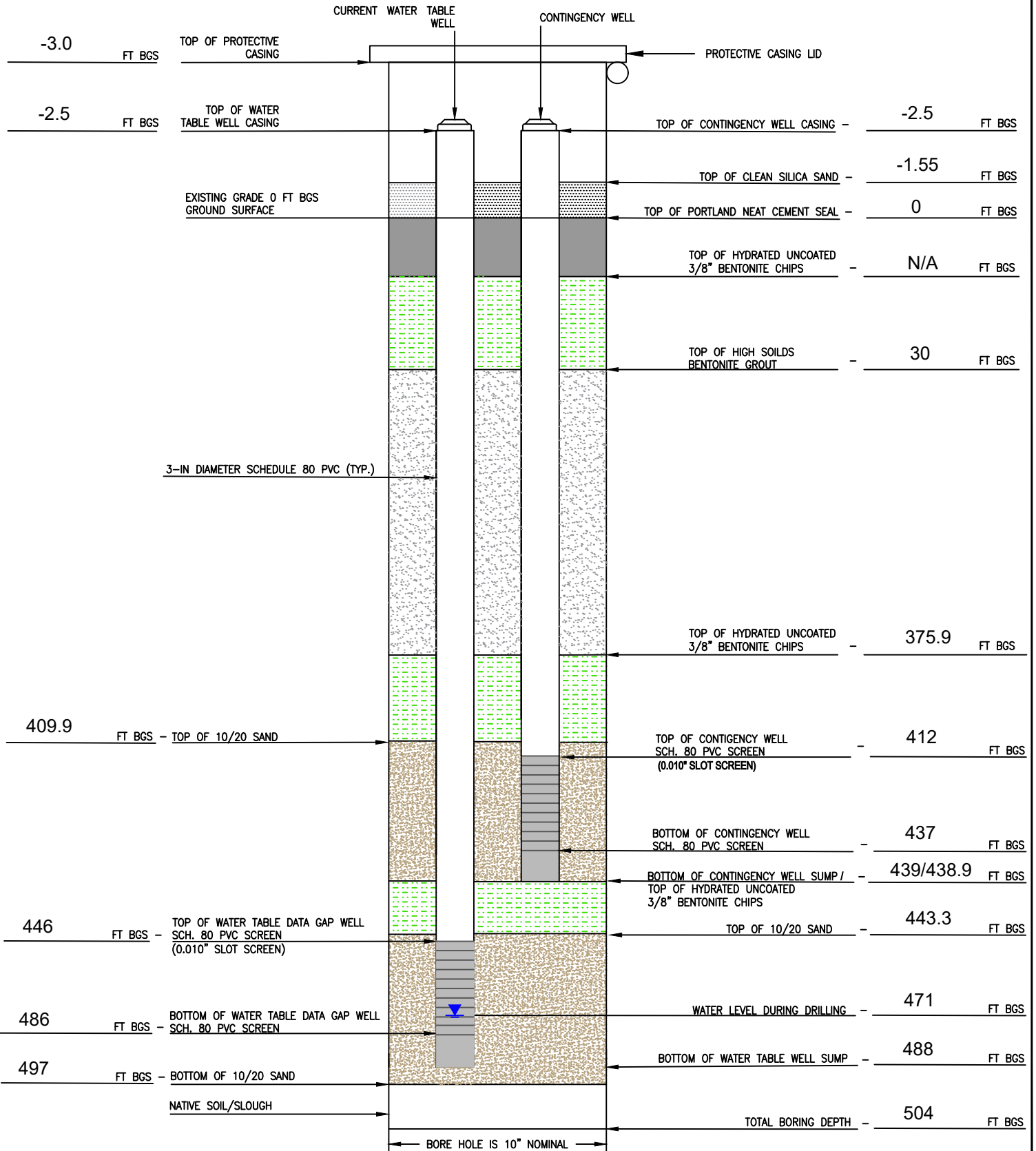
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S4



NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

PROJECT NO.:
62735DM02.1017

WELL ID:
KAFB-106S4

INSTALLATION START DATE/TIME:

05OCT18

GEOLOGIST: L. Andress,
J. Messenger

INSTALLATION END DATE/TIME:

16NOV18

DRILLER: R. Rodriguez
M. Green, F. Chattin



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

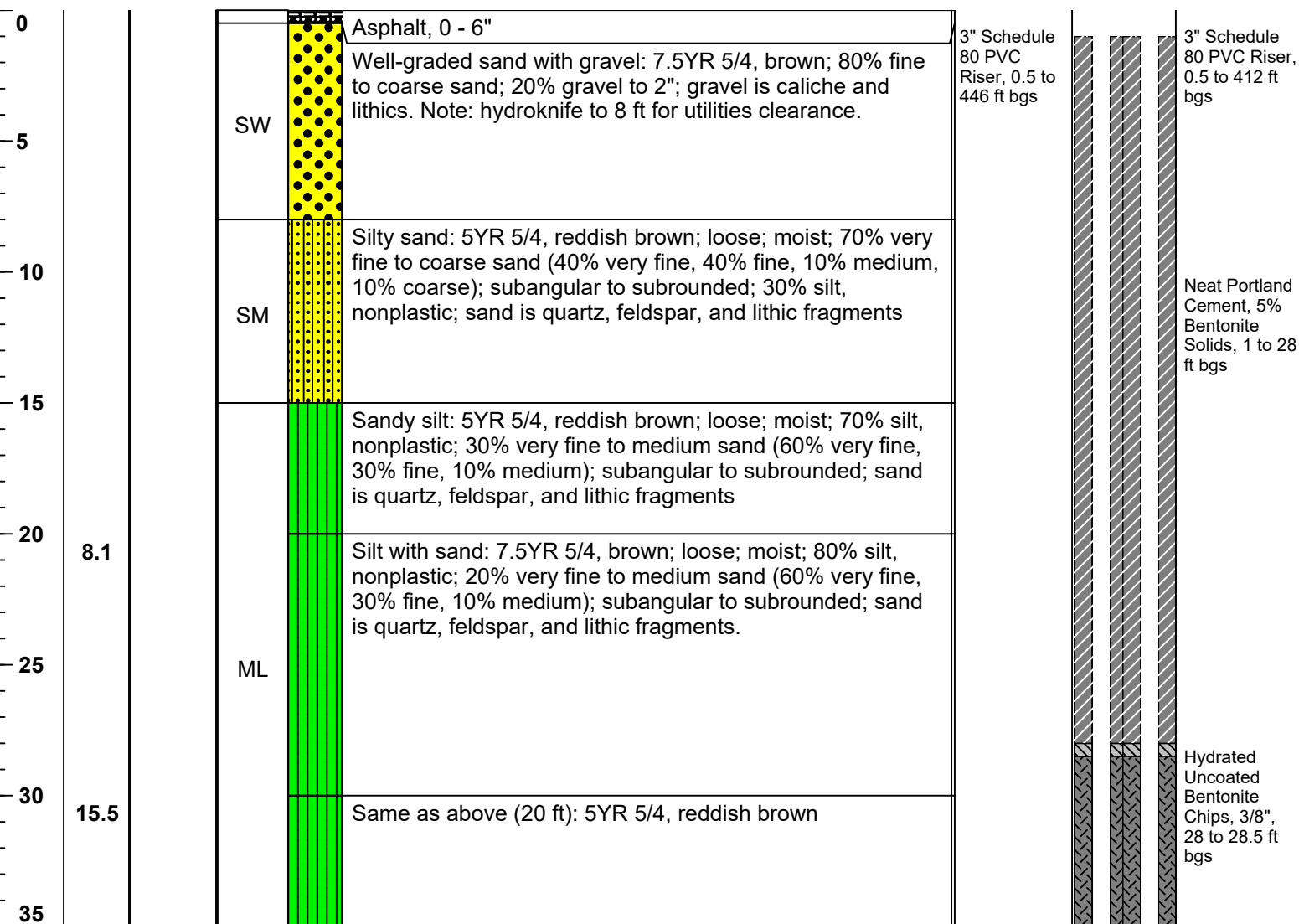
WELL LOG

Well ID: **KAFB-106S5**

Page: **1 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
						(1) (2)



Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

Page: **2 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

35					Silt with sand: 5YR 5/4, reddish brown; loose; moist; 80% silt; 5% clay; slightly plastic; 10% very fine to medium sand (75% very fine, 20% fine, 5% medium); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: clay is present in nodules.	
40	9.5				Same as above (35 ft): gravel to 3/8"	
45						
50	1.4			ML	Same as above (35 ft): 85% silt; 10% very fine to medium sand; 5% gravel to 3/8"; no clay	
55					Sandy silt: 5YR 5/4, reddish brown; loose; moist; 75% silt, slightly plastic; 20% fine to coarse sand (60% fine, 30% medium, 10% coarse); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
60				SW	Well-graded sand with gravel: 7.5YR 5/4, brown; loose; moist; 85% fine to coarse sand (10% fine, 40% medium, 50% coarse); 15% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments	
65				ML	Silt: 5YR 5/4, reddish brown; loose; moist; 90% silt, slightly plastic; 10% very fine to medium sand (40% very fine, 30% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
70						

High Solids
Bentonite
Grout, 28.5 to
375.7 ft bgs

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

Page: **3 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	----------------------	------	-----------	--------------------	-----------------------

(1) (2)

70	31.9		ML		Silt: 5YR 5/3, reddish brown; loose; moist; 85% silt; 5% clay; slightly plastic; 10% very fine to medium sand (40% very fine, 30% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: clay is present in nodules.	
75					No cuttings returned.	
80	2.0				Silt: 5YR 5/4, reddish brown; loose; moist; 85% silt; 5% clay; 10% very fine to medium sand (40% very fine, 30% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: clay is present in nodules.	
85						
90	3.0		ML		Silt with sand: 5YR 5/4, reddish brown; loose; moist; 80% silt; 5% clay; 15% very fine to medium sand (40% very fine, 30% fine, 30% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: clay is present in nodules.	
95					Same as above (90 ft): no clay; 5% gravel to 3/8"; subangular to subrounded; gravel is quartz and lithic fragments	
100	5.0				Silt: 5YR 5/4, reddish brown; loose; moist; 90% silt, slightly plastic; 10% very fine to medium sand (60% very fine, 30% fine, 10% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
105						

Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

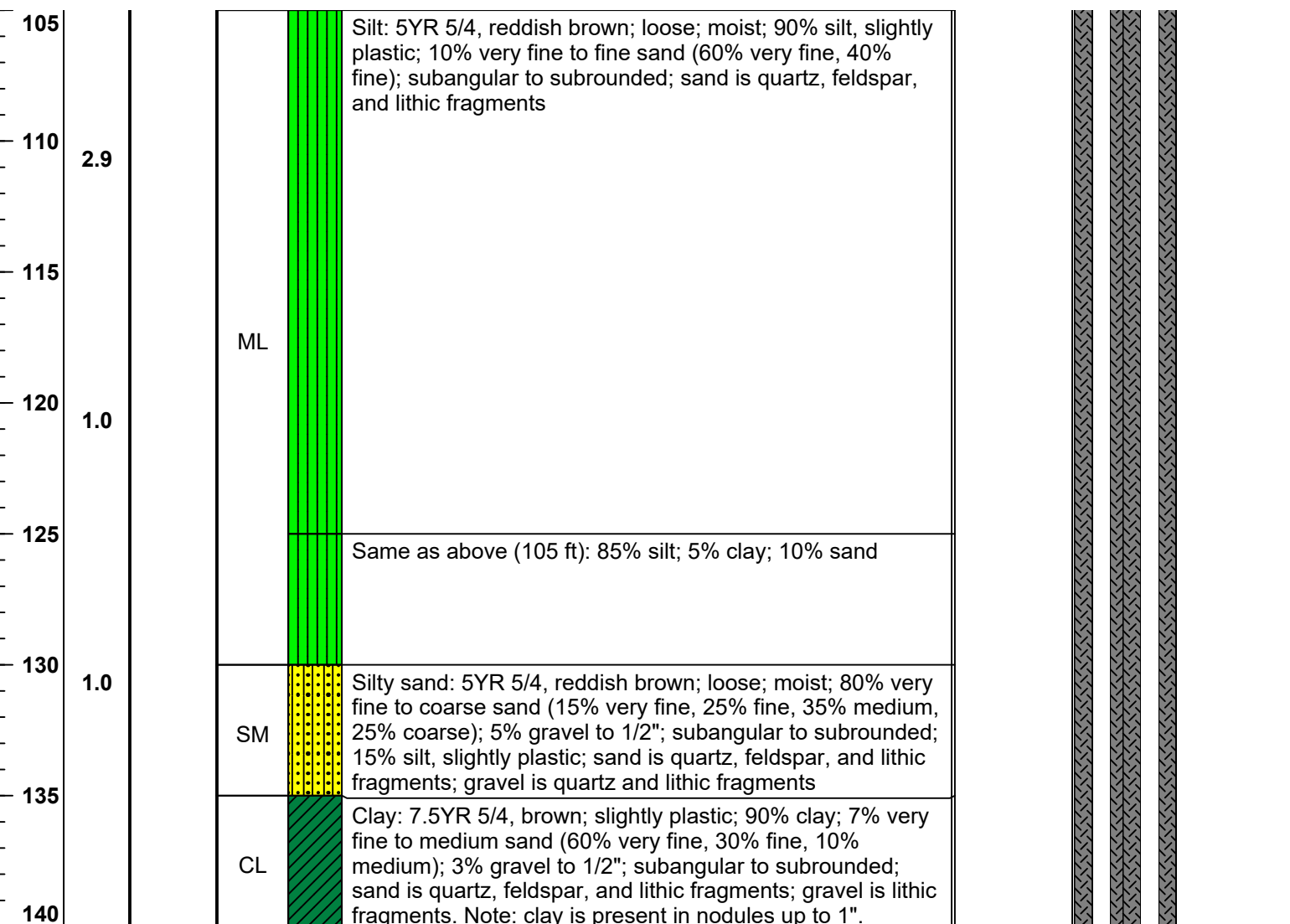
Well ID: **KAFB-106S5**

Page: **4 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

Page: **5 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

140	0.9				Silt: 7.5YR 5/4, brown; slightly plastic; 90% silt; 10% clay	
145				ML	Same as above (140 ft): 80% silt; 20% clay. Note: clay is present in nodules up to 1".	
150	0.8				Same as above (140 ft): Clay is present in nodules up to 1".	
155				SP-SM	Poorly graded sand with silt: 5YR 5/4, reddish brown; loose; moist; 90% fine to medium sand (60% fine, 40% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
160	1.6			SP	Poorly graded sand: 10YR 5/3, brown; loose; moist; 100% fine to medium sand (60% fine, 40% medium); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
165				SW-SM	Well-graded sand with silt: 7.5YR 5/4, brown; loose; moist; 90% fine to coarse sand (10% fine, 50% medium, 40% coarse); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche	
170	2.6			SW	Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to coarse sand (40% fine, 40% medium, 20% coarse); subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche	
175						

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

Page: **6 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
						(1) (2)

175					Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to coarse sand (40% fine, 40% medium, 20% coarse); subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche	
180	1.5				Same as above (175 ft): trace gravel to 3/8"; gravel is lithic fragments	
185					Same as above (175 ft): 95% sand; 5% gravel to 1"; gravel is quartz and lithic fragments	
190	1.3			SW	Same as above (175 ft): 95% sand; 5% gravel to 3/8"; gravel is quartz and lithic fragments	
195						
200	0.9				Same as above (175 ft): sand is 30% fine, 40% medium, 30% coarse; trace gravel to 3/8"	
205						
210				SW-SM	Well-graded sand with silt: 7.5YR 4/4, brown; loose; moist; 90% fine to coarse sand (30% fine, 40% medium, 30% coarse); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche	

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

Page: **7 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

210	10.7	P			Well-graded sand: 7.5YR 4/4, brown; loose; moist; 100% fine to coarse sand (10% fine, 50% medium, 40% coarse); trace gravel (up to 3%) to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
215			SW		Same as above (210 ft): 7.5YR 4/3, brown; no gravel	
220	4.6					
225			SW-SM		Well-graded sand with silt: 10YR 5/4, yellowish brown; loose; dry; 90% fine to coarse sand (15% fine, 40% medium, 15% coarse); trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
230	1.9		GW		Well-graded gravel with sand: 10YR 5/4, yellowish brown; dry; 60% gravel to 5/8"; 40% fine to coarse sand (20% fine, 30% medium, 50% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: drill chatter at 229 ft.	
235			SW		Well-graded sand with gravel: 7.5YR 5/3, brown; loose; moist; 85% fine to coarse sand (10% fine, 50% medium, 40% coarse); 15% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments	
240	4.1					
245			SP		Poorly graded sand: 10YR 6/4, light yellowish brown; loose; moist; 100% fine to medium sand (80% fine, 20% medium); subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche	
					Same as above (235 ft): 10YR 5/4, yellowish brown	

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

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T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

Page: **8 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

245					GW	Well-graded gravel with sand: 10YR 5/3, brown; loose; moist; 85% gravel to 7/8"; 15% fine to coarse sand (10% fine, 40% medium, 50% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: drill chatter at 248 ft.			
250	6.2				SW	Well-graded sand: 10YR 5/4, brown; loose; moist; 95% fine to coarse sand (20% fine, 50% medium, 30% coarse); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments			
255					SP-SM	Poorly graded sand with silt: 10YR 6/4, light yellowish brown; loose; moist; 90% fine to medium sand (90% fine, 10% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments			
260	2.2					Well-graded sand with gravel: 10YR 6/4, light yellowish brown; loose; moist; 80% fine to coarse sand (10% fine, 50% medium, 40% coarse); 20% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and pumice			
265					SW	Well-graded sand: 10YR 6/4, light yellowish brown; loose; moist; 100% fine to coarse sand (20% fine, 50% medium, 30% coarse); trace gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and pumice			
270	4.9					Same as above (265 ft): no gravel			
275					SC	Clayey sand: 10YR 5/4, yellowish brown; soft; 70% very fine to medium sand (30% very fine, 40% fine, 30% medium); subangular to subrounded; 30% clay, slightly plastic; sand is quartz, feldspar, and lithic fragments			
280									

Notes: (1) Current Water Table Well

(2) Contingency Well

⚡ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

Page: **9 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

280	7.0		SC		Clayey sand: 10YR 5/4, yellowish brown; soft; 80% very fine to medium sand (30% very fine, 40% fine, 30% medium); subangular to subrounded; 20% clay, slightly plastic; sand is quartz, feldspar, and lithic fragments	
285			SP-SM		Poorly graded sand with silt; 10YR 5/4, yellowish brown; loose; moist; 90% very fine to medium sand (20% very fine, 50% fine, 30% medium); subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments	
290					No cuttings returned	
295						
300	2.2		GW		Well-graded gravel with sand: 10YR 4/3, brown; loose; moist; 70% gravel to 3/4"; 30% fine to coarse sand (20% fine, 50% medium, 30% coarse); subangular to subrounded; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments	
305			SP		Poorly graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to medium sand (85% fine, 15% medium); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.	
310	2.3		SP-SM		Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; moist; 90% fine to medium sand (70% fine, 30% medium); trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
315			SW		Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to coarse sand (40% fine, 40% medium, 20% coarse); 5% gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic	

Notes: (1) Current Water Table Well

(2) Contingency Well

= Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

Page: **10 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

315					fragments.	
320	2.5				Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 85% fine to coarse sand (10% fine, 50% medium, 40% coarse); 15% gravel to 3/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
325					Same as above (315 ft): 60% fine to coarse sand (20% fine, 65% medium, 15% coarse); 40% gravel to 1". Note: drill chatter at 324 and 329 ft.	
330	2.4				Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (30% fine, 45% medium, 25% coarse); 10% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
335				SW	Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 80% fine to coarse sand (30% fine, 45% medium, 25% coarse); 20% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
340	2.6				Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to coarse sand (20% fine, 70% medium, 10% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
345						
350						

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

Page: **11 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

350	1.7				Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 85% fine to coarse sand (50% fine, 30% medium, 20% coarse); 15% gravel to 3/4"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
355					Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 90% fine to coarse sand (45% fine, 40% medium, 15% coarse); 10% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
360	4.0	P			Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; moist; 85% fine to coarse sand (45% fine, 40% medium, 15% coarse); 15% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
365					Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 95% fine to coarse sand (35% fine, 55% medium, 10% coarse); 5% gravel to 5/8"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
370	3.3			SW	Well-graded sand: 10YR 5/4, yellowish brown; loose; moist; 100% fine to coarse sand (20% fine, 60% medium, 20% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments	
375					Same as above (380 ft): 10YR 5/3, brown; sand is 20% fine, 55% medium, 25% coarse	
380	2.9					
385						

Hydrated
Uncoated
Bentonite
Chips, 3/8",
375.7 to
409.5 ft bgs

Notes: (1) Current Water Table Well

(2) Contingency Well

⚡ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

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Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 5/8" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Driller: Mark Green	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: J. Messenger		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
						(1) (2)

385					Well-graded sand: 10YR 5/3, brown; loose; moist; 95% fine to coarse sand (20% fine, 50% medium, 30% coarse); 5% gravel to 1"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments	
390	2.1			SW	Same as above (385 ft): 100% fine to coarse sand (30% fine, 60% medium, 10% coarse); trace gravel to 3/8"	
395						
400	1.1				Same as above (385 ft): 90% fine to coarse sand (20% fine, 50% medium, 30% coarse); 10% gravel to 1/2". End ARCH drilling at 400 ft, switch to sonic coring.	
405						
410						
415						
420						

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

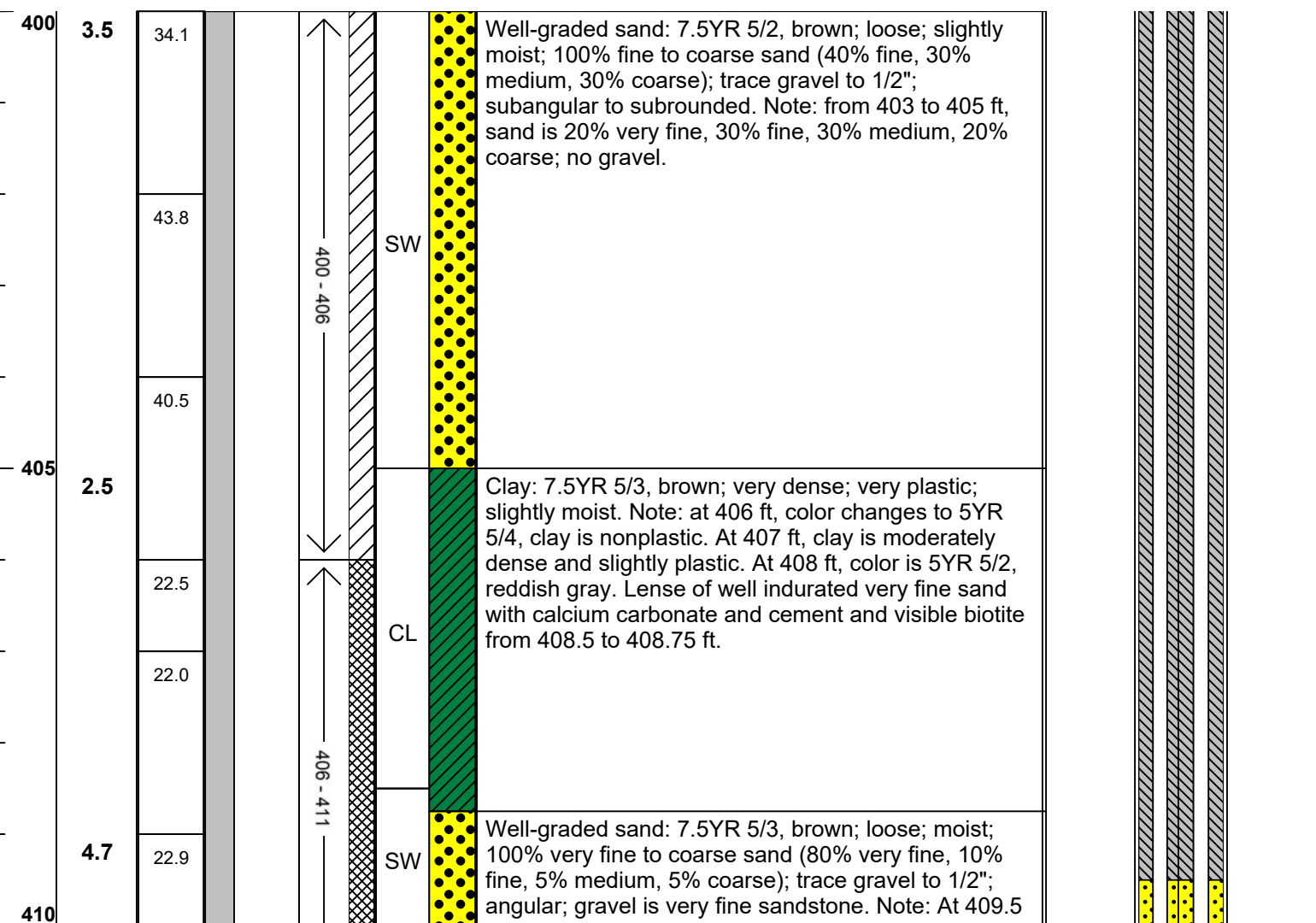
Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

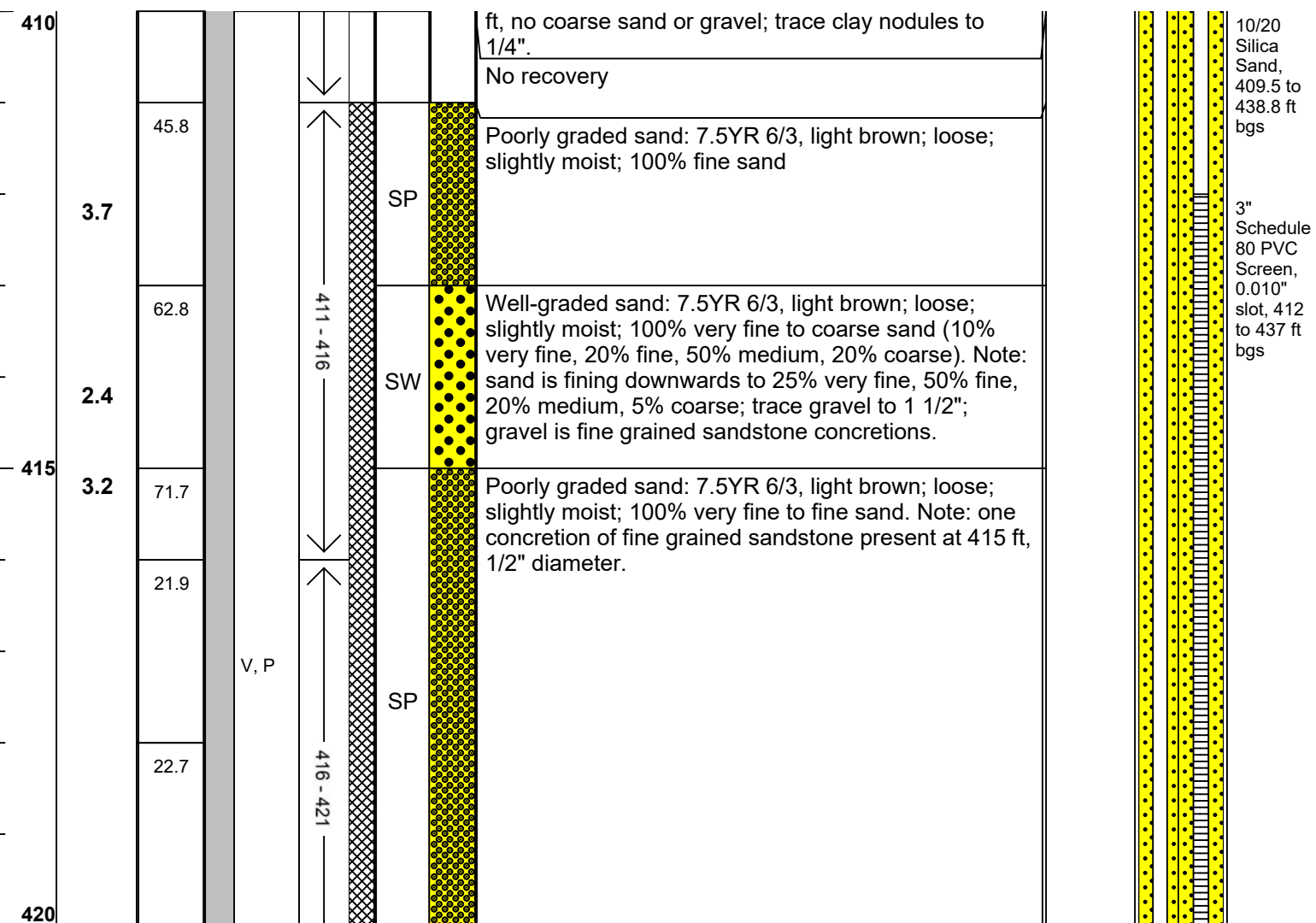
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

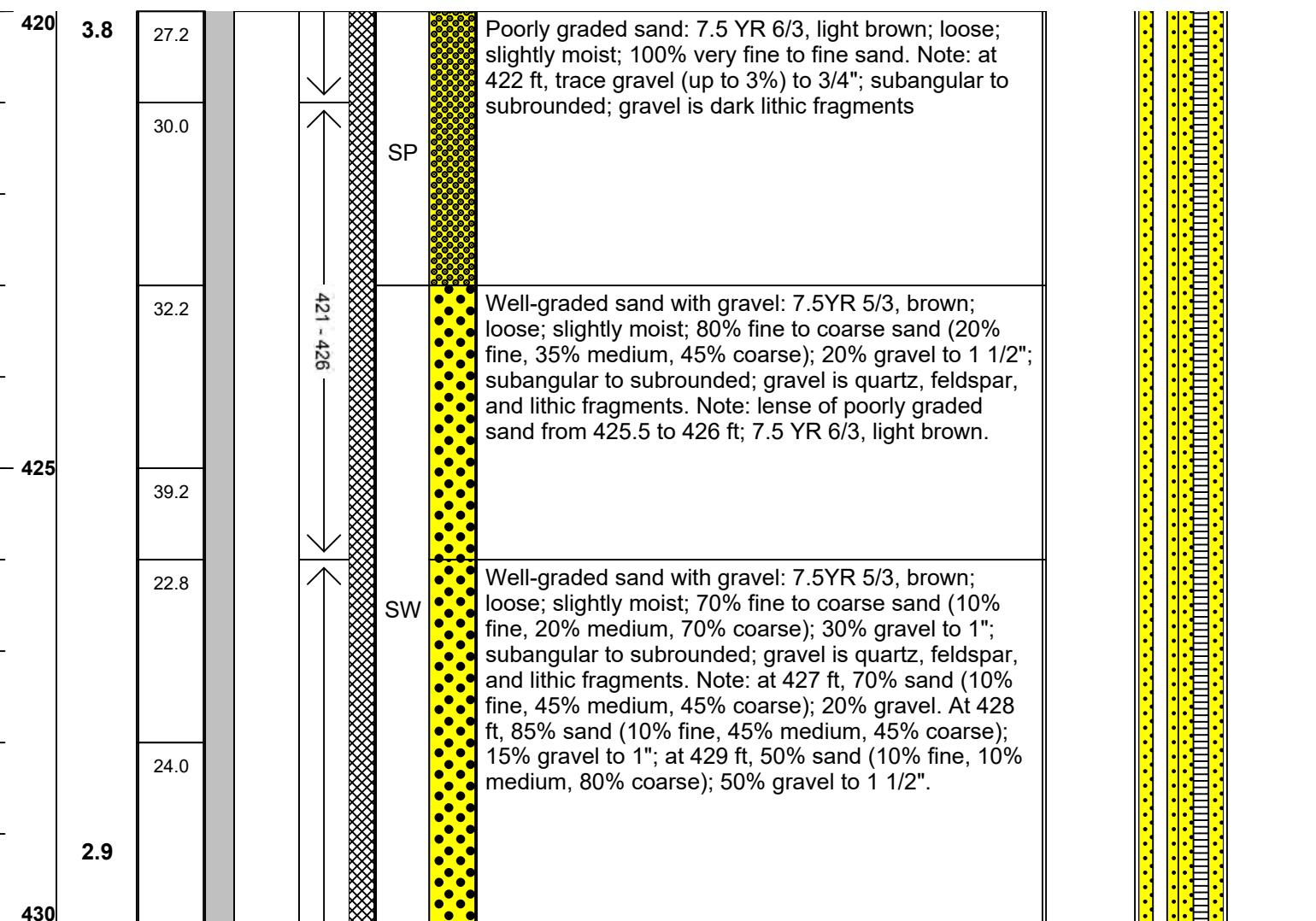
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

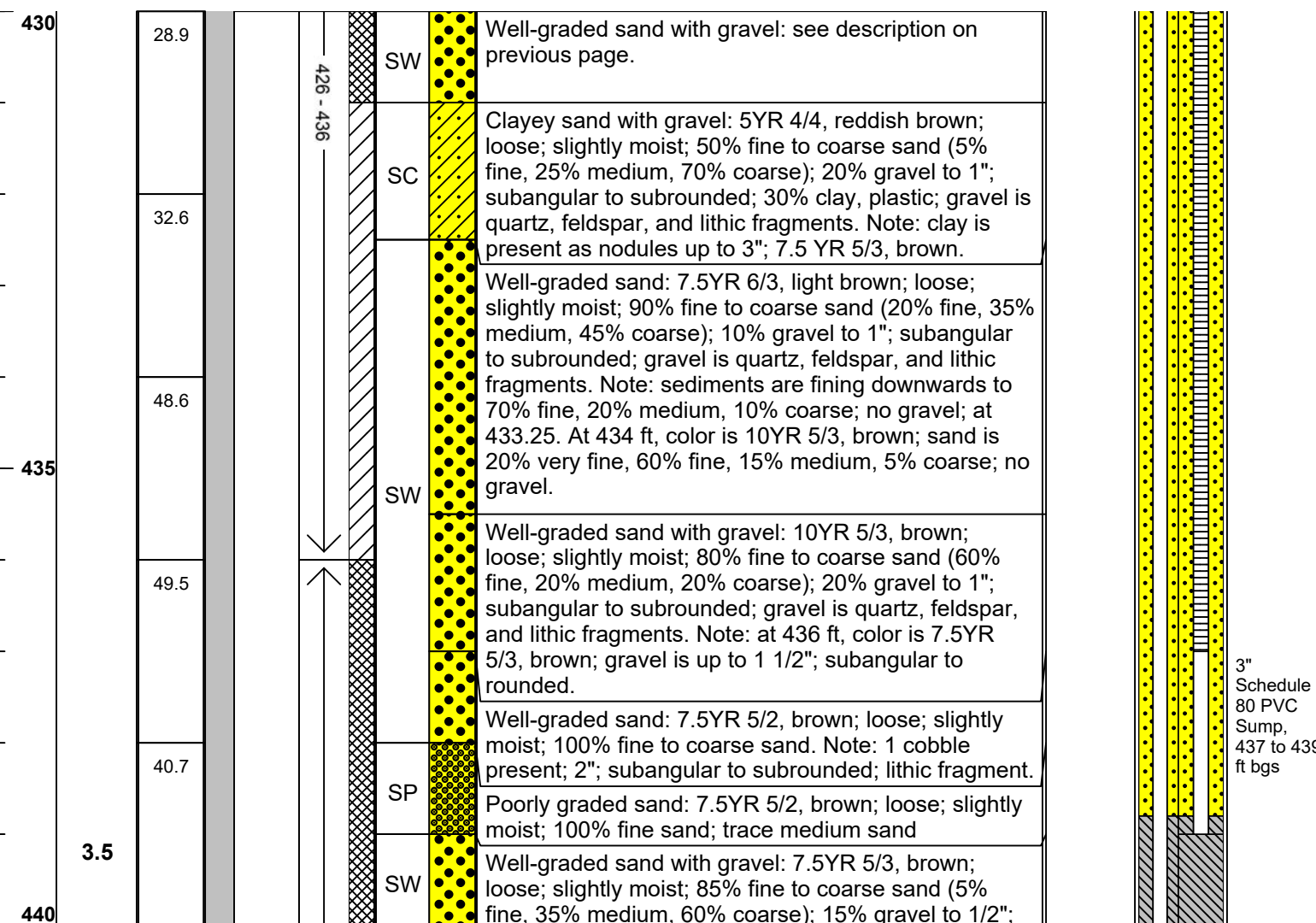
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

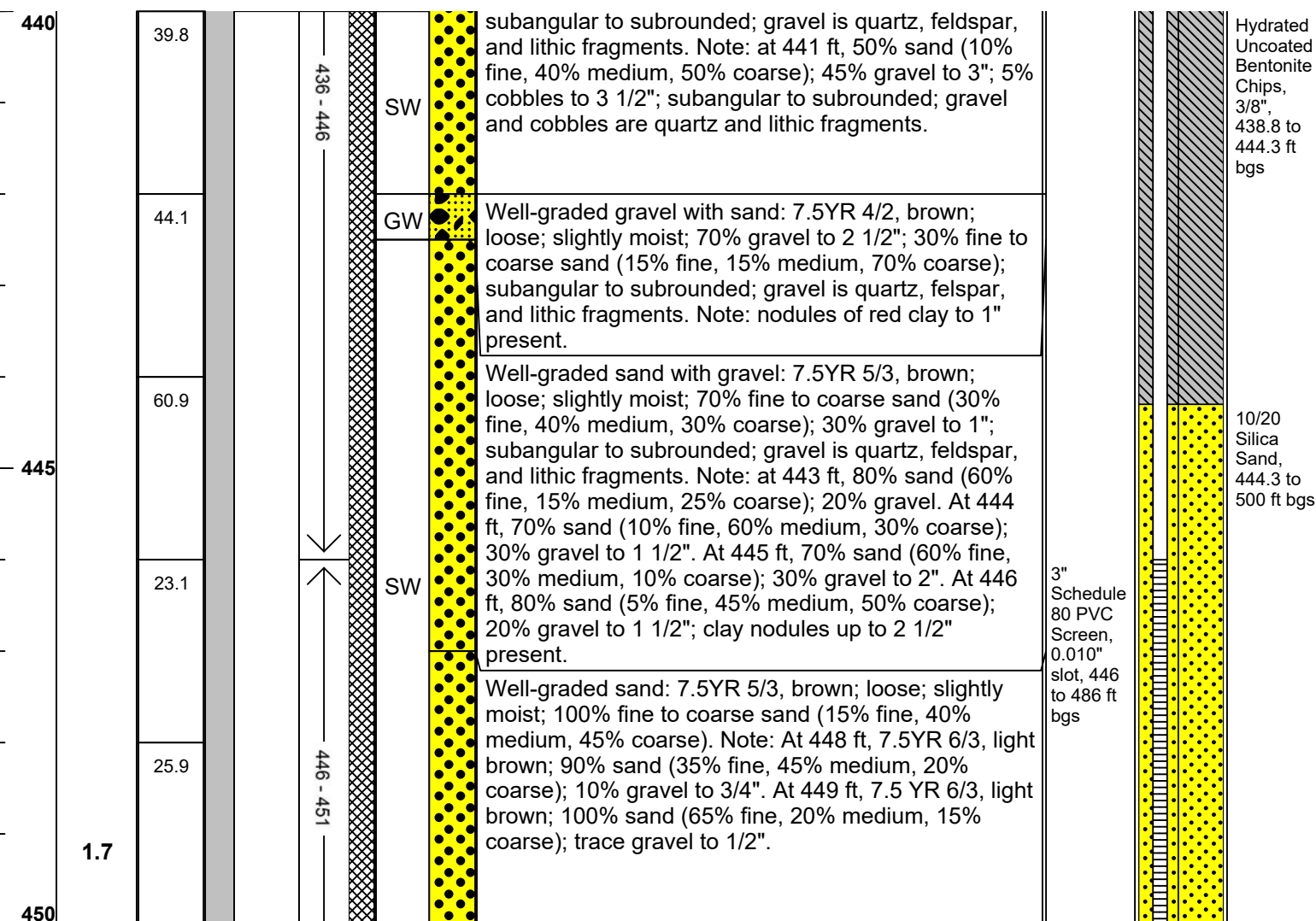
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

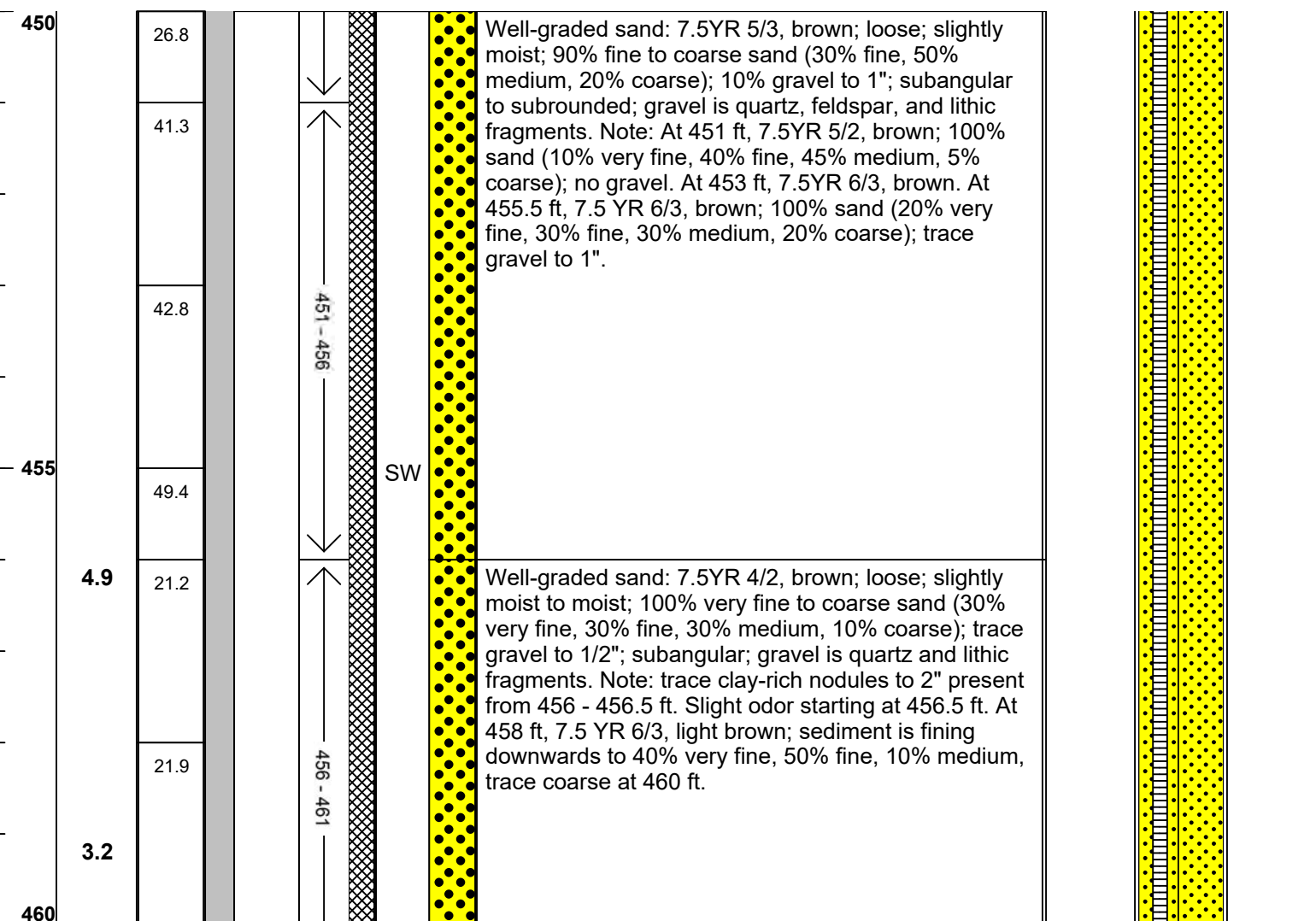
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

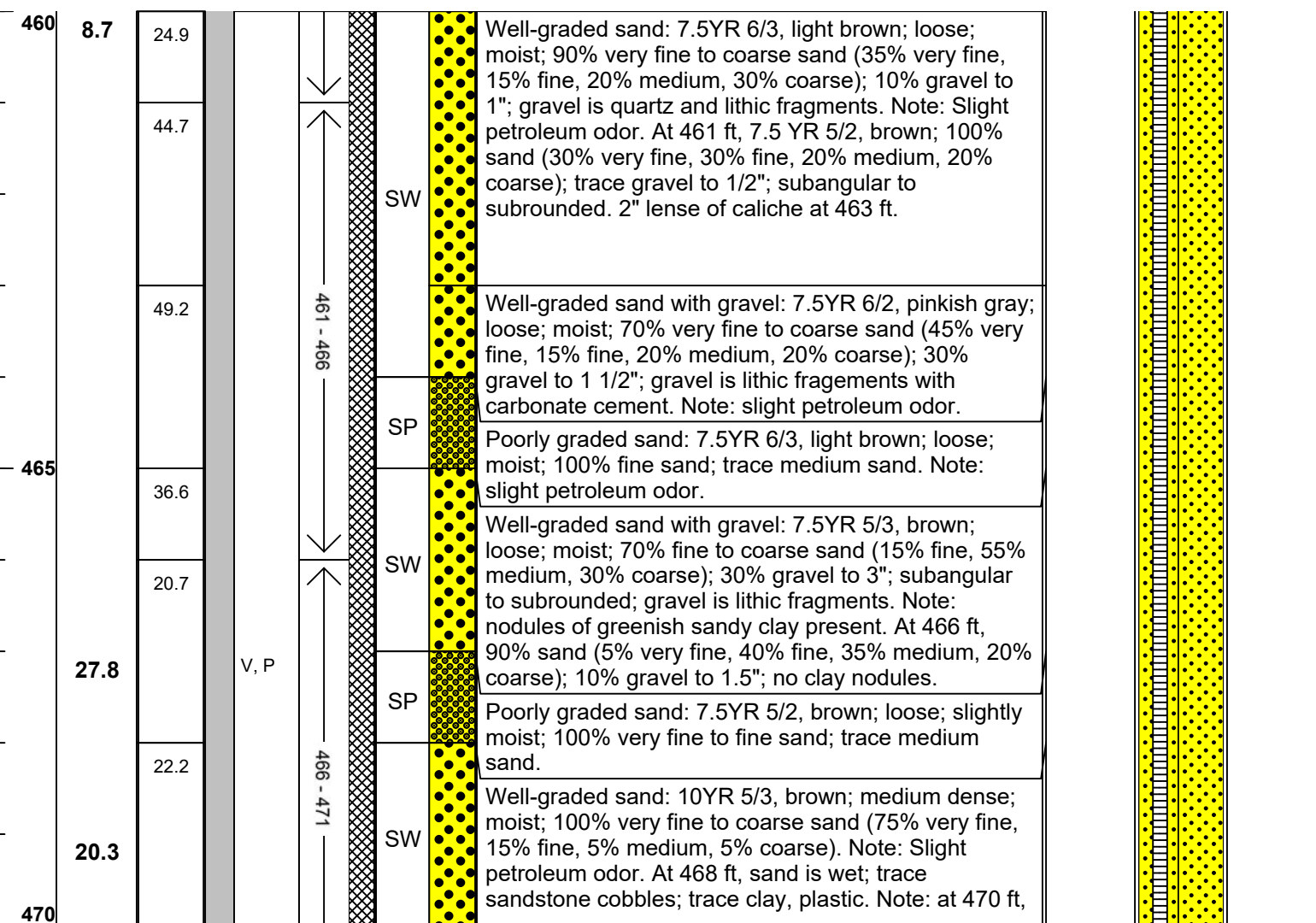
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

470	44.2	23.0						SC	color is 10YR 4/2, dark grayish brown; wet; 100% sand (40% very fine, 45% fine, 10% medium, 5% coarse); trace gravel to 1/2".	
		19.9							@ 470 ft: Clayey sand: 10YR 4/2, dark grayish brown; medium dense; wet; very fine to coarse sand; clay; silt, non-plastic to slightly plastic. Note: slight petroleum odor.	
	91.0							SW	Well-graded sand: 10YR 4/3, brown; medium dense; wet; 100% very fine to coarse sand (60% very fine, 20% fine, 15% medium, 5% coarse); trace gravel to 1/3"; subangular; gravel is granite and lithic fragments. Note: slight odor. No gravel at 472 ft, 10YR 4/2, dark grayish brown. At 473 ft, 95% sand (75% very fine to fine, 25% medium to coarse).	
		20.7								
475	77.3	19.5						SC	Clayey sand: 10YR 4/2, dark grayish brown; medium dense; wet; 50% very fine to coarse sand; 20% cobbles to 4 1/2"; 30% clay; nonplastic to slightly plastic; cobbles are medium to coarse sandstone. Note: clay is present as red nodules up to 3". Slight odor.	
		20.5								
								SW	Well-graded sand with gravel: 10YR 4/3, brown; loose to medium dense ; wet; 80% fine to coarse sand (15% fine, 70% medium, 15% coarse); 20% gravel to 1"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: slight odor. At 477 ft, 90% sand (20% fine, 35% medium, 45% coarse); 10% gravel to 1 1/2". At 478 ft, 70% sand (5% fine, 30% medium, 65% coarse); 30% gravel to 2". Lense of trace clay nodules to 1 1/4" at 480 ft.	
		20.7								
	27.7									
480										

Notes: (1) Current Water Table Well
 (2) Contingency Well
 ∇ = Depth to water after completion
 UV = ultraviolet fluorescence
 NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/08/18**

Completion Date: **11/05/18**

WELL LOG

Well ID: **KAFB-106S5**

Page: **21 of 23**

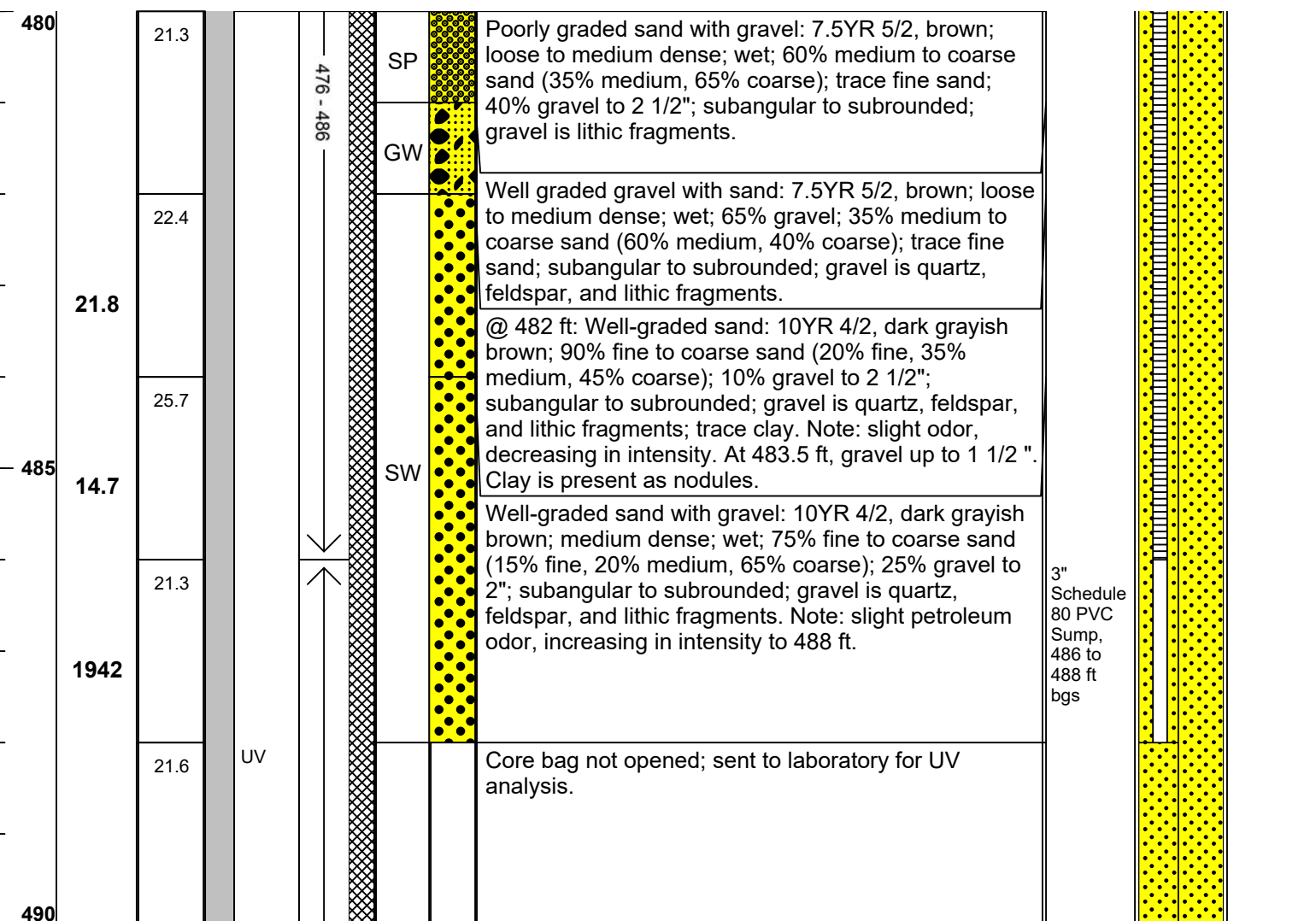
Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **L. Andress**

Boring Depth (ft): **506**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **470.39**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

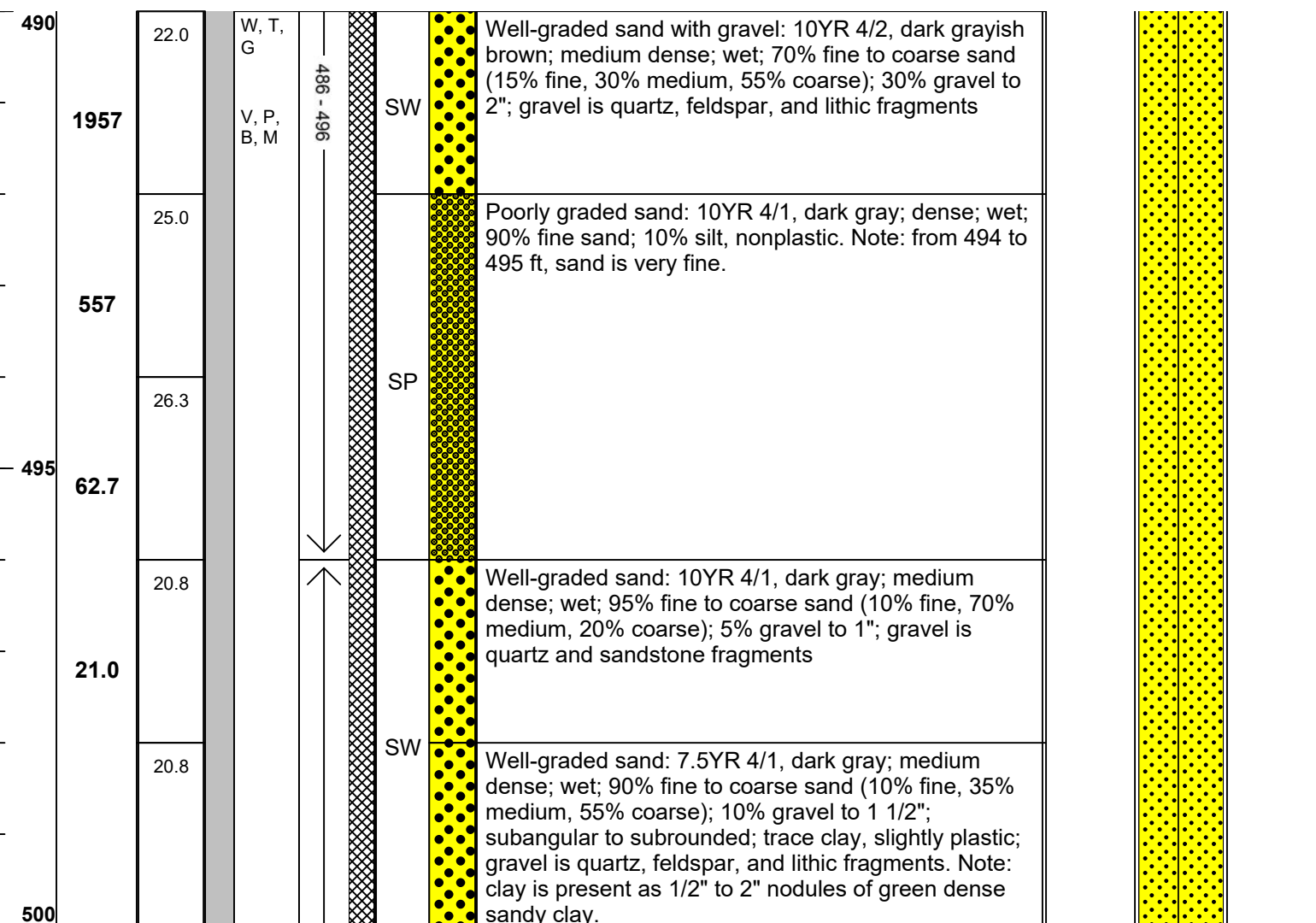
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

- (1) Current Water Table Well
- (2) Contingency Well
- ∇ = Depth to water after completion
- UV = ultraviolet fluorescence
- NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Complete
	Disturbed Core

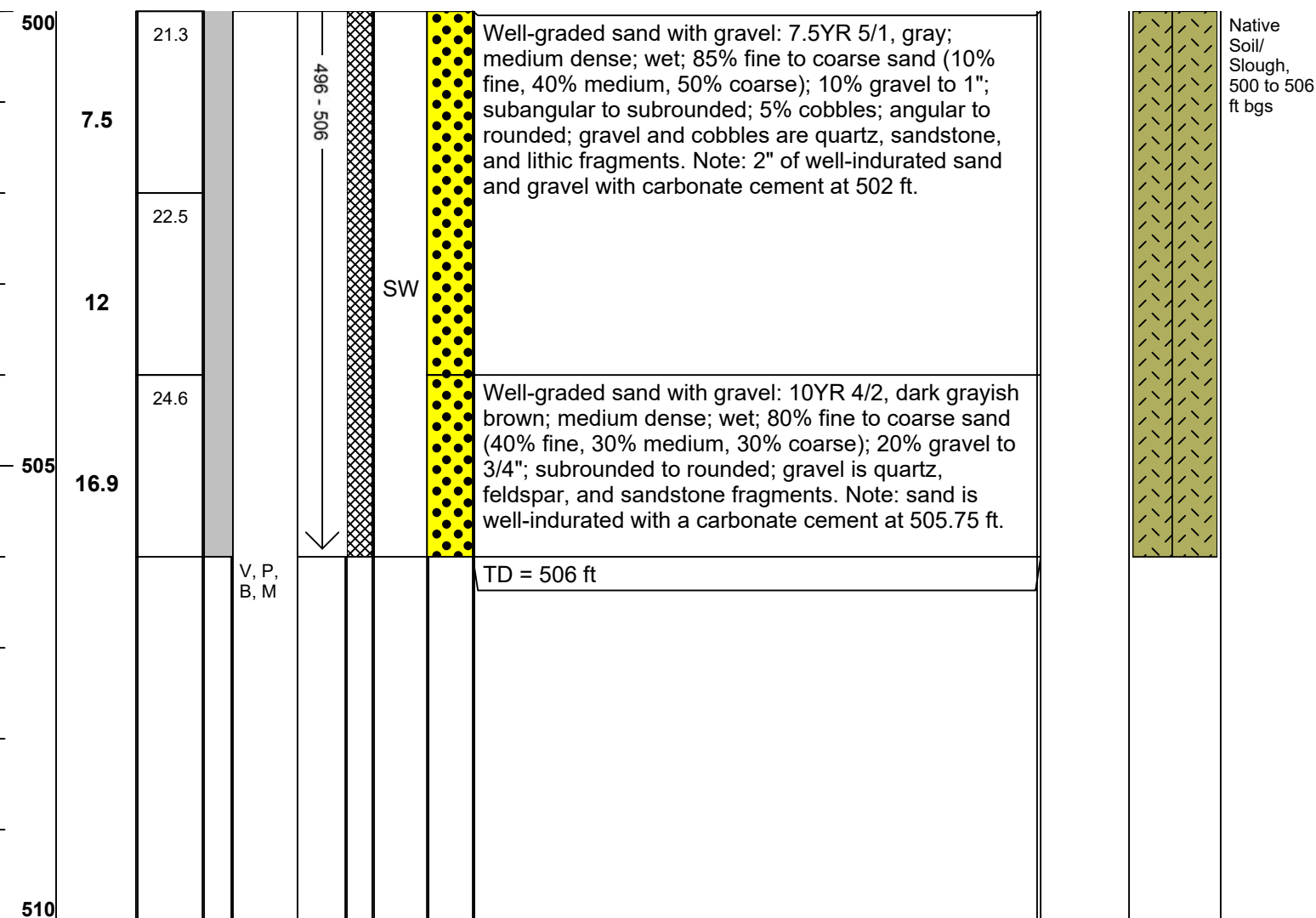
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 470.39	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

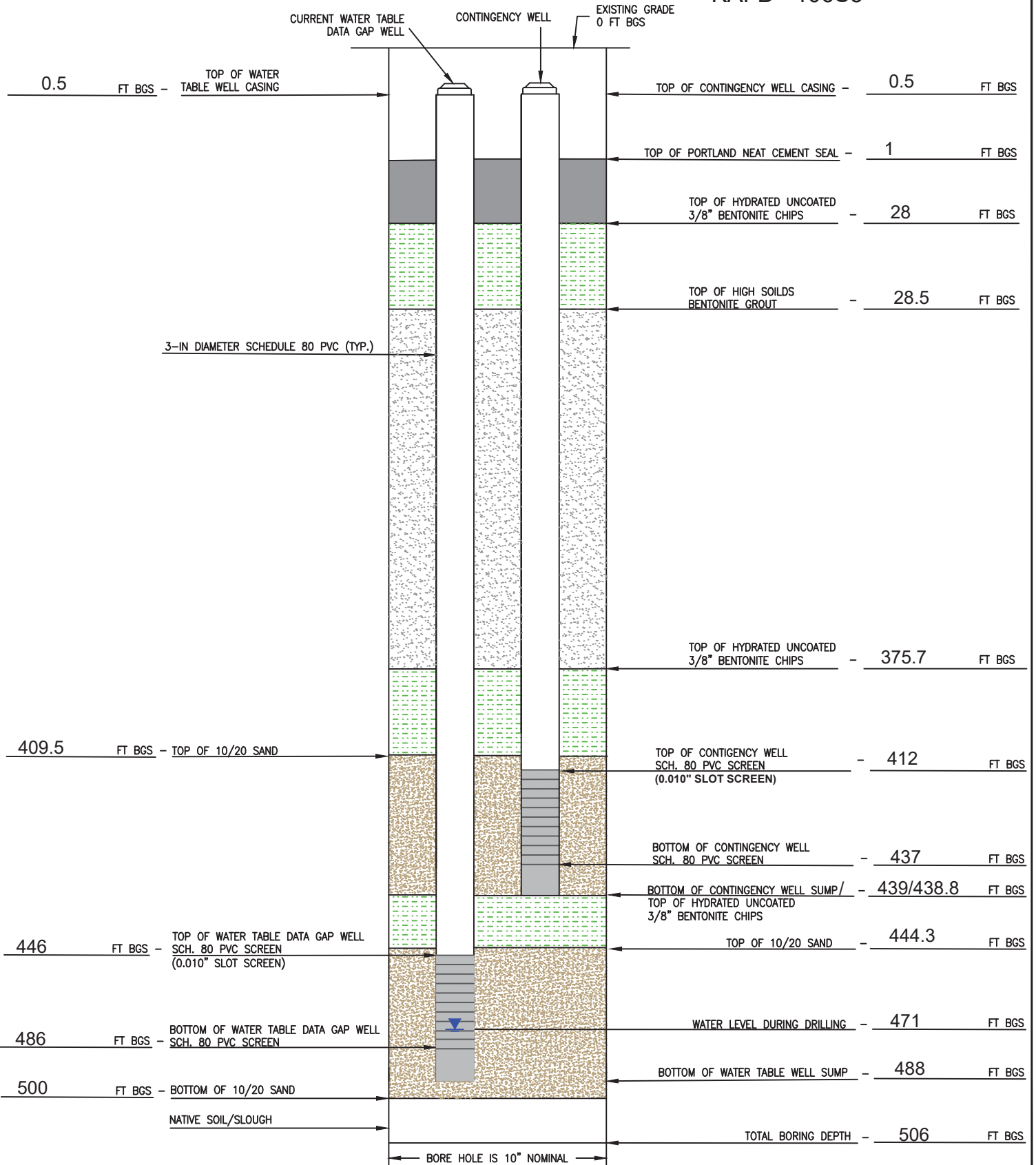
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S5



NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

PROJECT NO.:
62735DM02.1017

WELL ID:
KAFB-106S5

INSTALLATION START DATE/TIME:
05OCT18
GEOLOGIST: L. Andress
J. Messenger

INSTALLATION END DATE/TIME:
05NOV18
DRILLER: R. Rodriguez
M. Green



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

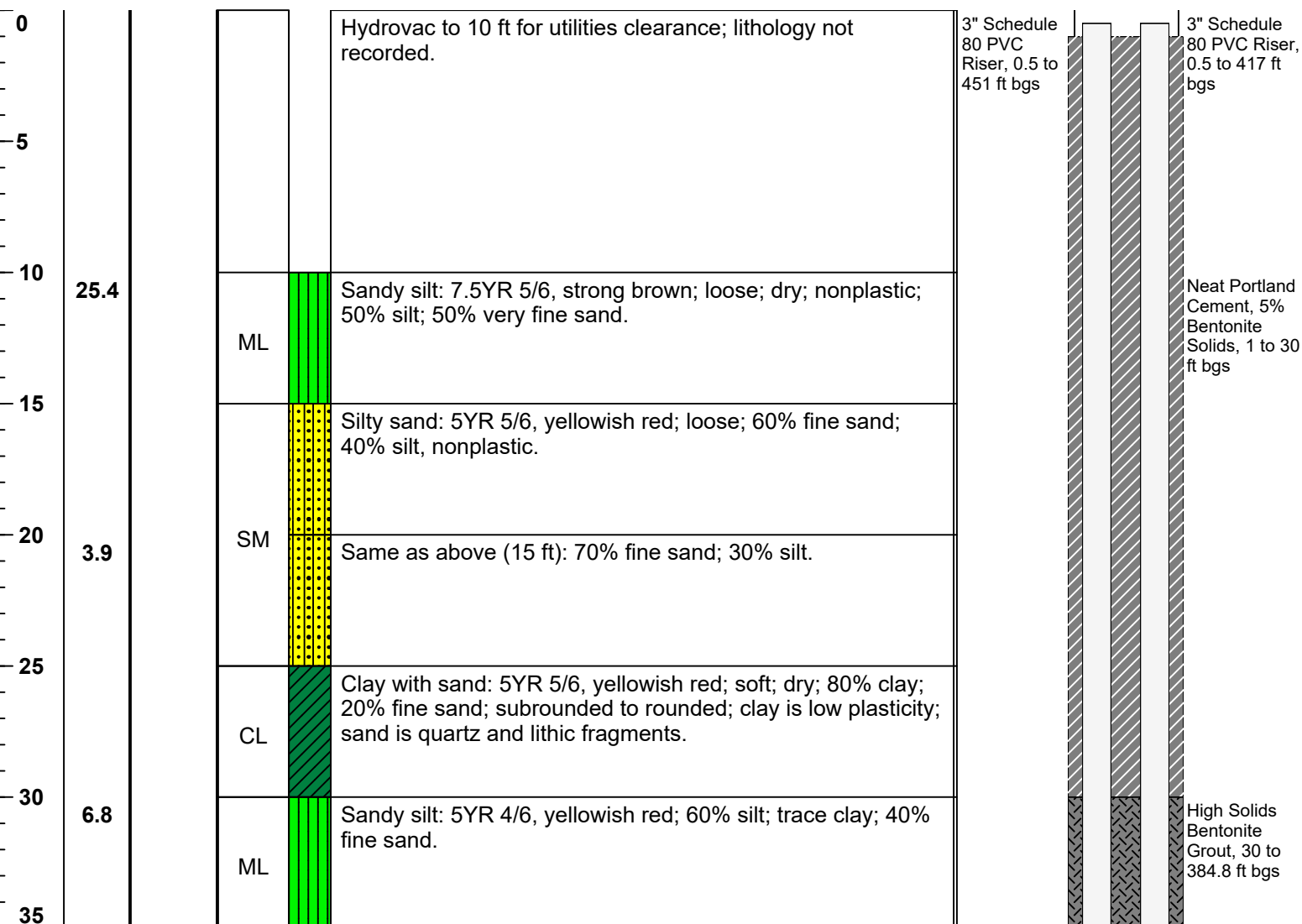
WELL LOG

Well ID: **KAFB-106S7**

Page: **1 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chatten	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
						(1) (2)



Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **2 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chatten	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

40	4.9	ML		Sandy silt: 5YR 4/6, yellowish red; trace clay; 50% silt; 50% fine sand.	
45		CL		Sandy clay: 5YR 6/4, light reddish brown; soft; dry; slightly plastic; 60% clay; 40% fine to medium sand (75% fine, 25% medium); subrounded; sand is quartz, feldspar, and lithic fragments.	
50	4.0	SC		Clayey sand: 5YR 5/6, yellowish brown; very loose; dry; 80% fine sand; subrounded; 20% clay and silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
55		CL		Clay: 5YR 5/6, yellowish red; very soft; dry; nonplastic; 90% clay; 10% fine sand; subrounded; sand is quartz, feldspar, and lithic fragments.	
60	3.5	SC		Clayey sand: 5YR 5/6, yellowish red; very loose; 70% fine to coarse sand (55% fine, 15% medium, 30% coarse); 30% clay.	
65				Same as above (60 ft): sand is 60% fine, 15% medium, 25% coarse; trace gravel, subrounded; gravel is quartz, feldspar, and lithic fragments.	
70				Same as above (60 ft): 60% clay; 40% fine to medium sand (80% fine, 10% medium); trace gravel, subrounded; gravel is quartz, feldspar, and lithic fragments.	

Notes: (1) Current Water Table Well

(2) Contingency Well

⚡ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **3 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

4.0				SW-SM	Well-graded sand with silt: 5YR 5/6, yellowish red; very loose; 90% fine to coarse sand (45% fine, 45% medium, 10% coarse); angular to subangular; 15% silt, nonplastic; sand is quartz, feldspar, and lithic fragments.	
75						
80	3.8			SP-SM	Poorly graded sand with silt: 5YR 4/6, yellowish red; very loose; 90% fine to medium sand (60% fine, 40% medium); angular to subangular; 10% silt; sand is quartz, feldspar, and lithic fragments.	
85					Same as above (75 ft): 5YR 5/6, yellowish red; sand is 60% fine, 40% medium.	
90	3.3			SP-SC	Poorly graded sand with clay: 5YR 5/8, yellowish red; 90% very fine to fine sand (60% very fine, 40% fine); rounded; 10% clay; sand is quartz, feldspar, and lithic fragments.	
95					Same as above (90 ft): sand is 55% very fine, 45% fine.	
100	1.6			SP-SM	Poorly graded sand with silt: 7.5YR 6/4, light brown; very loose; dry; 90% fine sand; subrounded; 10% silt; sand is quartz, feldspar, and lithic fragments.	
105						

Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **4 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

110	3.2		SP-SM	Same as above (100 ft): trace gravel; gravel is sandstone concretions.	
115			SM	Silty sand: 5YR 5/8, yellowish red; very loose; dry; 75% fine sand; rounded to subrounded; 25% silt; sand is quartz, feldspar, and lithic fragments.	
120	2.3		SM	Same as above (110 ft): 65% fine sand; 35% silt.	
125			SM	Same as above (110 ft): 50% fine sand; 50% silt.	
130	3.3		CL	Sandy clay: 7.5YR 5/6, strong brown; very soft; moist; low plasticity; 70% clay; 30% fine sand; sand is quartz, feldspar, and lithic fragments.	
135			CL	Same as above (125 ft): 60% clay; 40% fine sand.	
140			SM	Silty sand: 7.5YR 5/6, strong brown; loose; 70% fine to medium sand (85% fine, 15% medium); subrounded; 30% silt; sand is quartz, feldspar, and lithic fragments.	

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **5 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chatten	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
						(1) (2)

3.0			SC	Clayey sand: 7.5YR 5/6, strong brown; loose; moist; 60% fine and coarse sand (80% fine, 20% coarse); subrounded to rounded; 40% clay; medium plasticity; sand is quartz, feldspar, and lithic fragments.	
145					
			CL	Sandy clay: 7.5YR 5/6, strong brown; soft; moist; medium plasticity; 70% clay; 30% fine and coarse sand (80% fine, 20% coarse); subrounded to rounded; sand is quartz, feldspar, and lithic fragments.	
150					
3.8				Same as above (145 ft): 50% clay; 50% sand.	
155					
			ML	Sandy silt: 7.5YR 5/6, strong brown; soft; 70% silt; 30% fine to medium sand (65% fine, 35% medium); rounded; sand is quartz, feldspar, and lithic fragments.	
160					
4.1				Sandy silt: 7.5YR 6/8, reddish yellow; soft; dry; 50% silt; 50% fine sand; rounded; sand is quartz, feldspar, and lithic fragments. Note: trace silt is present as concretions.	
165					
				Same as above (160 ft): 50% silt; 40% fine sand; 10% gravel to 1/8", subrounded; gravel is quartz, feldspar, and lithic fragments.	
170					
19.8				Same as above (160 ft): 50% silt; 50% sand (60% fine, 30% medium, 10% coarse).	
175					

Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **6 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chatten	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

180	11.0	SM		Silty sand: 7.5YR 6/6, reddish yellow; loose; dry; sand is fine to coarse (60% fine, 25% medium, 15% coarse); rounded to subrounded; sand is quartz, feldspar, and lithic fragments.	
185				Same as above (175 ft): sand is 55% fine, 20% medium, 25% coarse.	
190	13.8	SW		Well-graded sand: 7.5YR 7/4, pink; loose; dry; 100% fine to coarse sand (30% fine, 60% medium, 10% coarse); subrounded to rounded; sand is quartz, feldspar, and lithic fragments.	
195				Same as above (185 ft); sand is 25% fine, 60% medium, 15% coarse.	
200	13.3	SW		Well-graded sand: 7.5YR 6/4, light brown; 100% very fine to coarse sand (45% very fine, 40% fine, 10% medium, 5% coarse); subrounded to rounded; sand is quartz, feldspar, and lithic fragments.	
205		SM		Silty sand: 7.5YR 6/6, reddish yellow; loose; dry; sand is very fine to medium (15% very fine, 20% fine, 60% medium), rounded; 5% gravel, subrounded to rounded; sand and gravel are quartz, feldspar, and lithic fragments.	
210					

Notes: (1) Current Water Table Well

(2) Contingency Well

= Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **7 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chatten	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

1.7					Well-graded sand with silt and gravel: 7.5YR 6/6, reddish yellow; loose; dry; 75% fine to coarse sand (15% fine, 65% medium, 20% coarse); rounded; 15% gravel; subrounded to rounded; 10% silt; sand and gravel are quartz, feldspar, and lithic fragments.	
215				SW-SM	Same as above (210 ft): sand is 10% fine, 65% medium, 25% coarse.	
220	2.1				Well-graded sand: 7.5YR 6/4, light brown; loose; dry; 95% fine to coarse sand (20% fine, 45% medium, 35% coarse); subrounded to rounded; 5% silt; sand is quartz, feldspar, and lithic fragments.	
225				SW	Well-graded sand with gravel: 7.5YR 6/6, reddish yellow; loose; dry; 80% fine to coarse sand (20% fine, 45% medium, 35% coarse); 15% gravel to 1 1/2"; 5% silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, limestone, and lithic fragments.	
230	2.4				Well-graded sand with silt and gravel: 7.5YR 6/6, reddish yellow; loose; dry; 50% fine to coarse sand (20% fine, 40% medium, 40% coarse); 40% gravel to 1 1/2"; 10% silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, limestone, and lithic fragments.	
235				SW-SM	Well-graded sand: 7.5YR 6/6, reddish yellow; loose; dry; 90% fine to coarse sand (15% fine, 60% medium, 25% coarse); 5% gravel to 1 1/2"; 5% silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, limestone, and lithic fragments.	
240	2.4				Well-graded sand with silt: 7.5YR 6/6, reddish yellow; loose; dry; 90% fine to coarse sand (10% fine, 80% medium, 10% coarse); 10% silt; sand is quartz, feldspar, and lithic fragments.	
245				SW-SM		

Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **8 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
						(1) (2)

250	2.5	SW-SM	Well-graded sand with silt: 7.5YR 6/6, reddish yellow; loose; dry; 90% fine to coarse sand (10% fine, 80% medium, 10% coarse); 10% silt; sand is quartz, feldspar, and lithic fragments.	
255		GP	Poorly graded gravel with sand: 7.5YR 6/4, light brown; loose; dry; 80% gravel to 3/4"; 20% medium to coarse sand (50% medium, 50% coarse); subrounded to rounded; gravel is quartz, feldspar, limestone, and lithic fragments; sand is quartz, feldspar, and lithic fragments.	
260	1.7	SM	Silty sand: 7.5YR 6/4, light brown; loose; dry; sand is fine to coarse (25% fine, 60% medium, 10% coarse); 5% gravel to 3/4"; subrounded to rounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, limestone, and lithic fragments.	
265			Clay: 7.5YR 7/4, pink; soft; medium plasticity.	
270	1.6	CL	Clay: 7.5YR 4/3, brown; soft; medium plasticity.	
275				
280				

Notes: (1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **9 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chatten	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

1.2			CL	Gravelly clay: 7.5YR 6/4, light brown; soft; low plasticity; 65% clay; 35% gravel to 1/4"; angular; gravel is limestone.	
285			SP	Poorly graded sand: 7.5YR 5/4, brown; loose; dry; 95% fine to medium sand (35% fine, 65% medium); 5% silt; sand is quartz, feldspar, and lithic fragments.	
290	1.7			Silty sand: 7.5YR 4/3, brown; loose; 70% sand (65% fine, 30% medium, 5% coarse); subrounded to rounded; 30% silt; sand is quartz, feldspar, and lithic fragments.	
295			SM	Same as above (290 ft): 80% sand (55% fine, 30% medium, 15% coarse); 20% silt.	
300	1.2			Same as above (290 ft): 85% sand (45% fine, 35% medium, 20% coarse); 15% silt.	
305			SP	Poorly graded sand with gravel: 7.5YR 6/3, light brown; loose; dry; 70% medium to coarse sand (35% medium, 65% coarse); 30% gravel to 1/2"; subrounded to rounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, lithic fragments, and limestone.	
310	1.4				
315					

Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **10 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
						(1) (2)

320	0.9				Poorly graded sand with gravel: 7.5YR 6/3, light brown; loose; dry; 70% medium sand; 30% gravel to 1/2"; subrounded to rounded; sand is quartz, feldspar, and lithic fragments; gravel is quartz, feldspar, lithic fragments, and limestone.	
325			SP		Poorly graded sand: 7.5YR 5/3, brown; loose; dry; 100% fine to medium sand (95% fine, 5% medium); sand is quartz, feldspar, and lithic fragments.	
330	1.3					
335			SW		Well-graded sand: 7.5YR 6/4, light brown; loose; dry; 95% fine to coarse sand (5% fine, 95% medium, 10% coarse); 5% silt.	
340	1.0		SM		Silty sand: 7.5YR 6/4, light brown; loose; dry; 80% fine to coarse sand (65% fine, 25% medium, 10% coarse); subrounded to rounded; 20% silt; sand is quartz, feldspar, and lithic fragments.	
345			SW		Well-graded sand with gravel: 7.5YR 6/3, light brown; loose; dry; 70% fine to coarse sand (15% fine, 55% medium, 30% coarse); 30% gravel to 1/4"; angular to subangular; sand is quartz, feldspar, and lithic fragments; gravel is quartz, limestone, and feldspar.	
350						

Notes: (1) Current Water Table Well

(2) Contingency Well

⚡ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **11 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

69.0					Well-graded sand with silt: 7.5YR 4/4, brown; loose; dry; 85% fine to coarse sand (70% fine, 10% medium, 20% coarse); 5% gravel to 1/4"; 10% silt; sand is quartz, feldspar, and lithic fragments; gravel is feldspar and lithic fragments.	
355				SW-SM		
360	2.6				Well-graded sand with silt and gravel: 7.5YR 4/4, brown; loose; dry; 75% fine to coarse sand (65% fine, 15% medium, 20% coarse); 15% gravel to 1/4"; 10% silt; sand is quartz, feldspar, and lithic fragments; gravel is feldspar and lithic fragments.	
365						
370	5.1			SW	Well-graded sand with gravel: 7.5YR 4/3, brown; loose; dry; 50% fine to coarse sand (10% fine, 20% medium, 70% coarse); 45% gravel to 1/2"; subrounded to rounded; 5% silt; sand and gravel are quartz, feldspar, and lithic fragments.	
375						
380	3.8			SM	Silty sand: 7.5YR 6/4, light brown; 85% fine to medium sand (95% fine, 5% medium); rounded; 15% silt; sand is quartz, feldspar, and lithic fragments.	
385						

Notes: (1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/16/19**

Completion Date: **2/4/19**

WELL LOG

Well ID: **KAFB-106S7**

Page: **12 of 23**

Drilling Company: Cascade	Boring Depth (ft): 506	Screen Material: 3" Sch. 80 PVC
Drilling Method: Air Rotary Casing Hammer	Boring Diameter (in): 9 5/8", 11 3/4"	0.010" slot screen
Drill Bit: 10 1/2" Ken Claw	Well Diameter: 3" ID	Seal Material(s): Cement; Bentonite;
8 1/2" Milltooth Tricone	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Driller: Forrest Chattin	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand
Geologist: C. Montoya		

Depth (ft)	PID (ppmv)	Samples Collected	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

390	9.8		SM		Silty sand: 7.5YR 6/4, light brown; 85% fine to medium sand (95% fine, 5% medium); rounded; 15% silt; sand is quartz, feldspar, and lithic fragments.	
395			SP-SM		Poorly graded sand with silt: 7.5YR 6/4, light brown; 90% fine to medium sand (90% fine, 10% medium); rounded; 10% silt; sand is quartz, feldspar, and lithic fragments.	
400	5.1		SW		Well-graded sand with clay and gravel: 7.5YR 6/6, reddish yellow; 70% fine to coarse sand (25% fine, 25% medium, 50% coarse); 20% gravel; subangular to subrounded; 10% clay; sand and gravel are quartz, feldspar, and lithic fragments.	
405					End ARCH drilling at 401 ft, begin sonic coring. Core log begins on the following page.	
410						
415						
420						

Hydrated
Uncoated
Bentonite
Chips, 3/8",
384.8 to
414.9 ft bgs

Notes: (1) Current Water Table Well

(2) Contingency Well

⚡ = Depth to water after completion

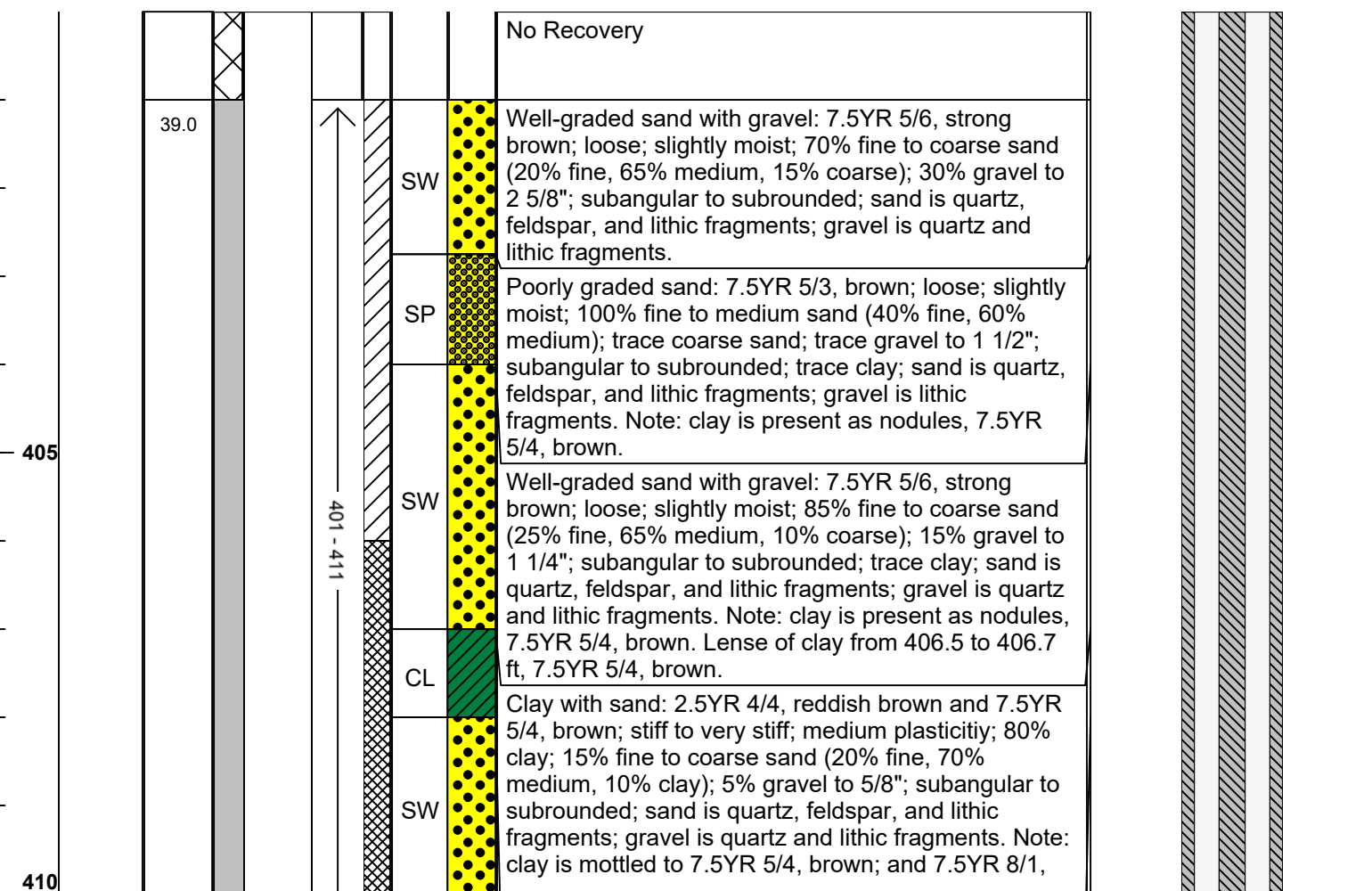
Samples: V = VOCs/EDB, P = TPH, M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

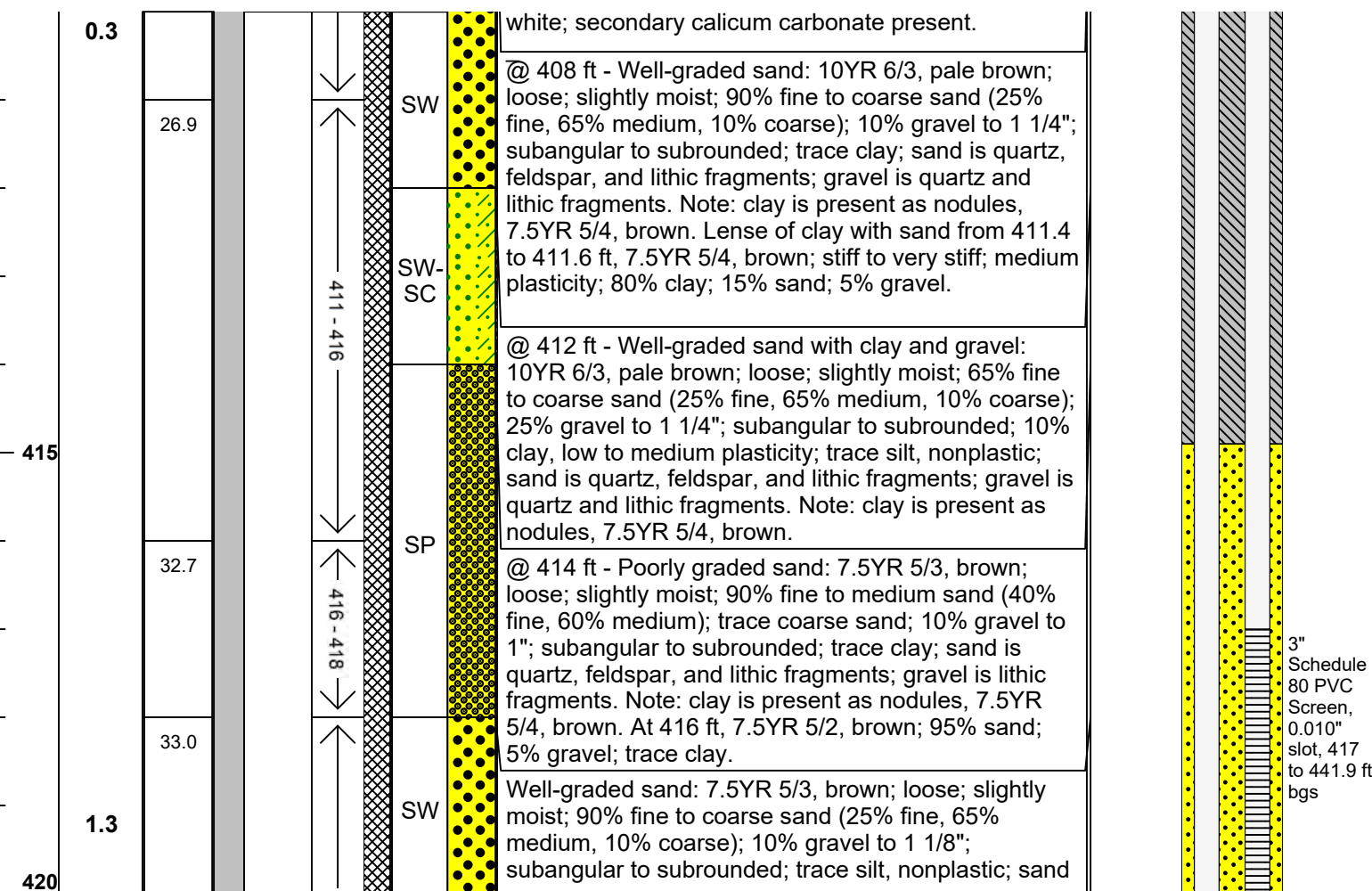
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

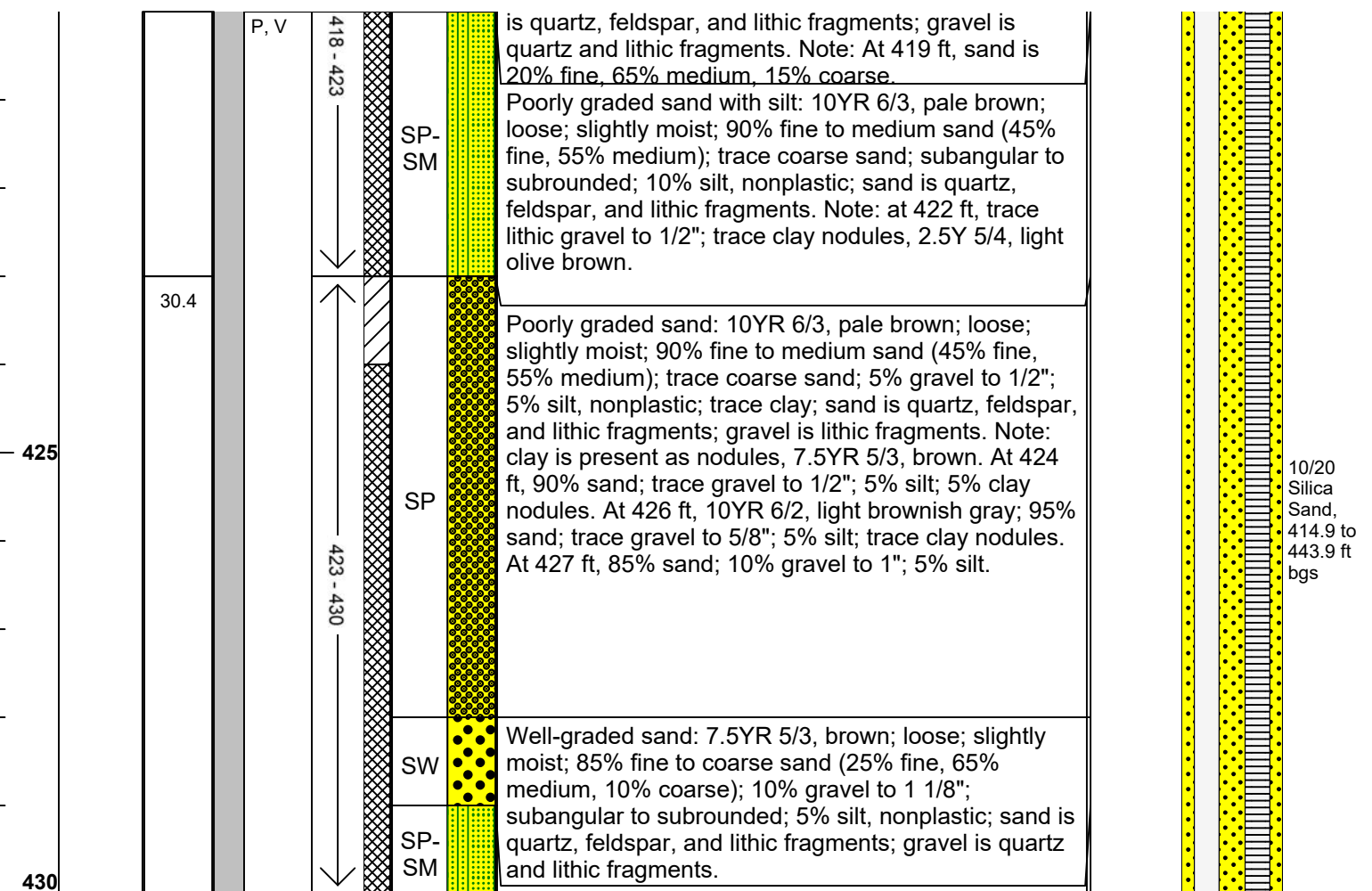
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

435	2.1	68.9	430 - 432	SW	@ 429 ft - Poorly graded sand with silt: 10YR 7/2, light gray; loose; slightly moist; 90% fine to medium sand (45% fine, 55% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments.
	58.6	SP		@ 430.25 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 55% medium, 15% coarse); 25% gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
	67.5			@ 432 ft - Poorly graded sand: 10YR 7/2, light gray; loose; slightly moist; 85% fine to medium sand (45% fine, 55% medium); trace coarse sand; 10% gravel to 1"; 5% silt, nonplastic; trace clay; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: clay is present as nodules, 7.5YR 5/3, brown. At 434 ft, 10YR 6/2, light brownish gray; 90% sand; 5% gravel; 5% silt.	
				SW	@ 436 ft - Well-graded sand with gravel: 10YR 6/3, pale brown; loose; slightly moist; 70% fine to coarse sand (30% fine, 55% medium, 15% coarse); 25% gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.
	440			SW-SM	

Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

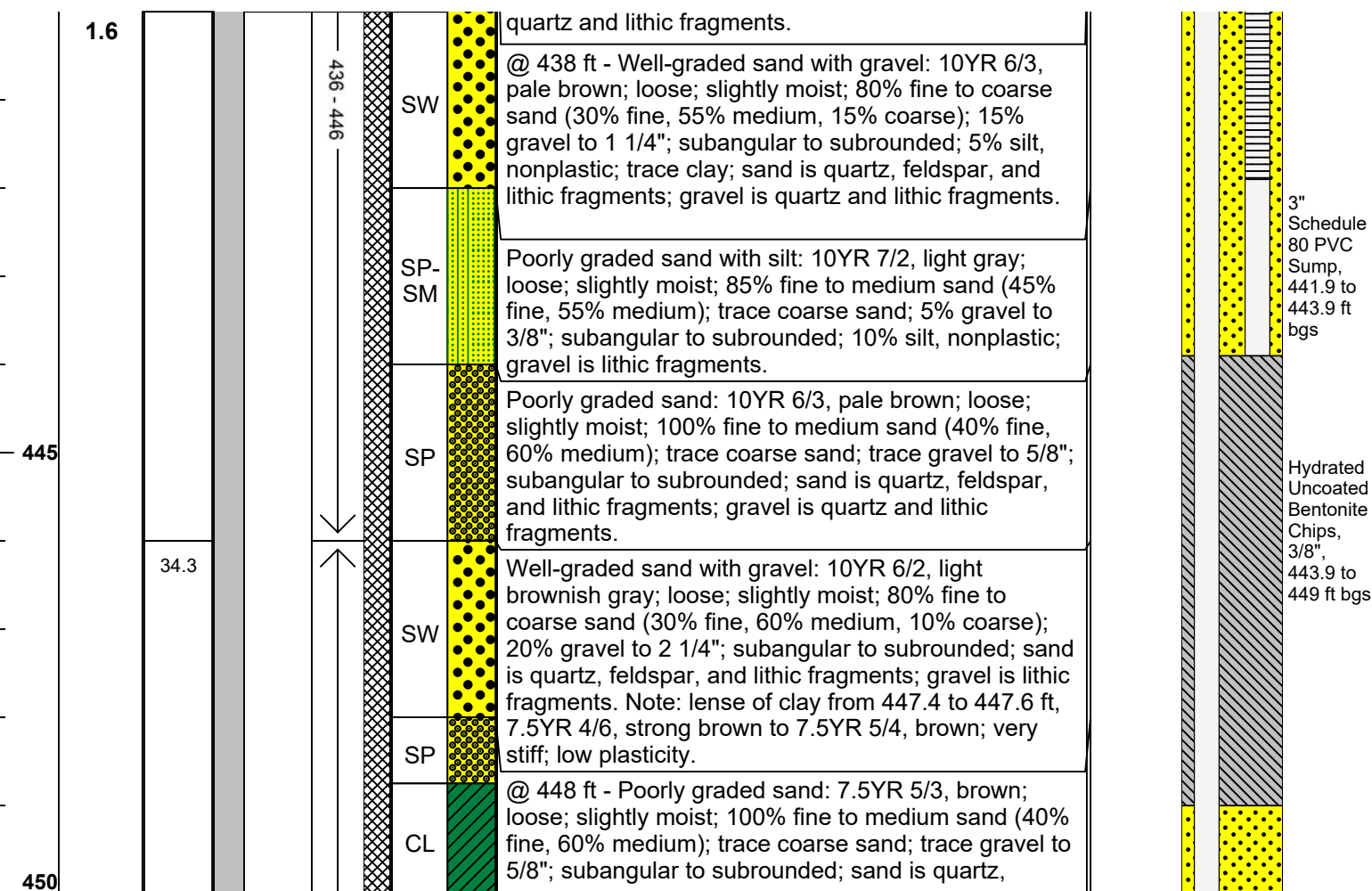
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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bgs = below ground surface

DTW = depth to water

ft = feet

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

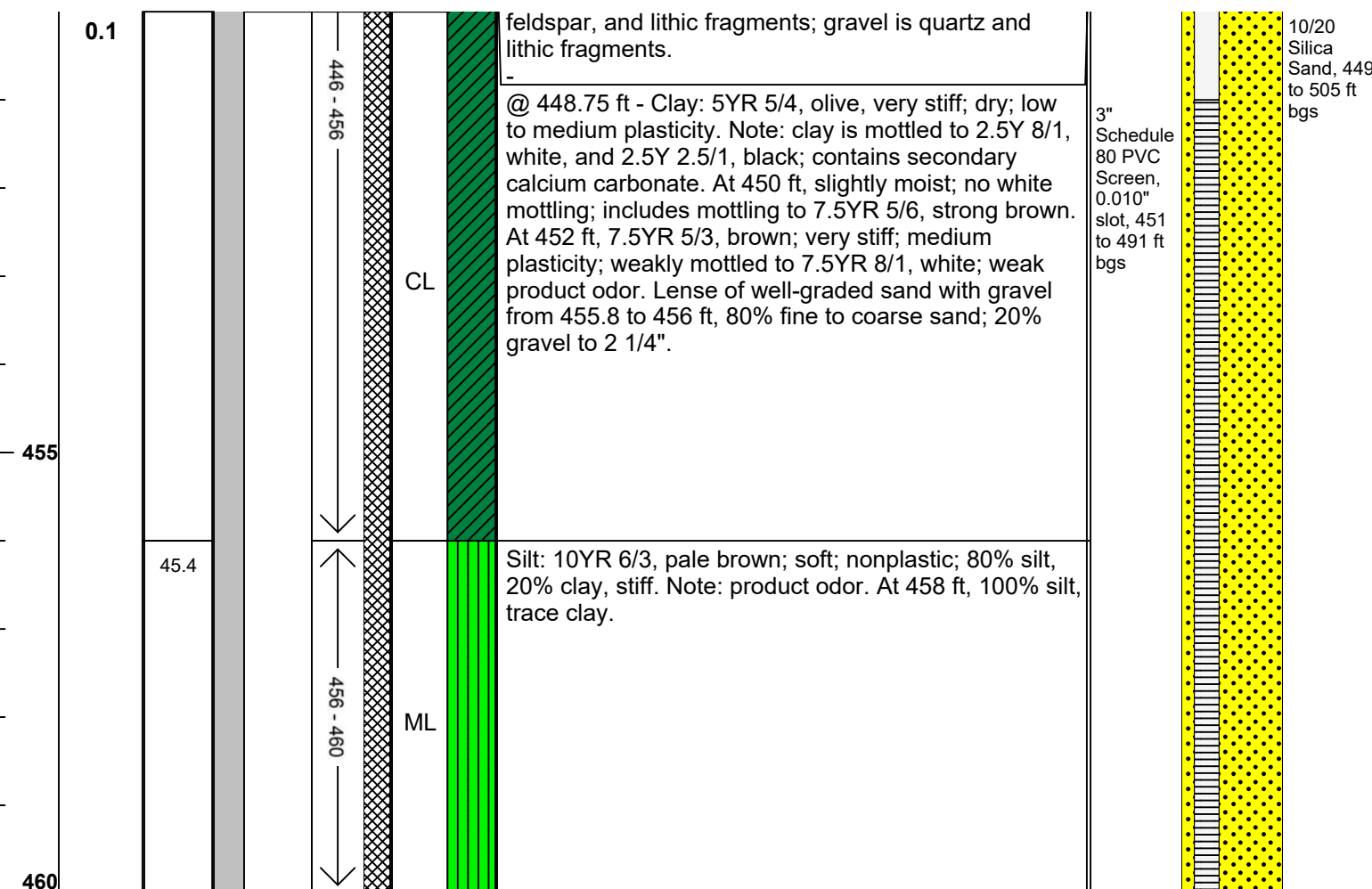
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

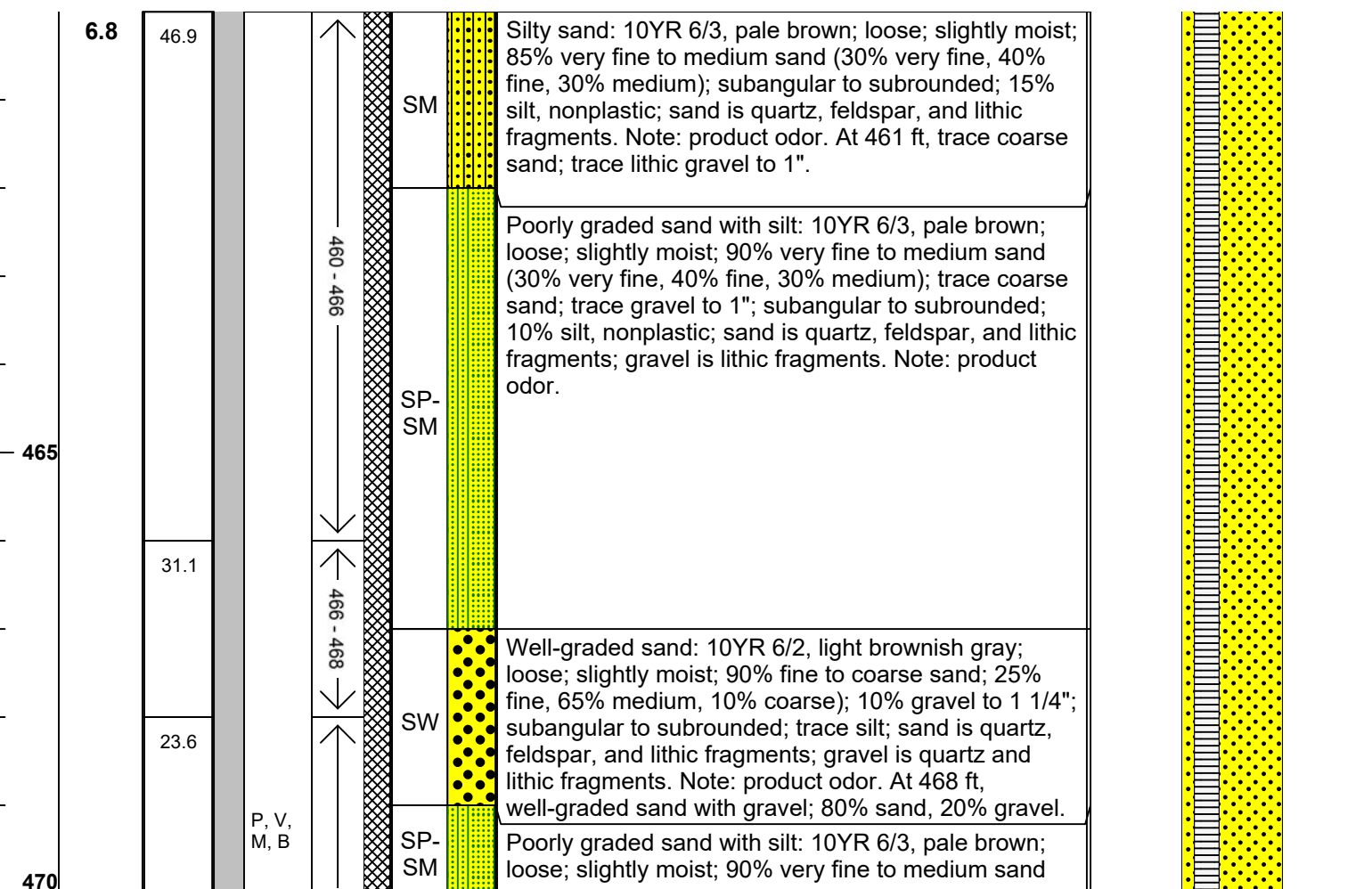
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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ft = feet

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

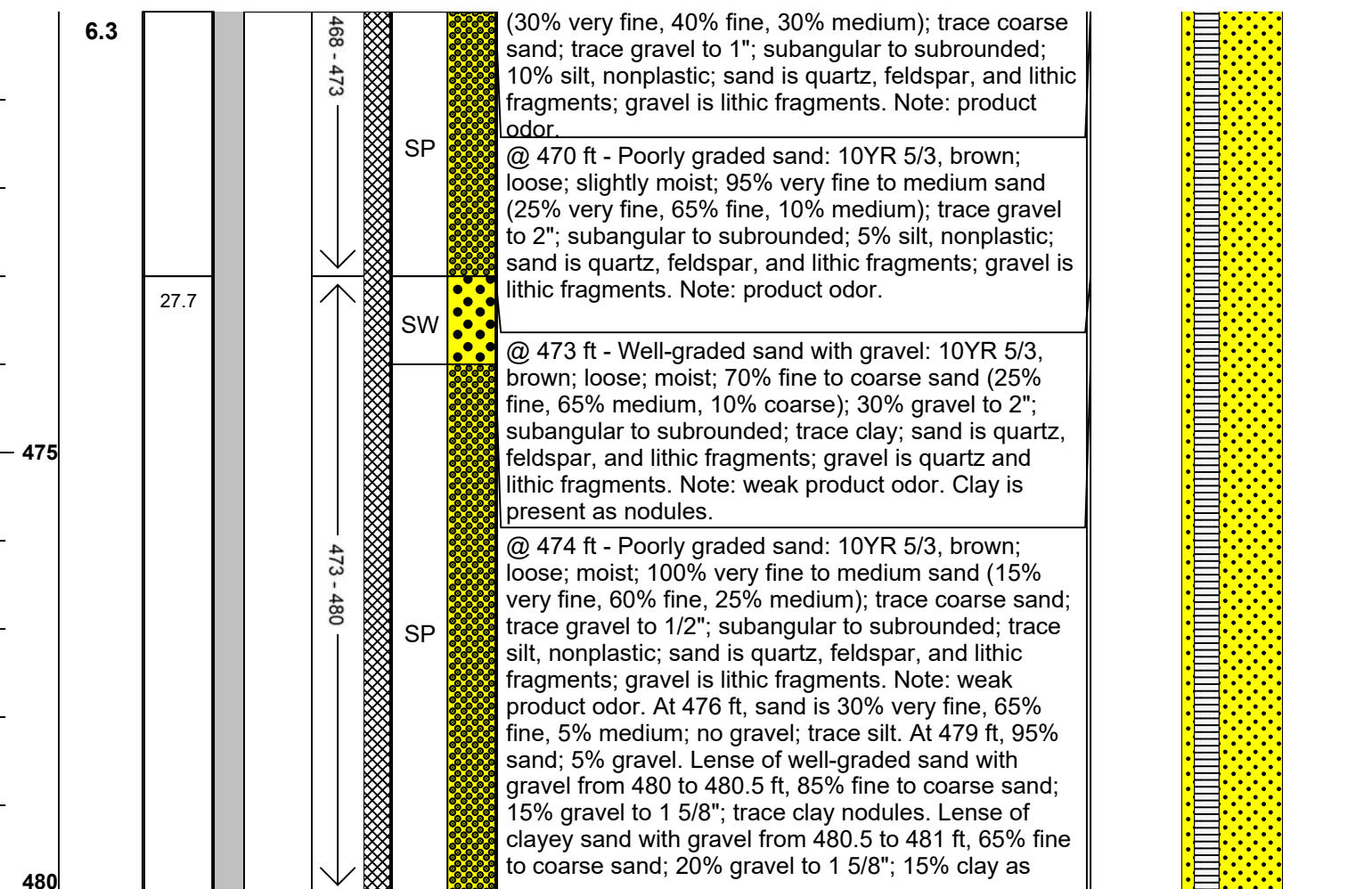
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

46.3	30.6				480 - 481				nodules, low plasticity, 7.5YR 5/3, brown, and 5Y 6/3, pale olive.	
	39.9				481 - 486	SP			Poorly graded sand with gravel: 7.5YR 4/2, brown; loose; moist; 85% fine to medium sand (40% fine, 60% medium); trace coarse sand; 15% gravel to 1 3/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: product odor.	
						GW			Well-graded gravel with sand: 7.5YR 4/2, brown; loose; moist; 65% gravel to 3"; 35% fine to coarse sand (15% fine, 60% medium, 25% coarse); subangular to subrounded; trace silt, nonplastic; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: product odor.	
	31.1					SW			Well-graded sand with gravel: 7.5YR 4/2, brown; loose; moist; 65% fine to coarse sand (20% fine, 70% medium, 10% coarse); 35% gravel to 3"; trace cobbles to 3 1/2"; subangular to subrounded; trace silt; sand is quartz, feldspar, and lithic fragments; gravel and cobbles are lithic fragments. Note: product odor. At 487 ft, well-graded sand, 90% sand; 10% gravel to 1 1/2"; trace silt.	
485						SP			Poorly graded sand: 7.5YR 4/2, brown; loose; moist; 95% fine to medium sand (40% fine, 60% medium); trace coarse sand; 5% gravel to 1 1/4"; subangular to subrounded; trace silt; sand is quartz, feldspar, and	
490										

Notes:

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

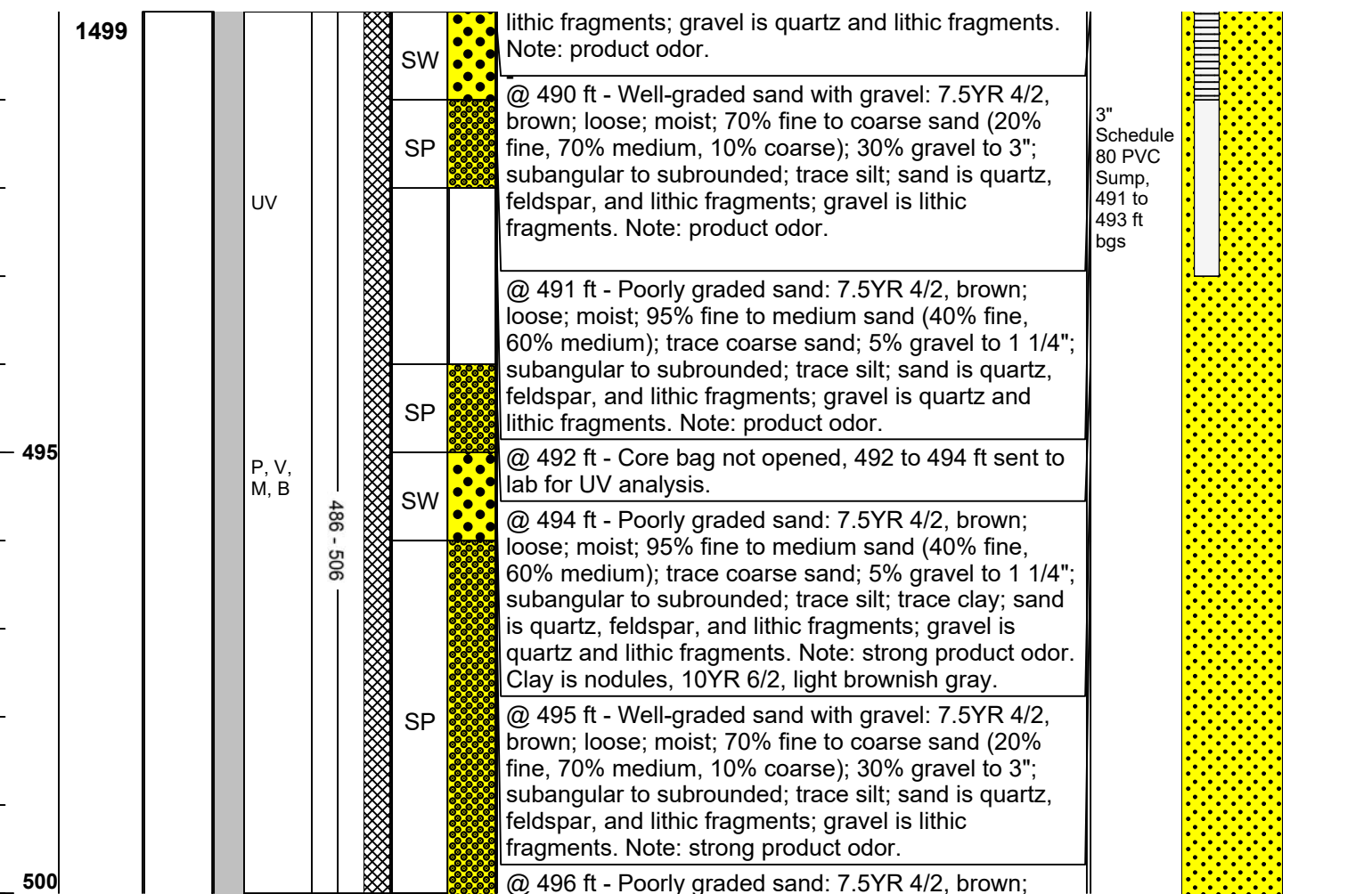
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

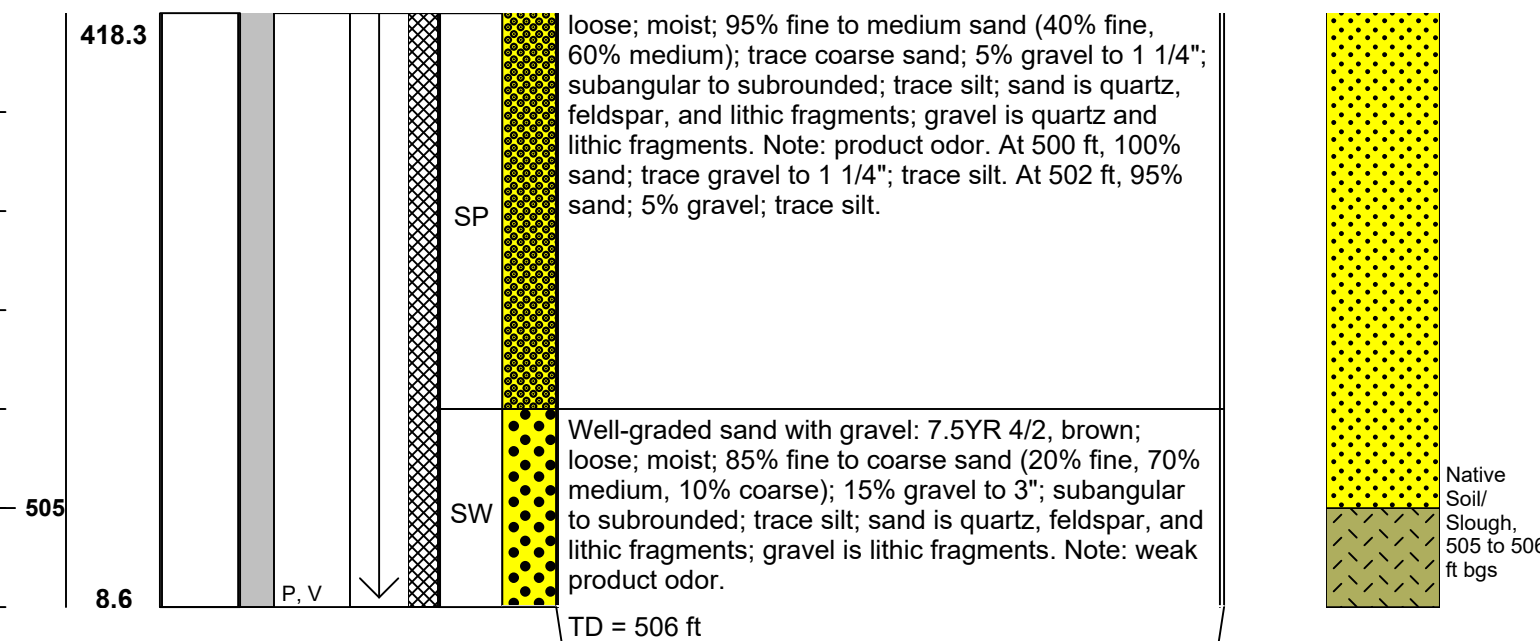
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 506 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 474.44	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well
(2) Contingency Well
 = Depth to water after completion
 UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 DTW = depth to water
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	None
	Interval Fluoresced

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

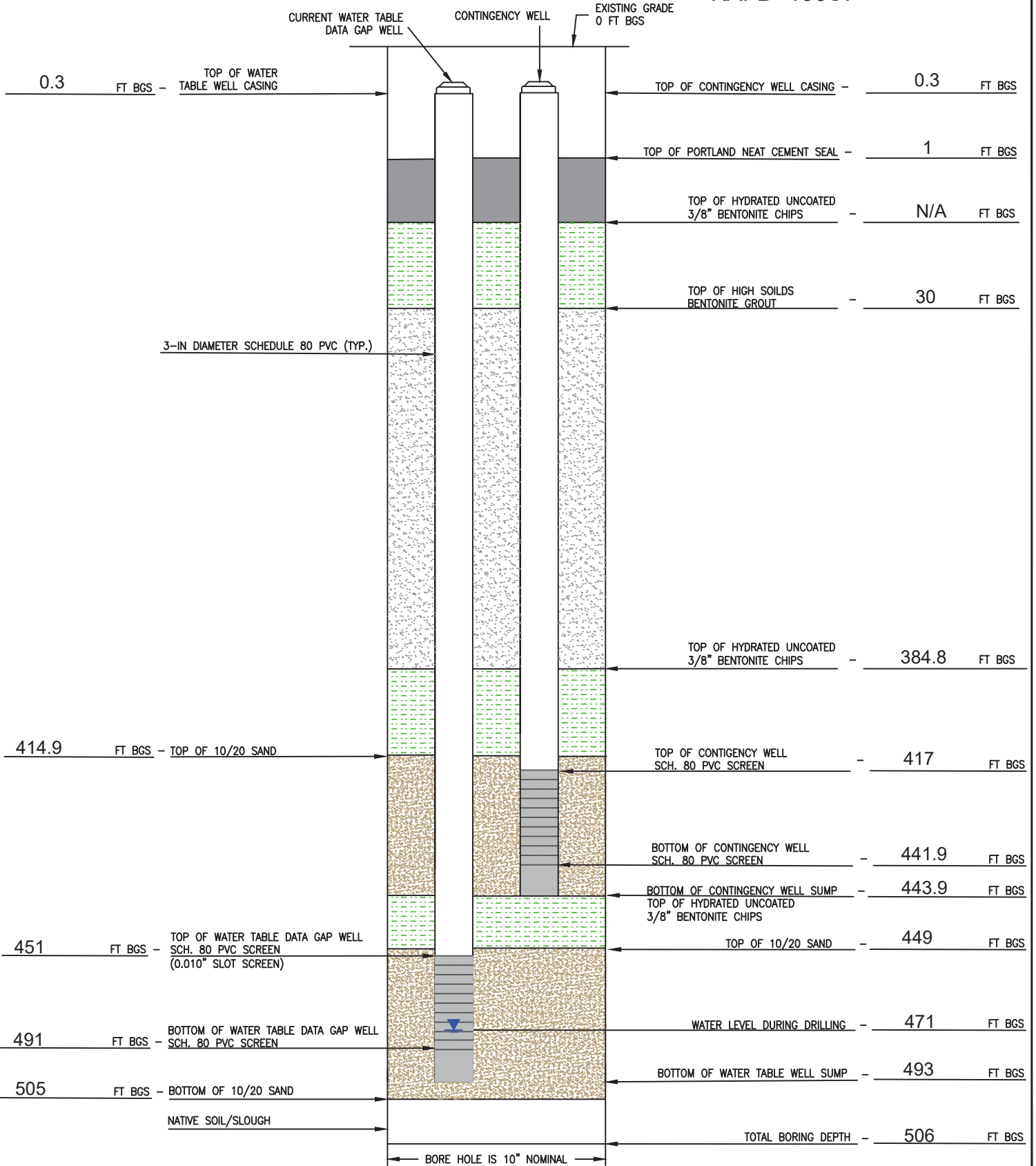
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S7



NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

PROJECT NO.:
62735DM02.1018

WELL ID:
KAFB-106S7

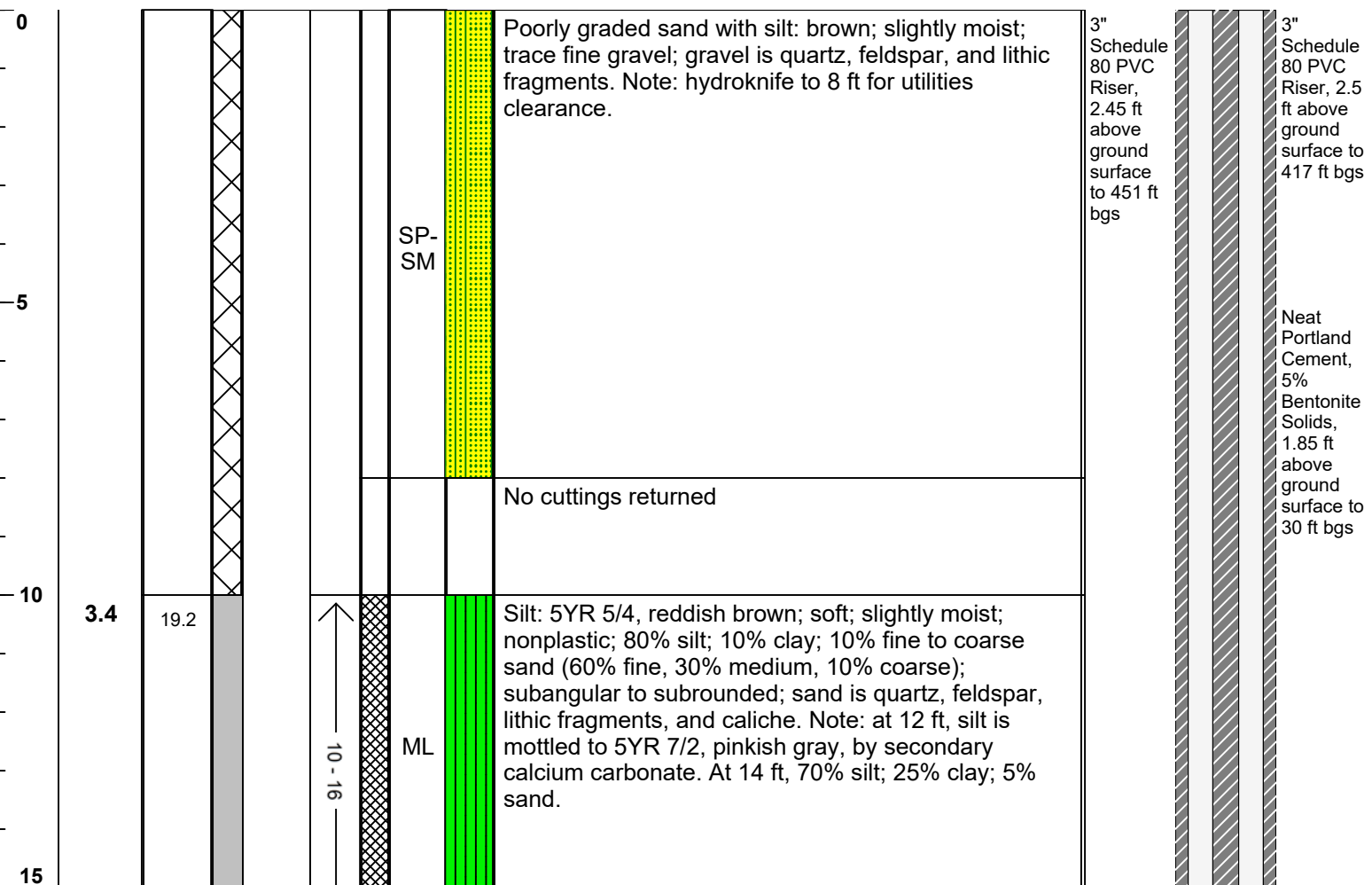
INSTALLATION START DATE/TIME:
10JAN19
GEOLOGIST: L. Andress/
J. Messenger

INSTALLATION END DATE/TIME:
04FEB19
DRILLER: R. Rodriguez/
M. Green

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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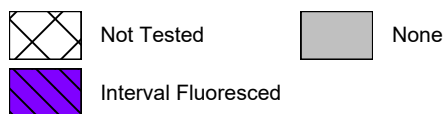
(1) (2)



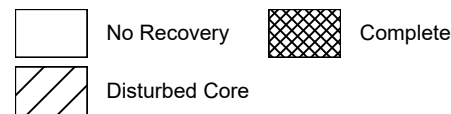
Notes:

- (1) Current Water Table Well
- (2) Contingency Well
- ∇ = Depth to water after completion
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- ppmv = parts per million by volume
- USCS = Unified Soil Classification System

UV Fluorescence Field Test



Core Recovery



Following coring, the borehole was overdrilled using ARCH for well installation

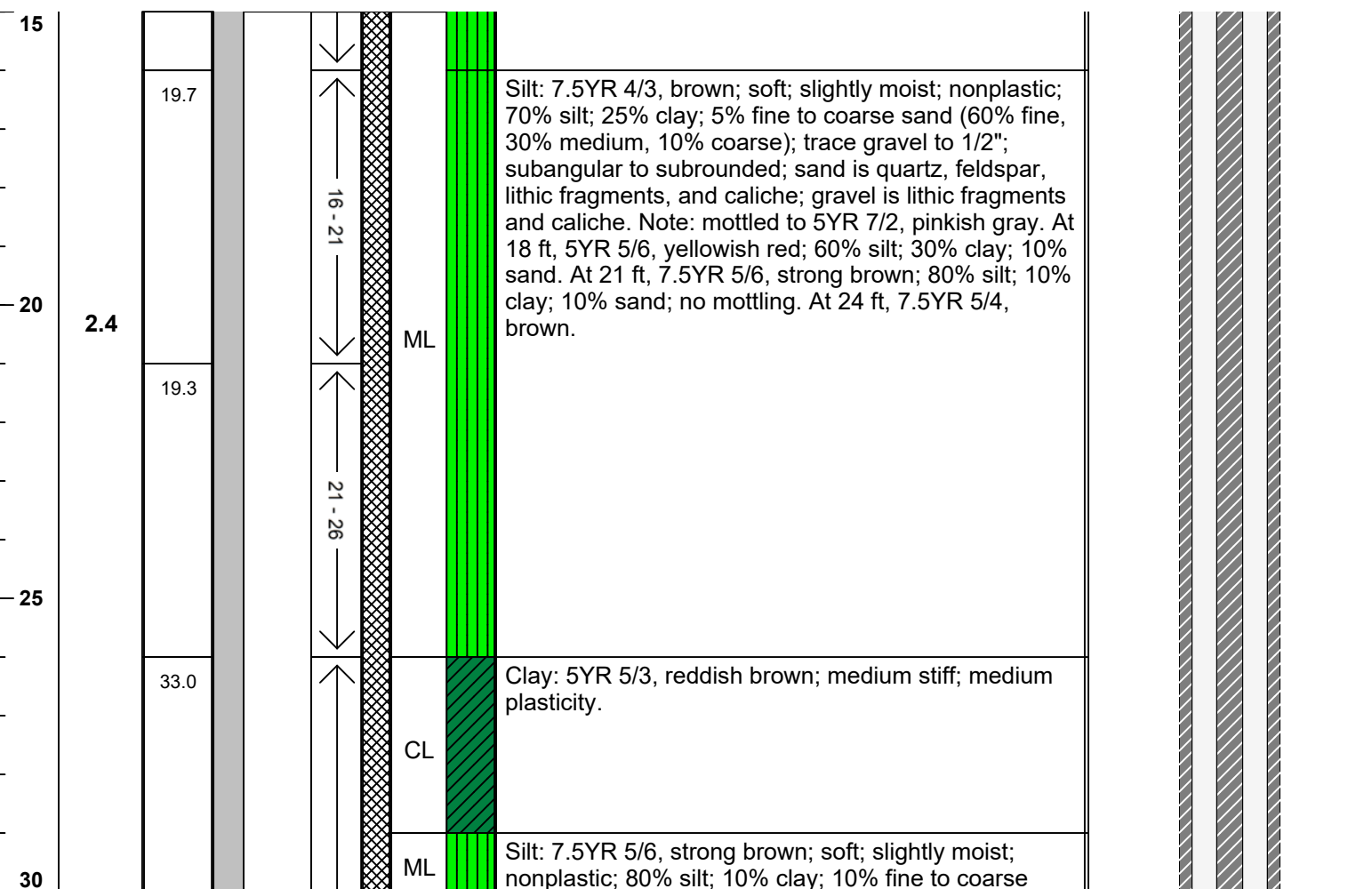
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

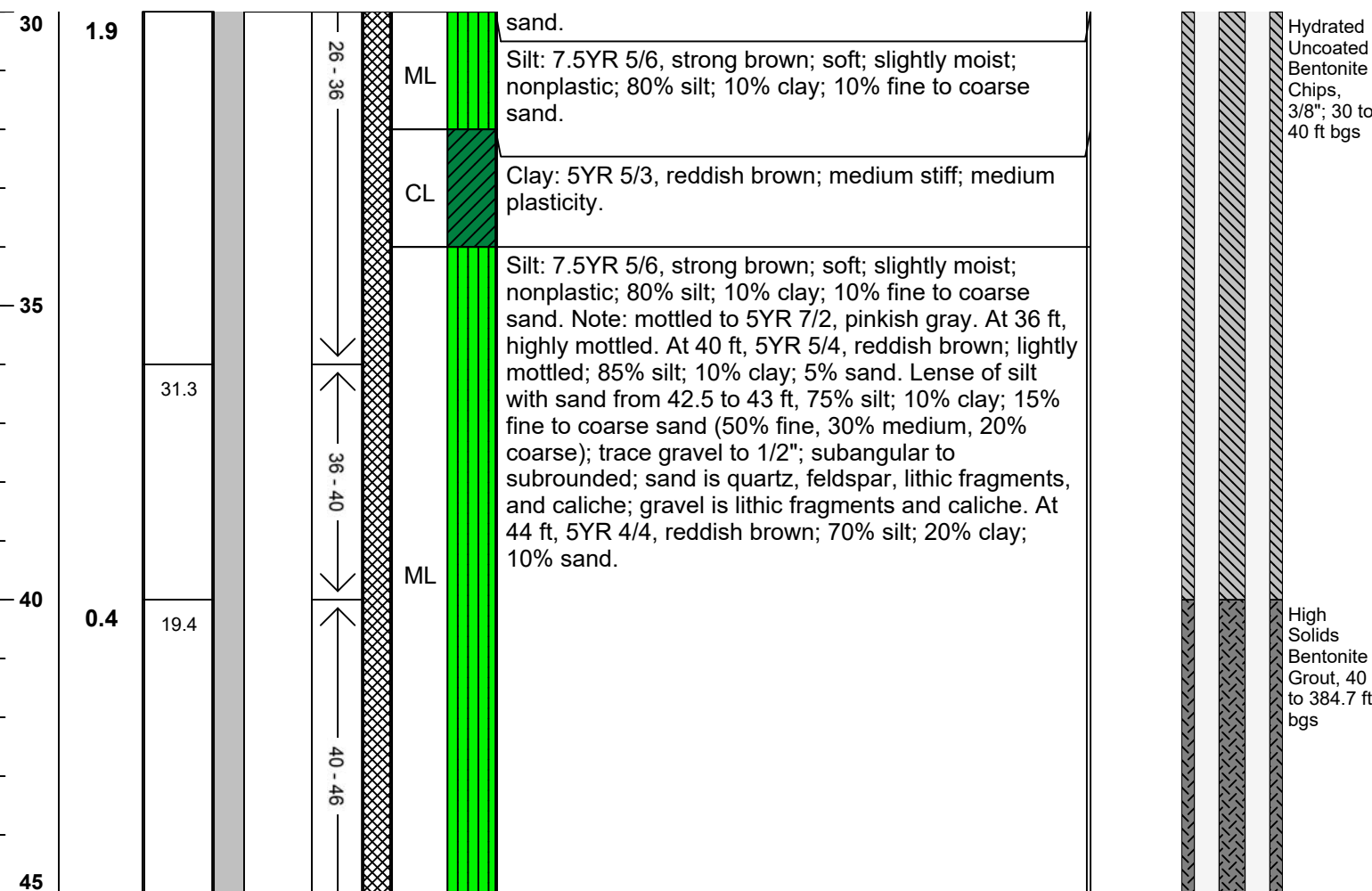
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

45									Silt: 5YR 4/4, reddish brown; soft; slightly moist; nonplastic; 70% silt; 20% clay; 10% fine to coarse sand. Note: at 47 ft, highly mottled to 5YR 8/2, pinkish white, with secondary calicum carbonate alteration throughout. Amount of alteration decreases from 49 to 50 ft. At 50 ft, 7.5YR 5/4, brown.	
	26.6				46 - 50			ML		
50		26.4			50 - 56			CL	Clay: 7.5YR 5/3, brown; medium stiff; medium plasticity. Note: clay is lightly mottled to 7.5YR 7/2, pinkish gray.	
	43.2							ML	Silt: 5YR 4/4, reddish brown; soft; slightly moist; nonplastic; 70% silt; 20% clay; 10% fine to coarse sand. Note: lightly mottled to 5YR 8/2, pinkish white, with some secondary calicum carbonate alteration.	
55		28.6						SM	Silt with sand: 5YR 5/4, reddish brown; soft; slightly moist; nonplastic; 80% silt; 5% clay; 15% fine to medium sand (40% fine, 60% medium); trace coarse sand; subangular to subrounded; sand is quartz, feldspar, lithic fragments, and caliche.	
60									@ 58 ft - Silty sand: 7.5YR 5/4, brown; loose; slightly	

Notes:

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

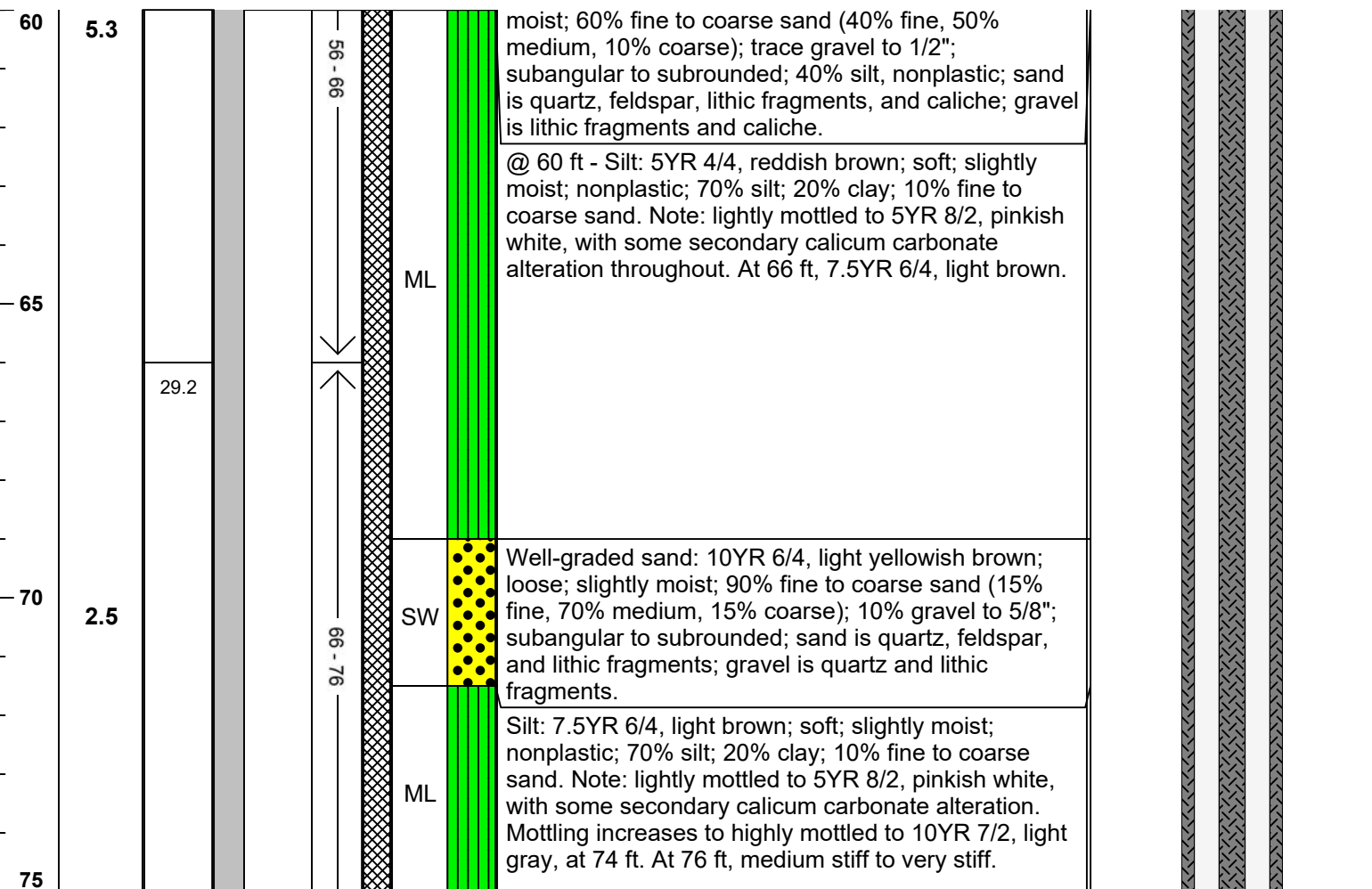
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

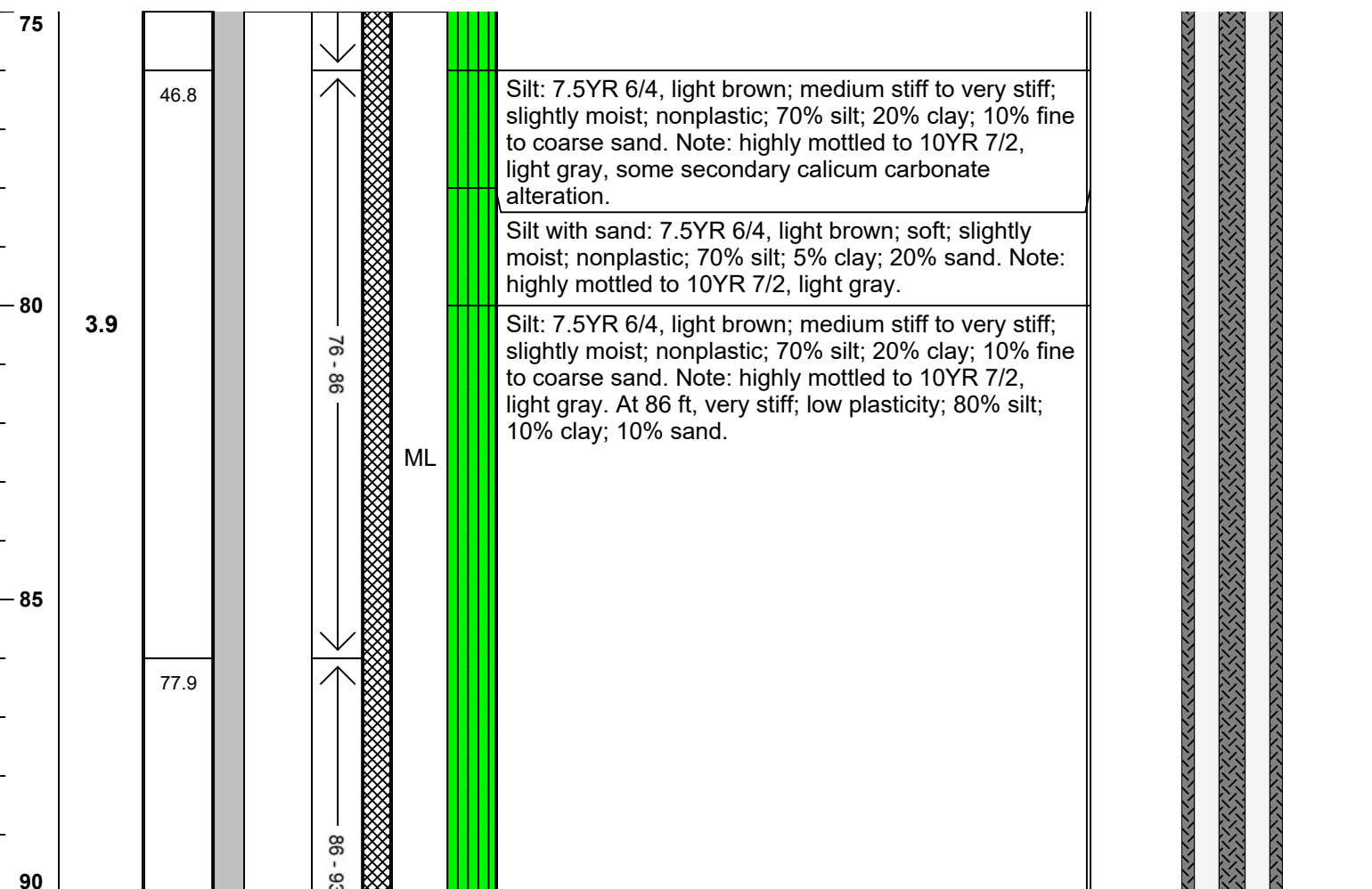
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
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Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

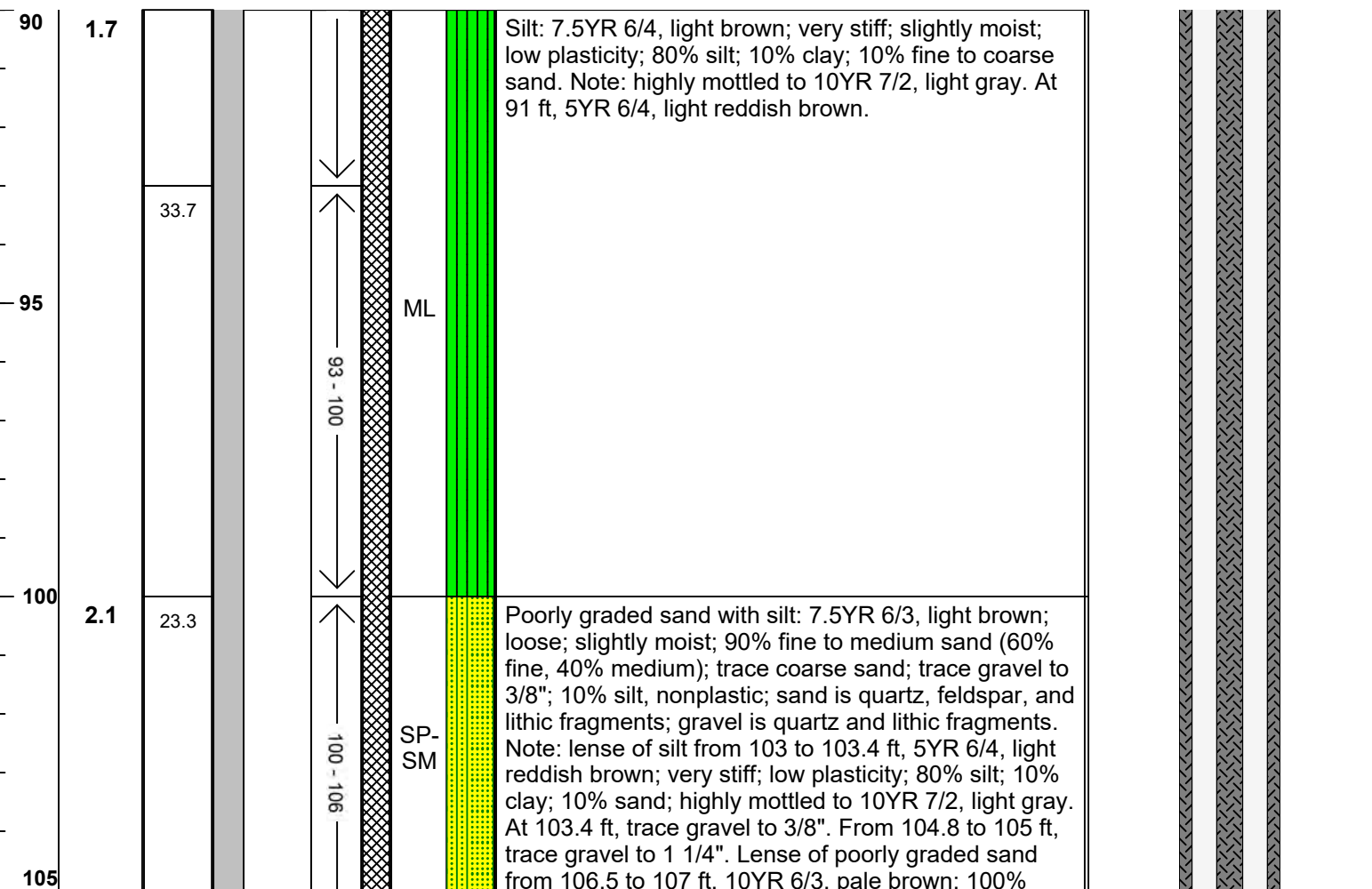
Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **514 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite,**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

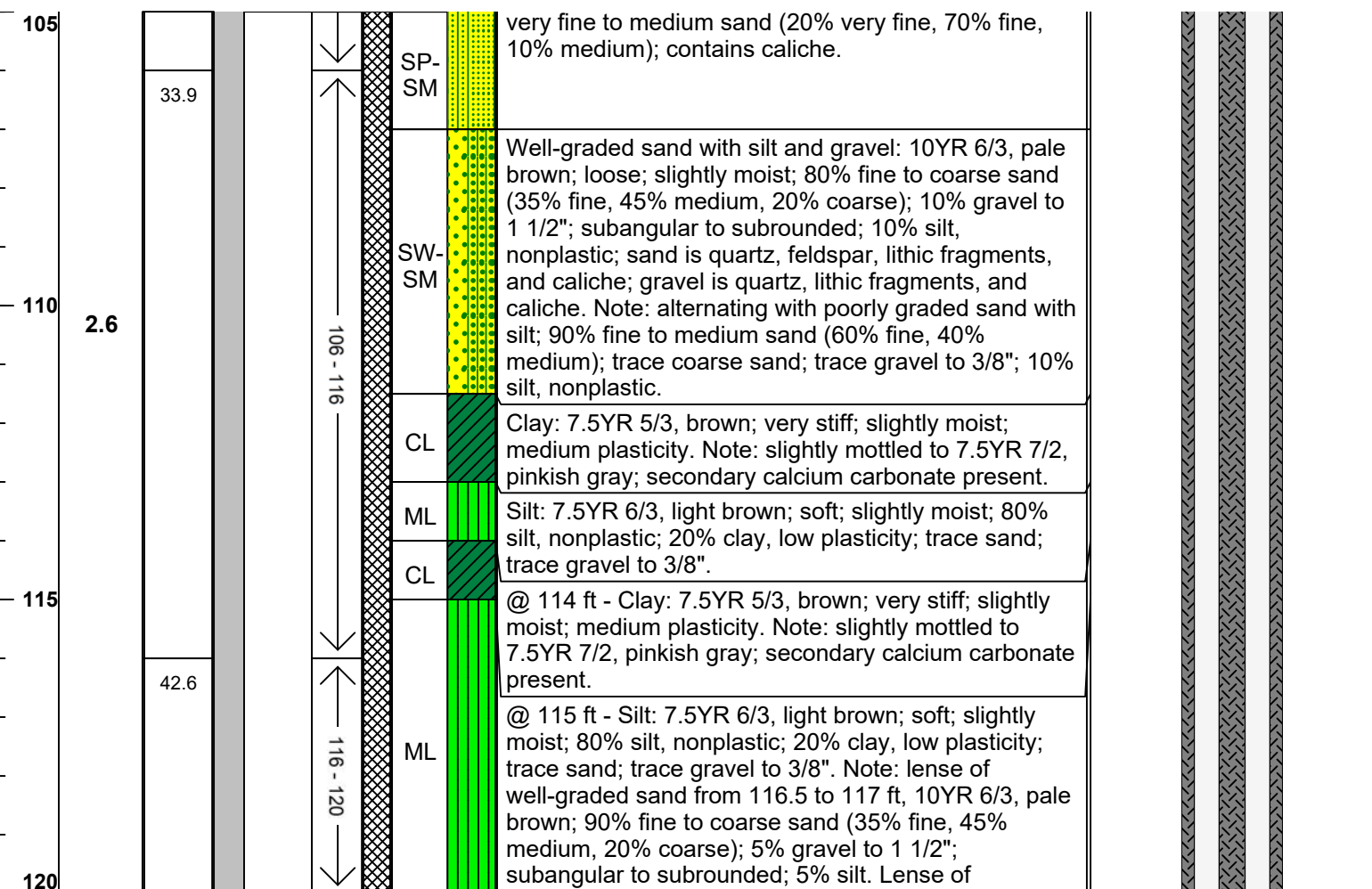
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

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UV Fluorescence Field Test

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	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

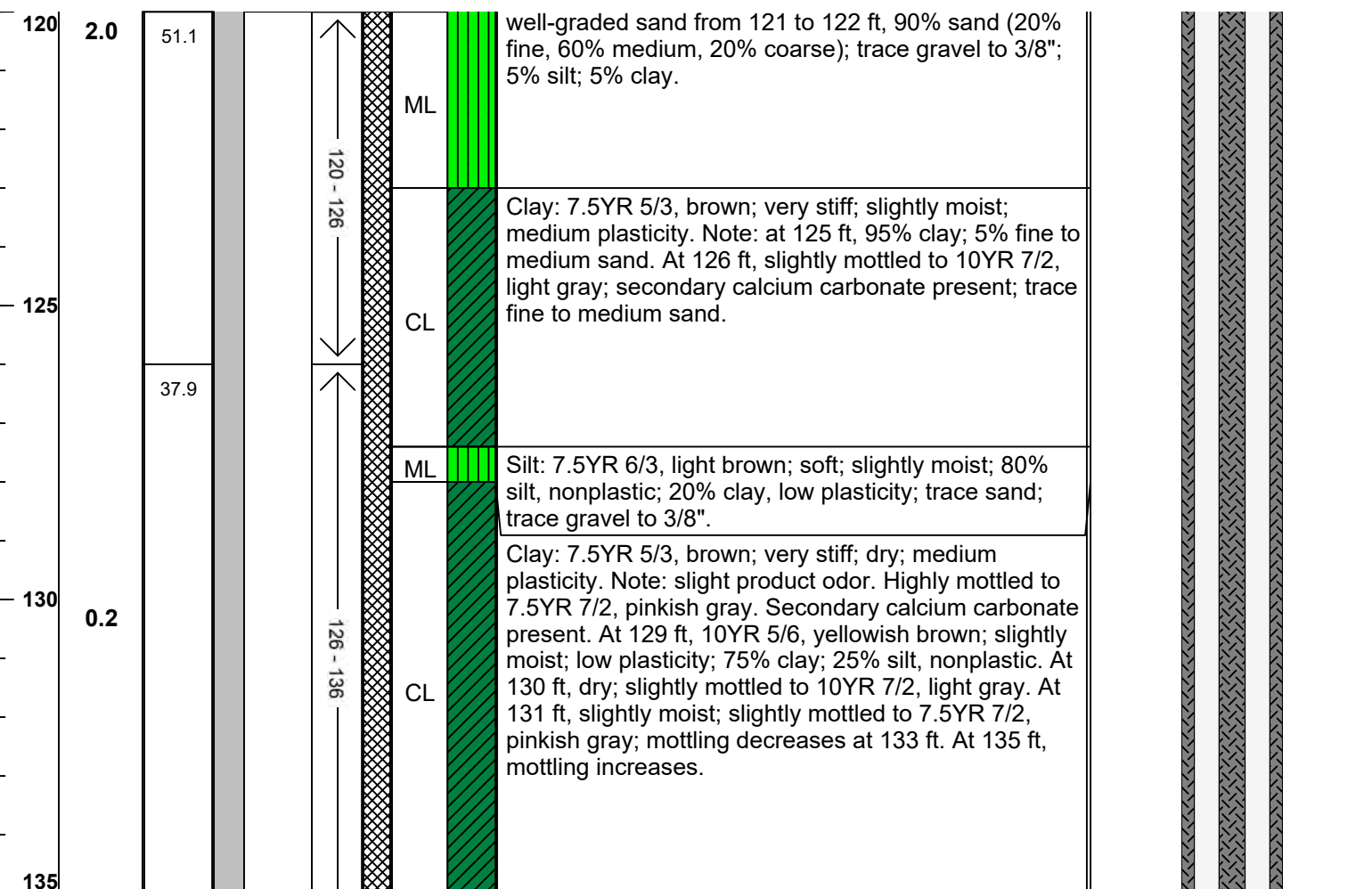
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
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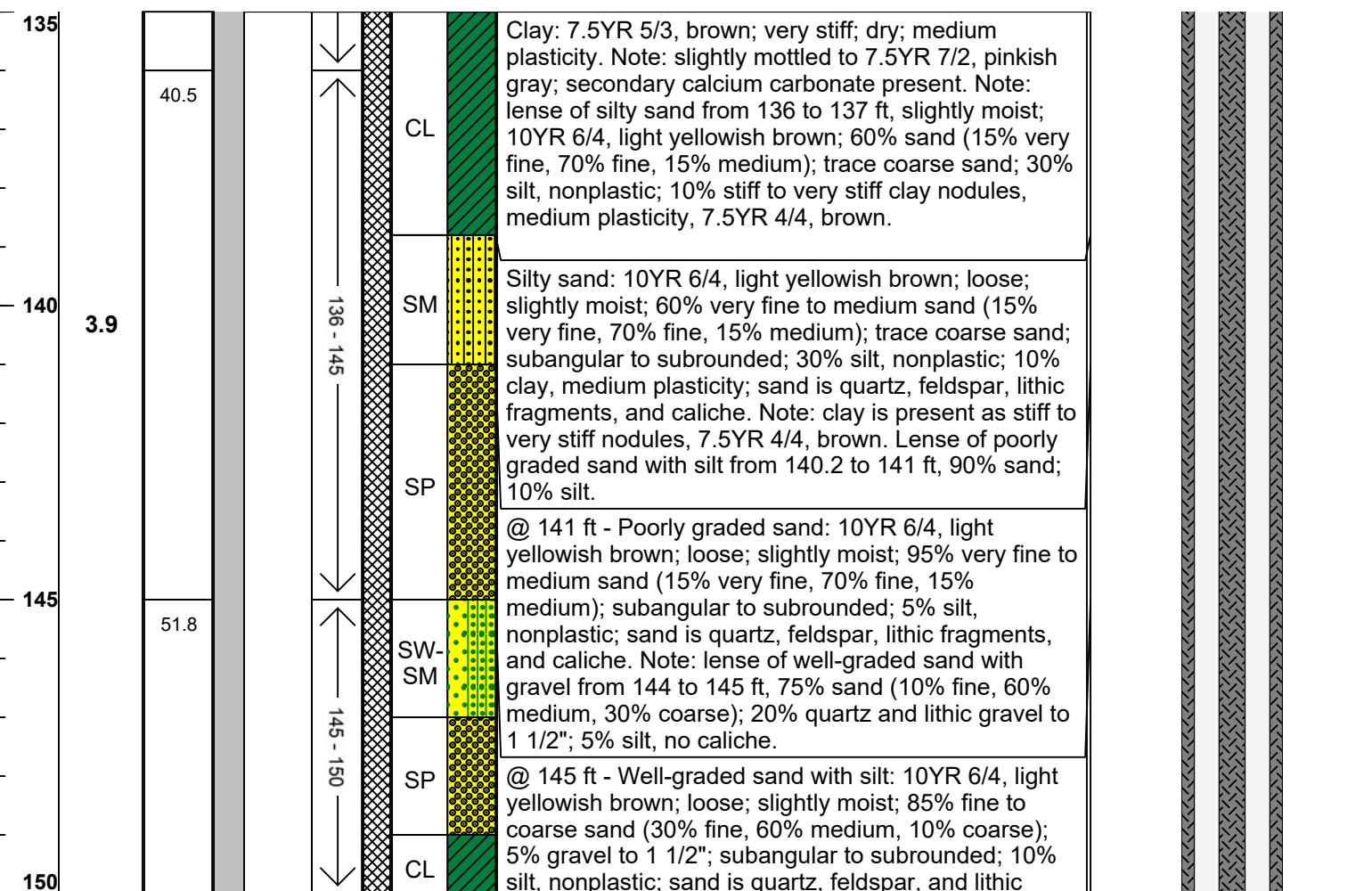
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

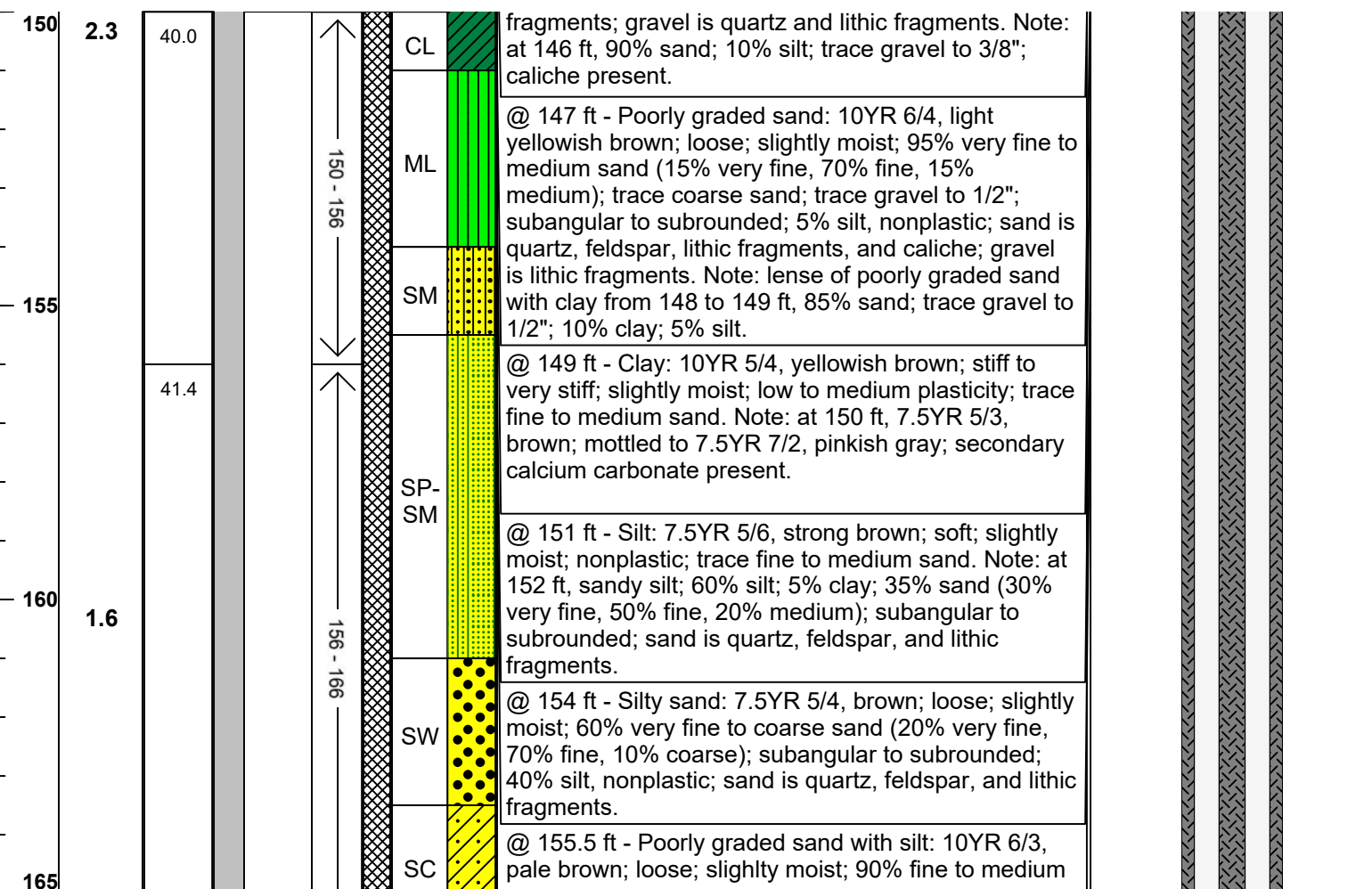
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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	Not Tested		None
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	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

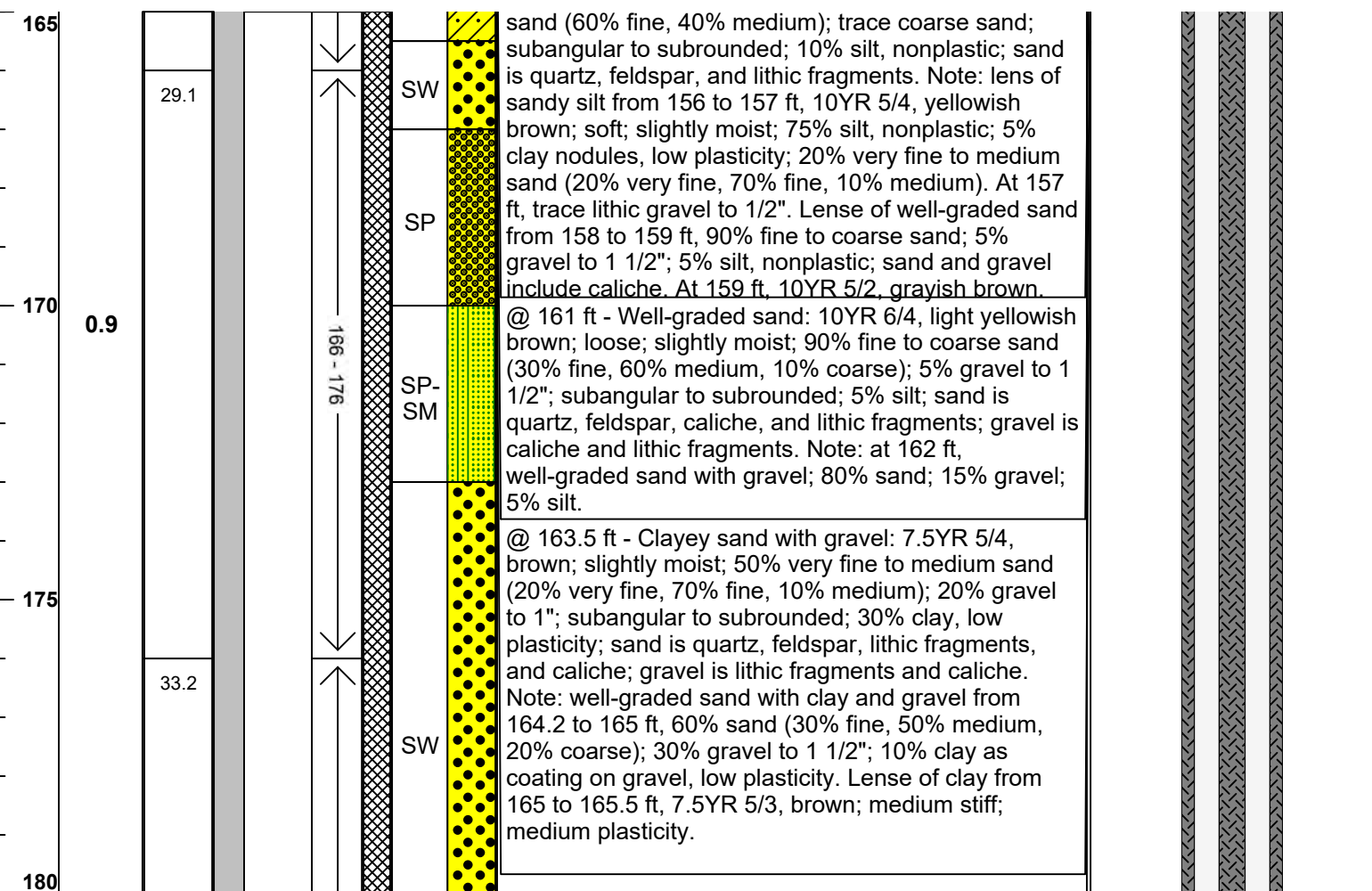
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

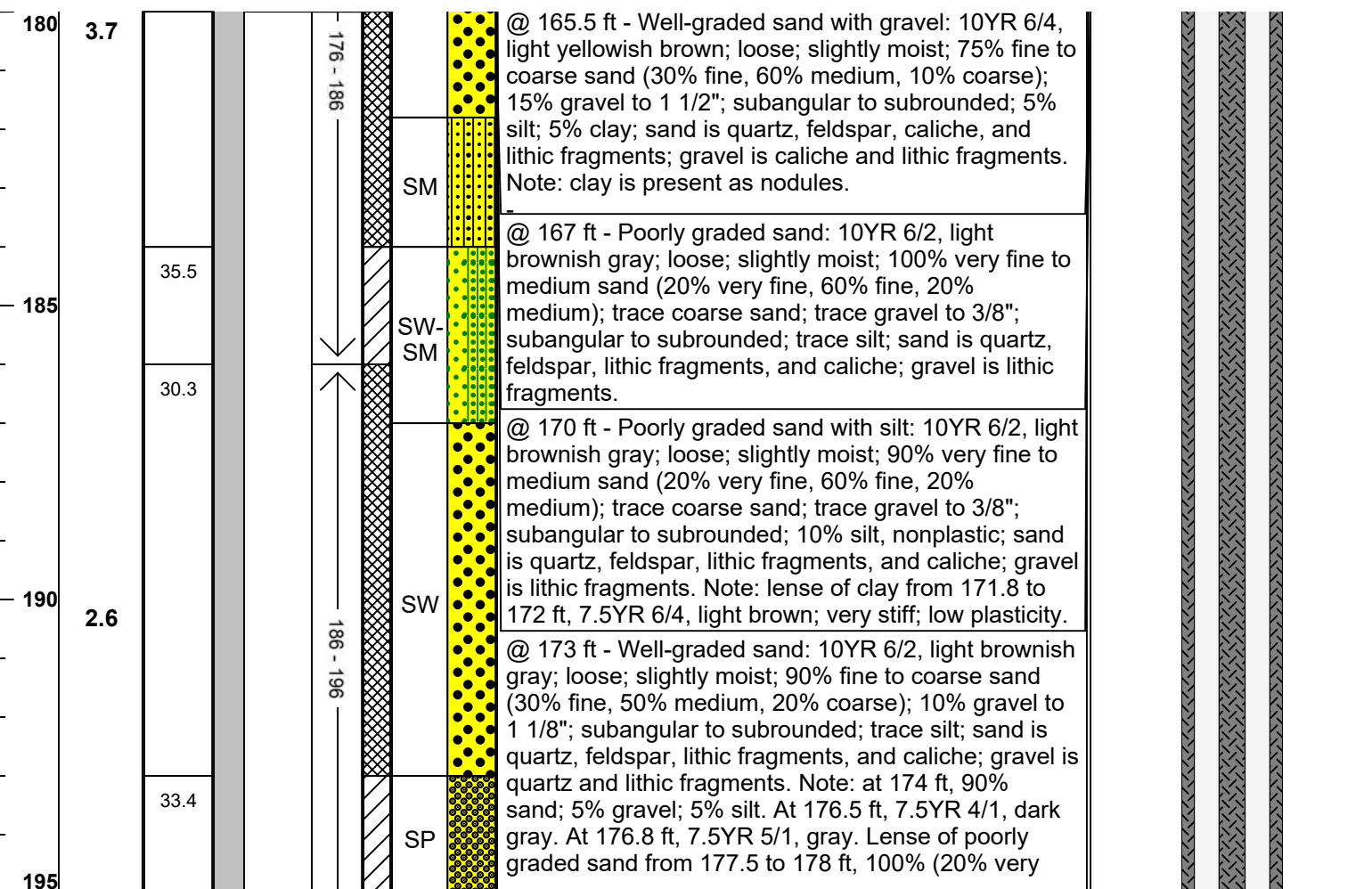
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

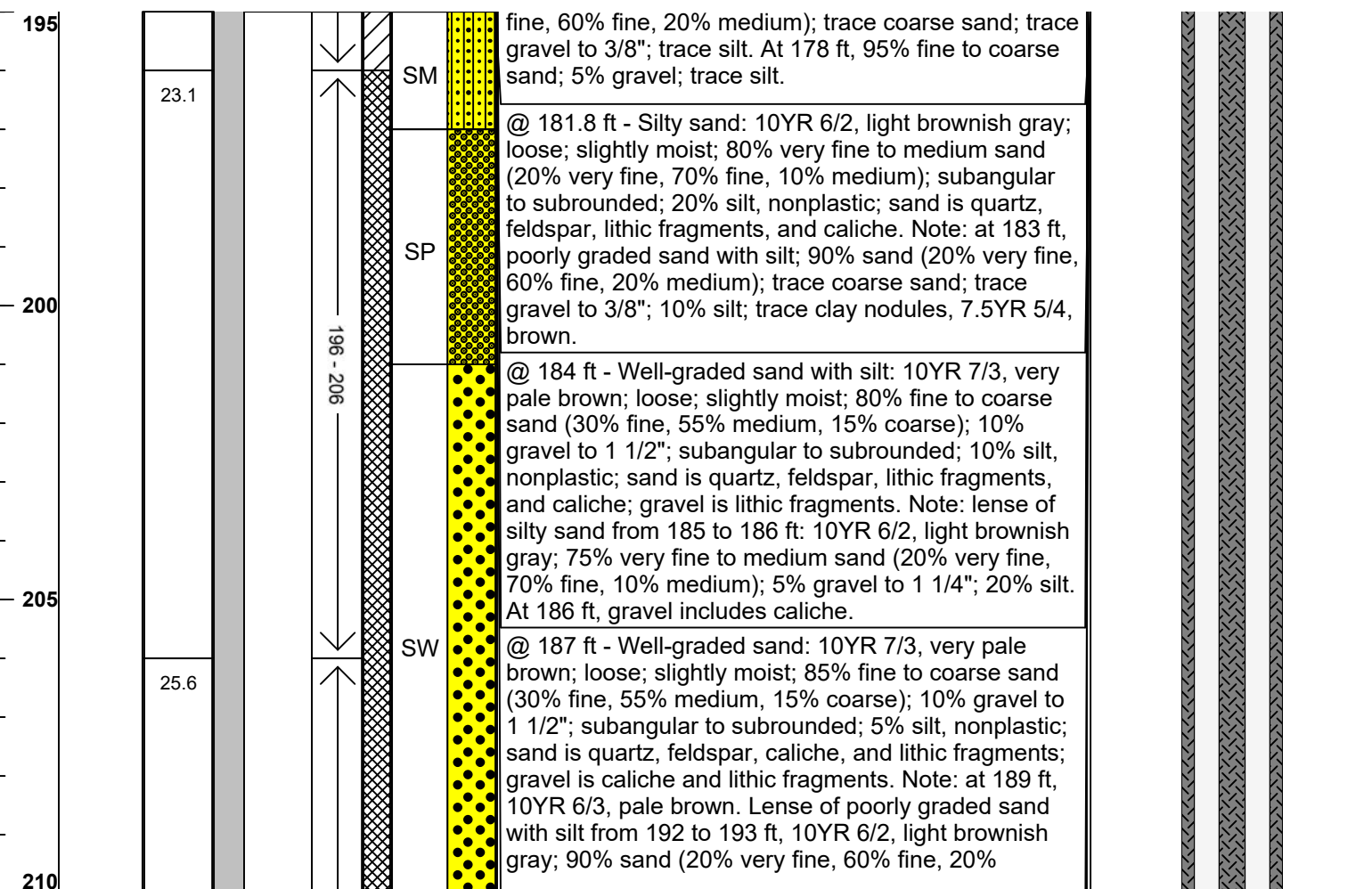
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

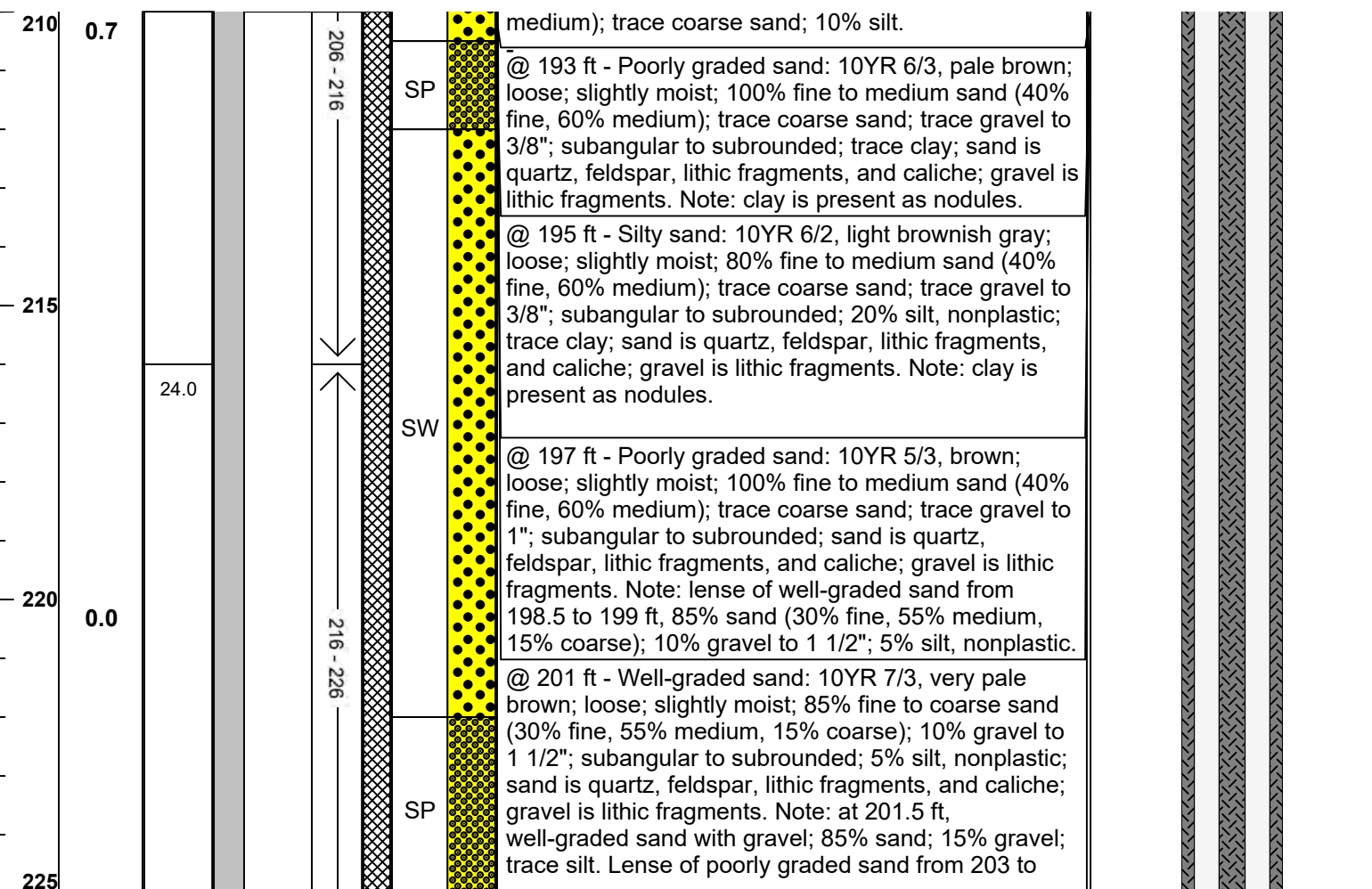
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

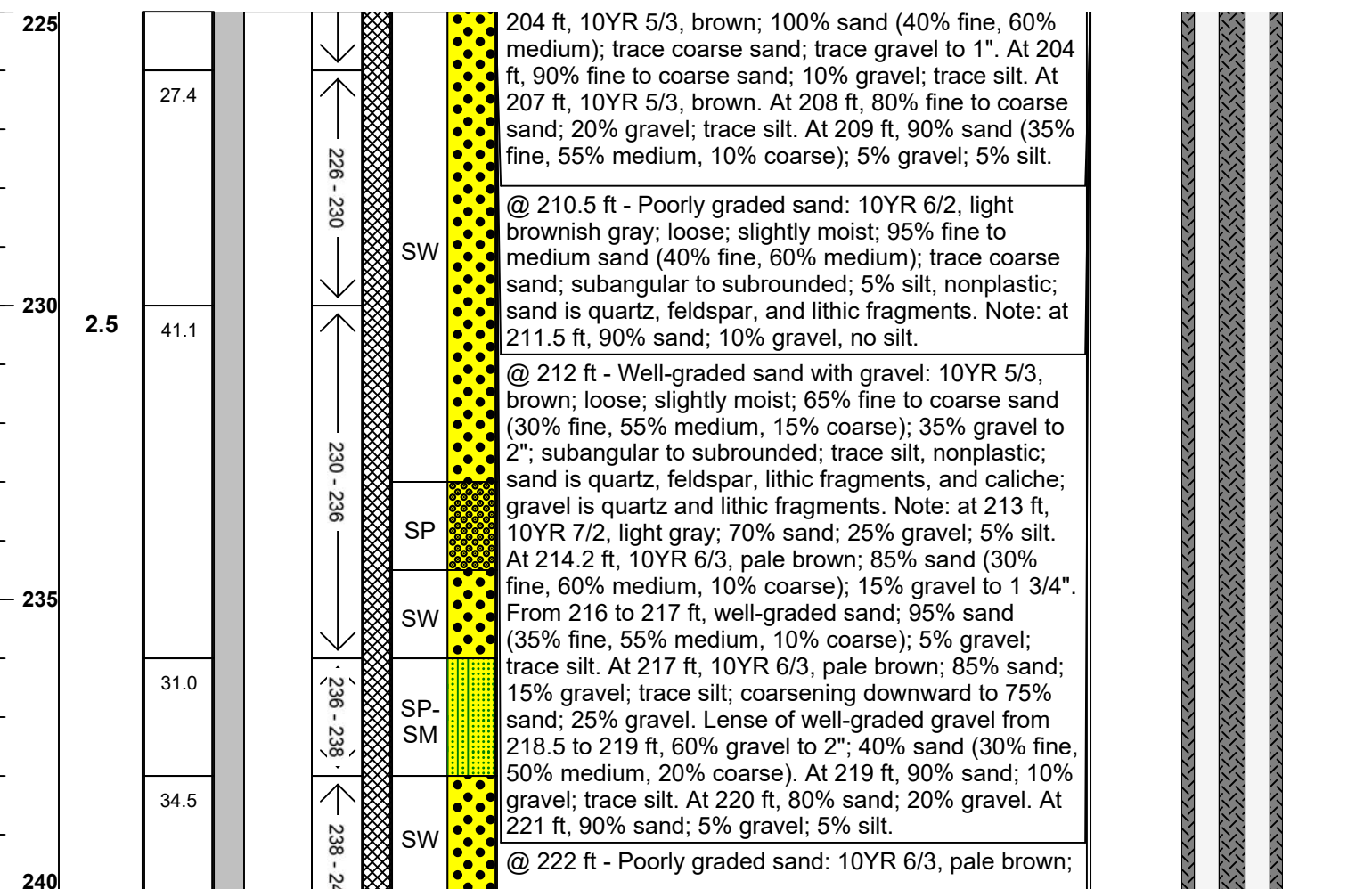
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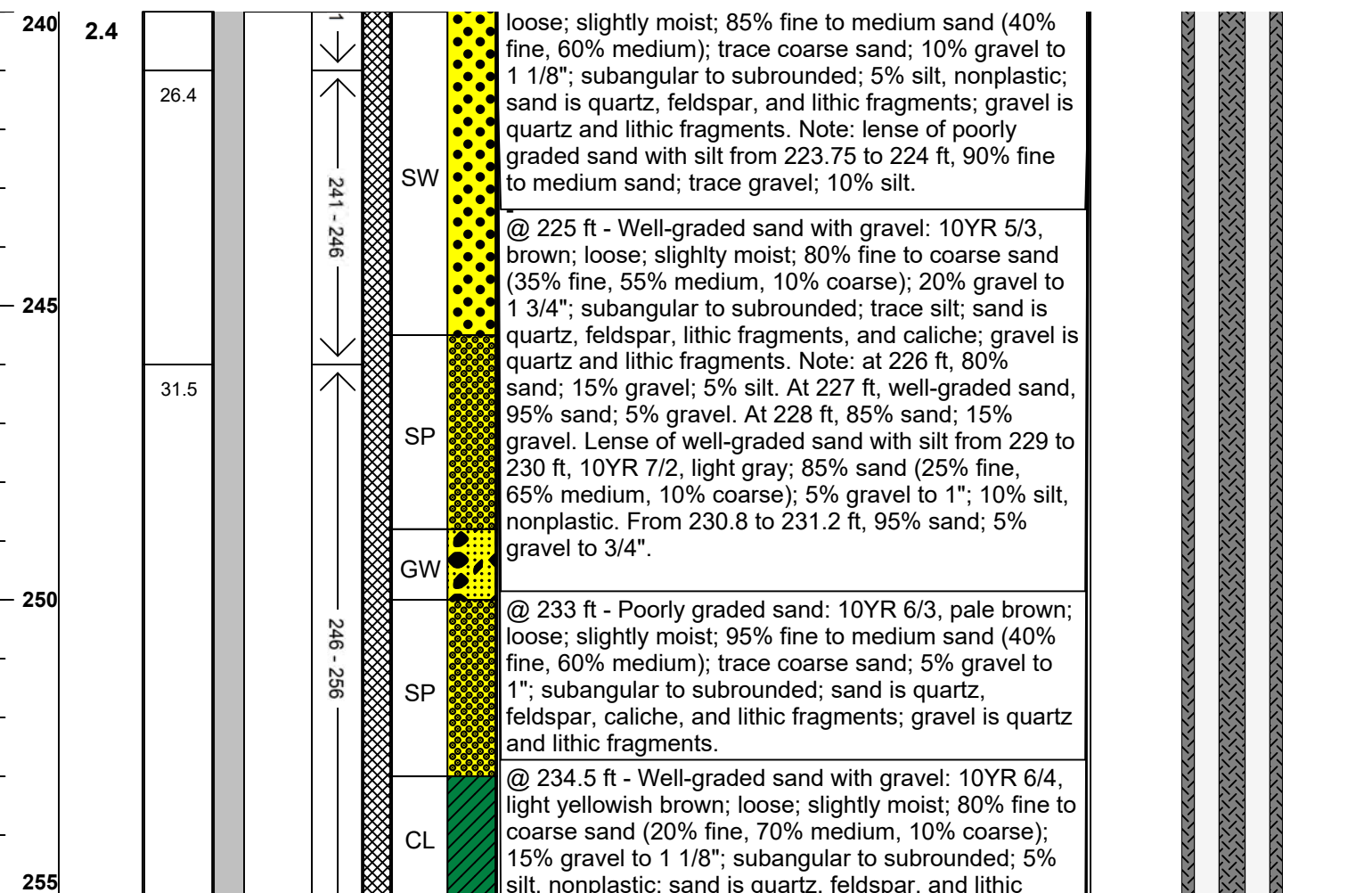
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Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

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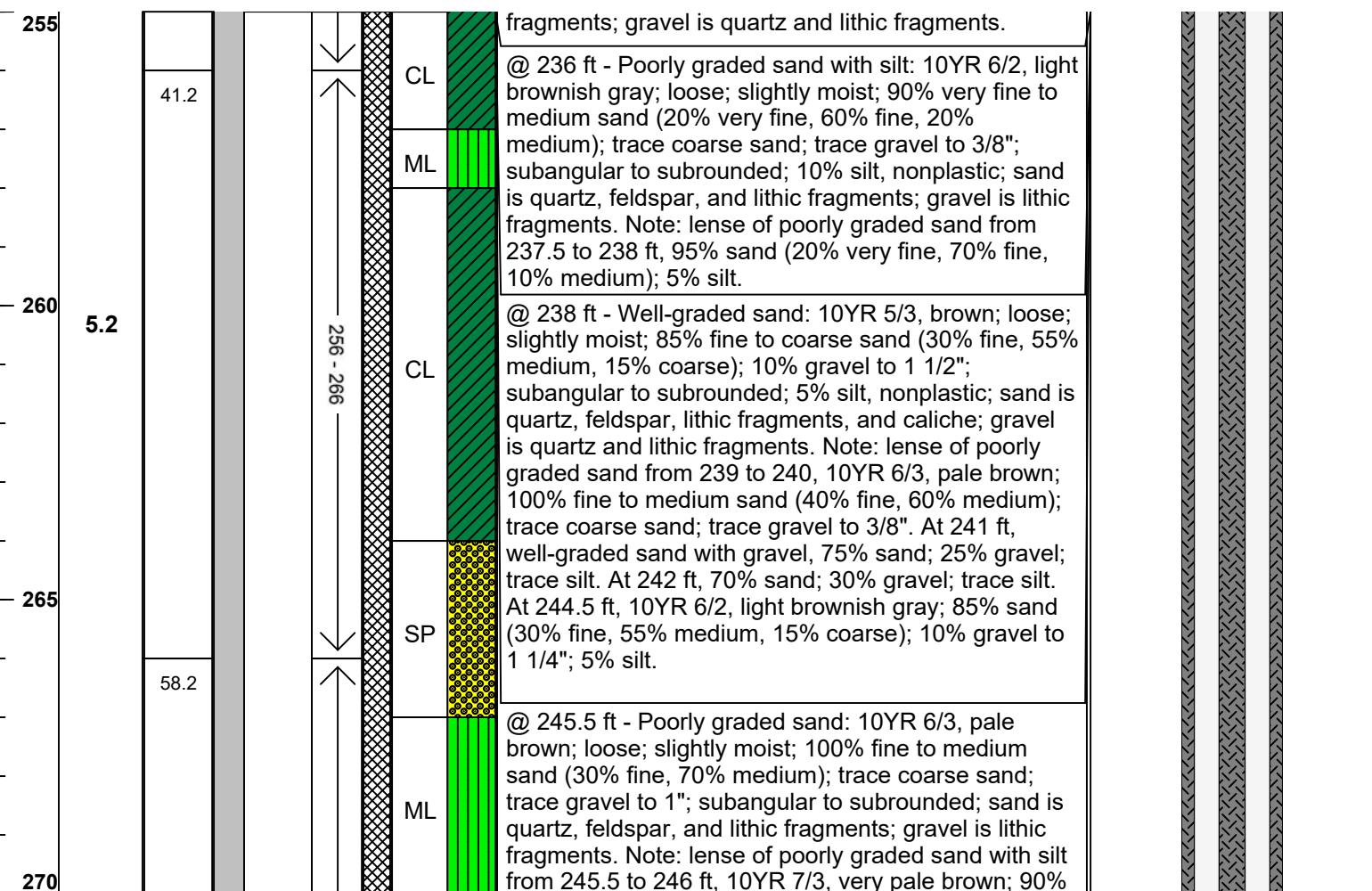
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None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

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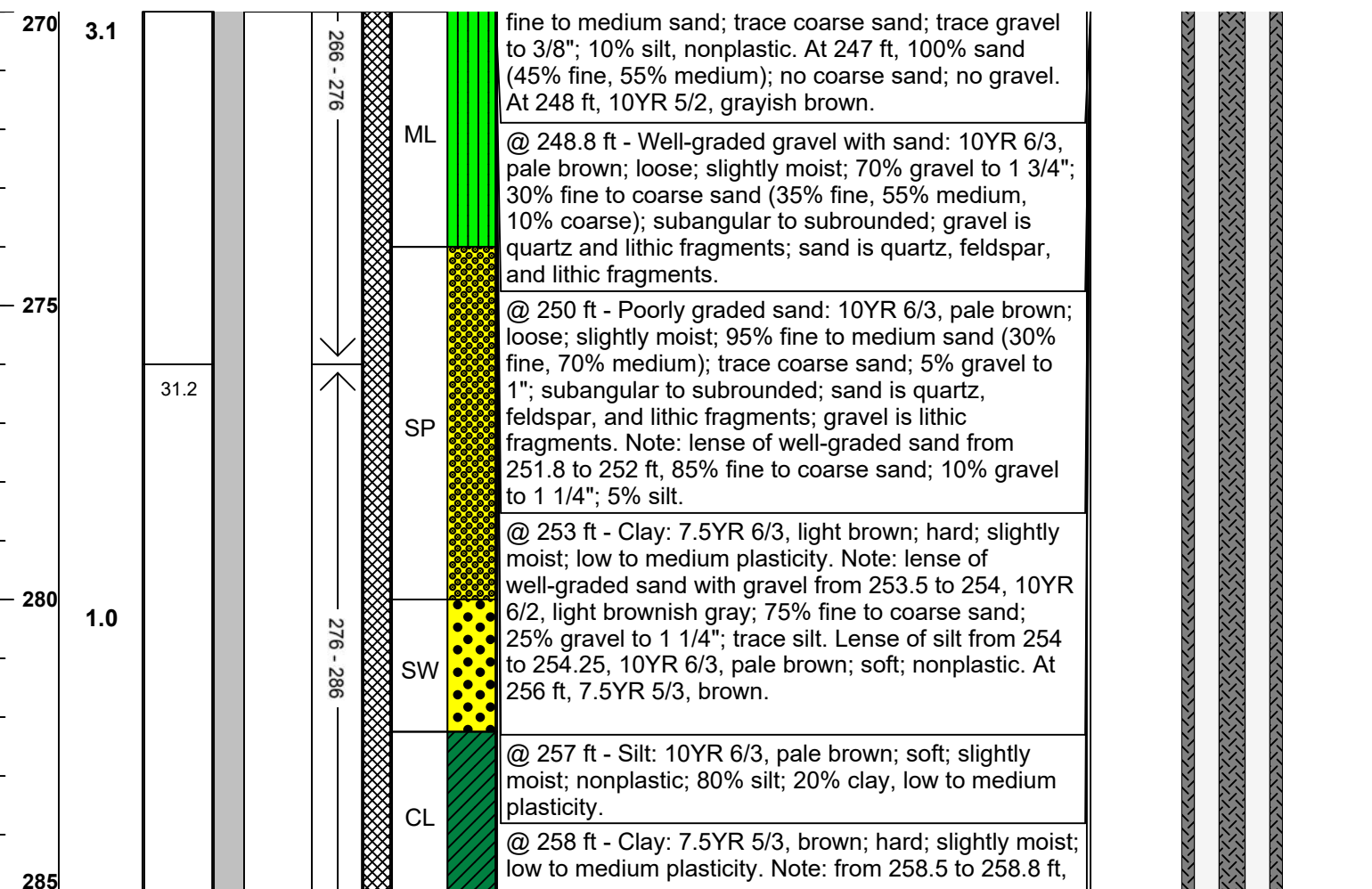
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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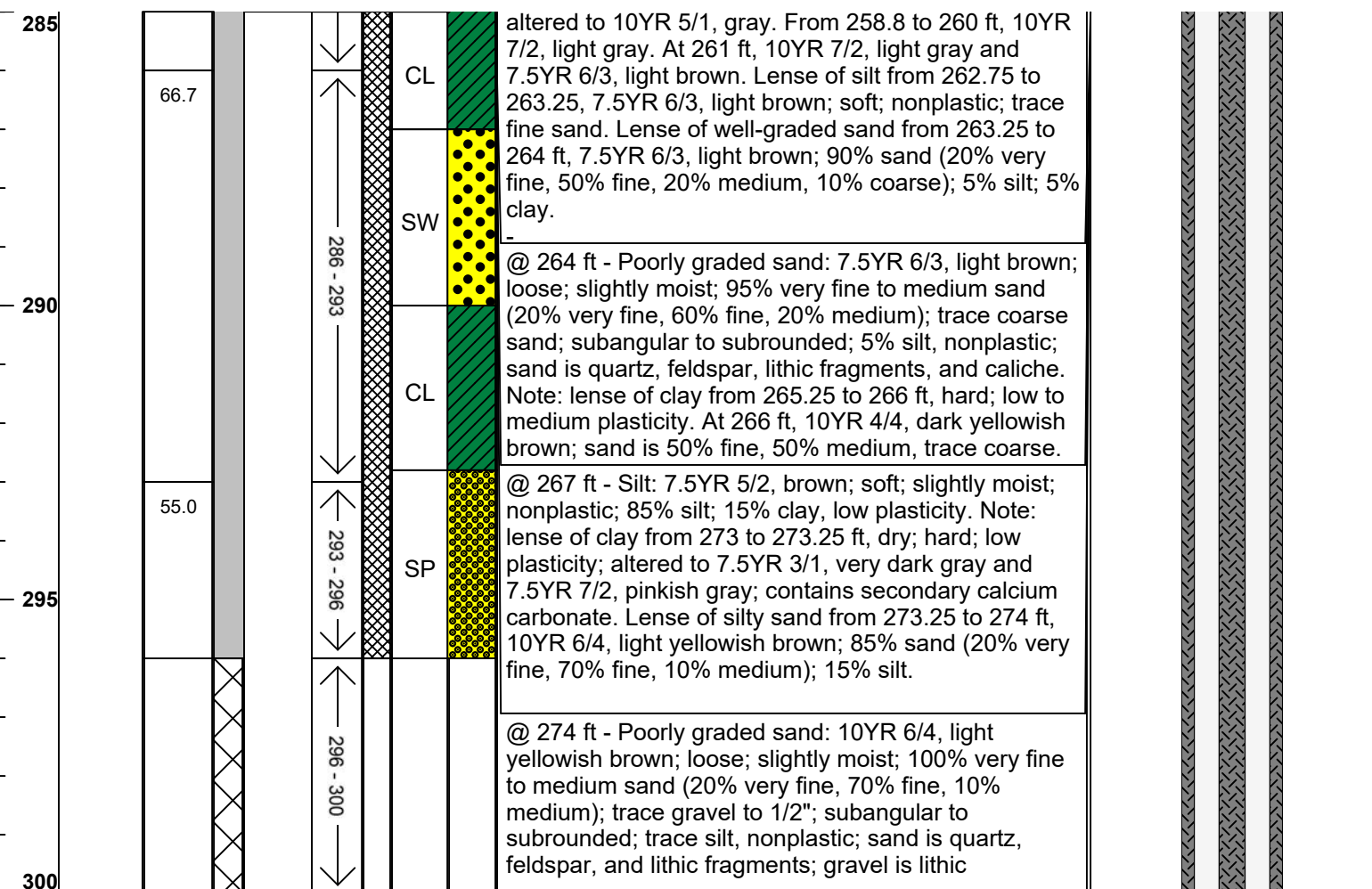
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Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

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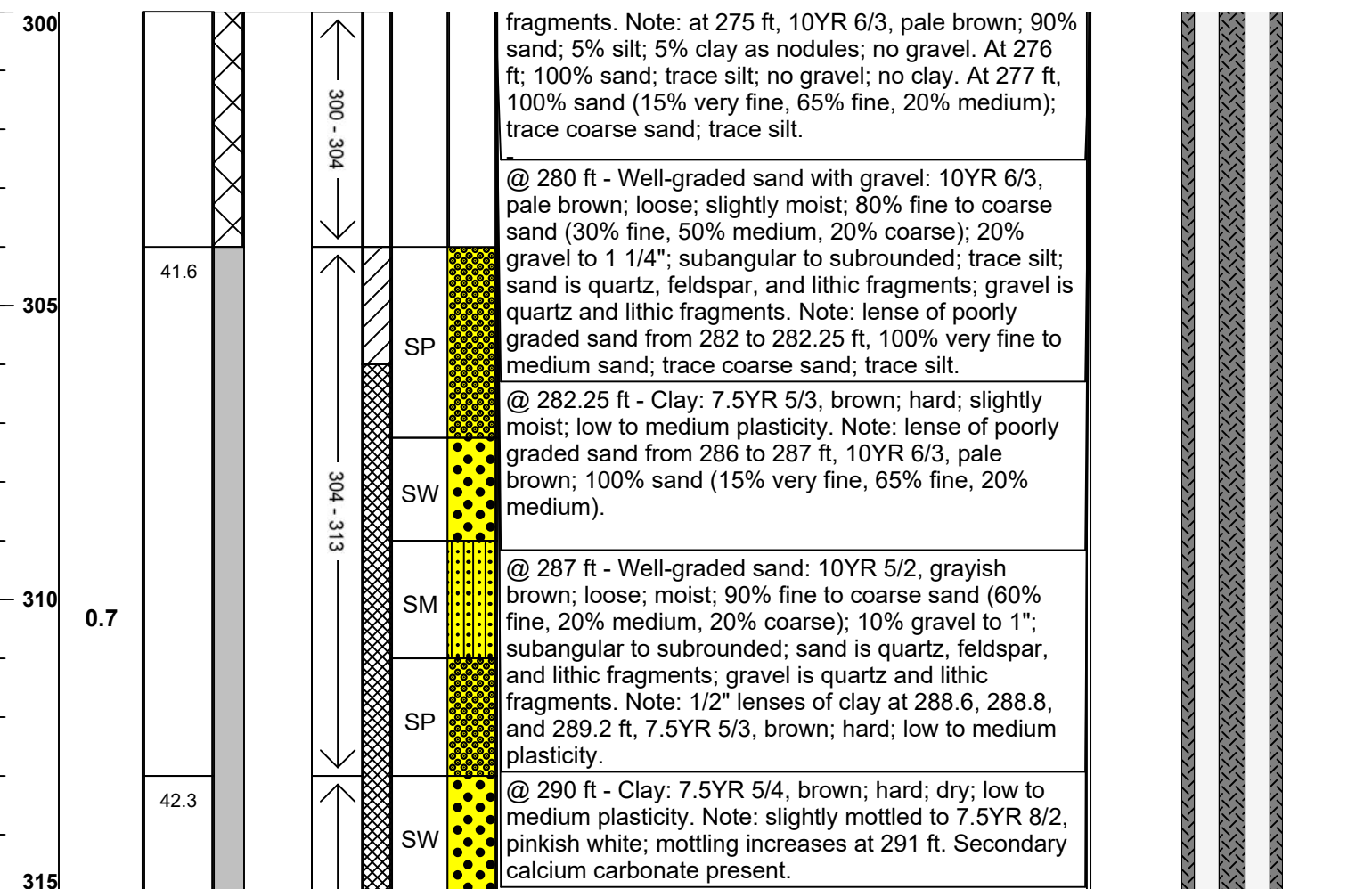
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Interval Fluoresced

Core Recovery



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Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

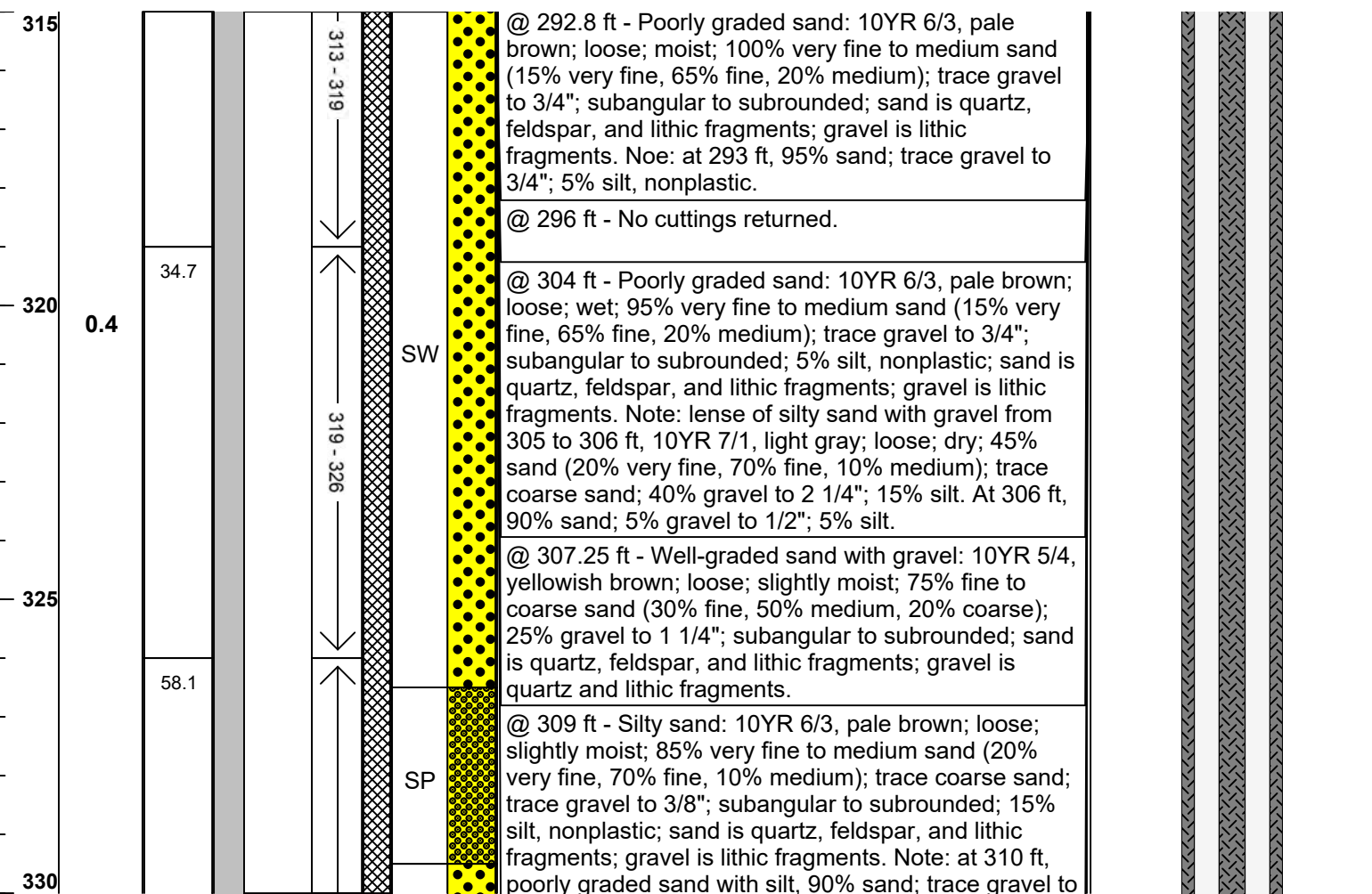
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

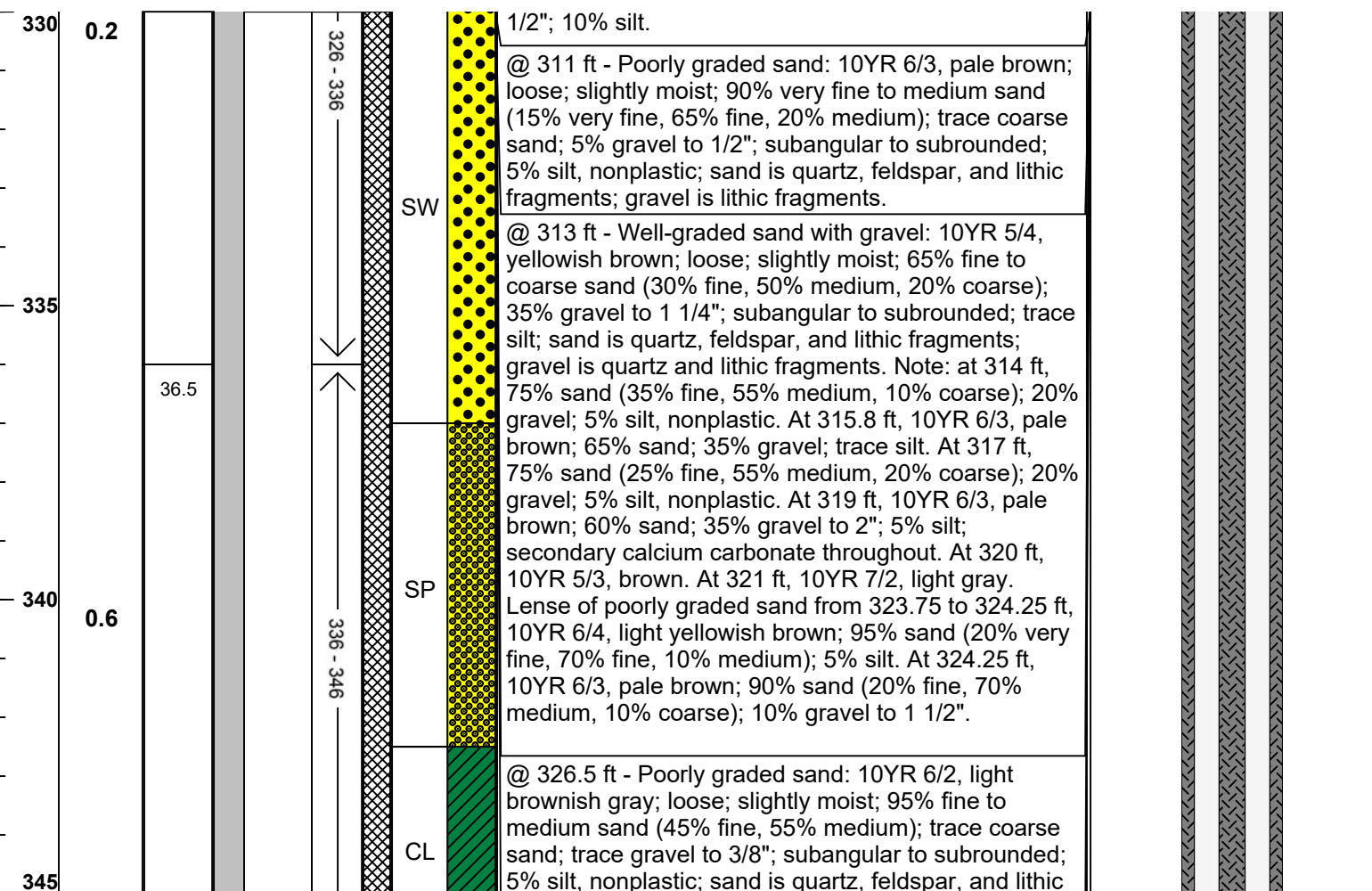
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

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(2) Contingency Well

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DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

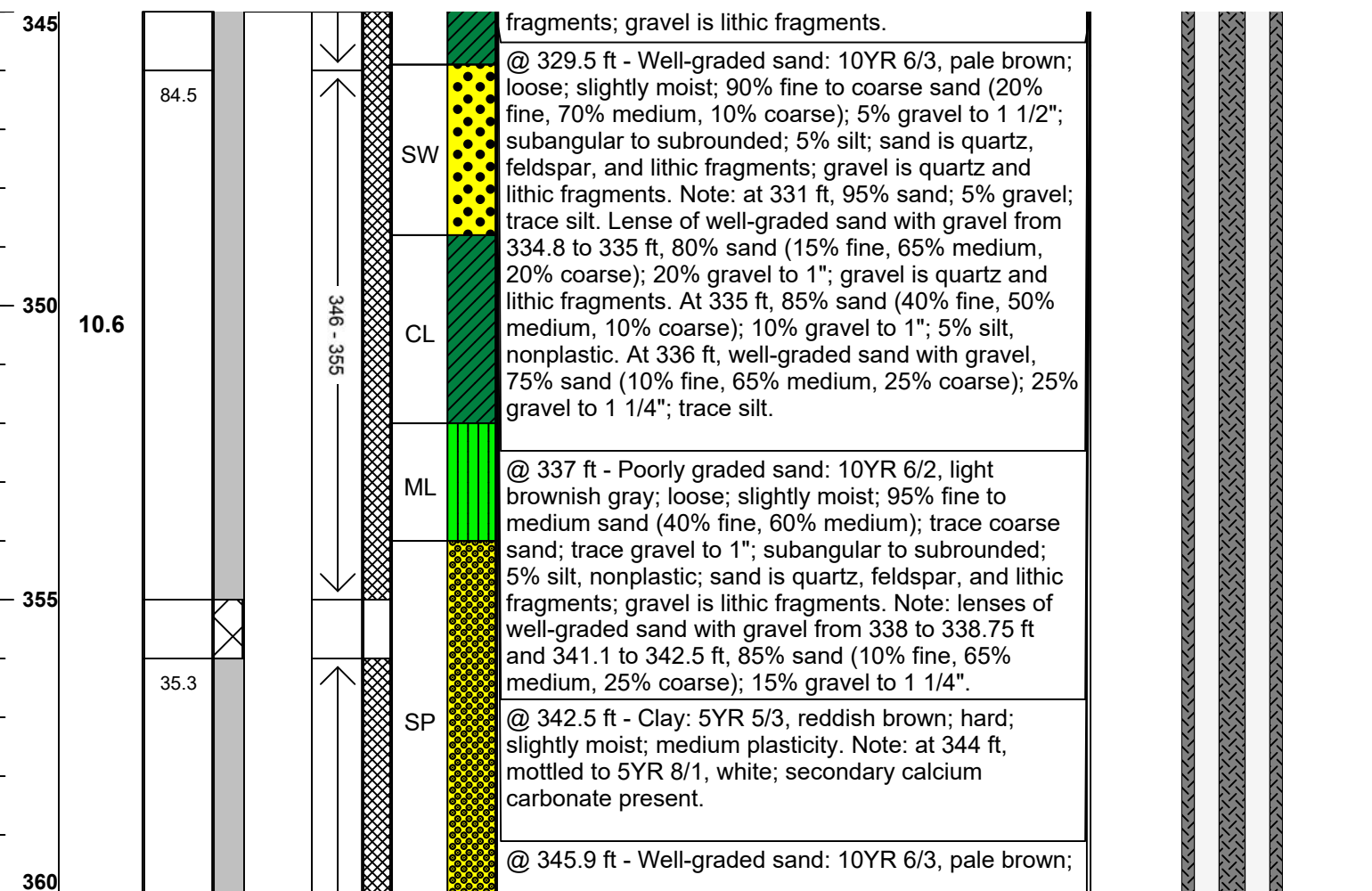
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

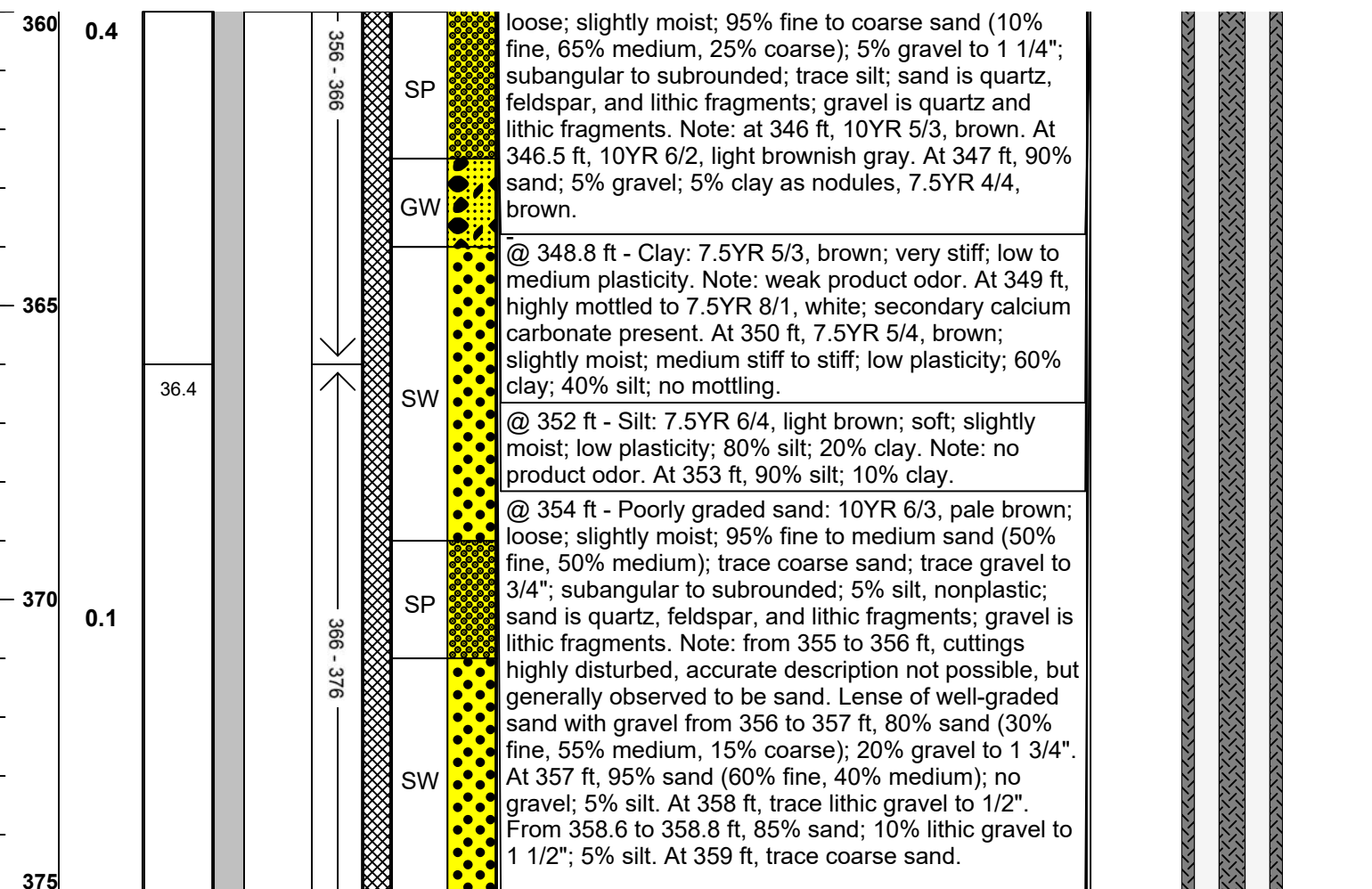
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

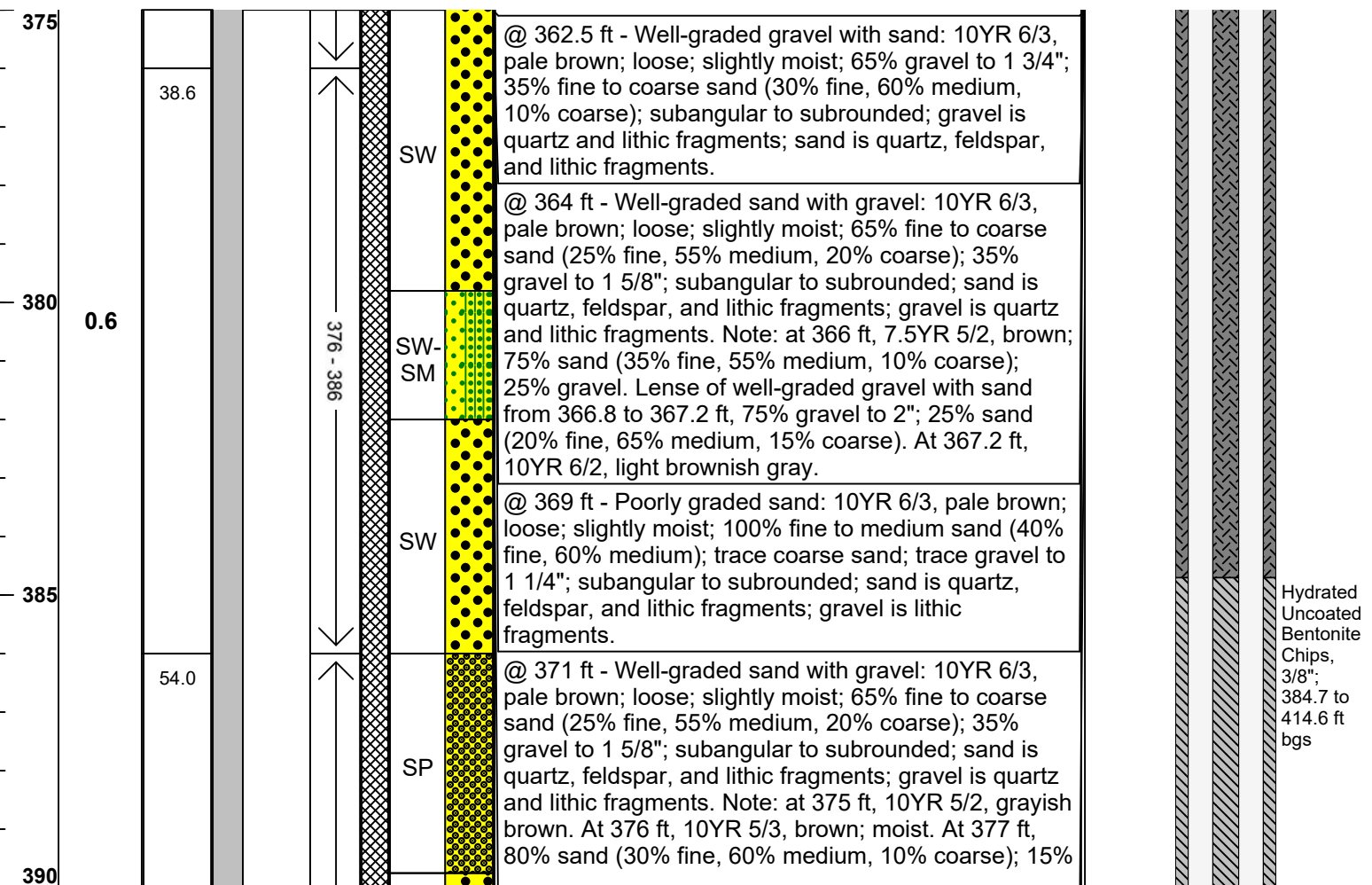
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

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NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

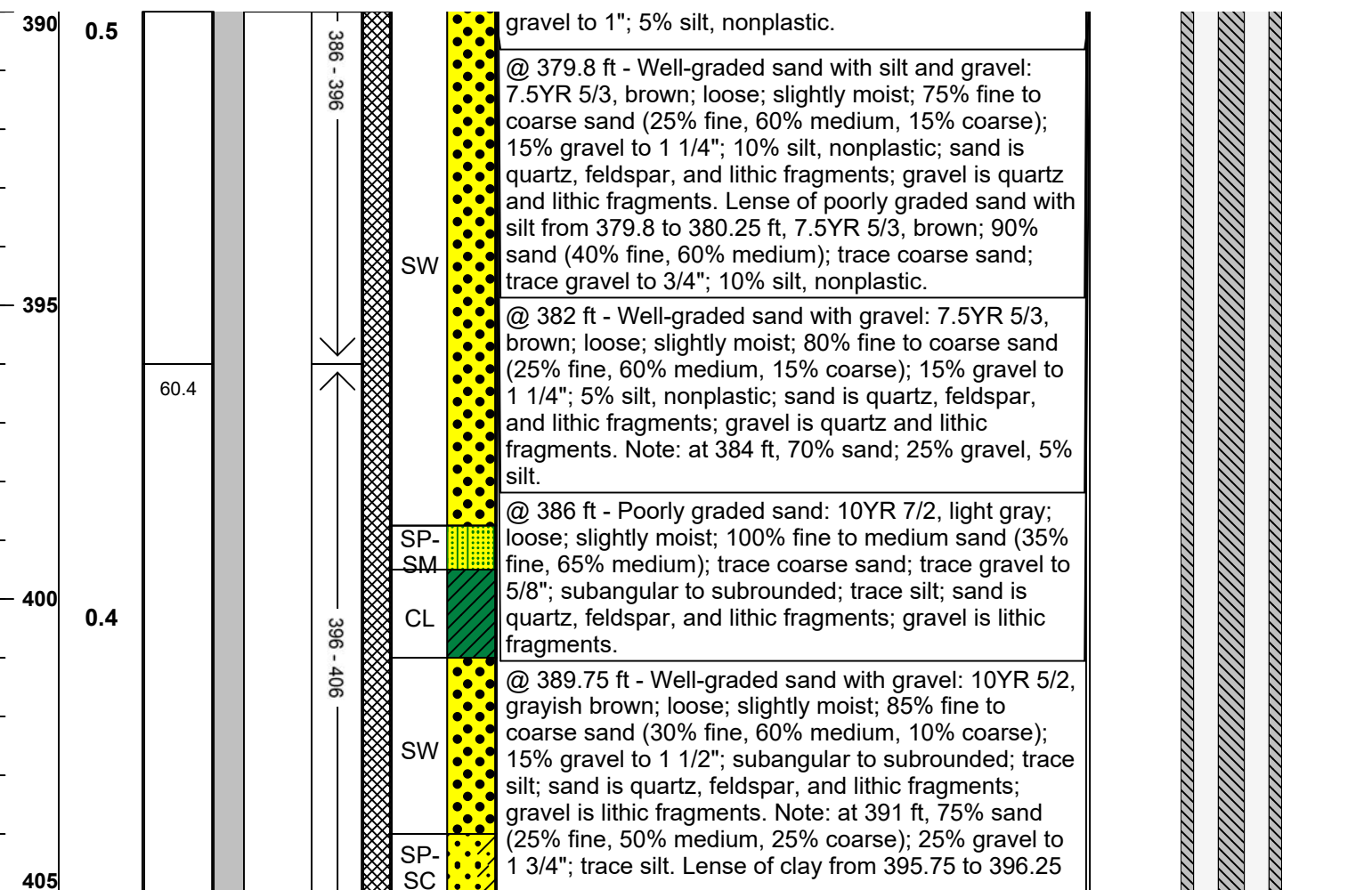
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

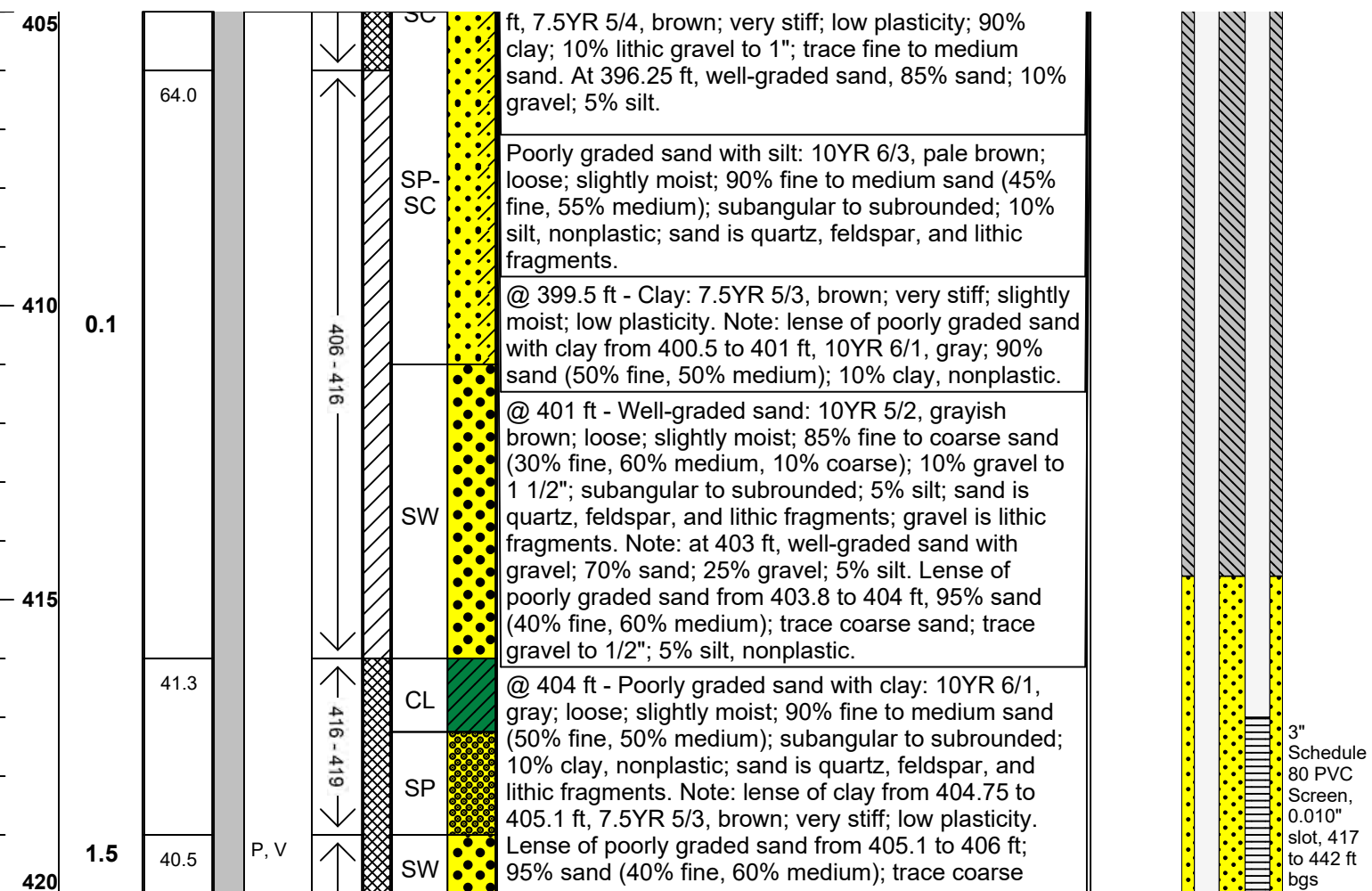
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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ft = feet

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

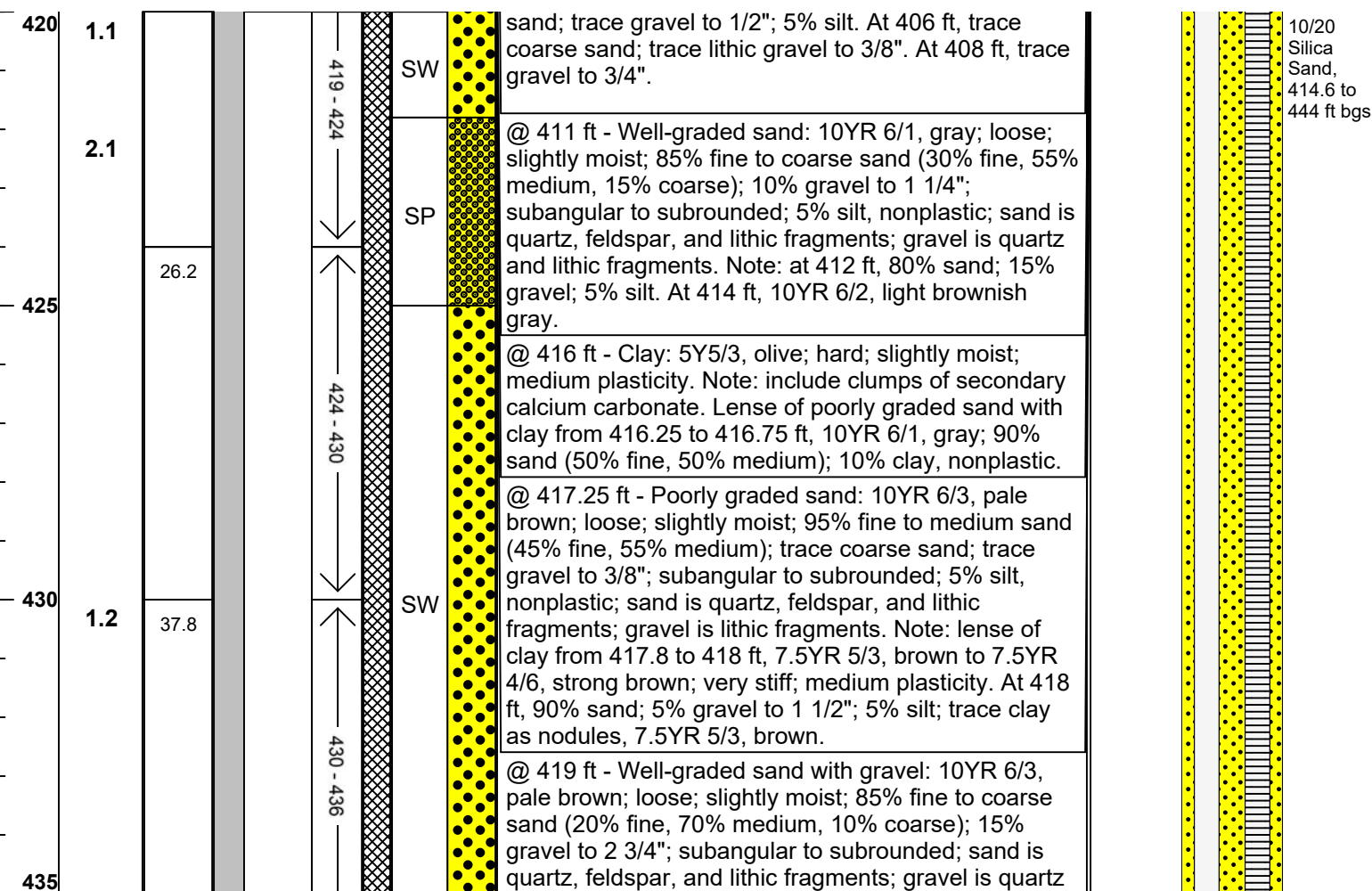
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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(1) (2)



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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

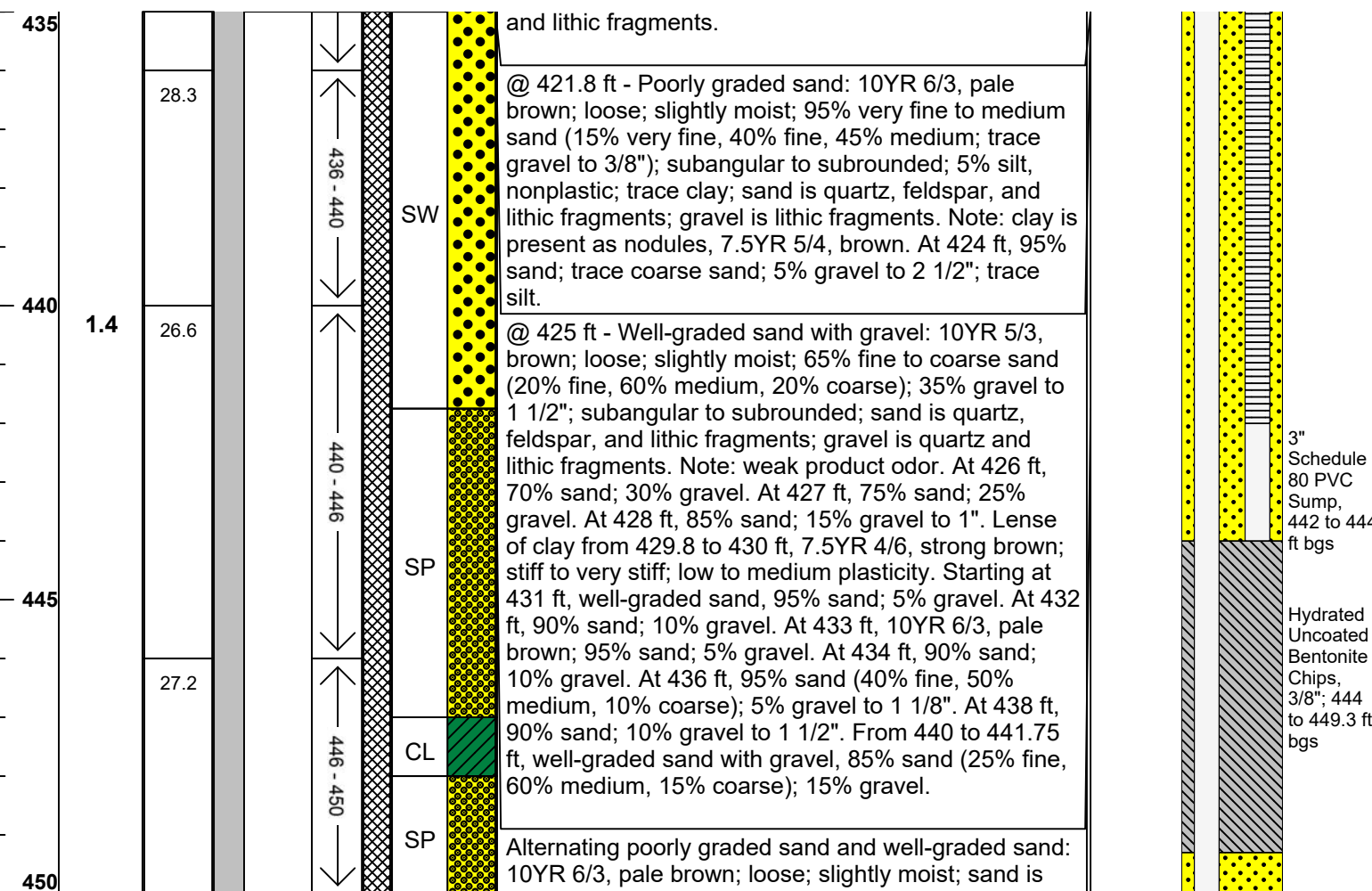
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

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UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

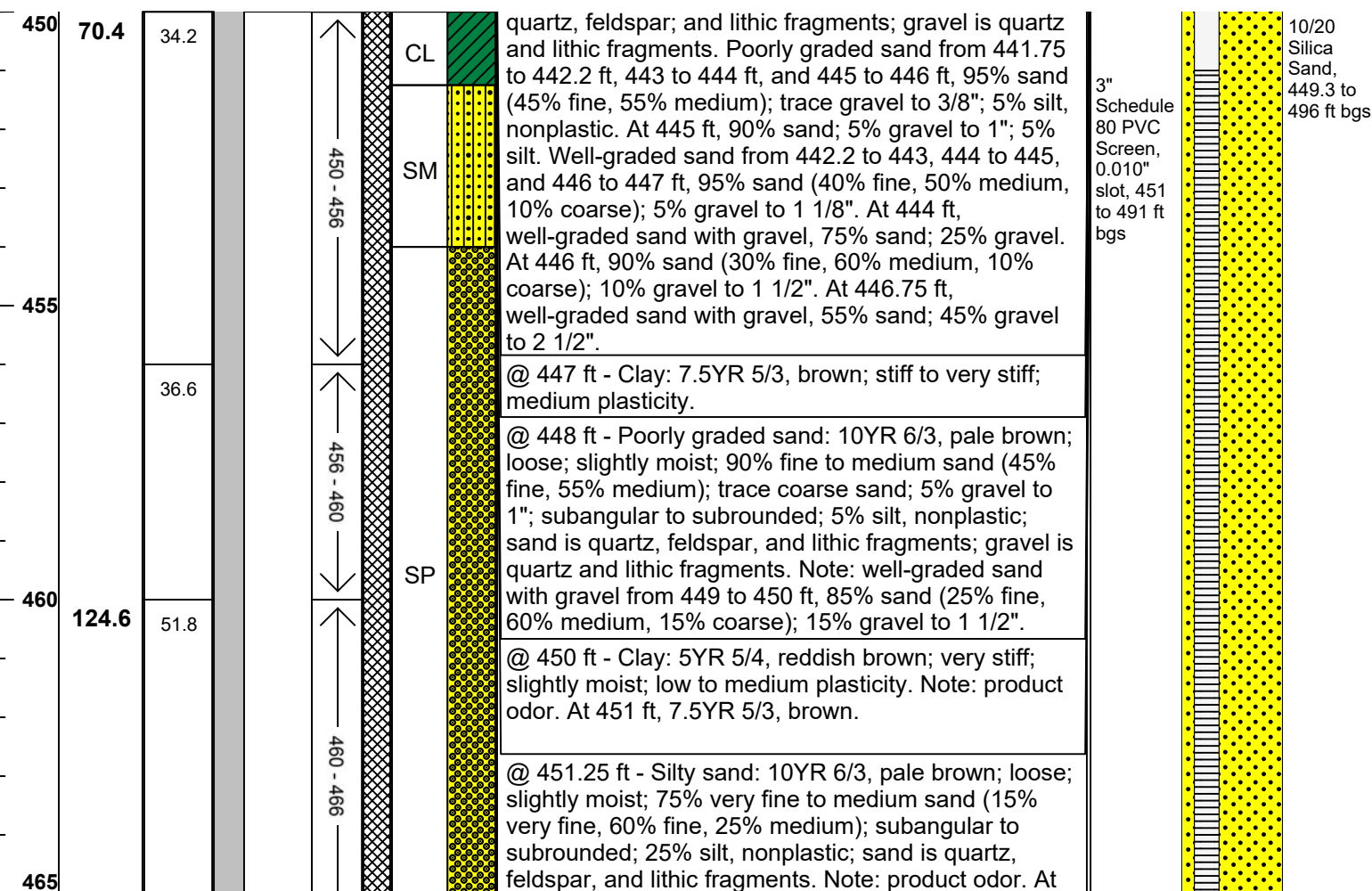
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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DTW = depth to water

ft = feet

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

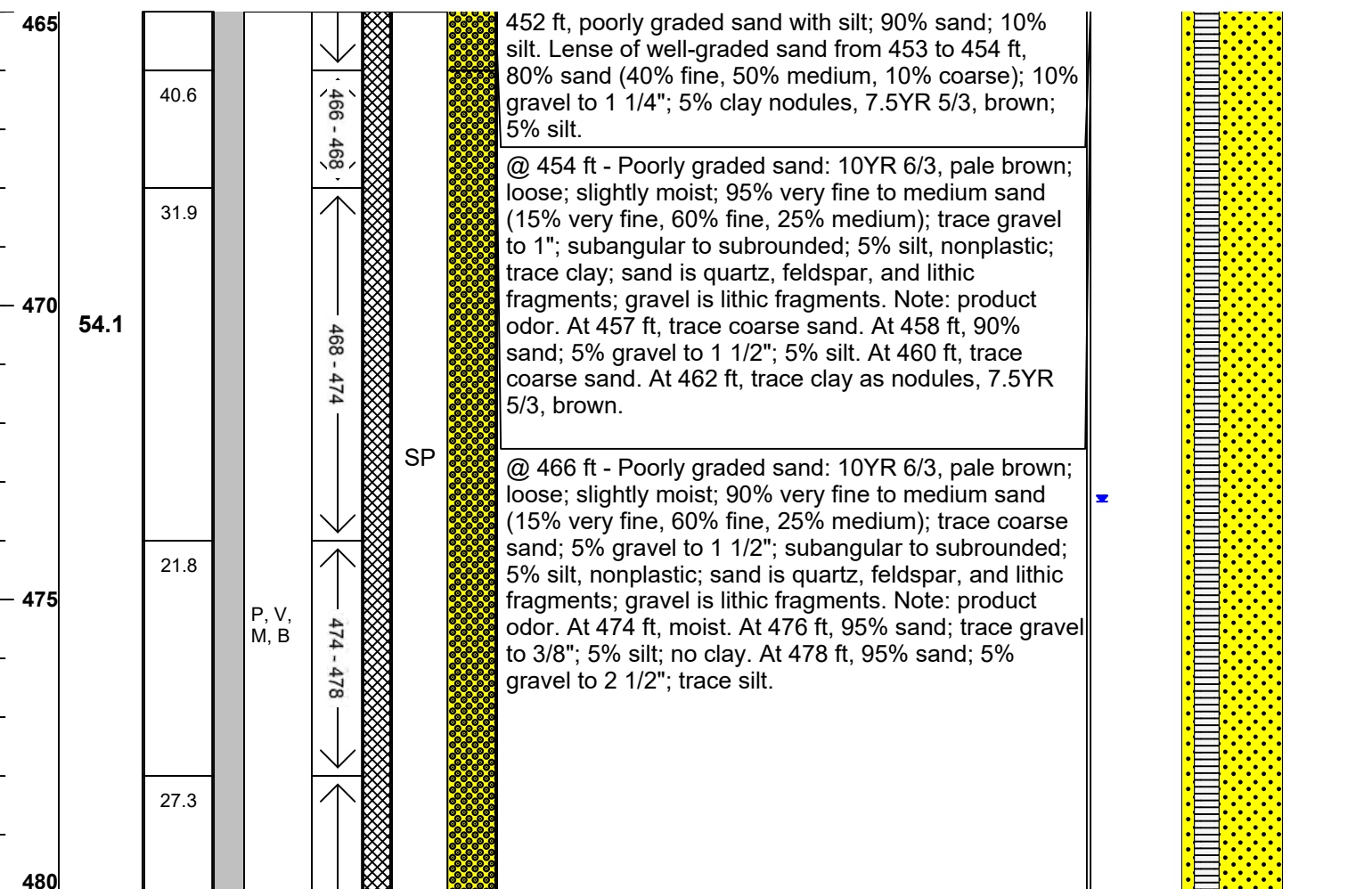
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



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bgs = below ground surface

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ft = feet

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

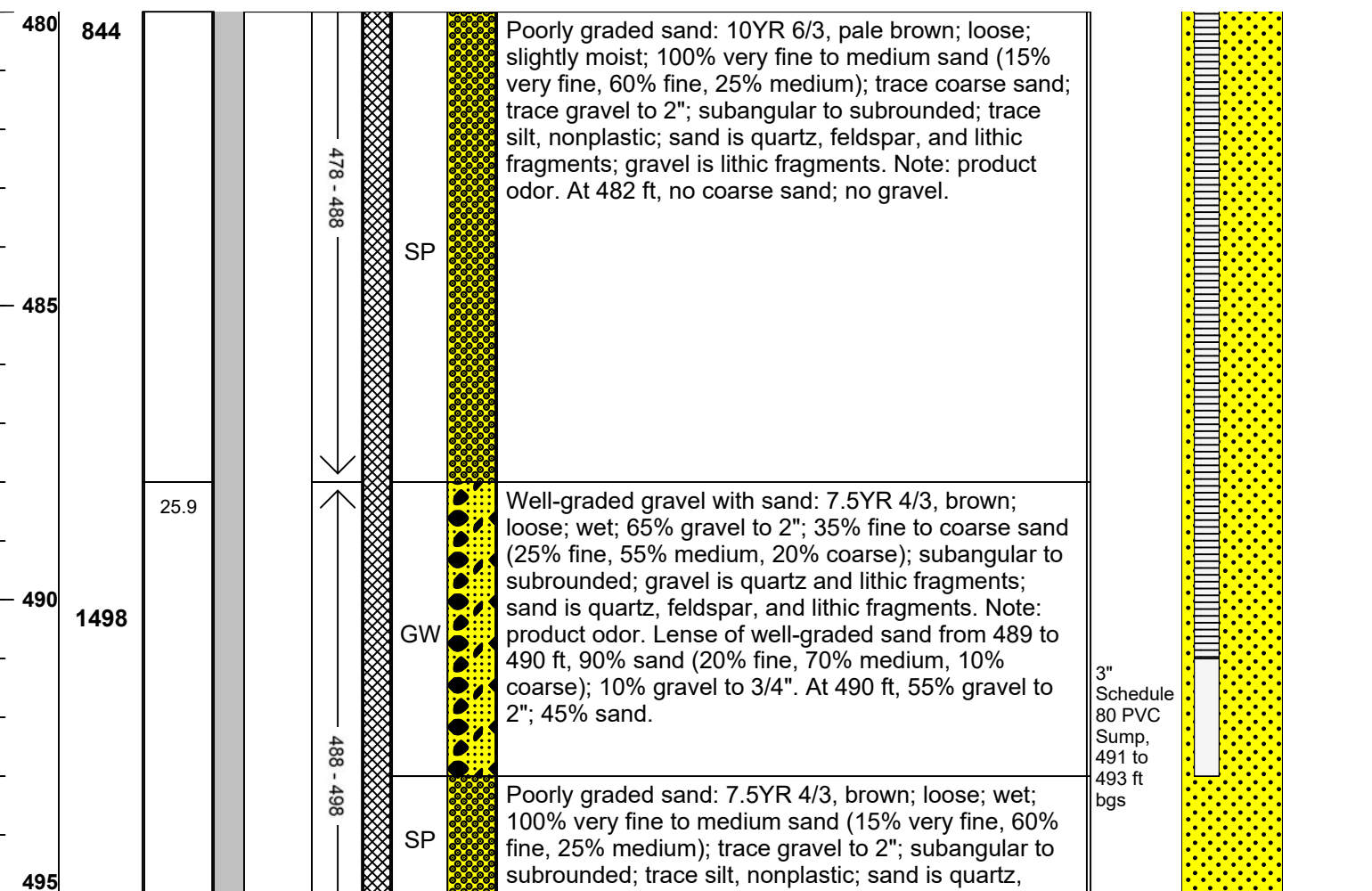
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

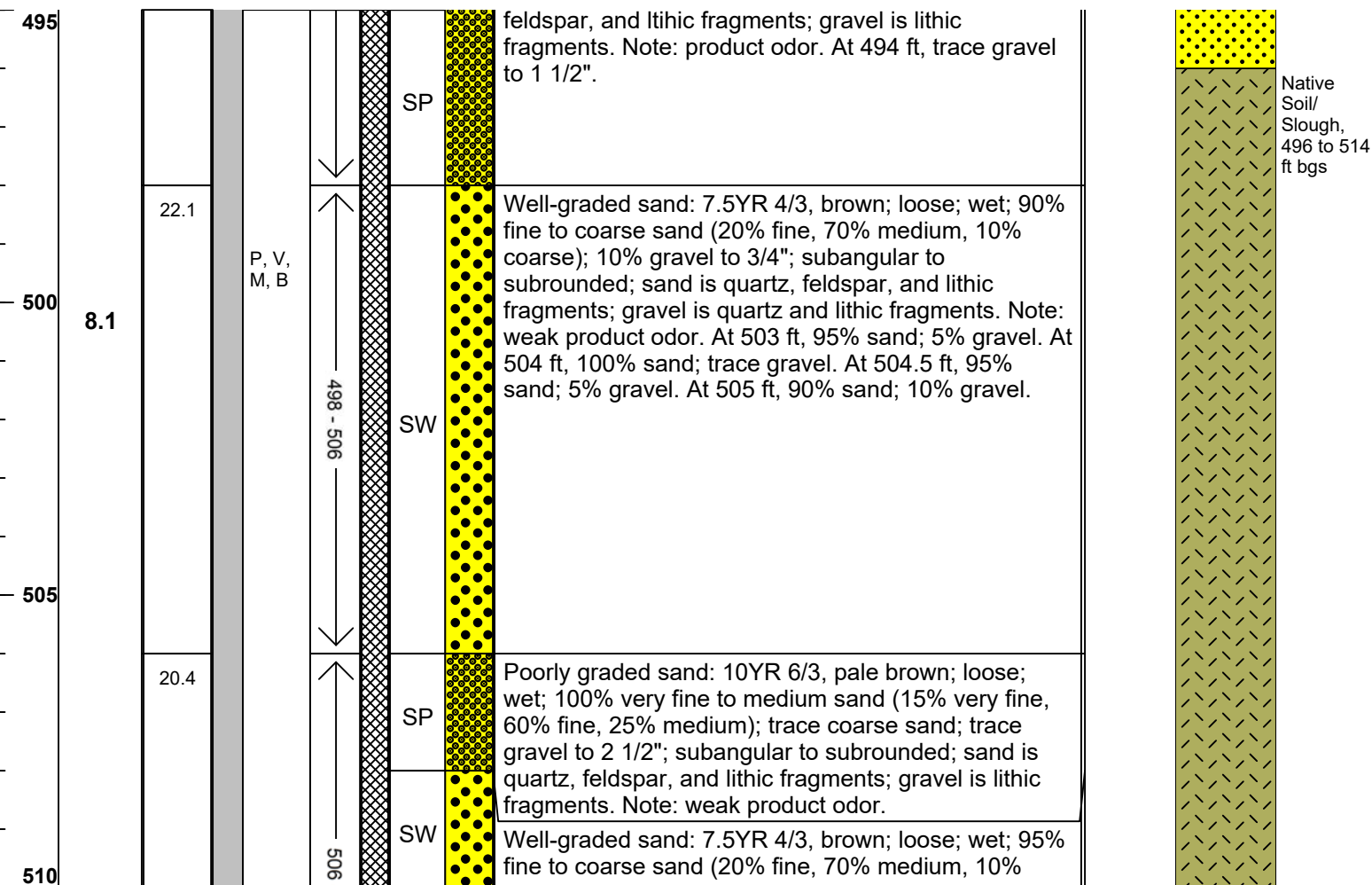
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

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- (2) Contingency Well
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- NA = Not Applicable
- bgs = below ground surface
- DTW = depth to water
- ft = feet
- ID = inner diameter
- ppmv = parts per million by volume
- USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/4/2019**

Completion Date: **3/1/2019**

WELL LOG

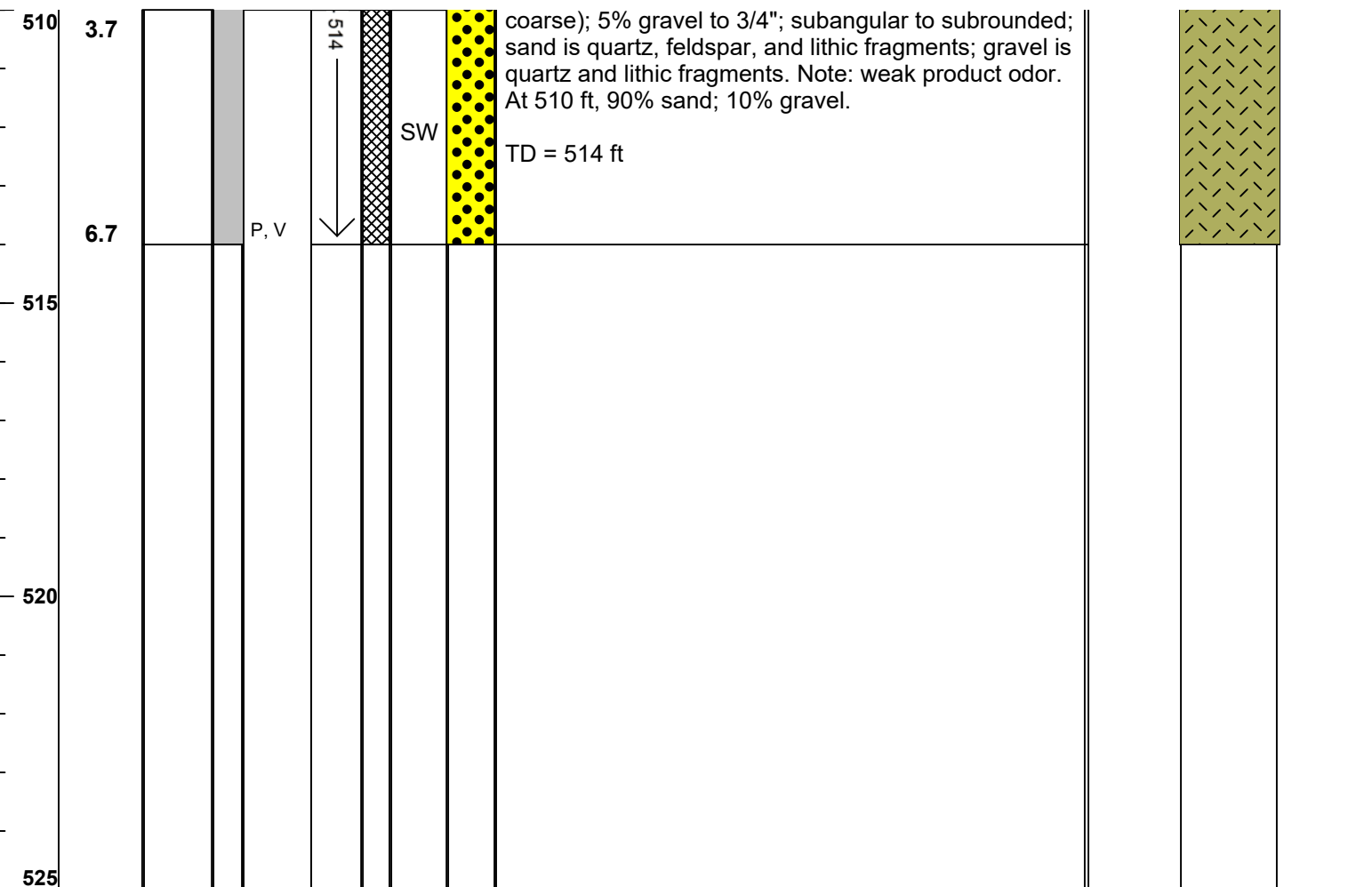
Well ID: **KAFB-106S8**

Page: **35 of 35**

Drilling Company: Cascade	Boring Depth (ft): 514 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.67	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

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∇ = Depth to water after completion

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bgs = below ground surface

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ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

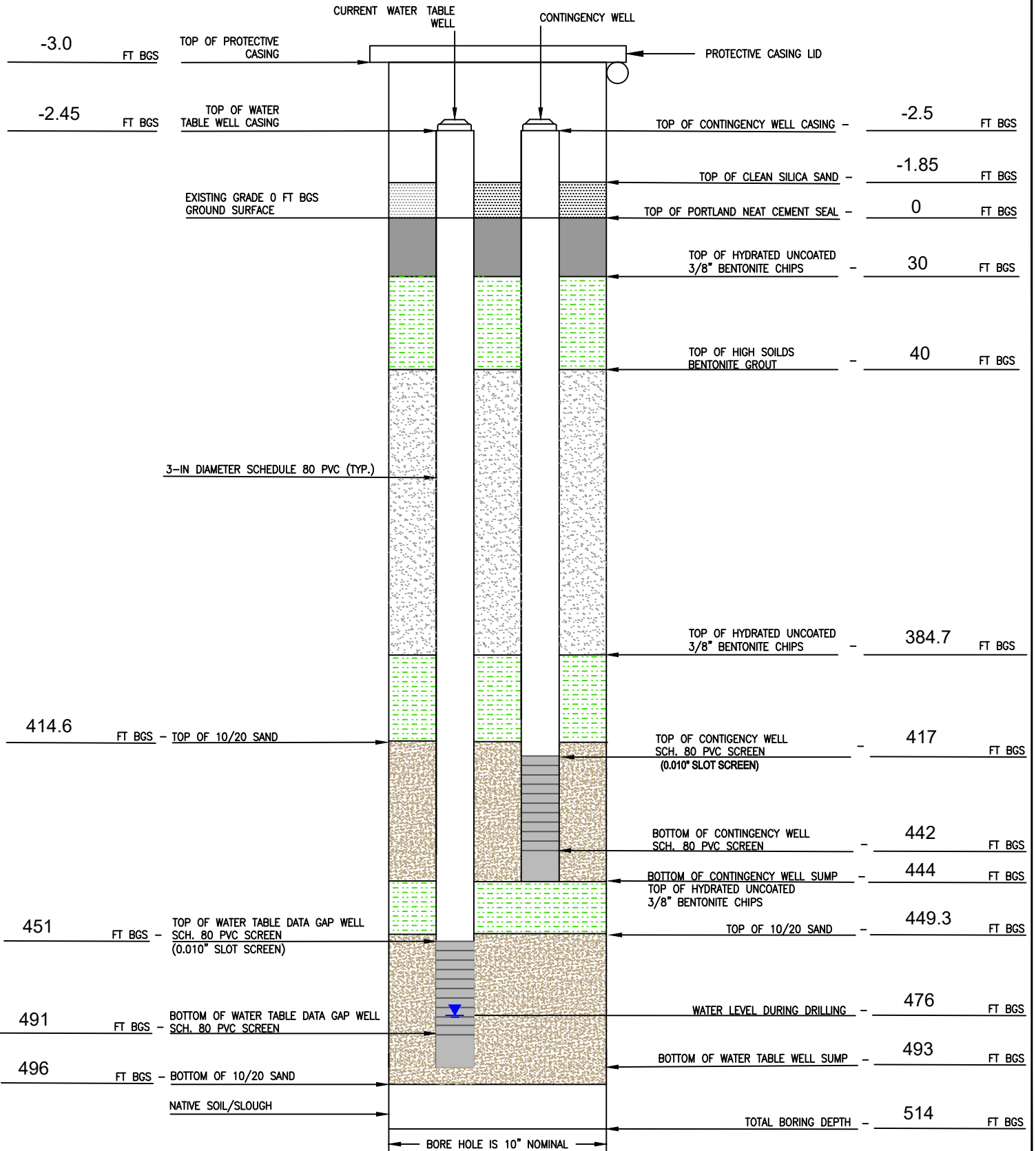
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106S8



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

PROJECT NO.: 62735DM02.1019

WELL ID: KAFB-106S8

INSTALLATION START DATE/TIME: 04JAN19

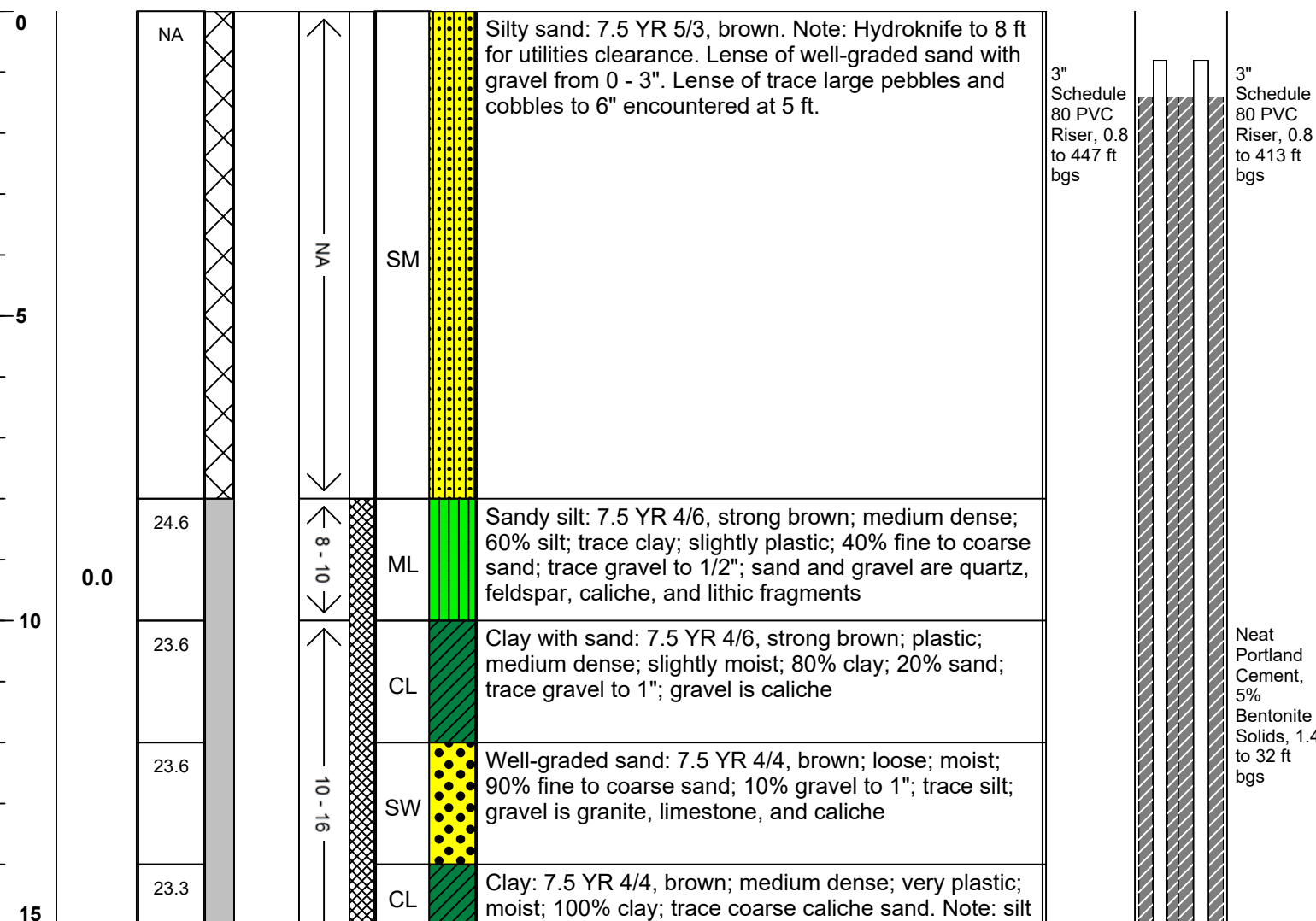
INSTALLATION END DATE/TIME: 01MAR19

GEOLOGIST: J.Messenger

DRILLER: R. Rodriguez

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/6/2018**

Completion Date: **11/8/18**

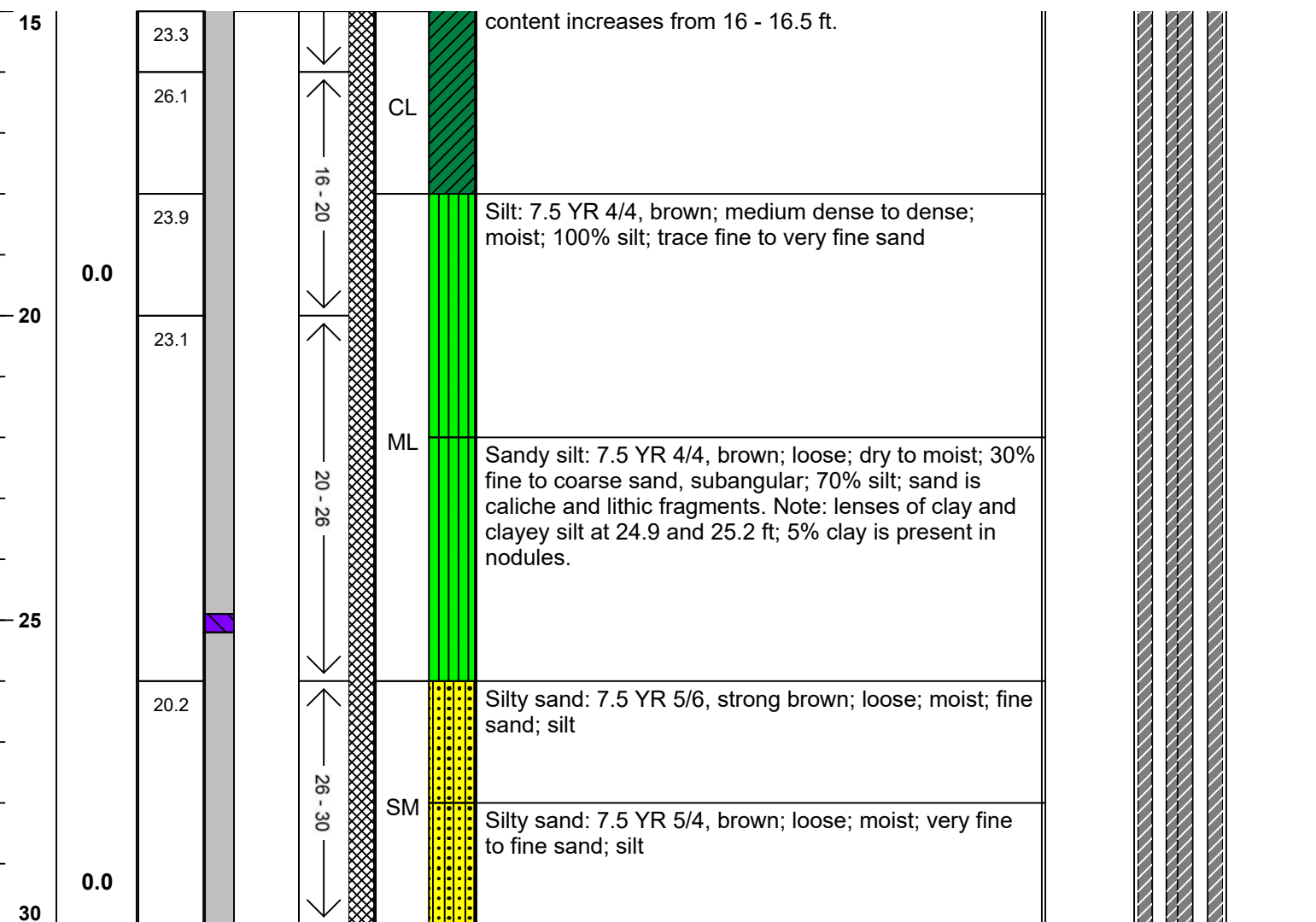
WELL LOG

Well ID: **KAFB-106S9**

Page: **2 of 34**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

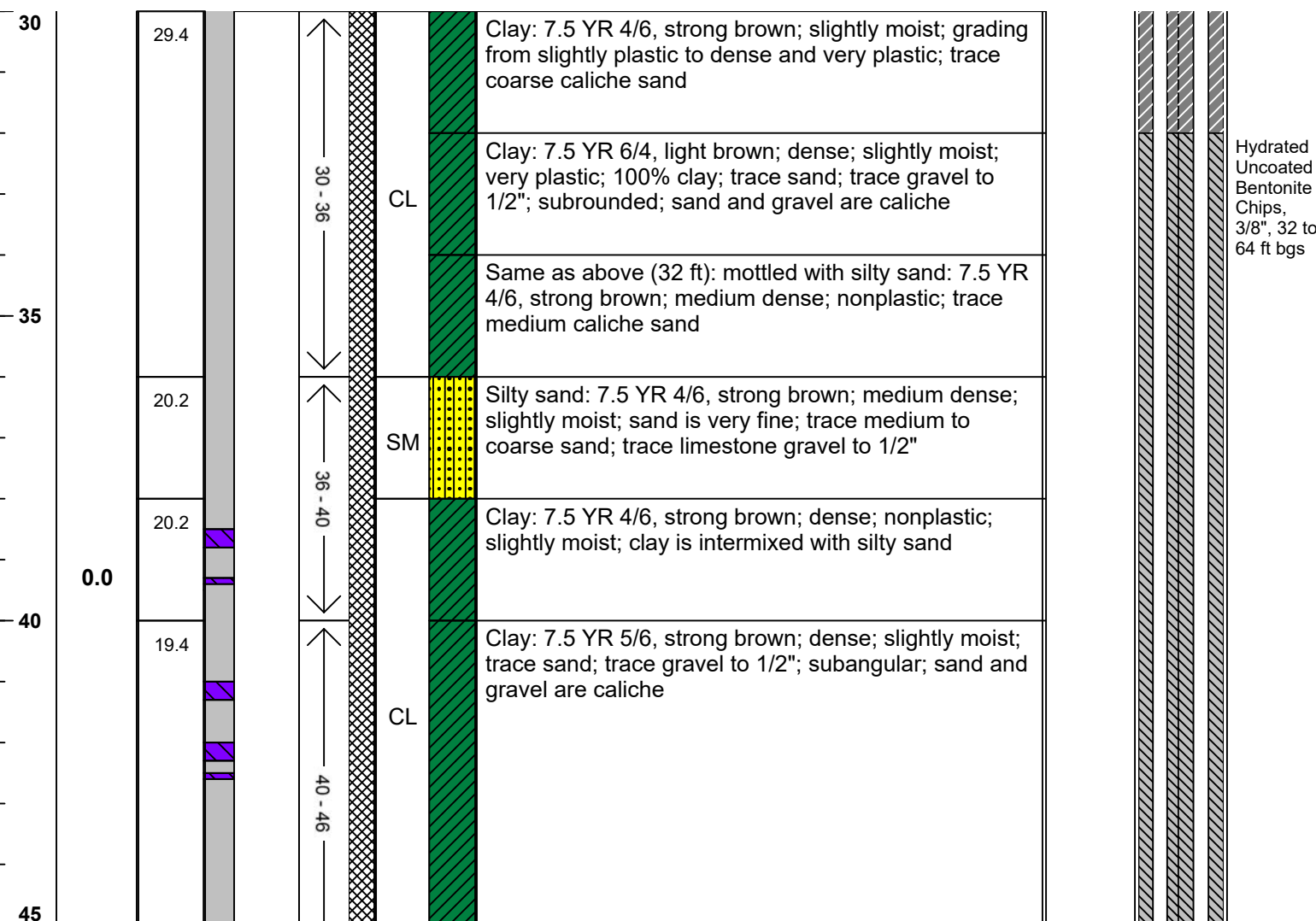
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

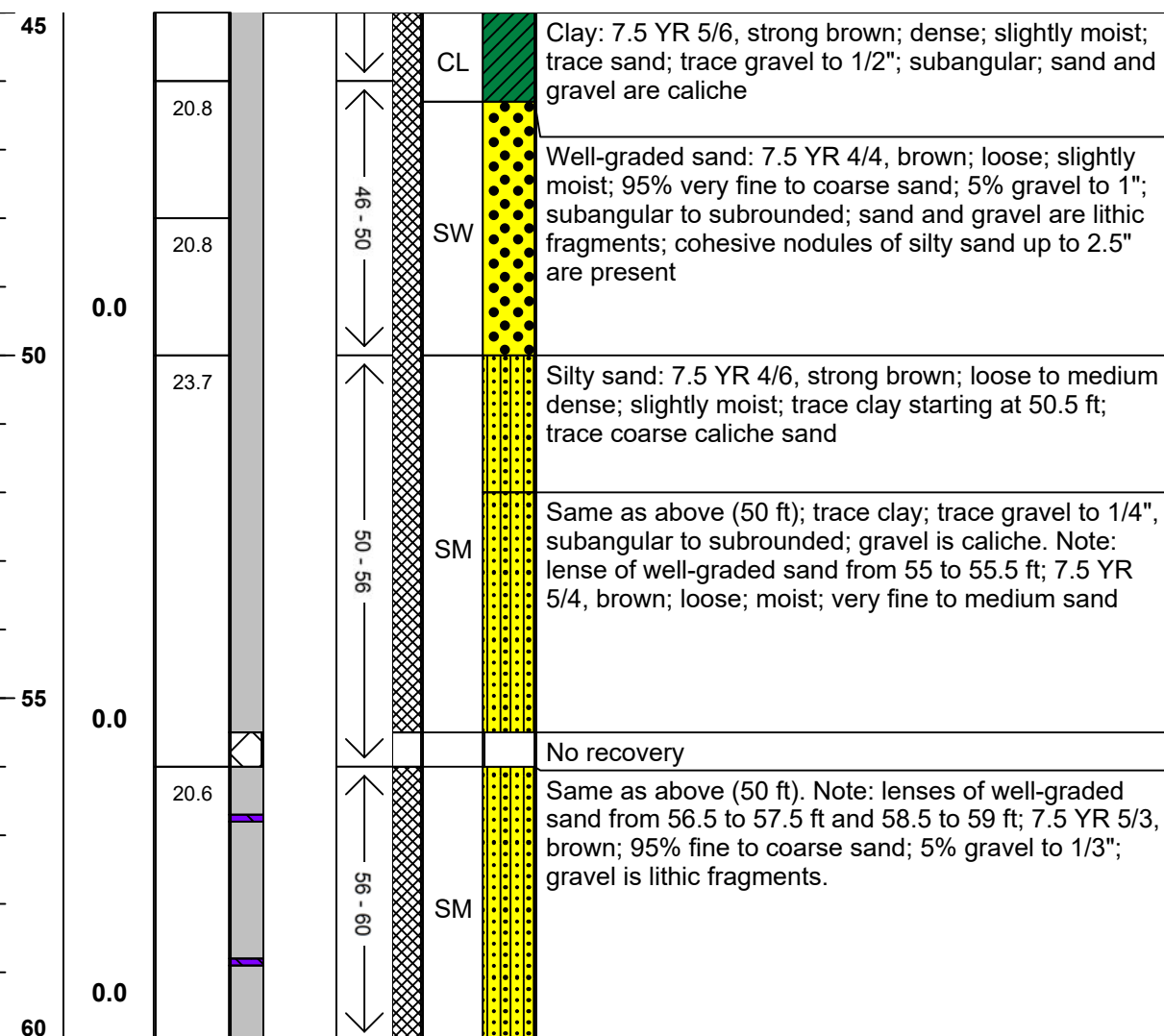
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

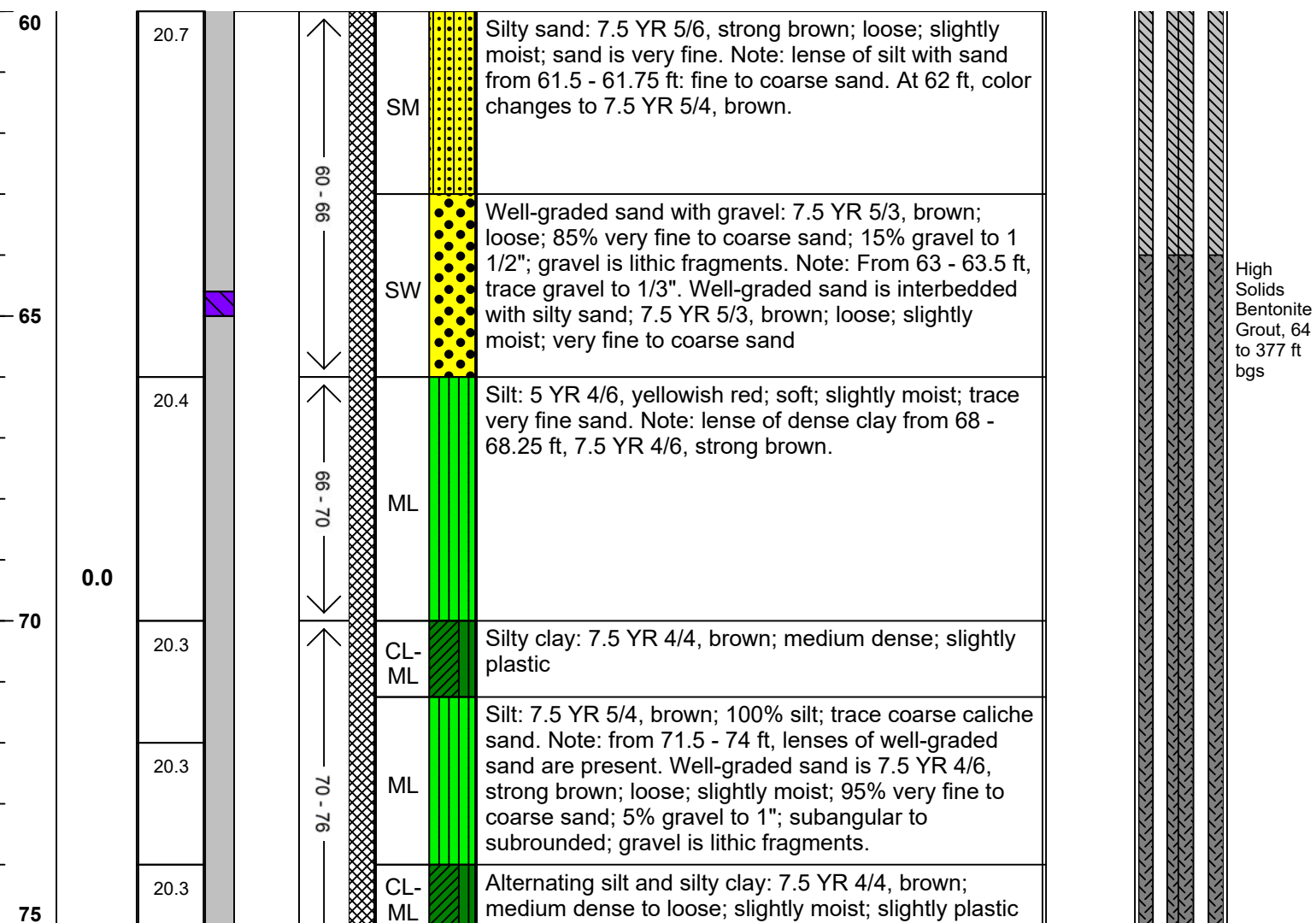
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	None
	Interval Fluoresced

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

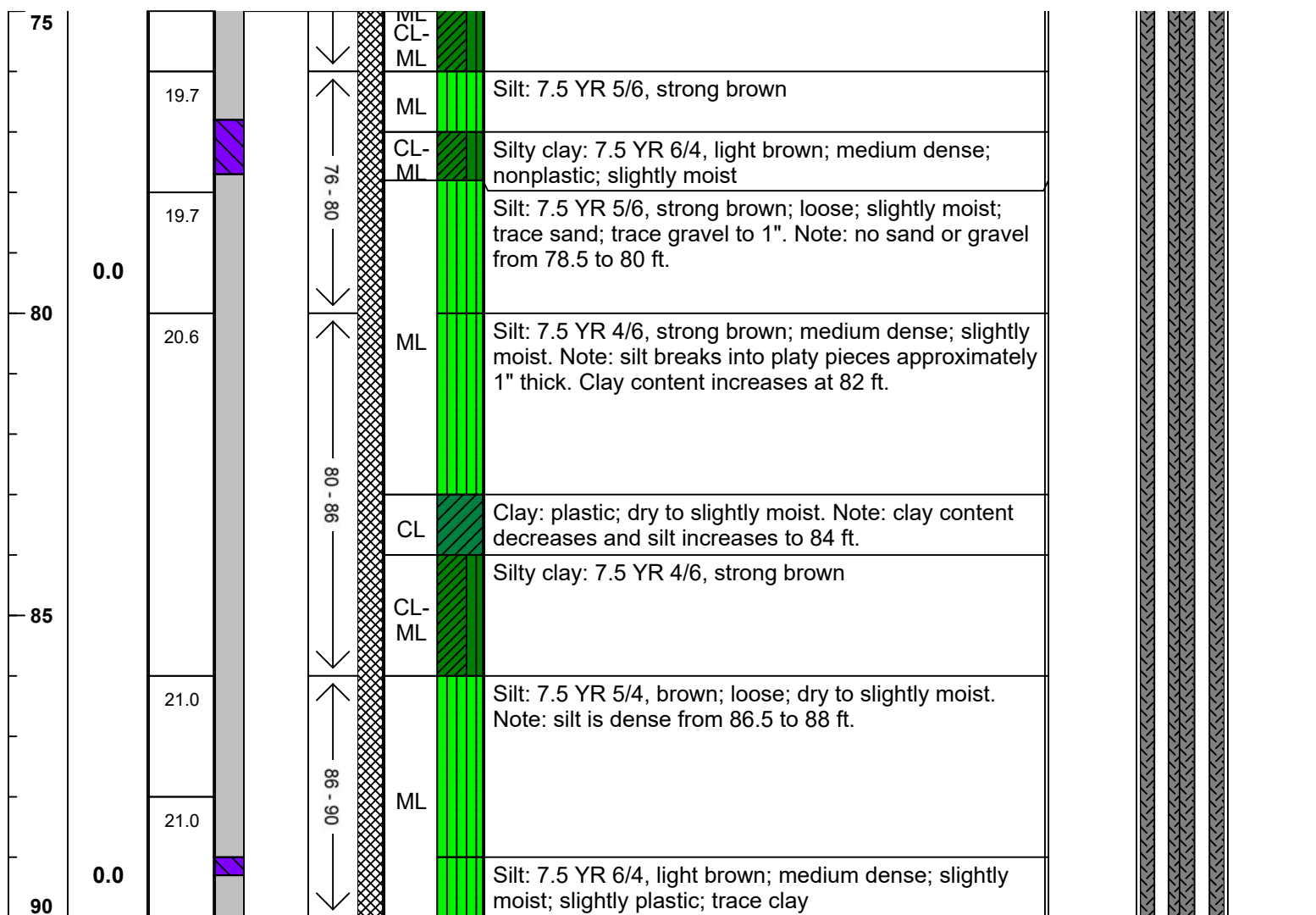
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

WELL LOG

Well ID: **KAFB-106S9**

Page: 6 of 34

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: L. Andress									Boring Depth (ft): 510 ft Boring Diameter (in): 7" Well Diameter: 3" ID DTW After Completion (ft bgs): 472.67 Riser Material: 3" Sch. 80 PVC			Screen Material: 3" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand		
Depth (ft)	PI/D (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description			Completion Details		



Notes:

- (1) Current Water Table Well
(2) Contingency Well
Σ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test



Not Tested



Interval Fluoresced



None

Core Recovery



No Recovery



Disturbed Core



Complete

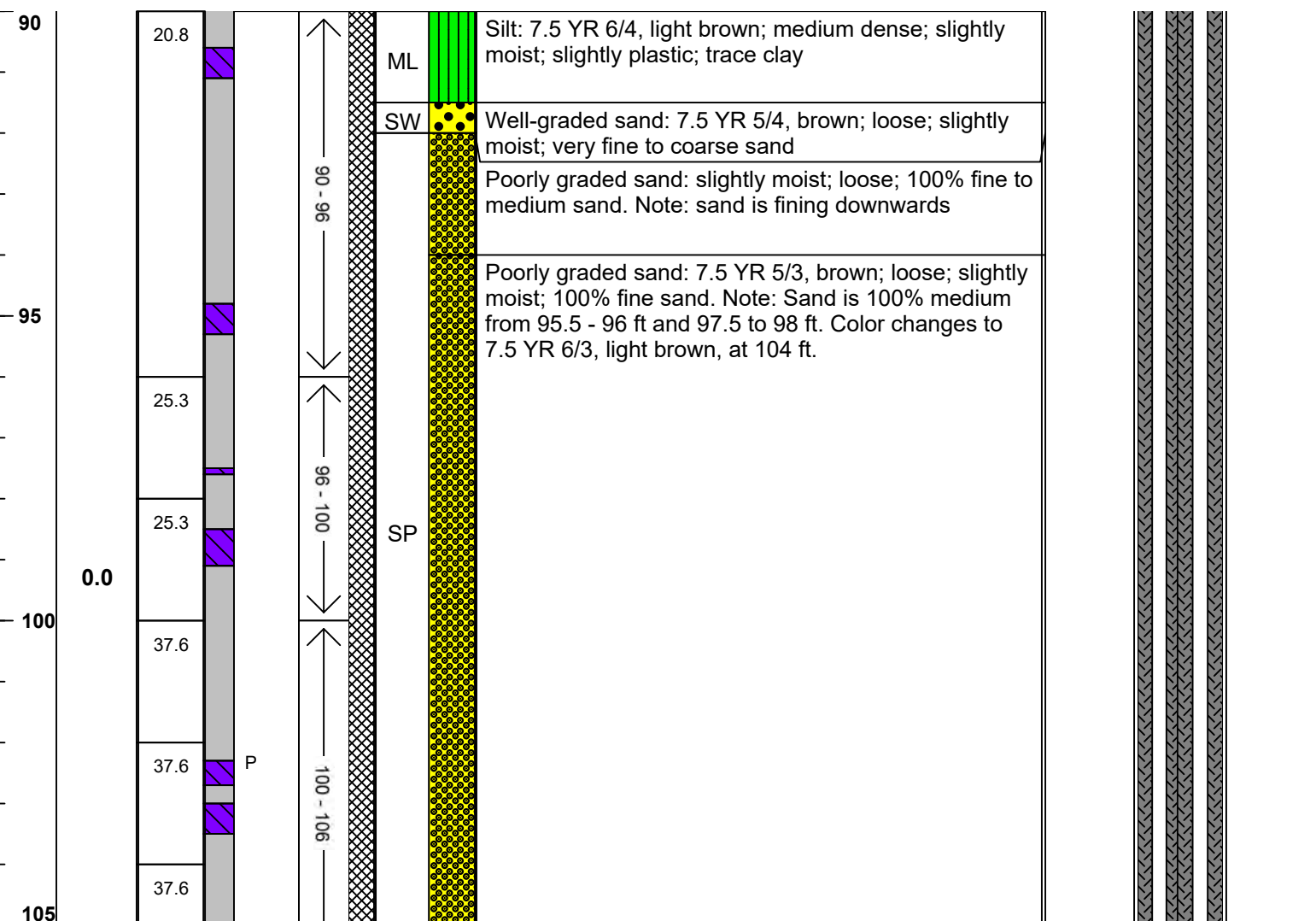
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∩ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

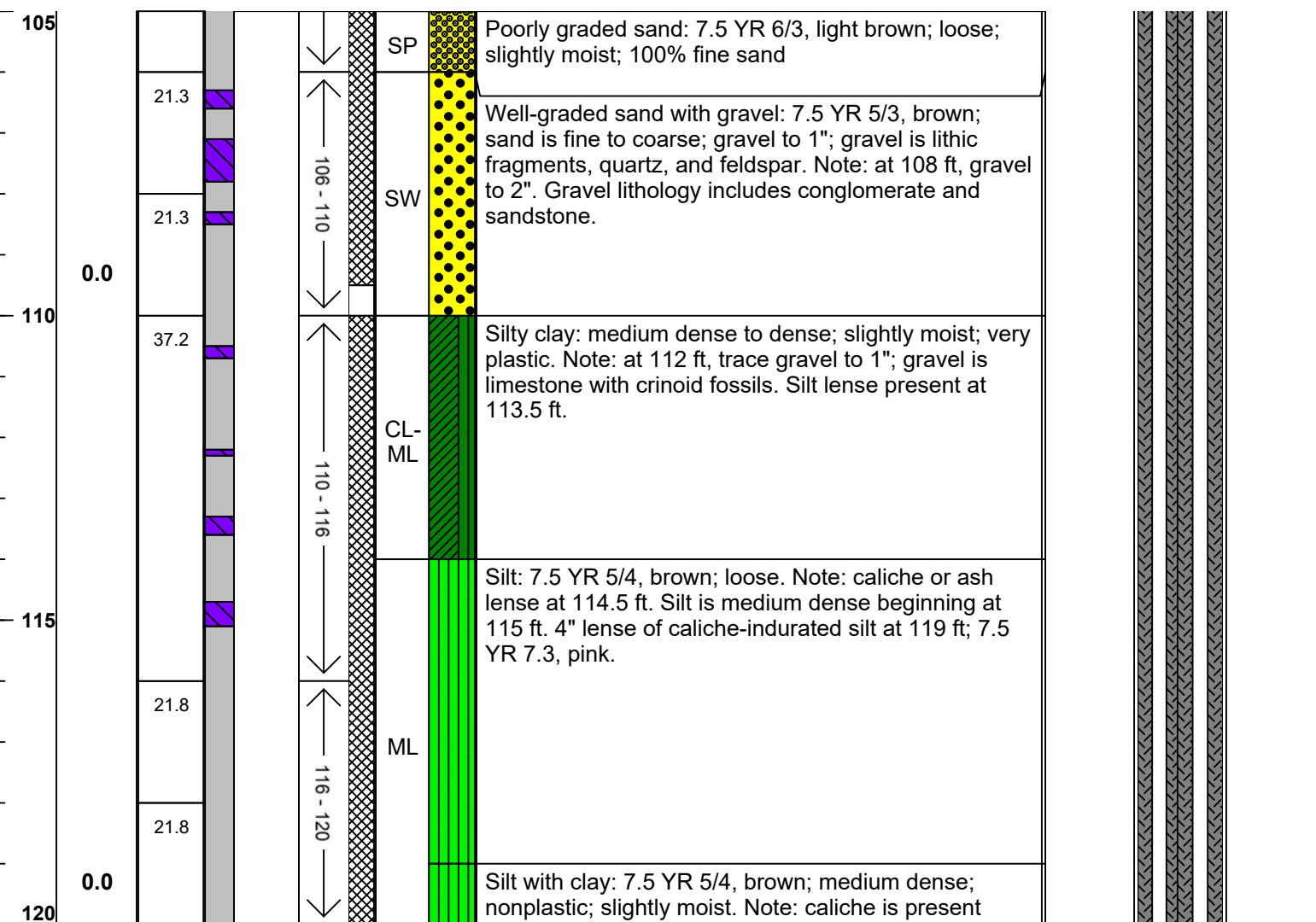
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/6/2018**

Completion Date: **11/8/18**

WELL LOG

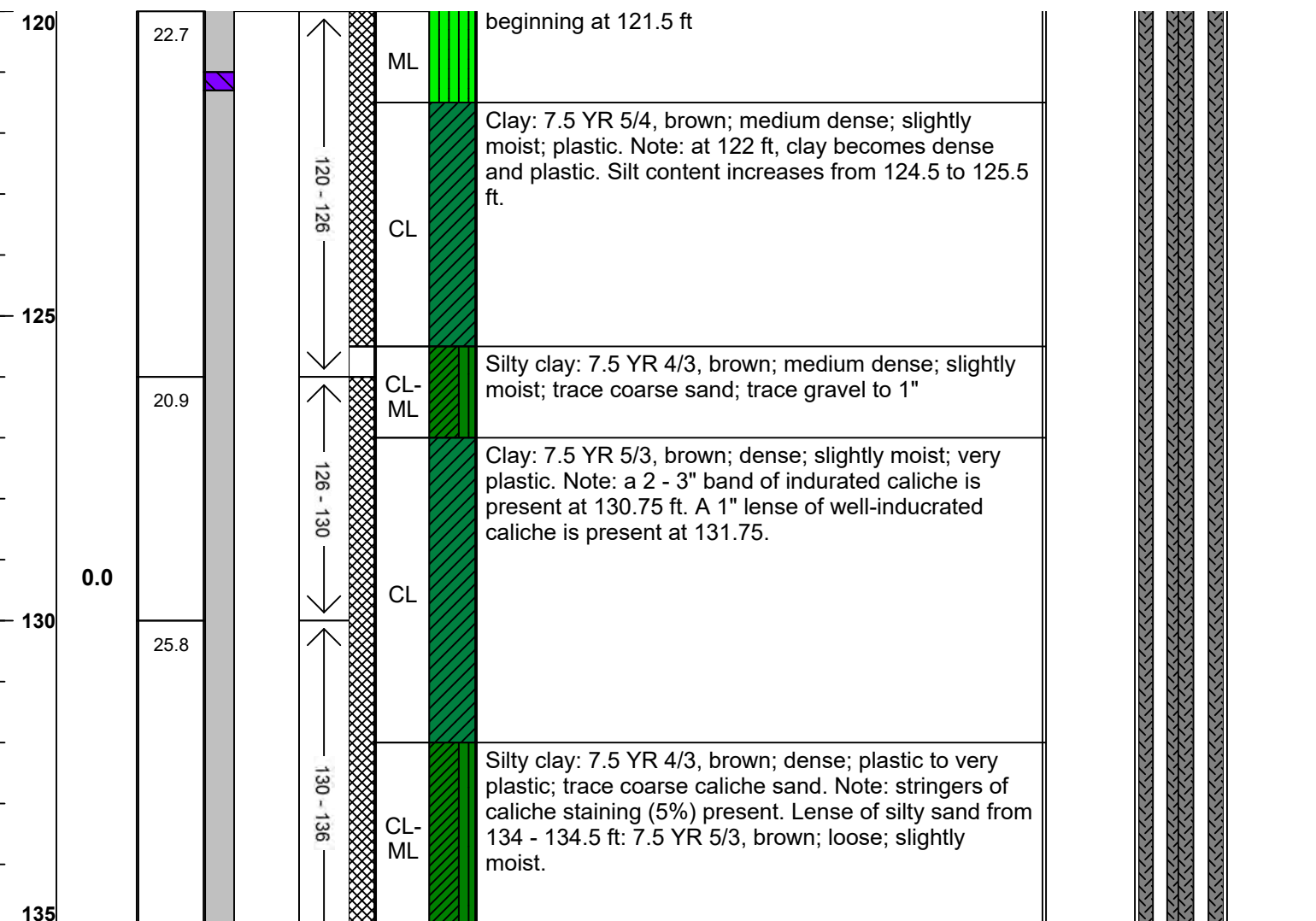
Well ID: **KAFB-106S9**

Page: **9 of 34**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/6/2018**

Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**

Page: **10 of 34**

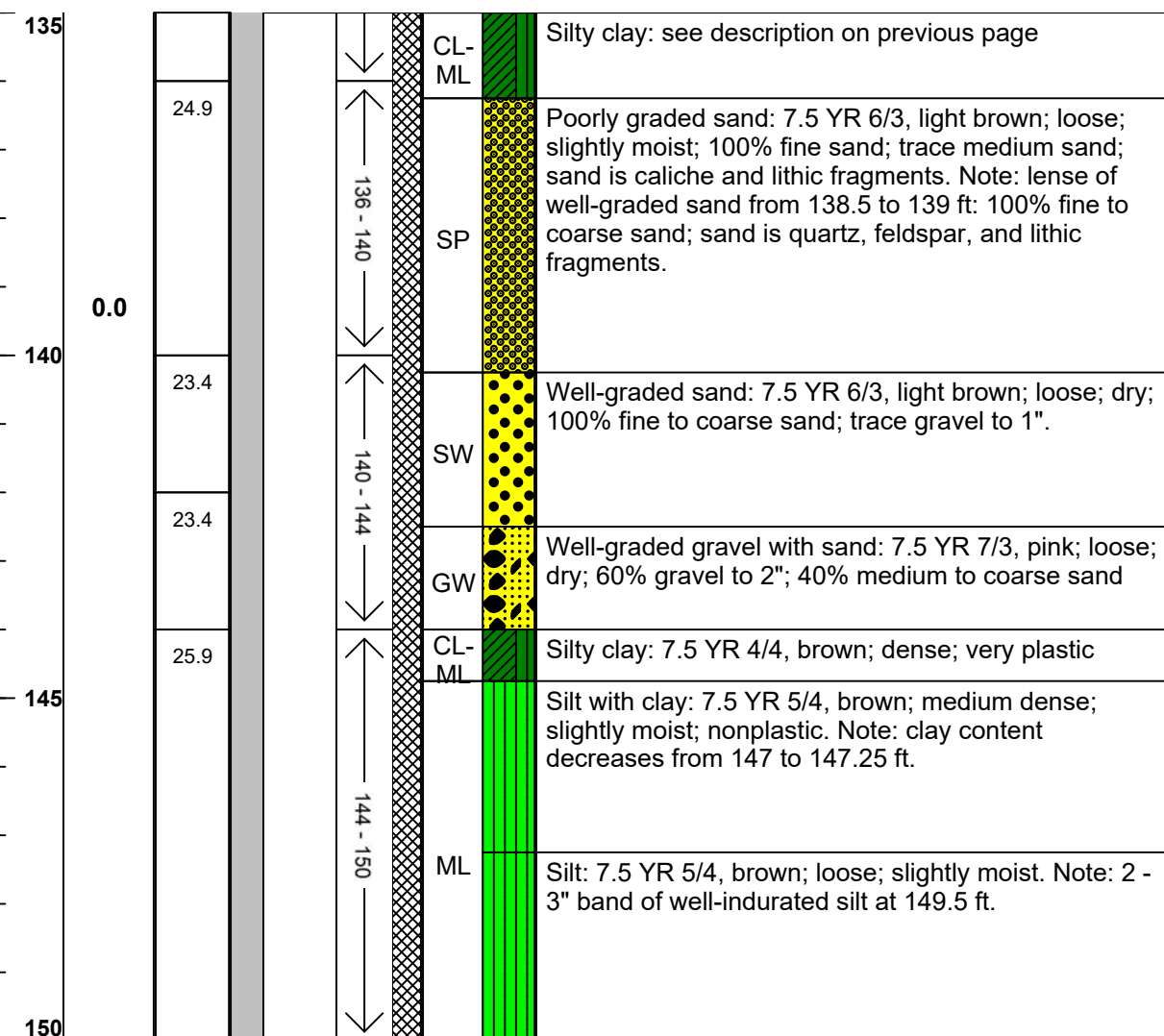
Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **L. Andress**

Boring Depth (ft): **510 ft**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **472.67**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
= Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

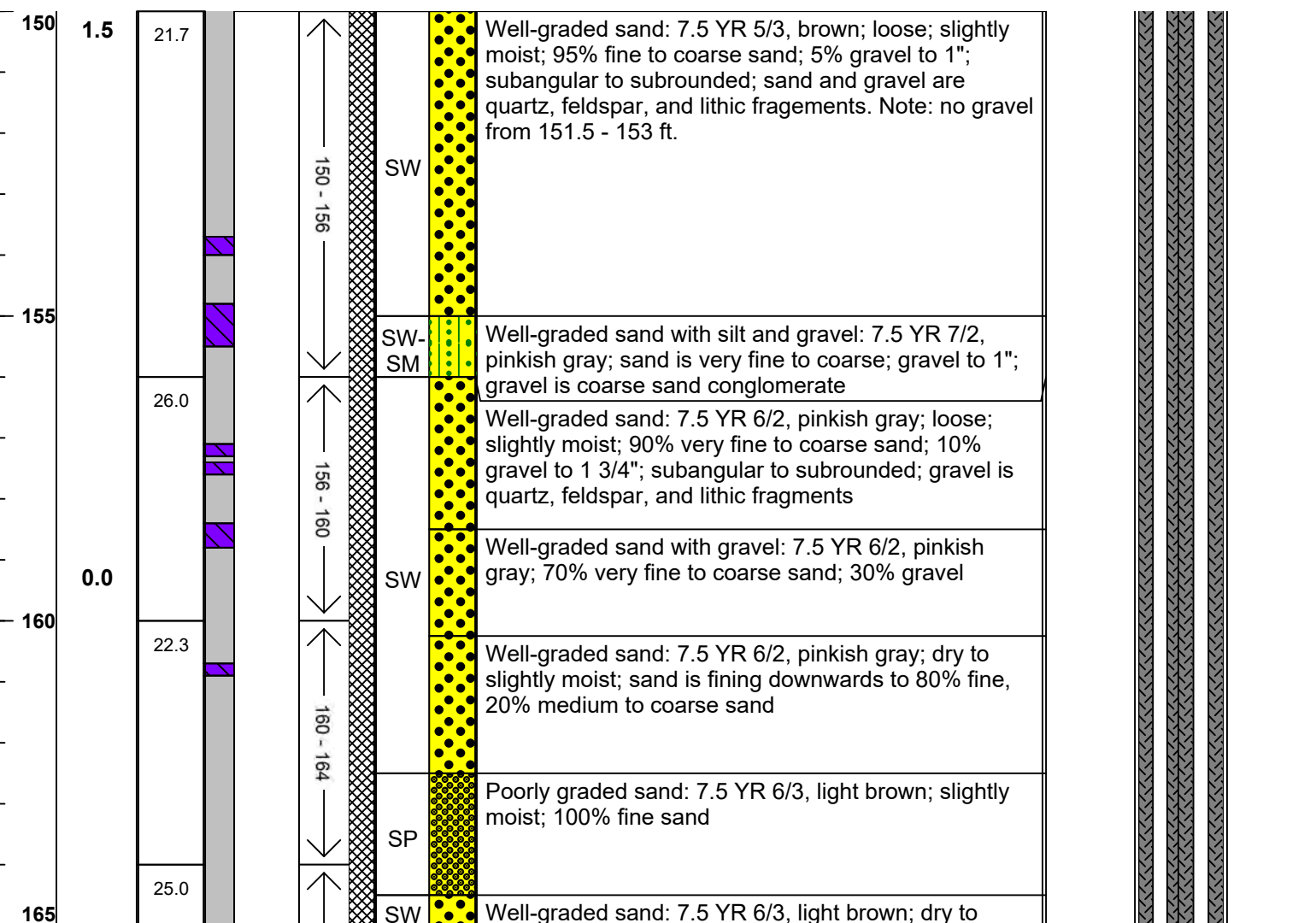
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

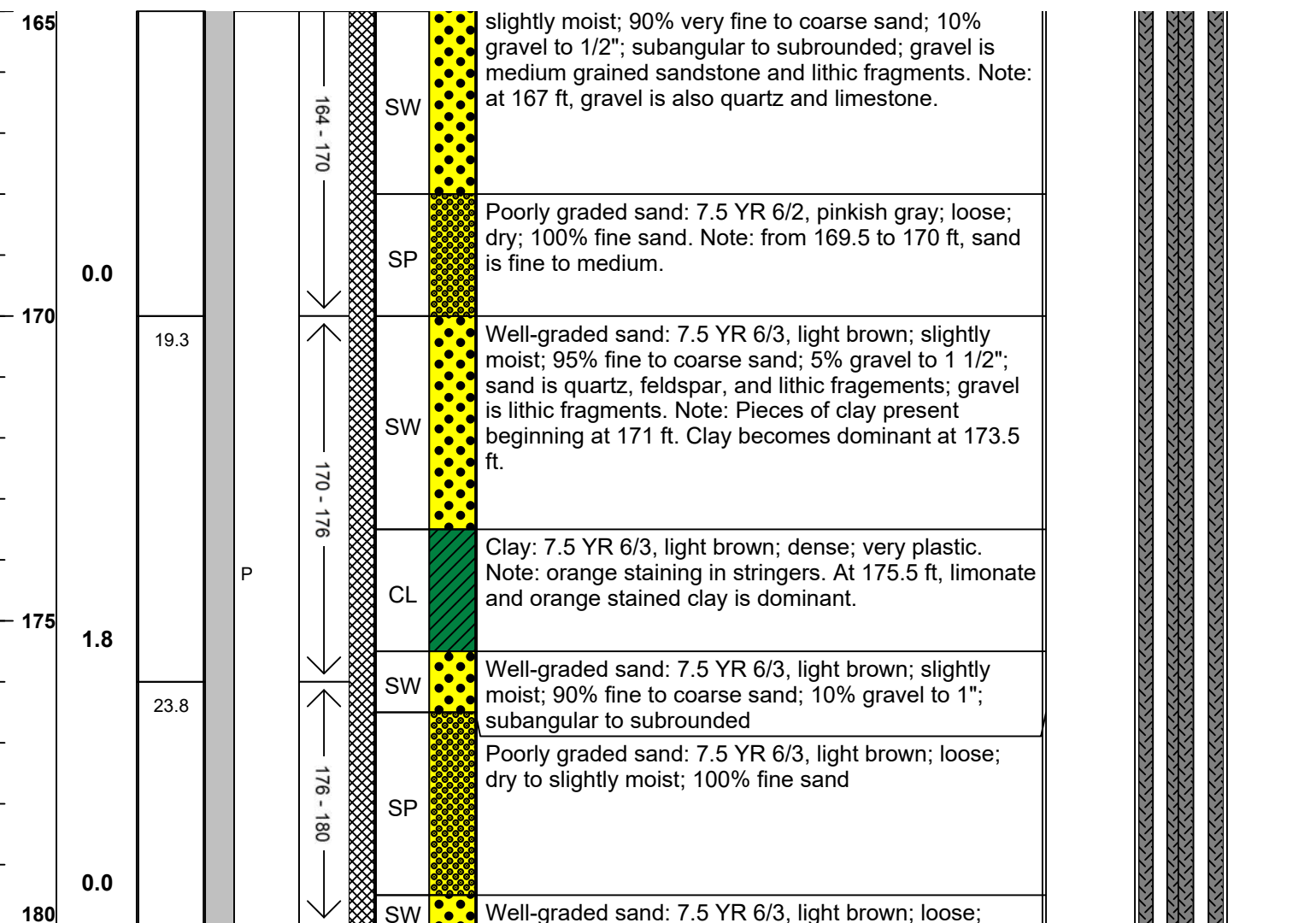
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/6/2018**

Completion Date: **11/8/18**

WELL LOG

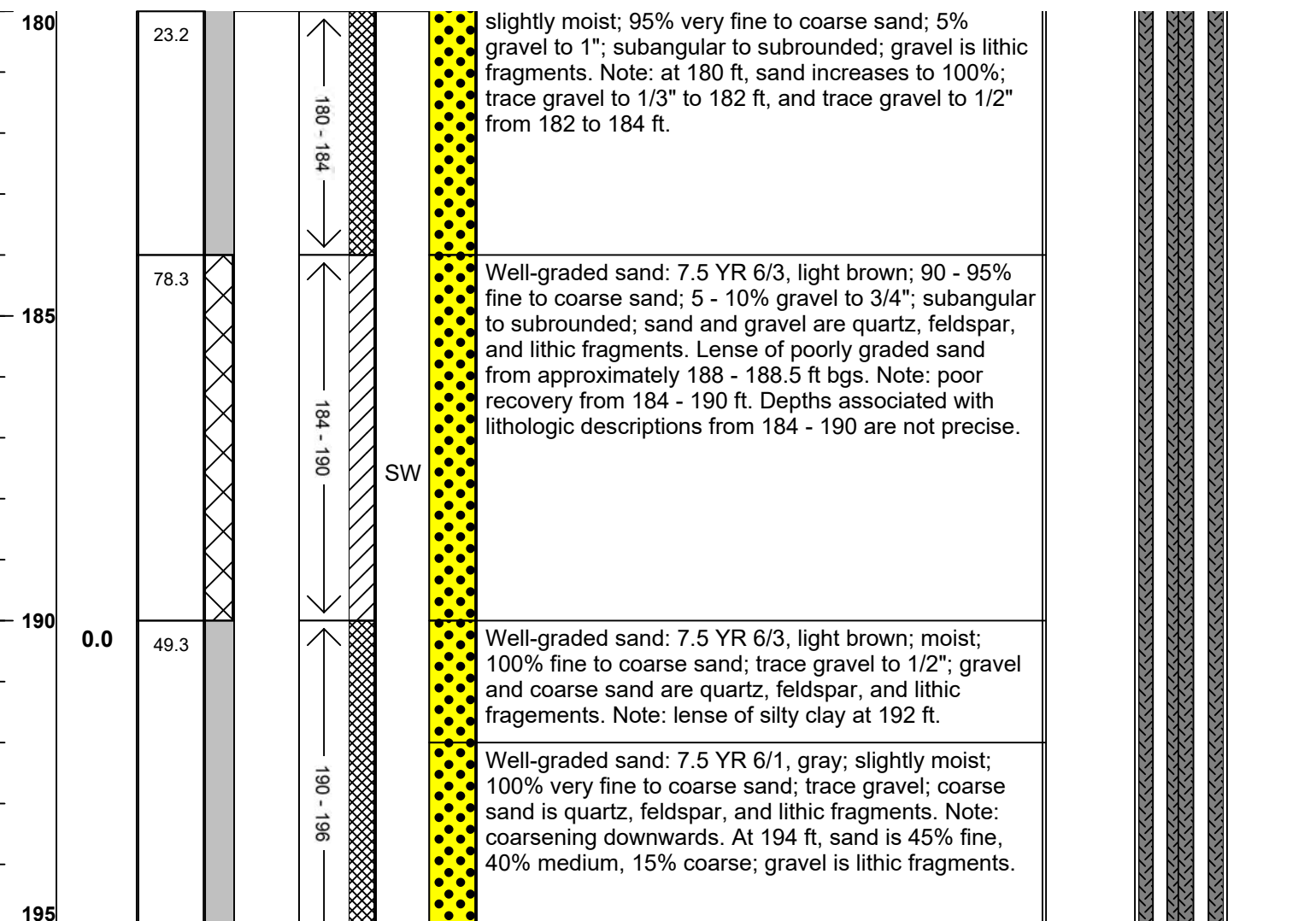
Well ID: **KAFB-106S9**

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	None
	Interval Fluoresced

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity



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and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/6/2018**

Completion Date: **11/8/18**

WELL LOG

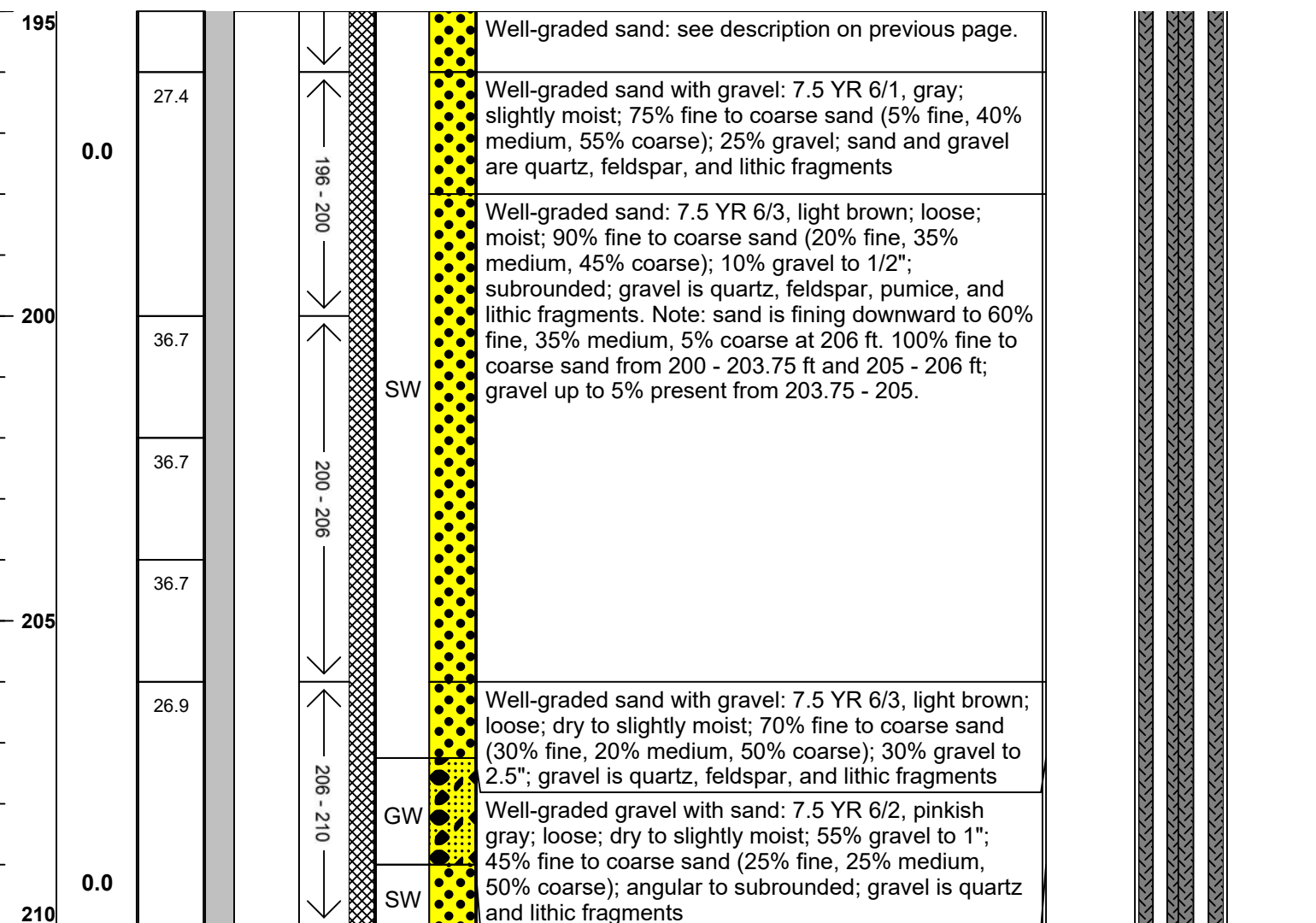
Well ID: **KAFB-106S9**

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/6/2018**

Completion Date: **11/8/18**

WELL LOG

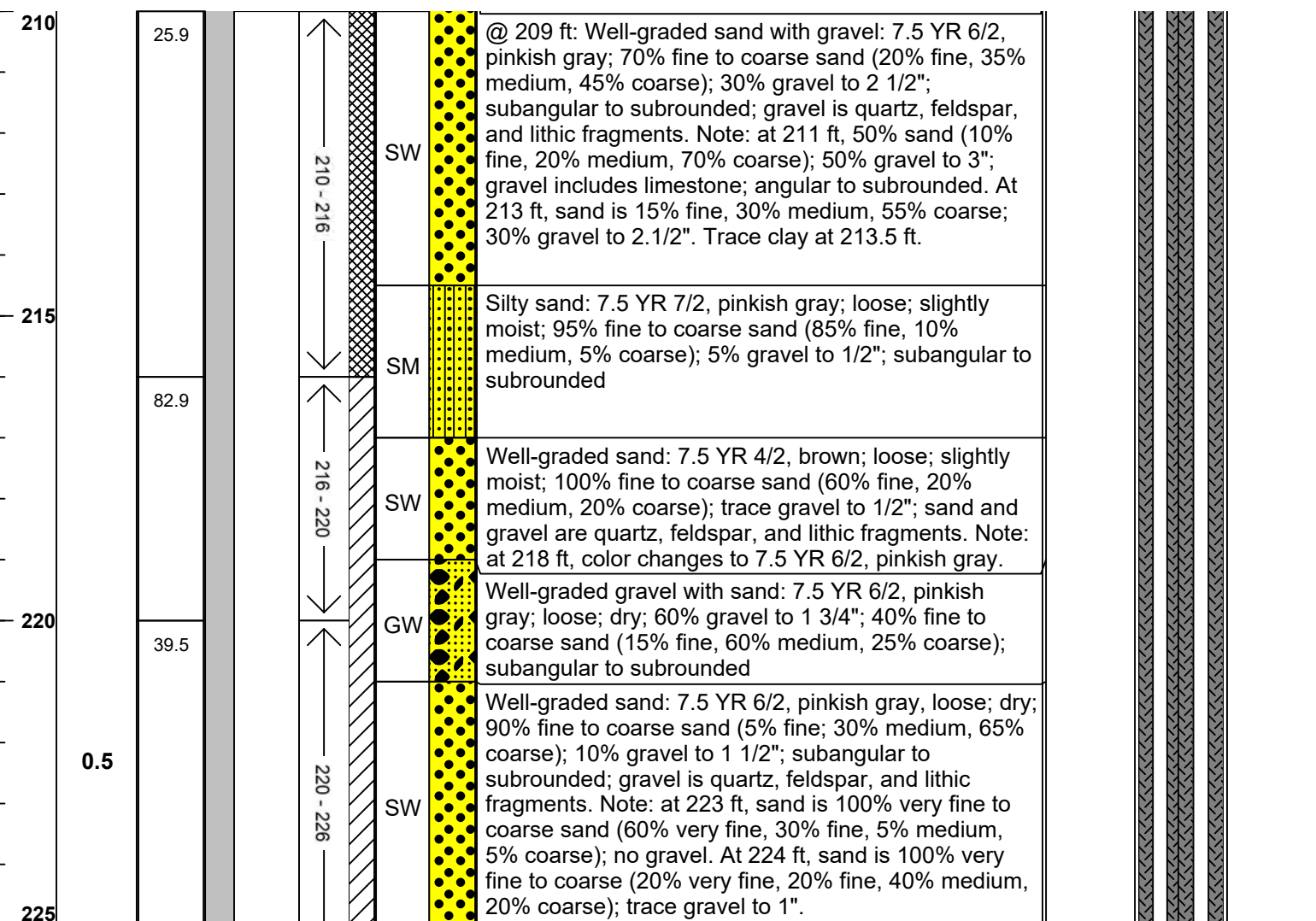
Well ID: **KAFB-106S9**

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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

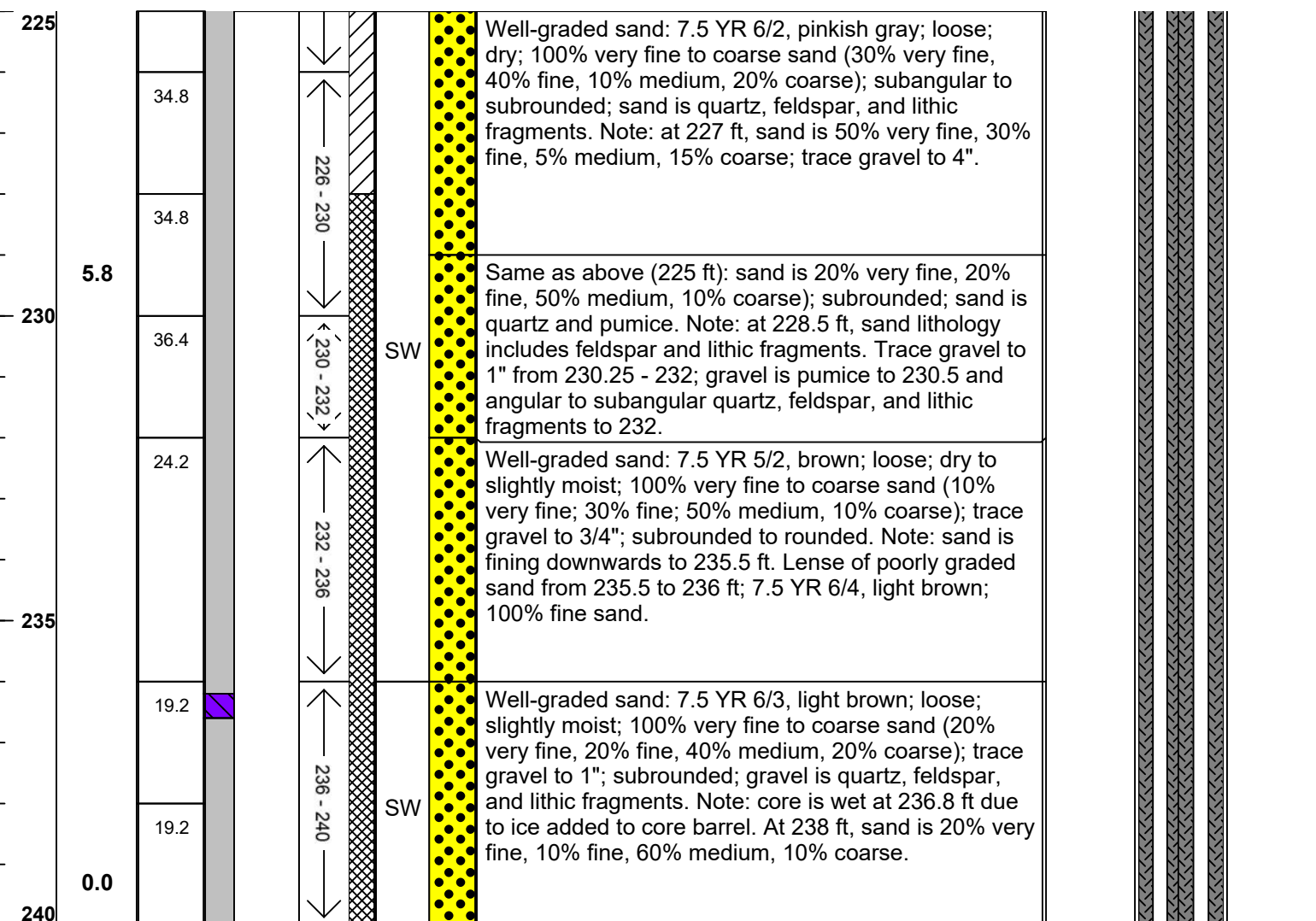
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

- (1) Current Water Table Well
- (2) Contingency Well
- ☒ = Depth to water after completion
- UV = ultraviolet fluorescence
- NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

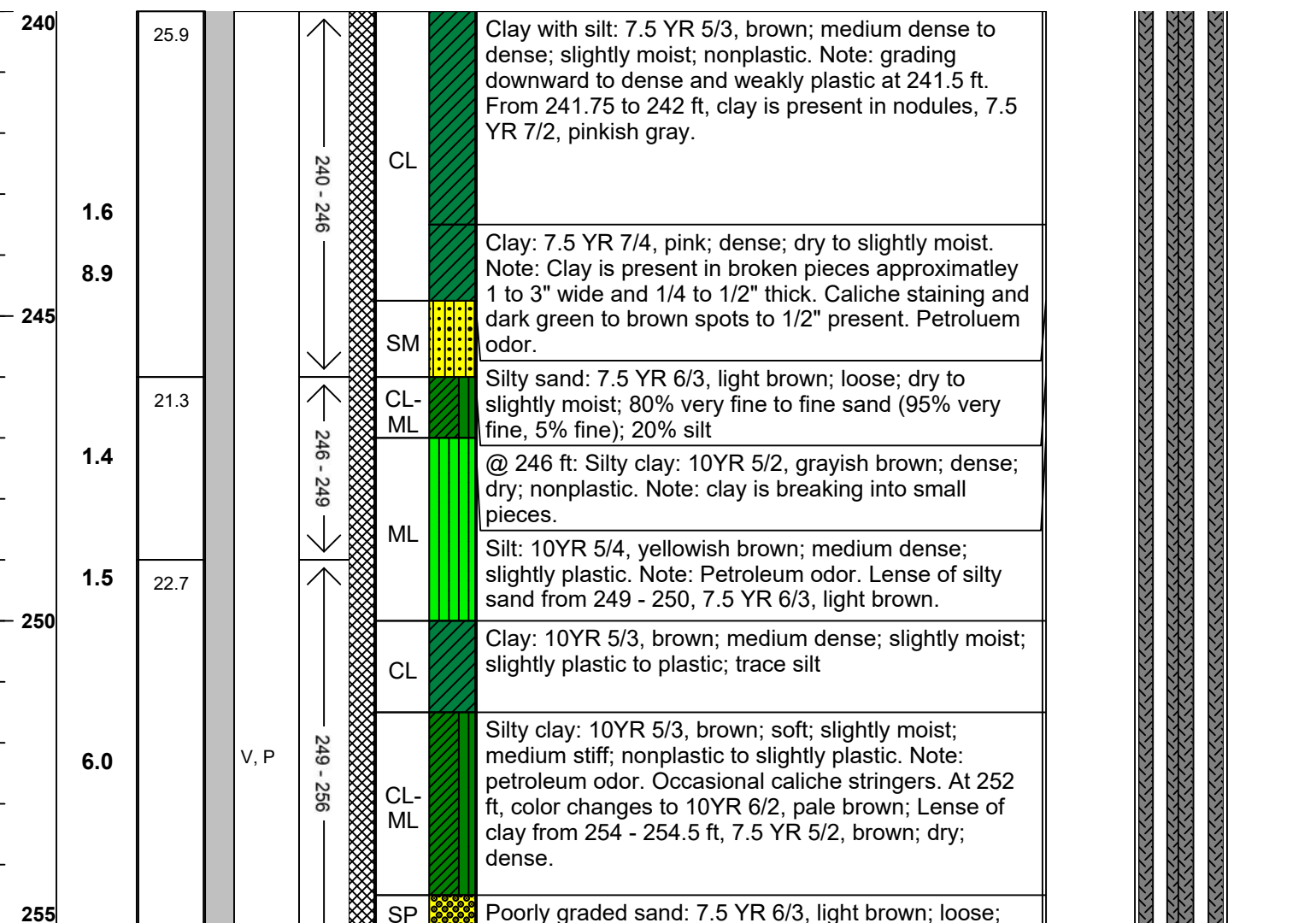
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

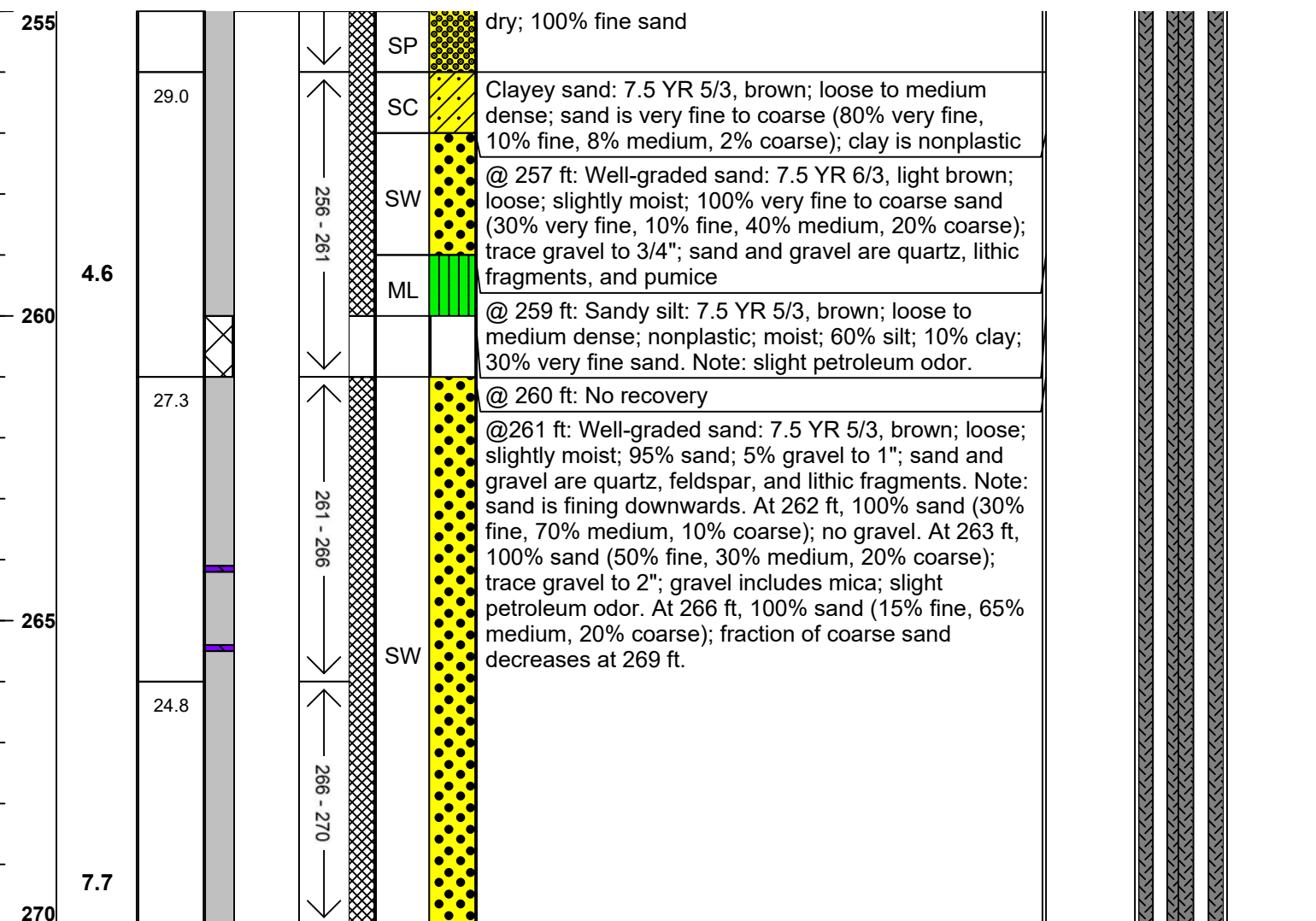
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

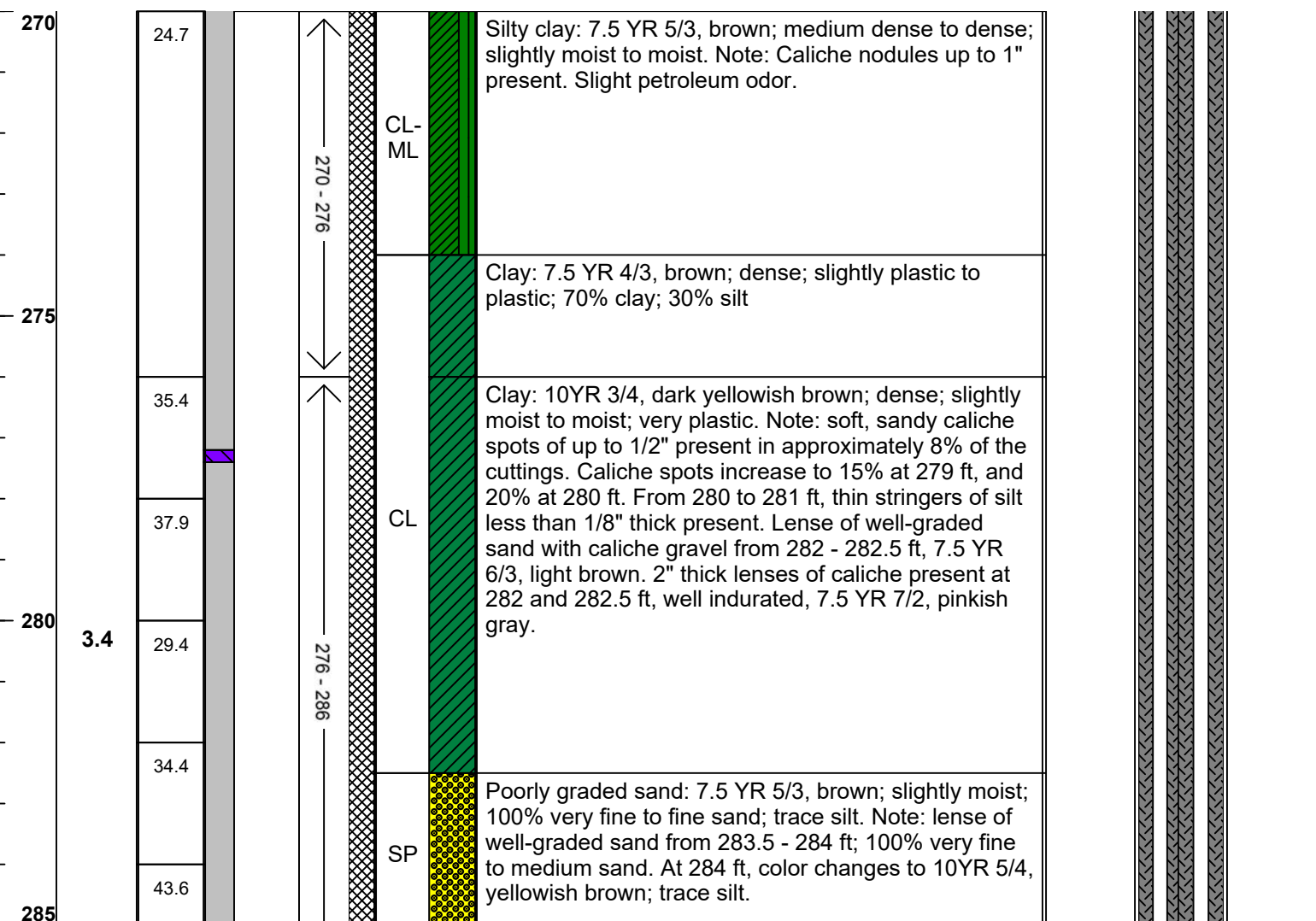
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/6/2018**

Completion Date: **11/8/18**

WELL LOG

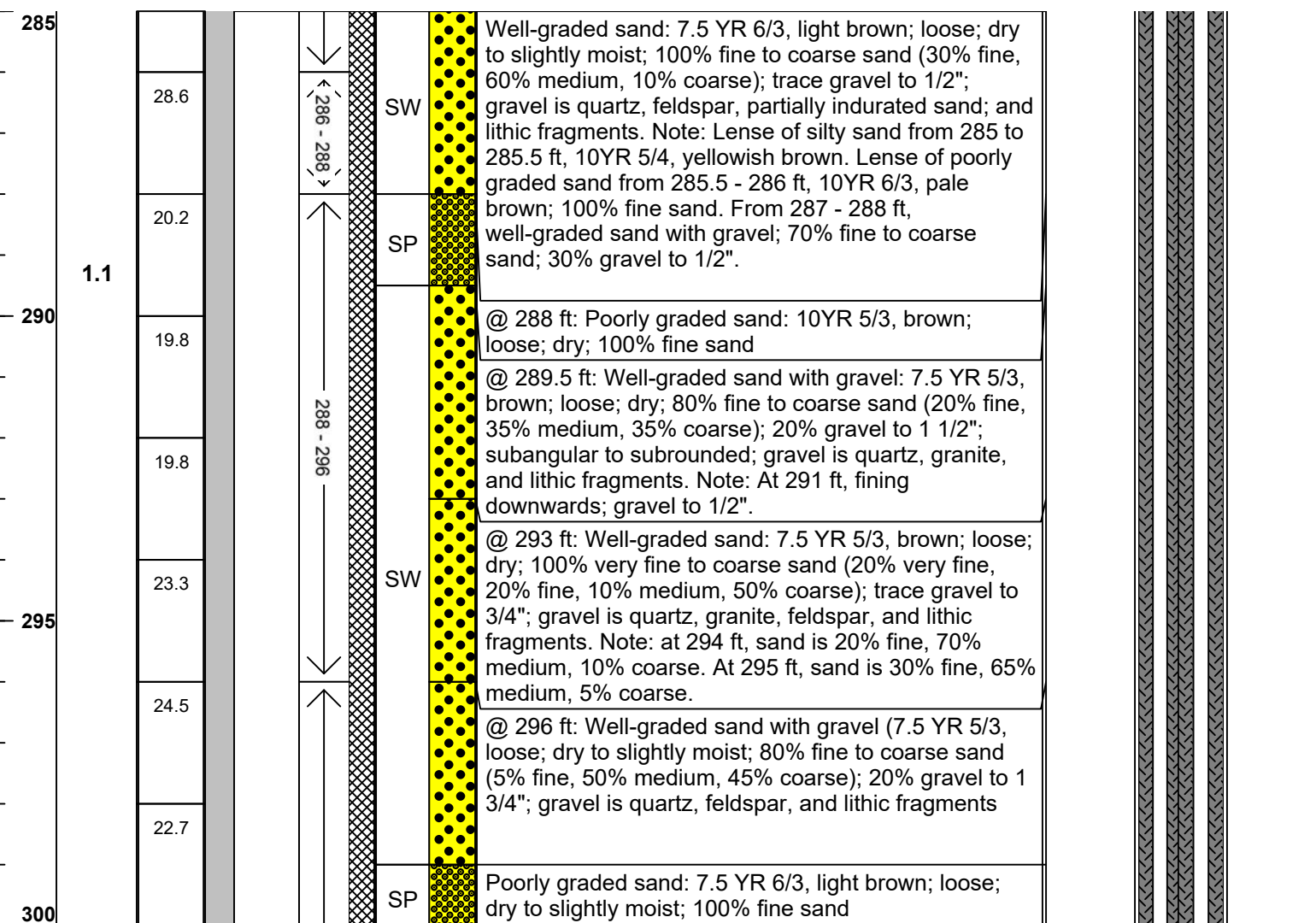
Well ID: **KAFB-106S9**

Page: **20 of 34**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

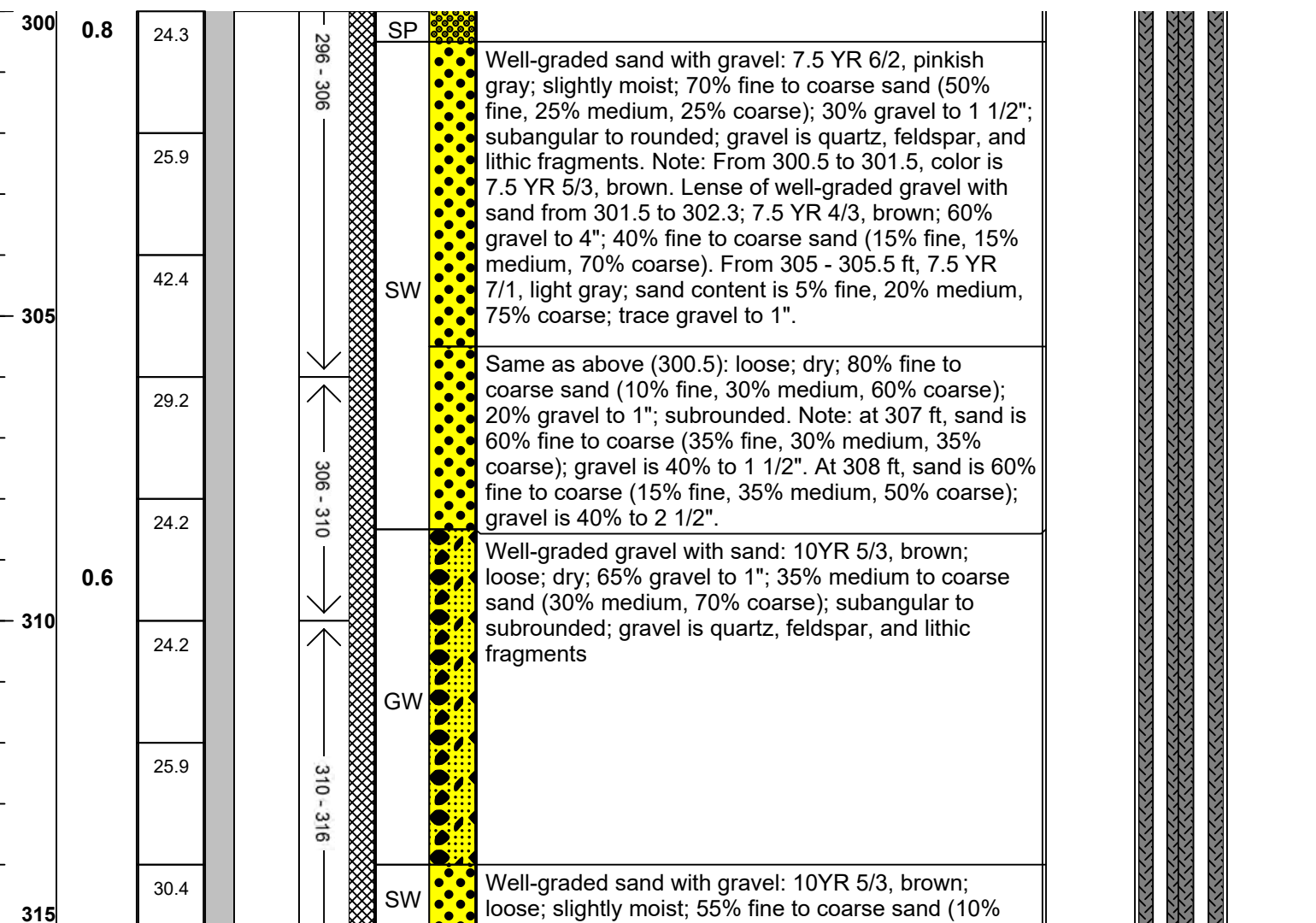
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Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
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Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/6/2018**

Completion Date: **11/8/18**

WELL LOG

Well ID: **KAFB-106S9**

Page: **22 of 34**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

315									fine, 30% medium, 60% coarse); 45% gravel to 2"; gravel is quartz, feldspar, granite, and lithic fragments	
	20.9									
	25.9								Well-graded sand: 7.5 YR 5/3, brown; loose; slightly moist; 100% fine to coarse sand (20% fine, 75% medium, 5% coarse); trace gravel to 1/4"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 318 ft, sand is 60% fine, 20% medium, 20% coarse; trace gravel to 1/2".	
320	23.7				316 - 324			SW	Well-graded sand with gravel: 7.5 YR 5/3, brown; loose; slightly moist; 80% fine to coarse sand (25% fine, 50% medium, 25% coarse); 20% gravel to 1 1/2"; subangular to subrounded; gravel is quartz, feldspar, and lithic fragments. Note: at 322 ft, color changes to 10YR 5/3, brown.	
	43.1									
	39.8				324 - 326			CL	Clay: 10YR 5/3, brown; dense; slightly moist; very plastic. Note: clay has iron staining/inclusions. Orange spots/nodules are approximately 1" long and less than 1/8" wide. Some black organic specks and streaks are present.	
325	23.3							SP	Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 100% fine sand. Note: at 327.5 ft, 90% fine sand; 10% gravel to 2"; subangular to subrounded; gravel is lithic fragments. Lense of silty sand from 328 to 328.5 ft; very fine sand; 10% gravel to 1".	
	25.1				326 - 330			SW	Well-graded sand: 10YR 5/3, brown; loose; dry; 95% fine to coarse sand (20% fine, 40% medium, 40% coarse); 5% gravel to 3/4"; gravel is quartz, feldspar,	
330										

Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

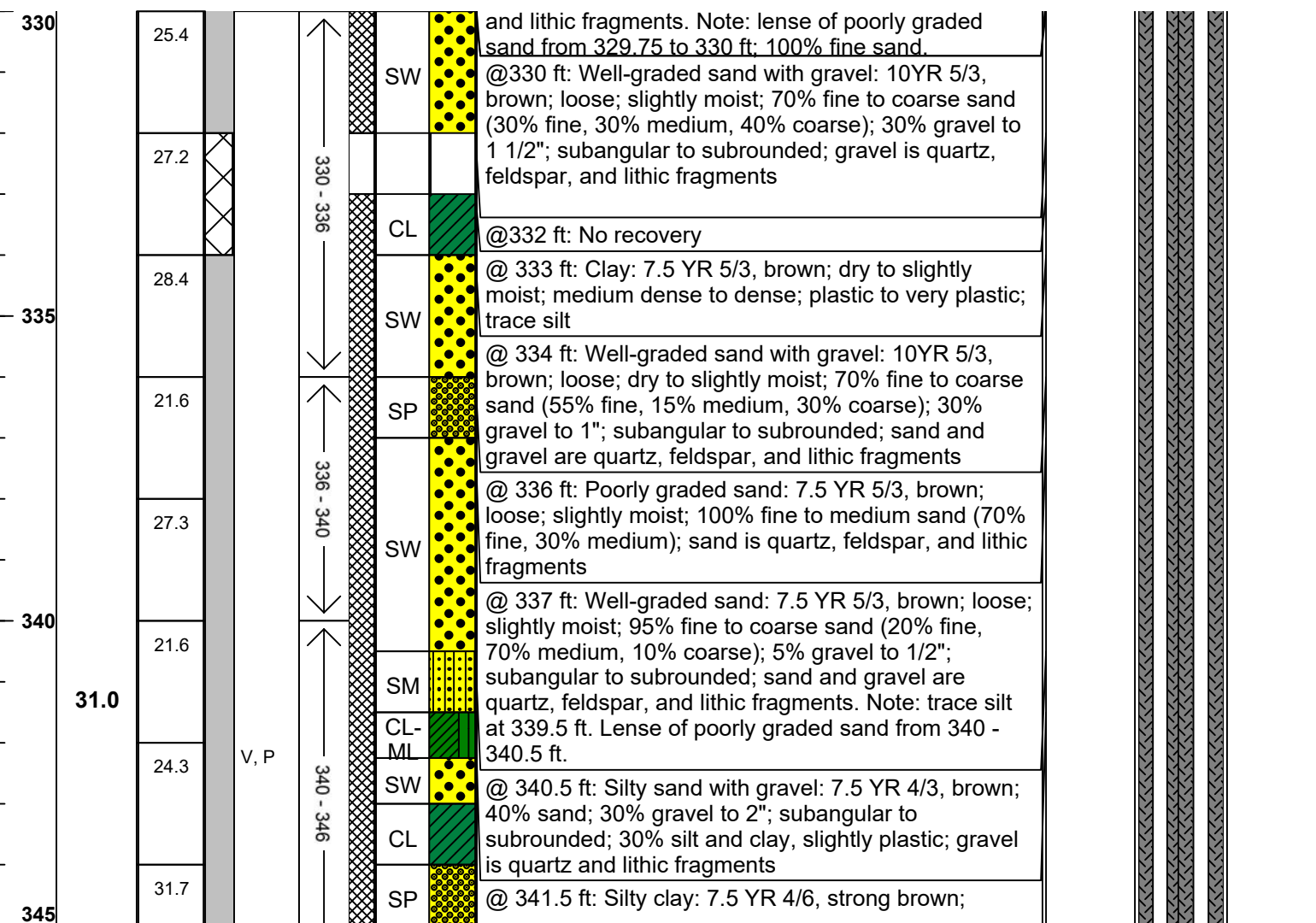
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

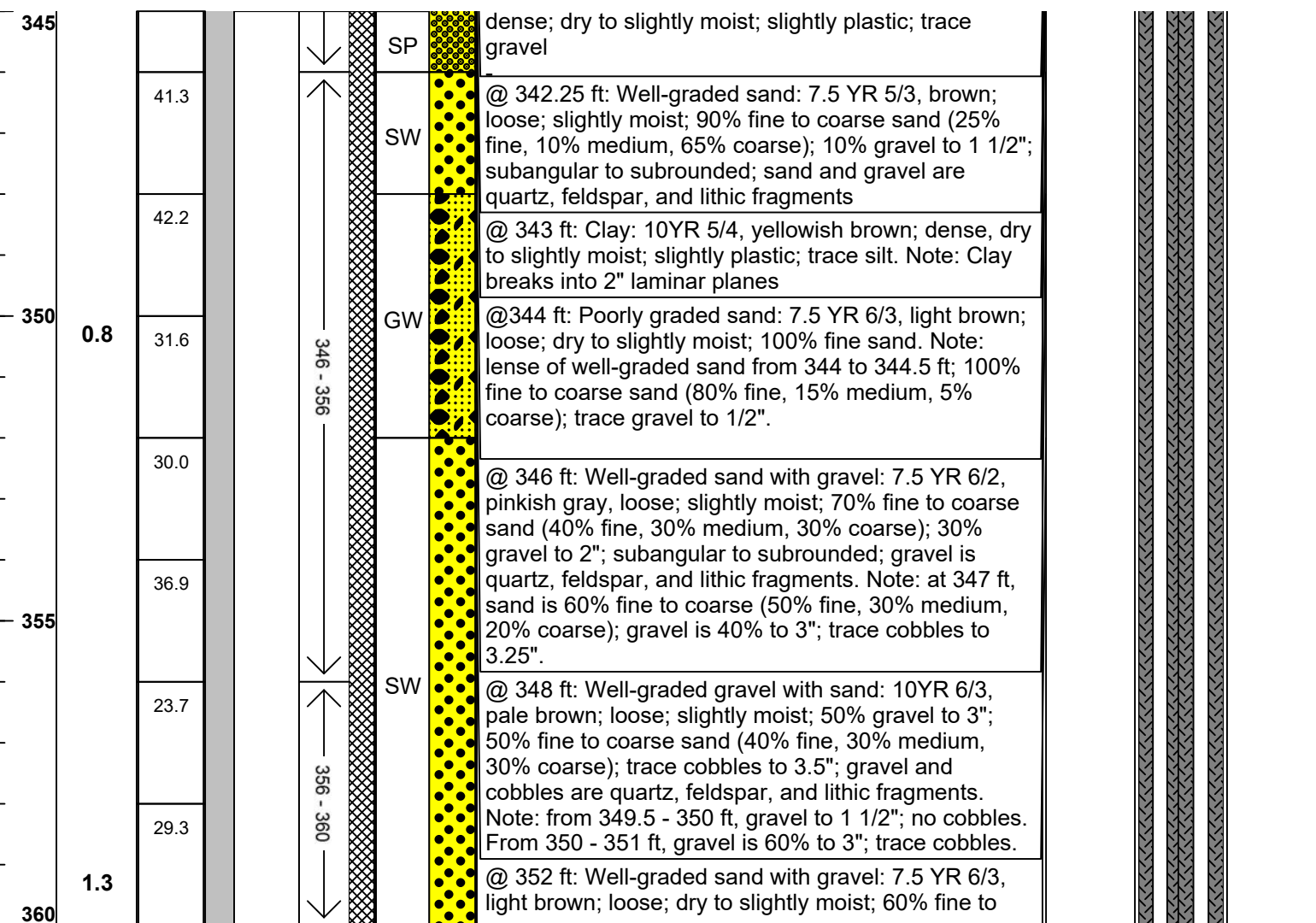
Following coring, the borehole was overdrilled using ARCH for well installation

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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

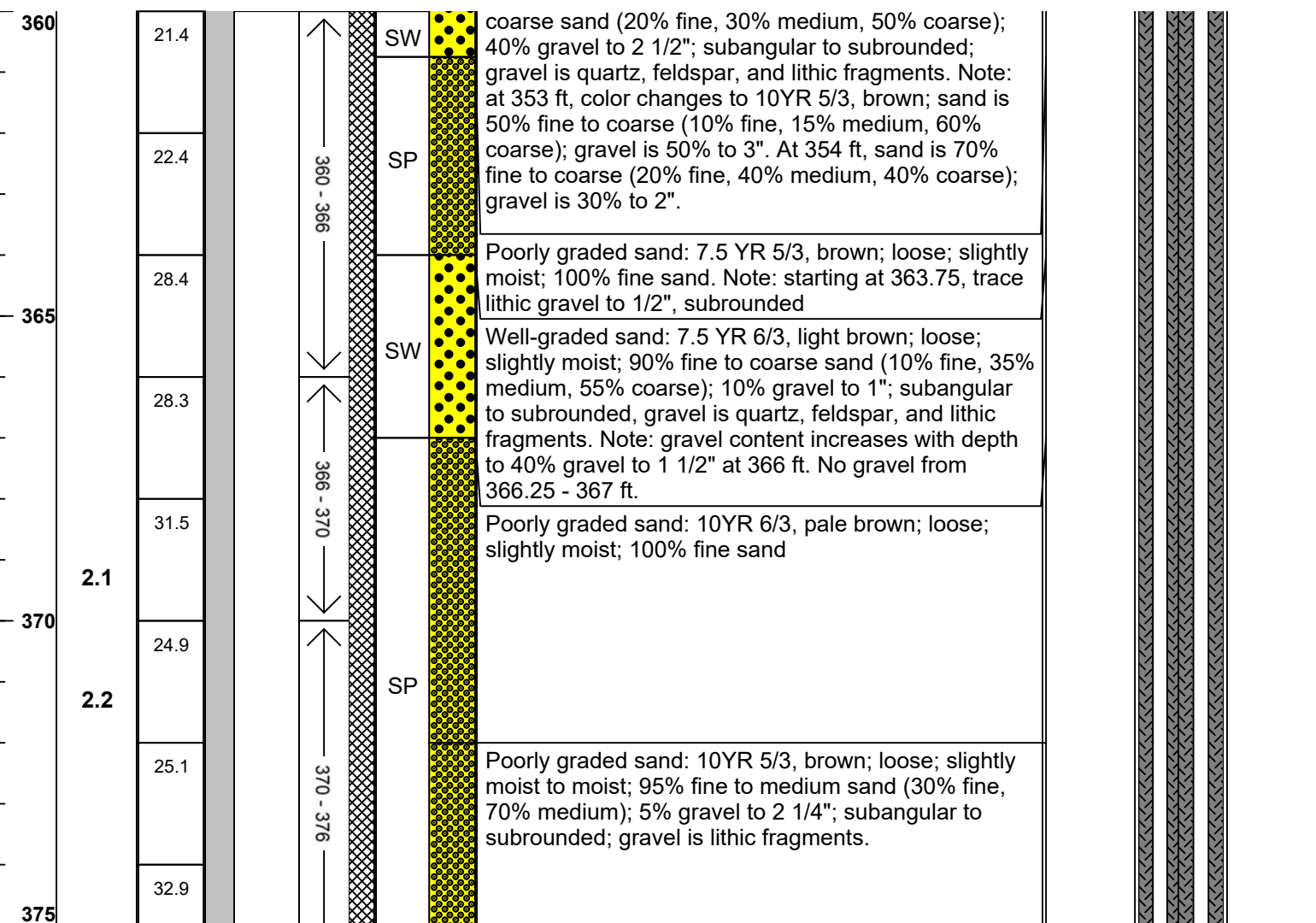
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Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

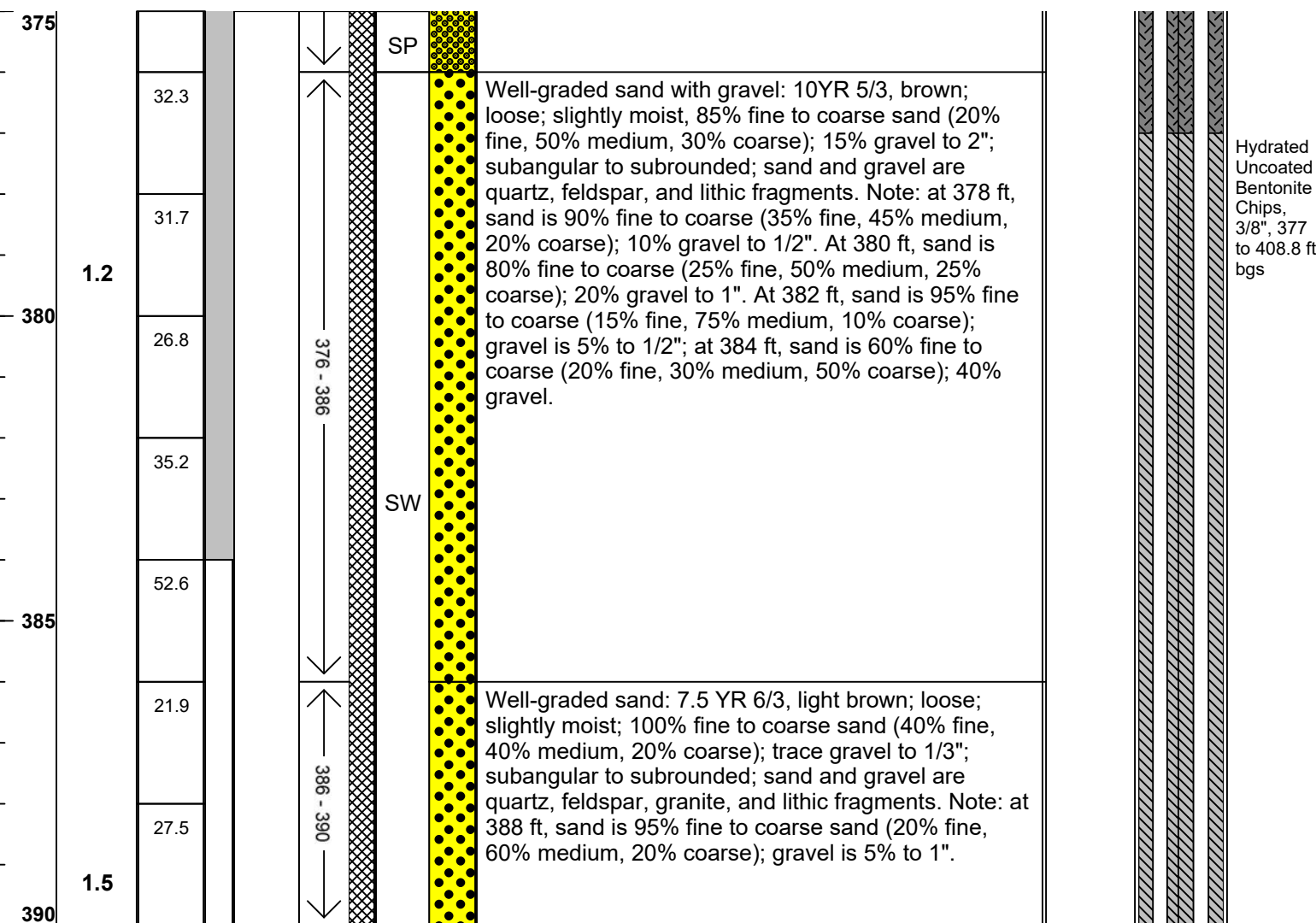
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

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NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

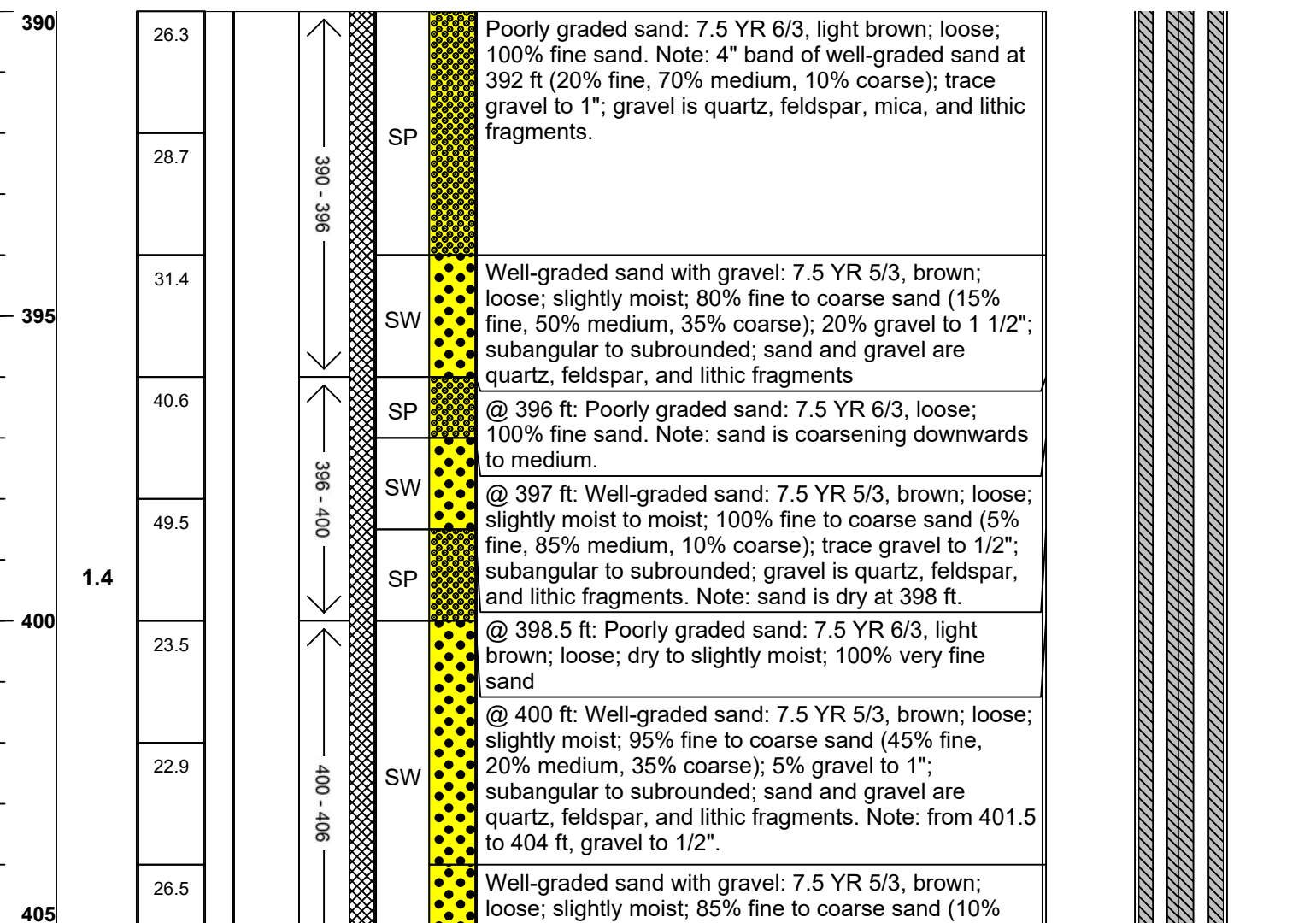
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Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



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UV Fluorescence Field Test	
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	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
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EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/6/2018**

Completion Date: **11/8/18**

WELL LOG

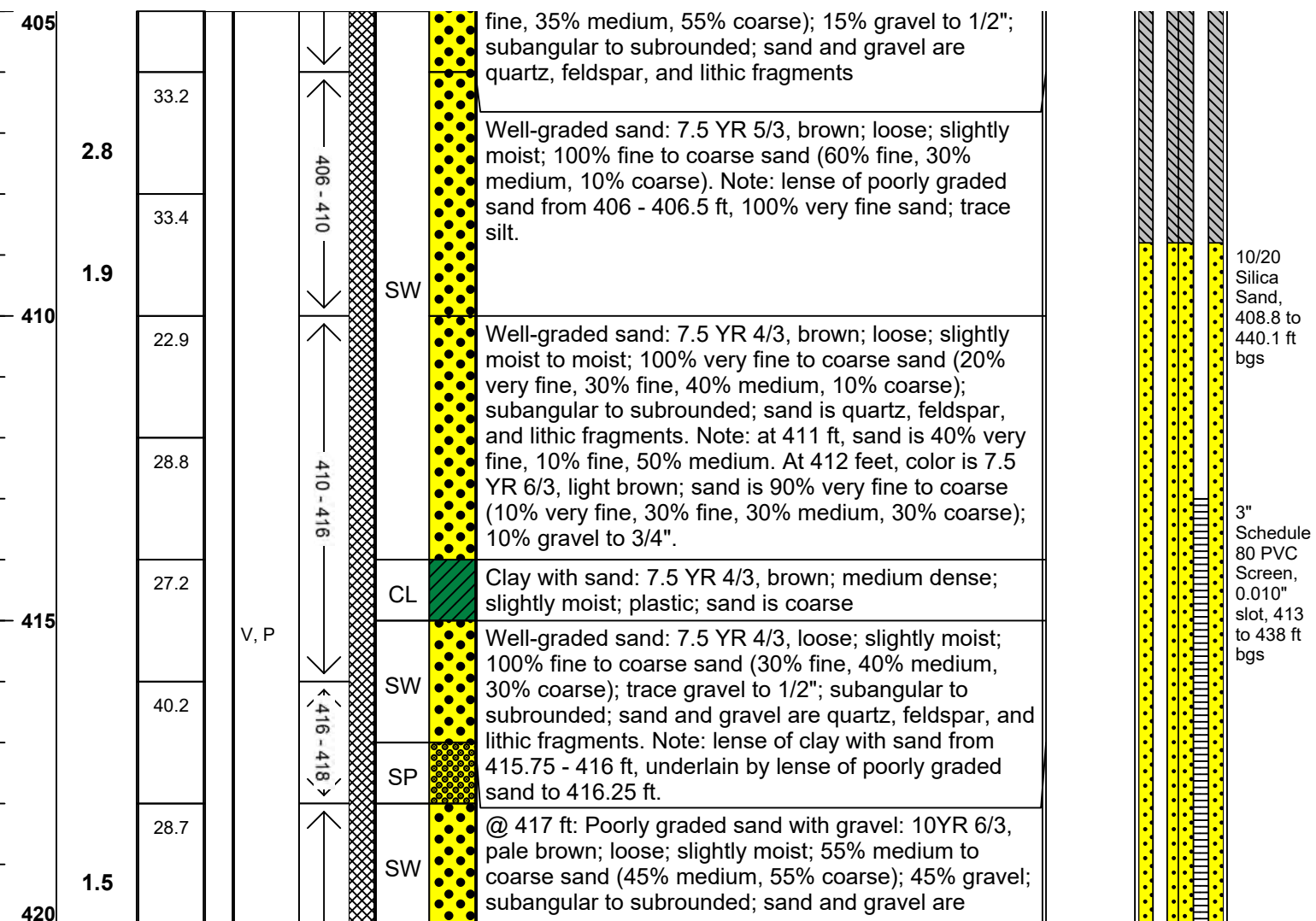
Well ID: **KAFB-106S9**

Page: **28 of 34**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

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UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

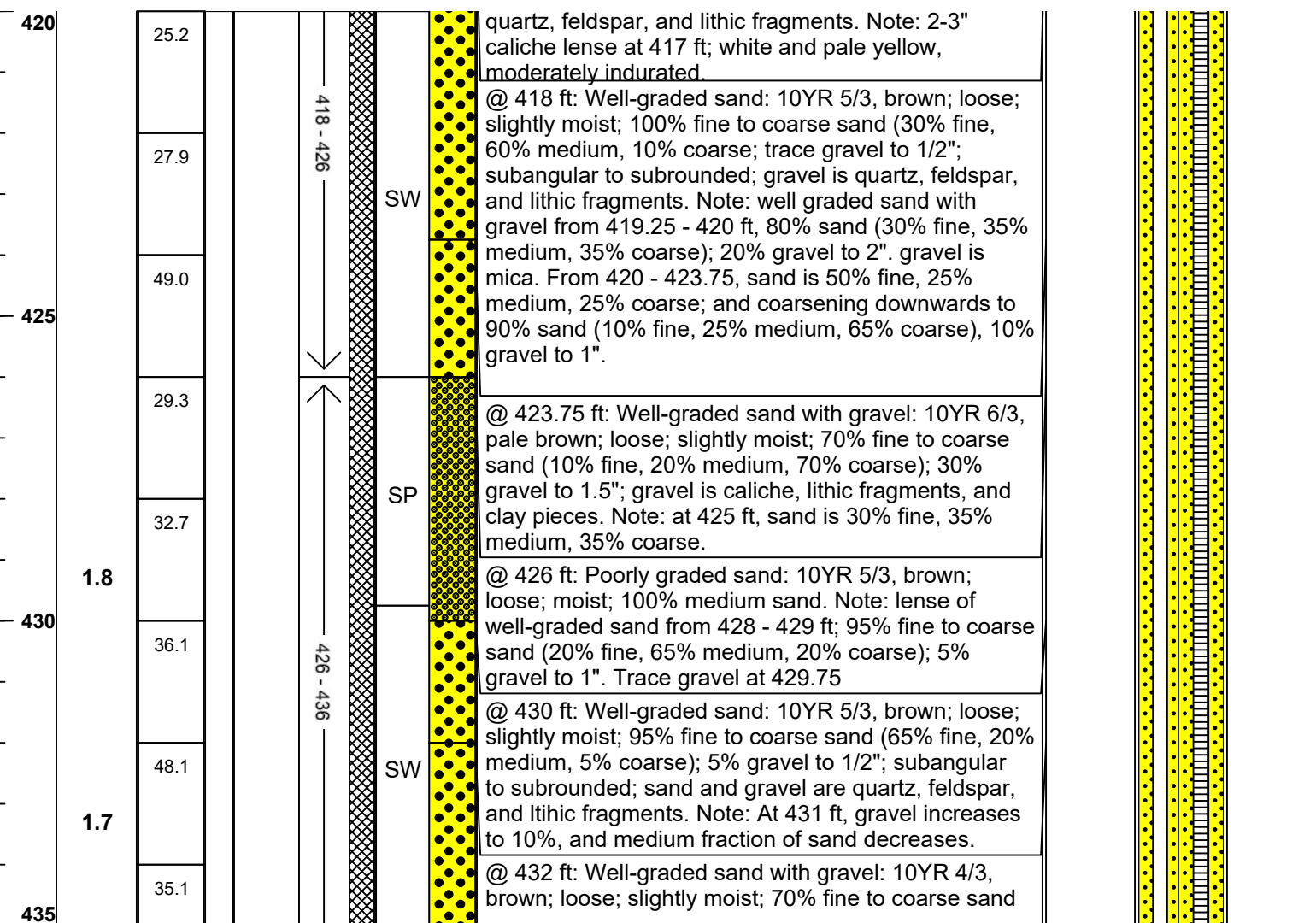
Following coring, the borehole was overdrilled using ARCH for well installation

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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes: (1) Current Water Table Well
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UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

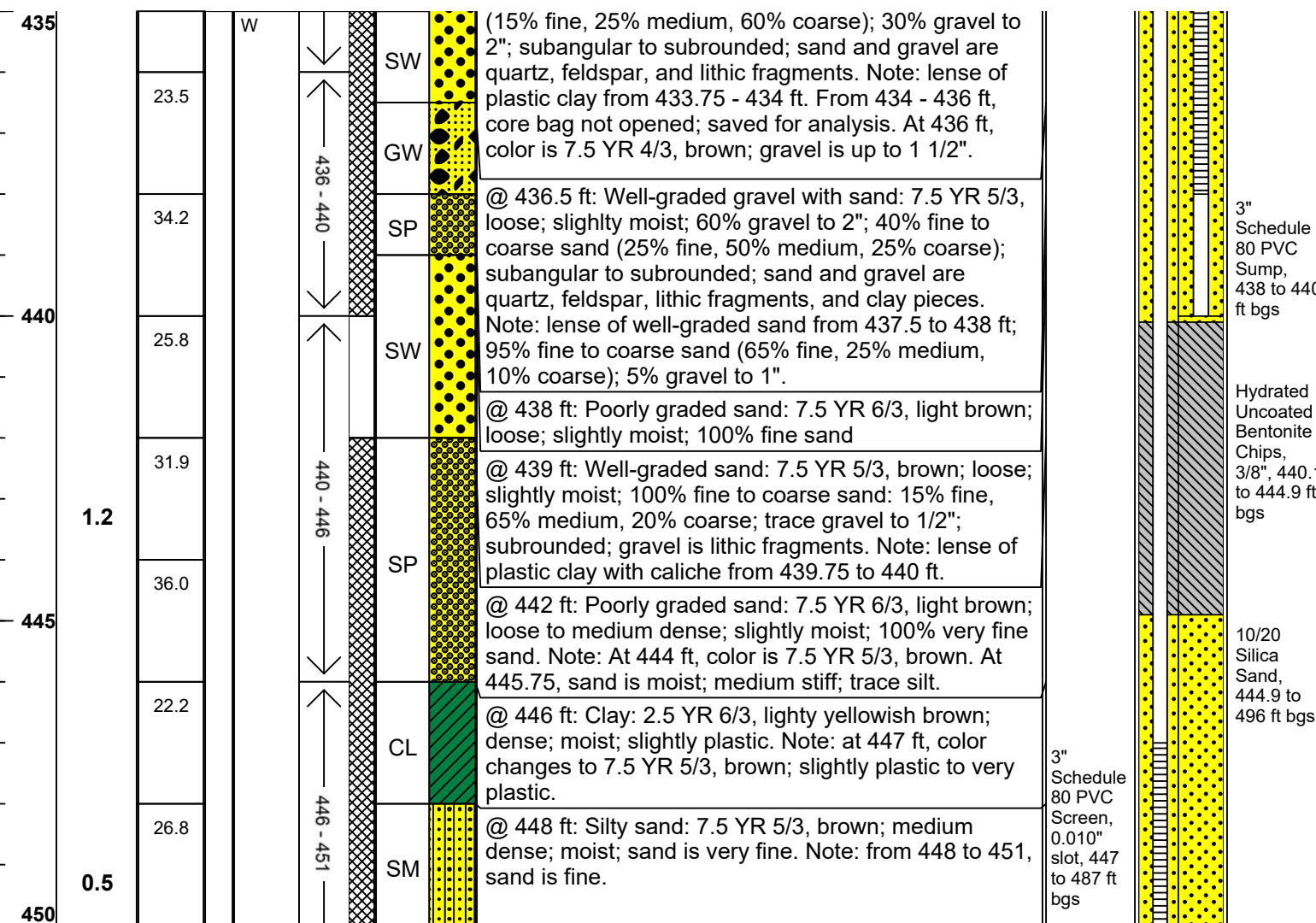
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

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UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

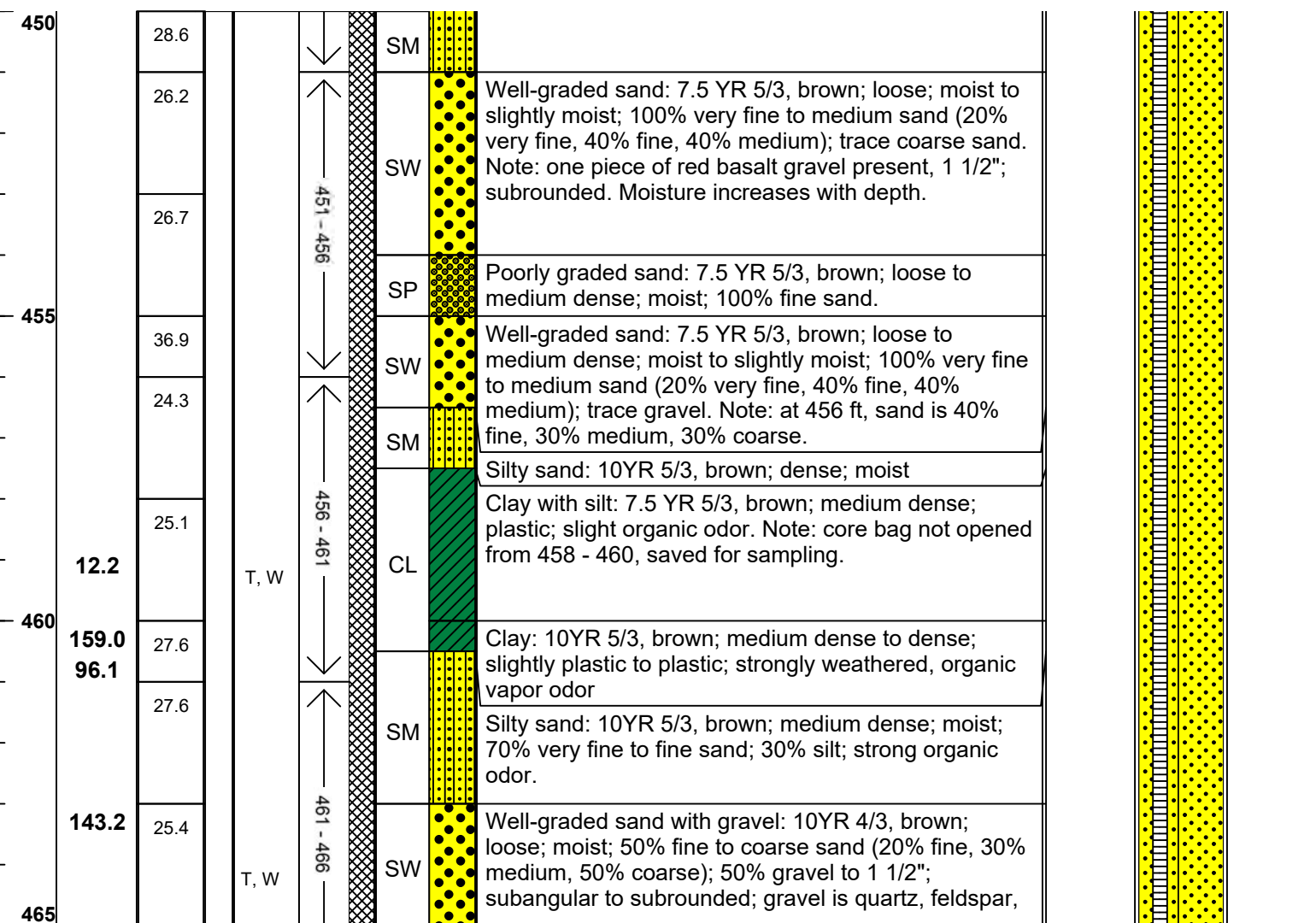
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Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
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Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

- (1) Current Water Table Well
- (2) Contingency Well
- ∇ = Depth to water after completion
- UV = ultraviolet fluorescence
- NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
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Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
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Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

465	305.0	26.5							and lithic fragments. Note: strong weathered organic odor. Core bag not opened for 463 - 465 ft, saved for sampling and logged through the bag; description based on 465 ft core. At 466 ft, color is 7.5YR 5/3, brown; sand is 60% fine to coarse (10% fine, 25% medium, 65% coarse); 40% gravel to 1". At 467.5 ft: 1 - 2" lense of white indurated caliche. At 468 ft, sand is 80% fine to coarse (5% fine, 30% medium, 60% coarse); gravel is 20% to 1".	
	379.8	23.2			466 - 471			SW		
		22.3								
470	519.4	23.7	P, V		471 - 476			SP	Well-graded sand: 10YR 5/3, brown; loose; slightly moist to moist; 90% fine to coarse sand (20% fine, 40% medium, 40% coarse); 10% gravel to 1"; subangular to subrounded; sand and gravel are quartz, feldspar, and lithic fragments. Note: at 470 ft, sand is 95% fine to coarse (20% fine, 35% medium, 45% coarse); gravel is 5% to 2". At 471 ft, sand is 90% fine to coarse (45% fine, 10% medium, 45% coarse); gravel is 10% to 1". At 472 ft, gravel is red and gray clay pieces to 2".	
	1440	21.3								
	2531	21.2	G, UV						Poorly graded sand: 10YR 4/2, dark grayish brown; medium dense; wet; 100% fine sand. At 457 ft, color is 10YR 3/3, dark brown, with visible black sediment.	
475	2557	22.0	V, P, B, M					SW		
		22.7						SC	Well-graded sand: 10YR 4/3, brown; loose to medium dense; 95% fine to coarse sand (80% fine, 10% medium, 10% coarse); 5% gravel to 1/2"; sand and gravel are quartz, feldspar, and lithic fragments. Note: strong odor	
		27.1	B, M,		476 - 482			SW	@ 477 ft: Clayey sand: 7.5 YR 5/2, brown; medium dense; 70% fine to coarse sand (50% fine, 25% medium, 25% coarse); 10% gravel to 1/2"; 20% clay, medium plastic. Note: Large caliche cobble, 6",	
480										

Notes: (1) Current Water Table Well
(2) Contingency Well
☒ = Depth to water after completion
UV = ultraviolet fluorescence
NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

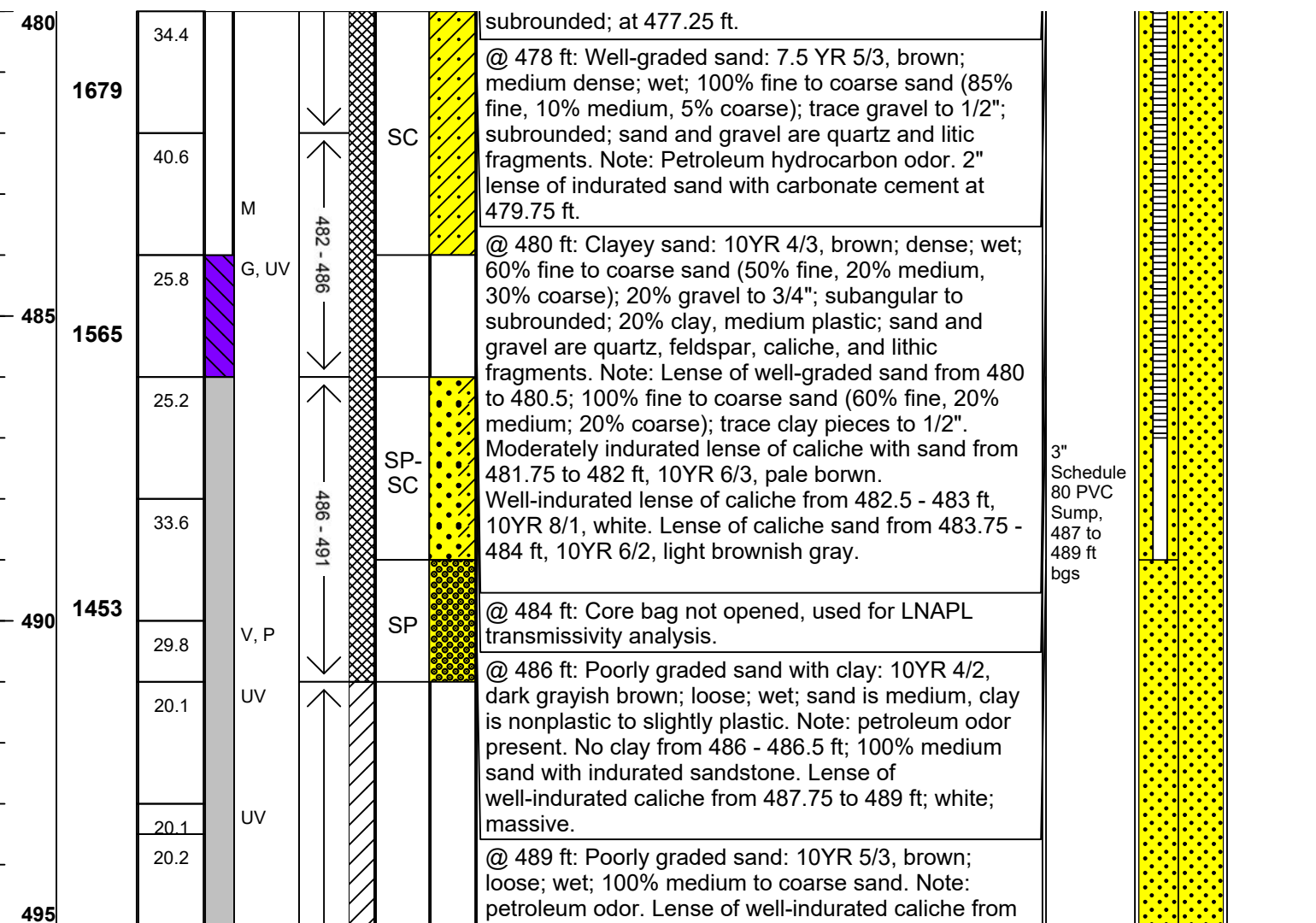
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **10/6/2018**

Completion Date: **11/8/18**

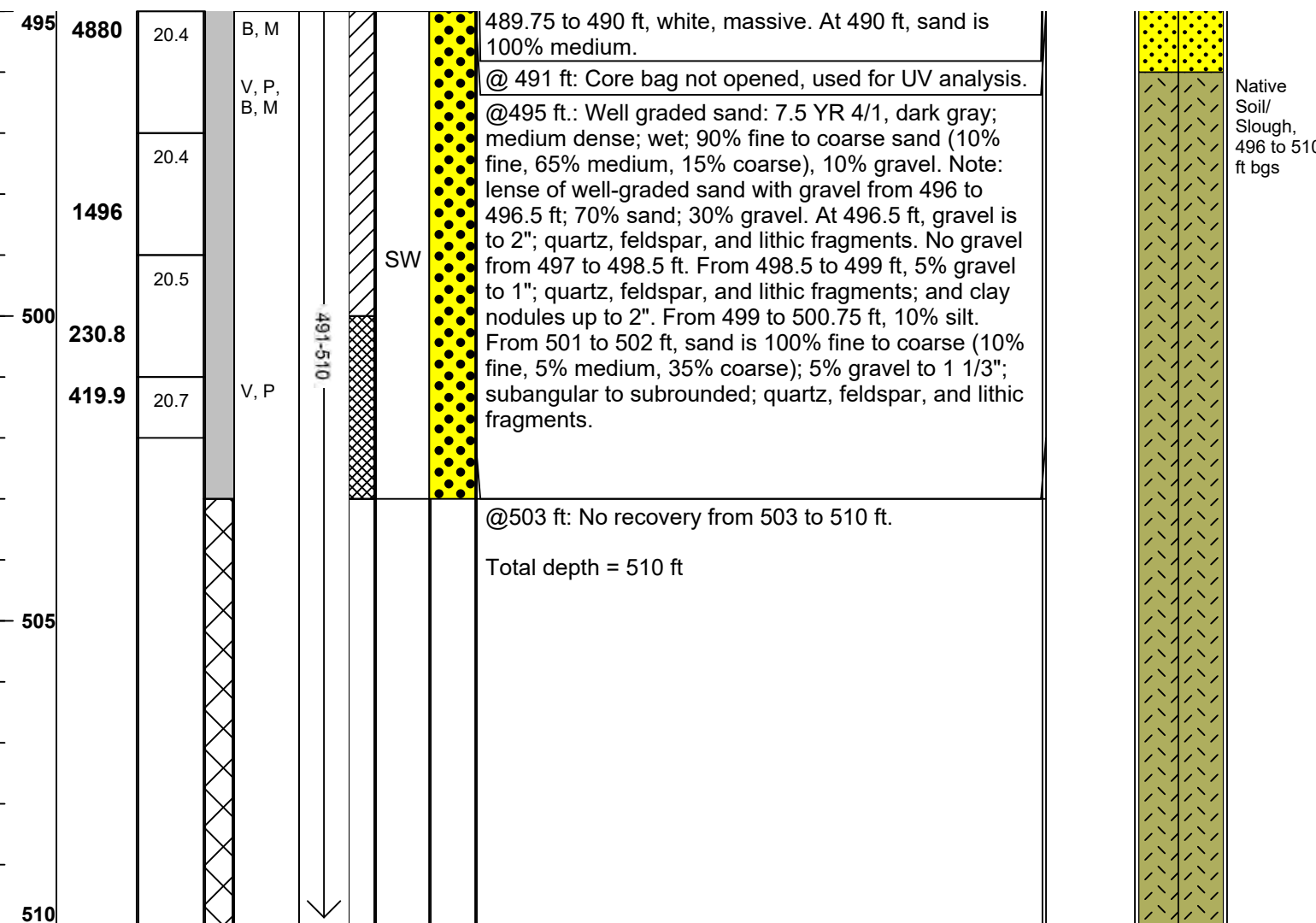
WELL LOG

Well ID: **KAFB-106S9**

Page: **34 of 34**

Drilling Company: Cascade	Boring Depth (ft): 510 ft	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 472.67	High Solids Bentonite Grout
Geologist: L. Andress	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

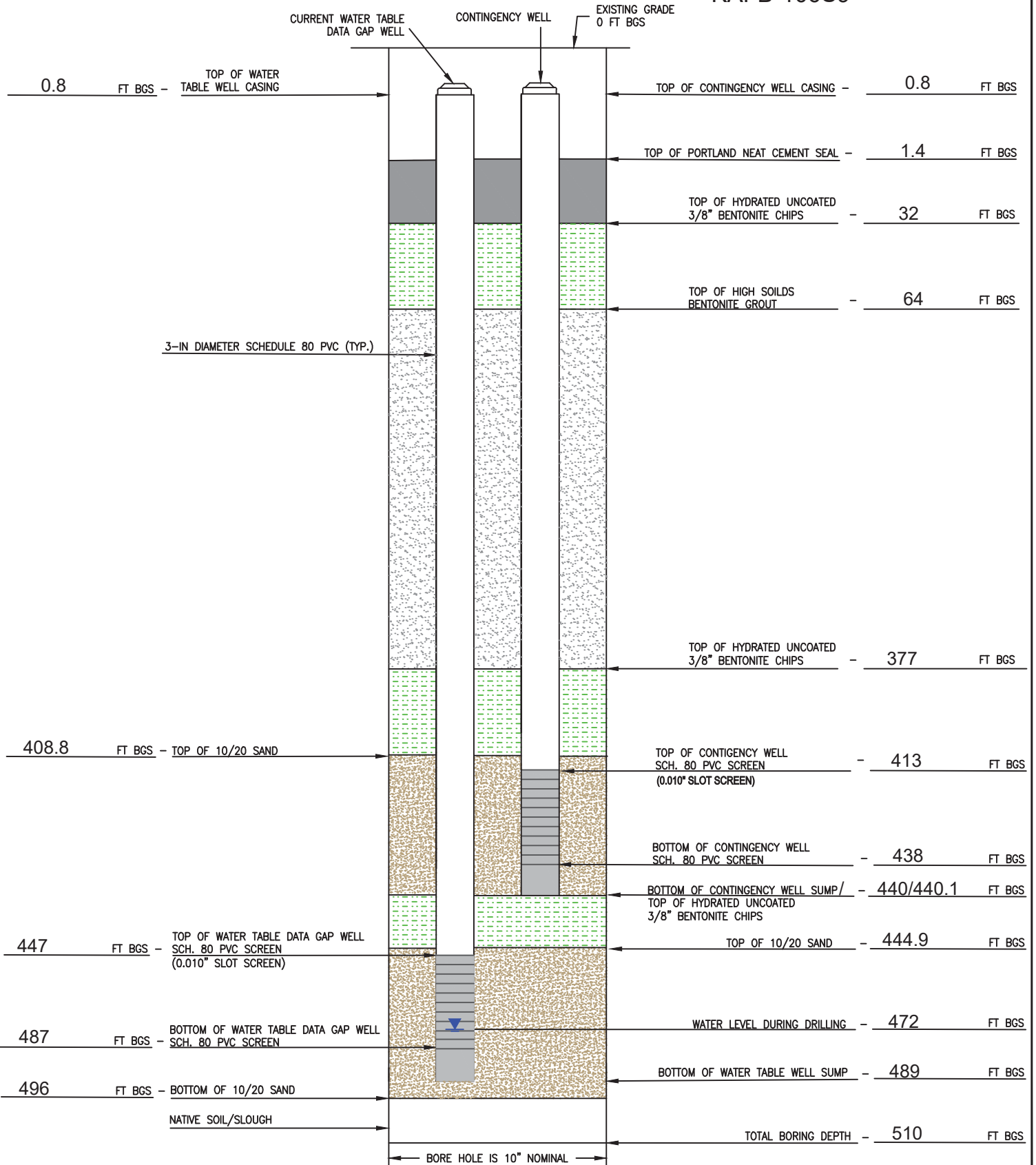
Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

NESTED MONITORING WELL CONSTRUCTION

KAFB-106S9



NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016

EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

PROJECT NO.:
62735DM02.1017

WELL ID:
KAFB-106S9

INSTALLATION START DATE/TIME:
05OCT18

GEOLOGIST:
L. Andress

INSTALLATION END DATE/TIME:
08NOV18

DRILLER:
R. Rodriguez

Project: **62735DM02.1014**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/4/19**

Completion Date: **3/1/19**

WELL LOG

Well ID: **KAFB-106247**

Page: **1 of 52**

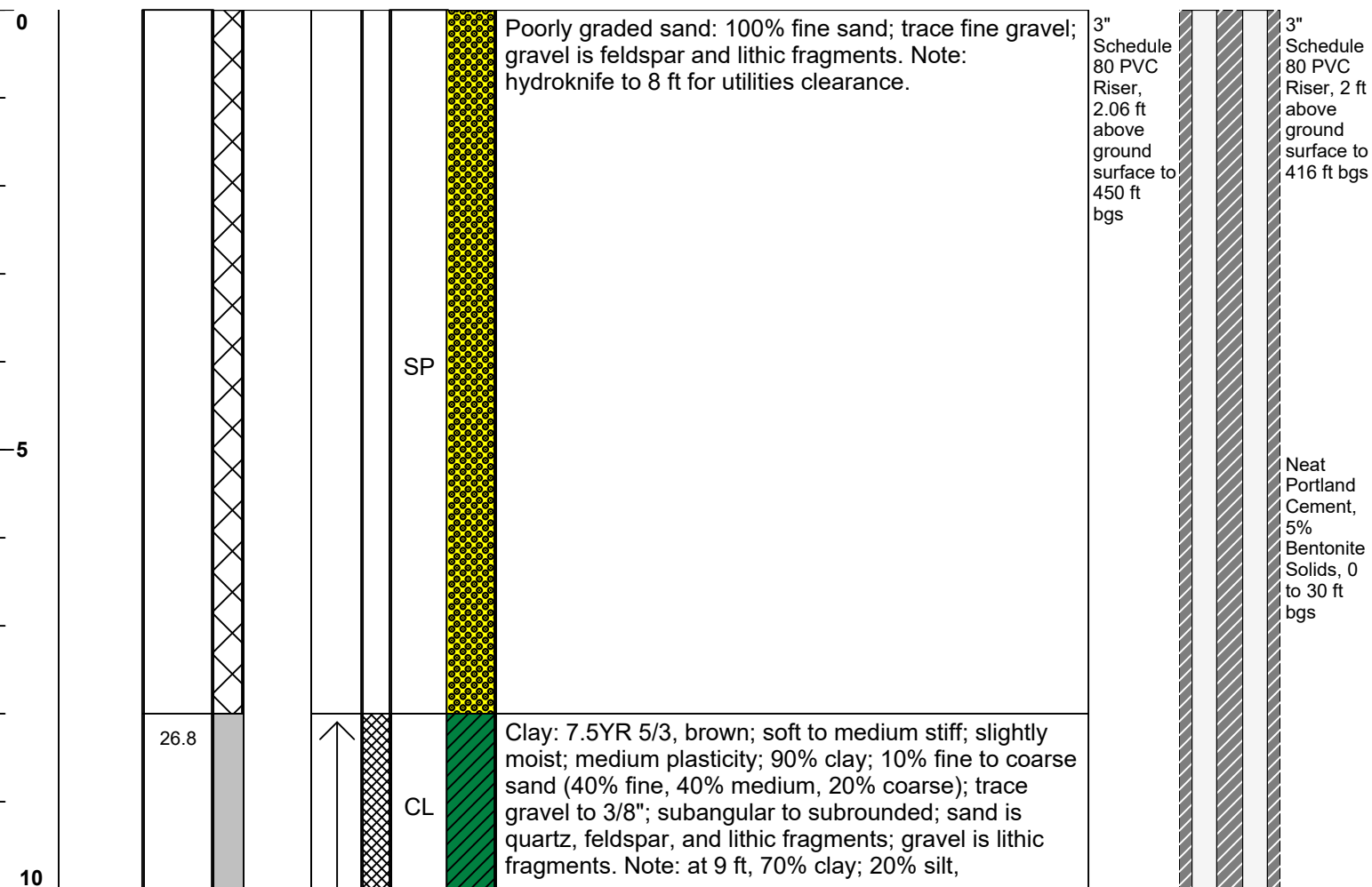
Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite,**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

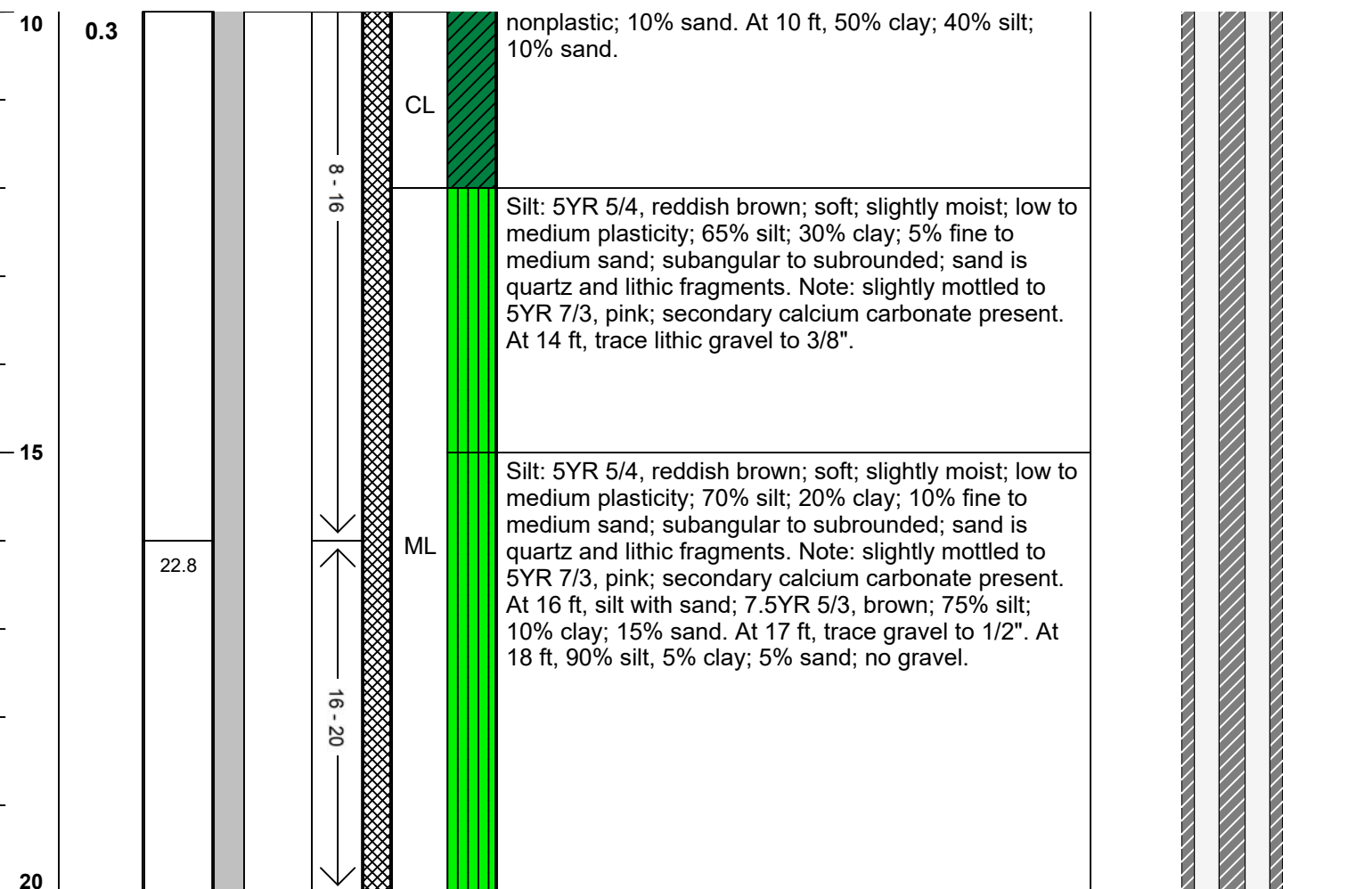
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1014**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/4/19**

Completion Date: **3/1/19**

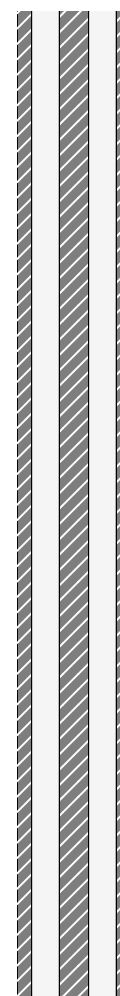
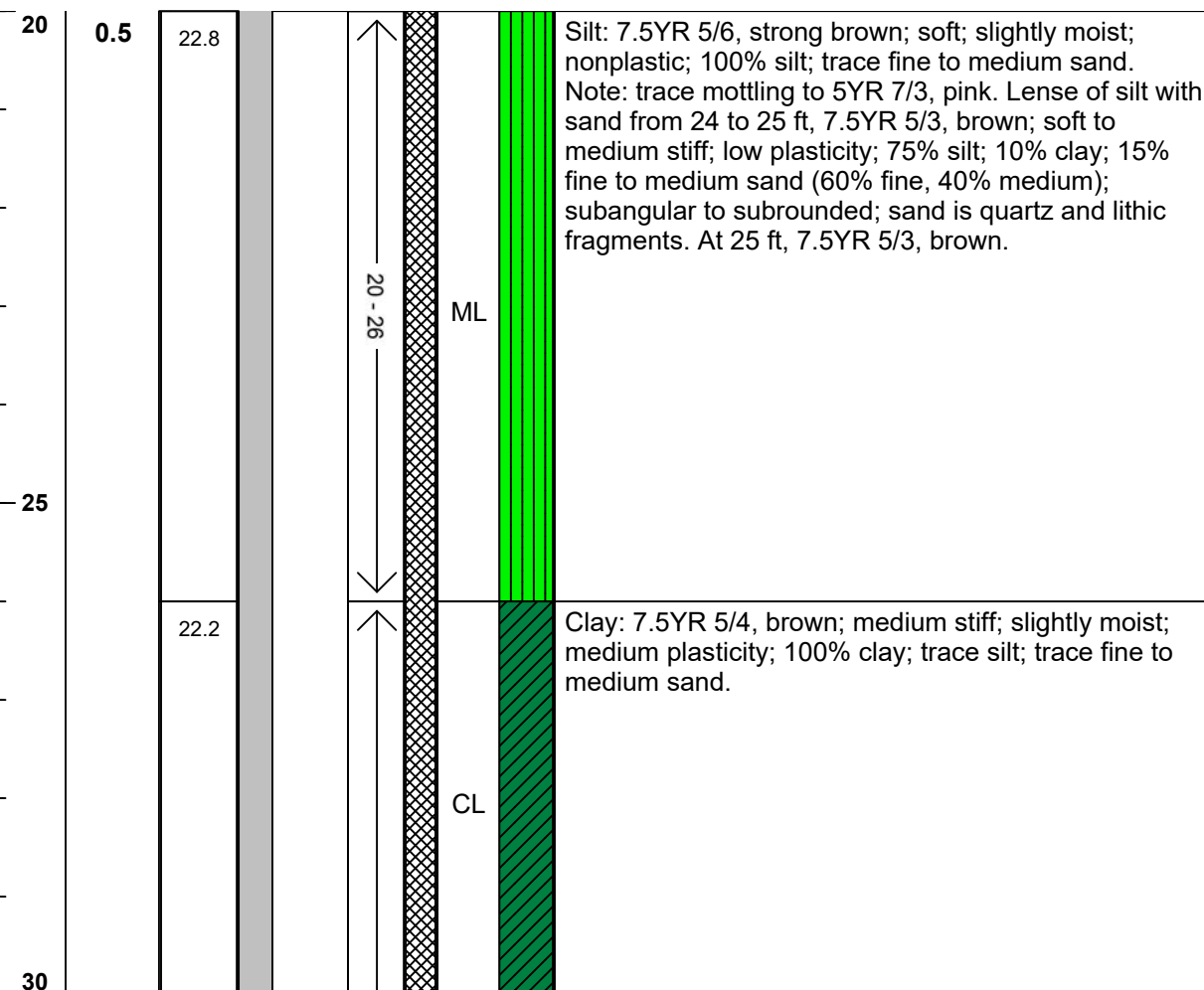
WELL LOG

Well ID: **KAFB-106247**

Page: **3 of 52**

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

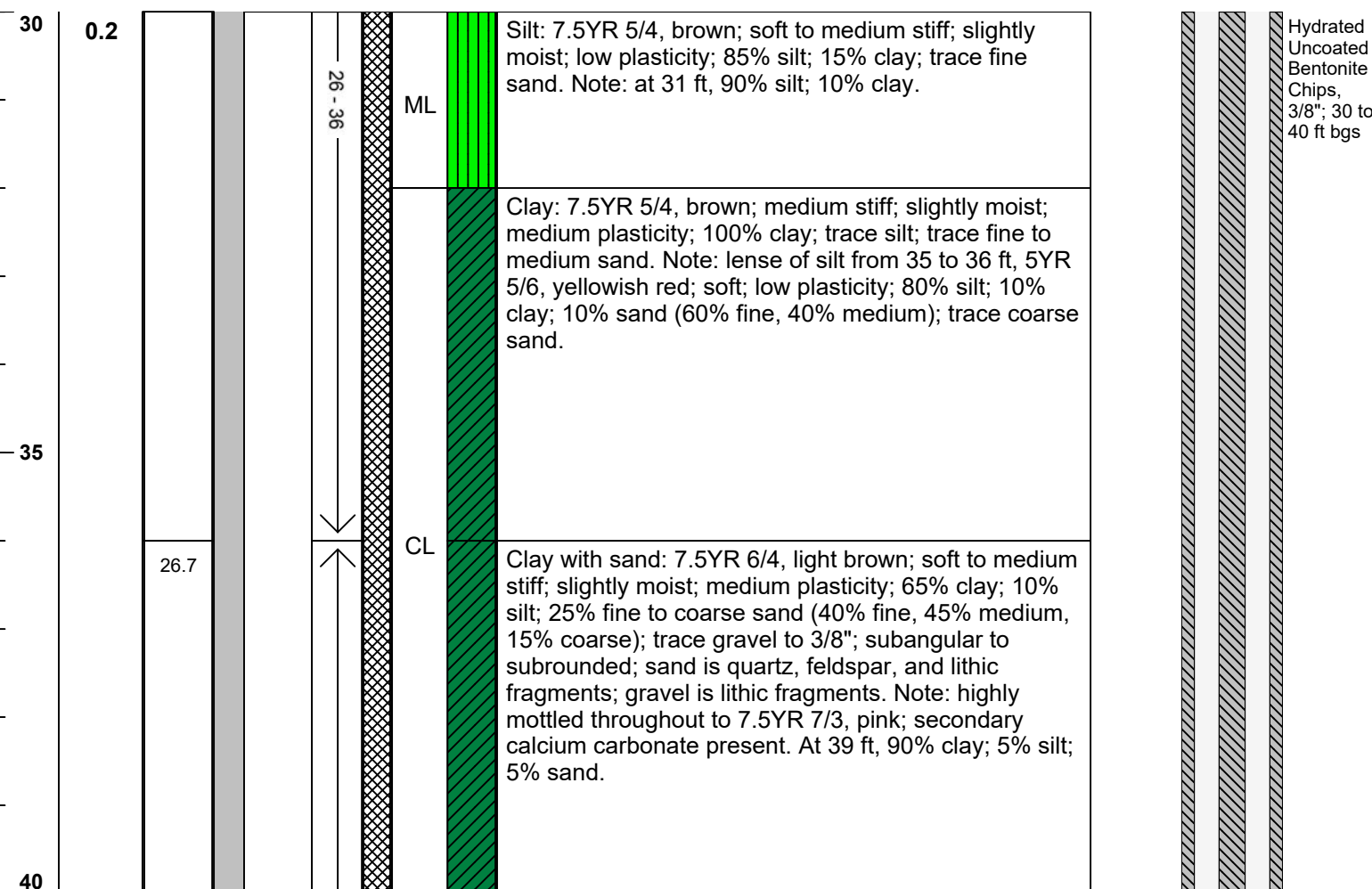
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

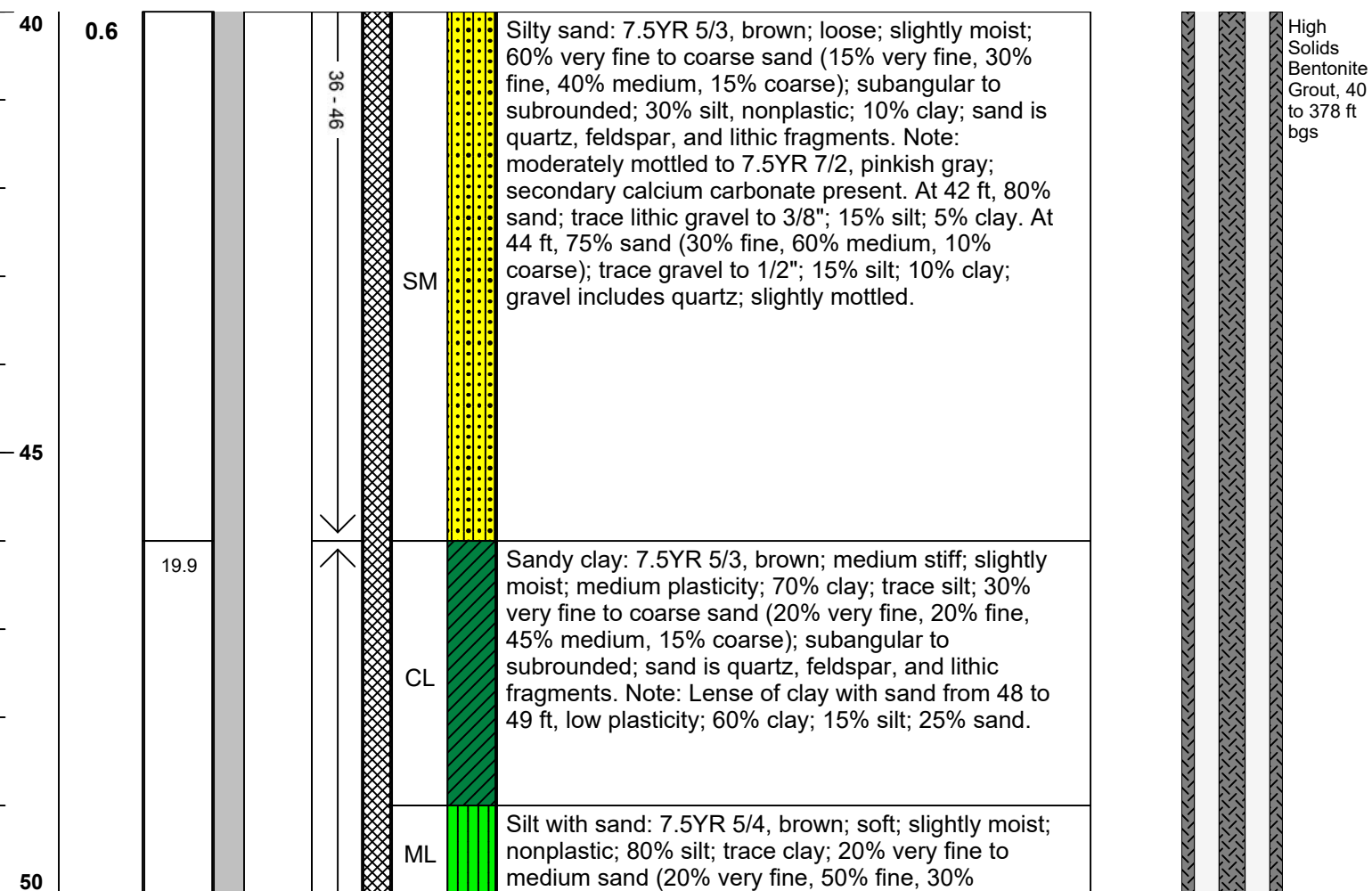
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

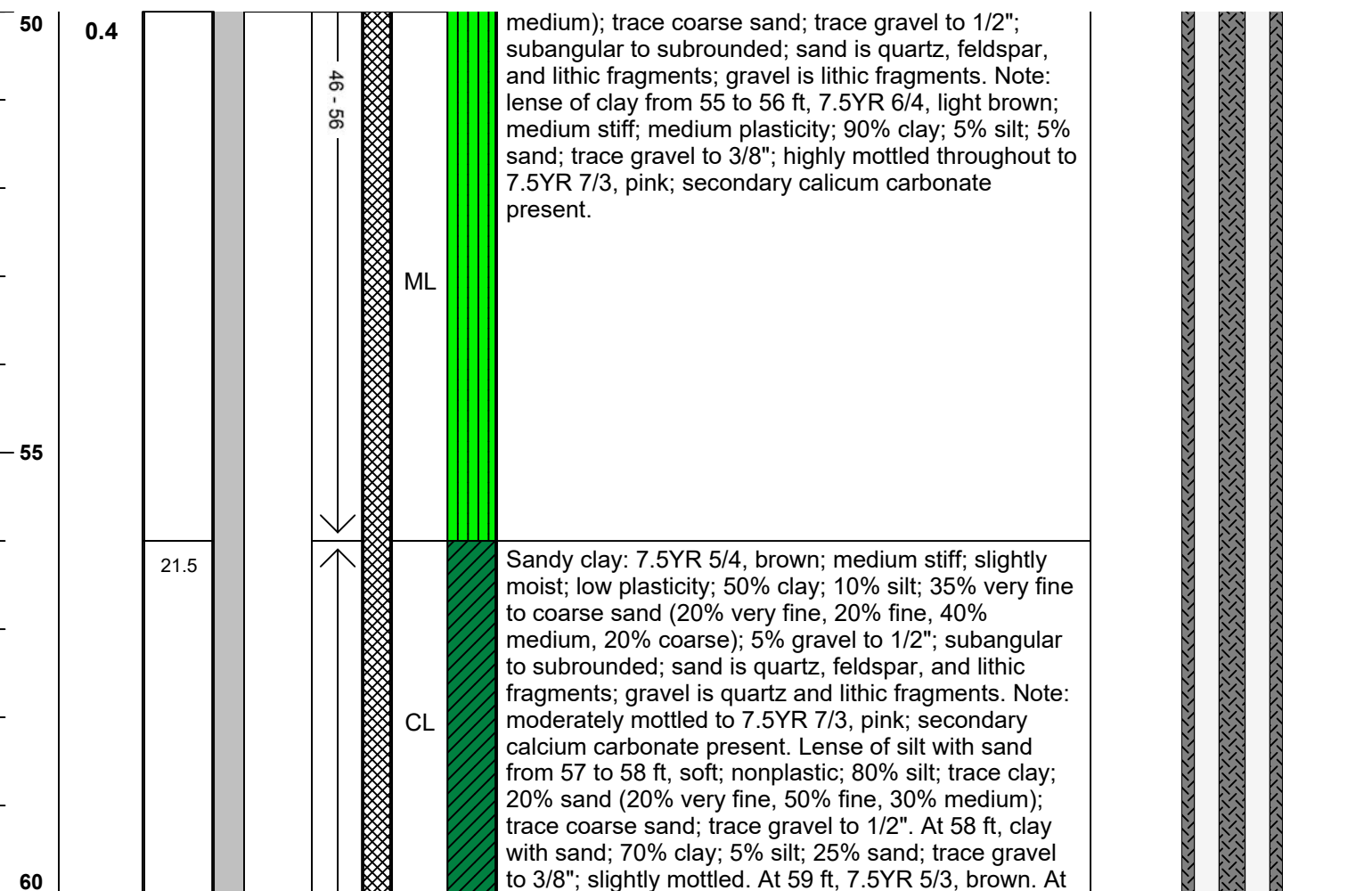
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

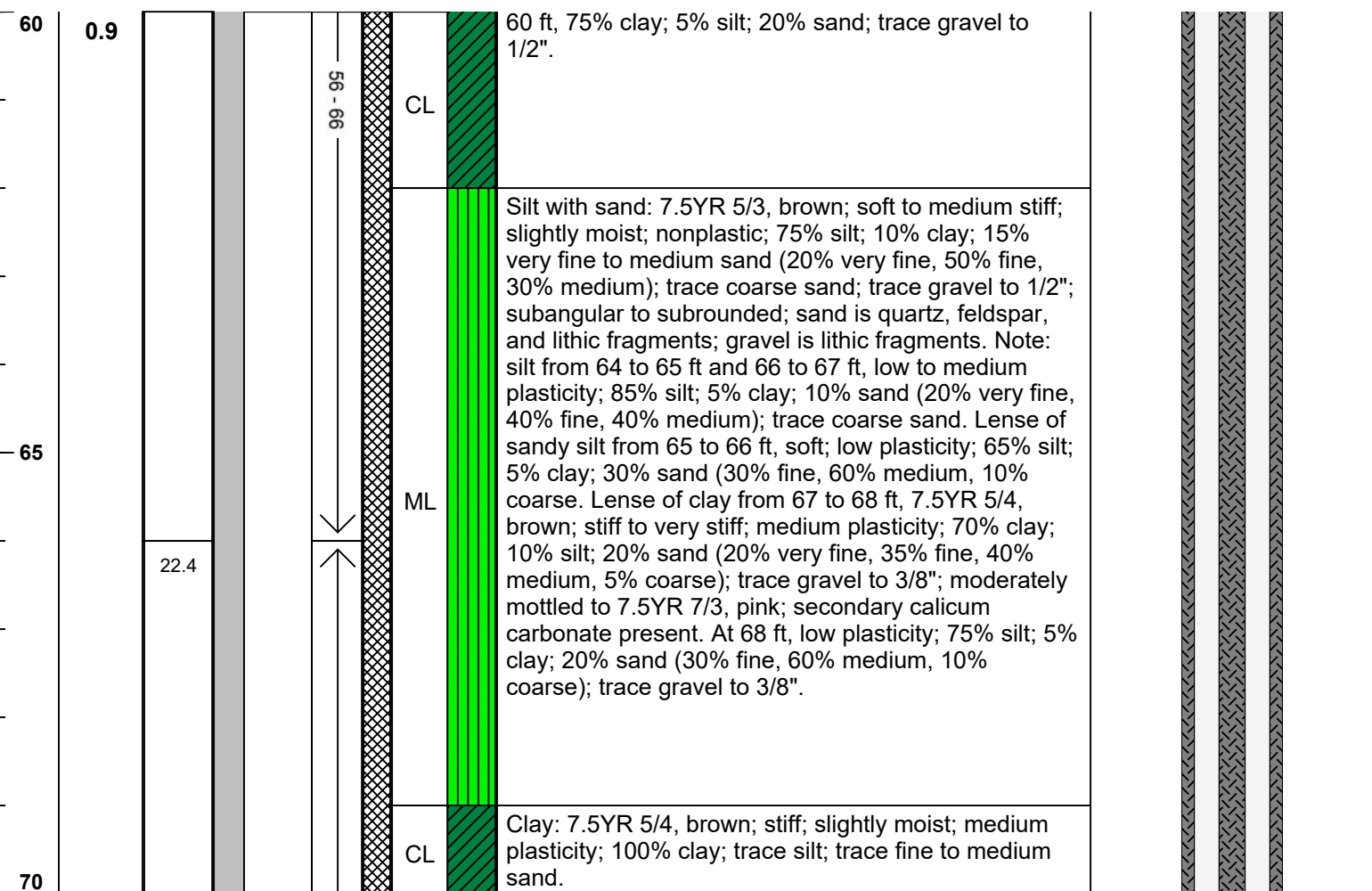
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)

70	1.1					66 - 76		CL	Clay: 7.5YR 5/4, brown; stiff; slightly moist; medium plasticity; 100% clay; trace silt; trace fine to medium sand. Note: lense of silt from 71.5 to 72 ft, 7.5YR 5/3, brown; soft; low plasticity; 85% silt; 5% clay; 10% sand (30% fine, 60% medium, 10% coarse); trace gravel to 3/8".	
								SM	Silty sand: 10YR 5/4, yellowish brown; loose; slightly moist; 70% very fine to coarse sand (20% very fine, 20% fine, 50% medium, 10% coarse); trace gravel to 3/8"; subangular to subrounded; 30% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: lense of silt from 73 to 73.75 ft, 7.5YR 5/4, brown; soft; nonplastic; 100% silt; trace fine to medium sand. At 73.75 ft, 85% sand (30% fine, 50% medium, 20% coarse); trace quartz and lithic gravel to 2"; 15% silt.	
75		32.2						CL	Clay: 7.5YR 5/4, brown; stiff; slightly moist; medium plasticity; 100% clay; trace silt; trace fine to medium sand.	
								SW-SM	Well-graded sand with silt: 7.5YR 5/2, brown; loose; slightly moist; 85% fine to coarse sand (35% fine, 50% medium, 15% coarse); 5% gravel to 3/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
80								ML	Silt: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 100% silt; trace fine sand.	

Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

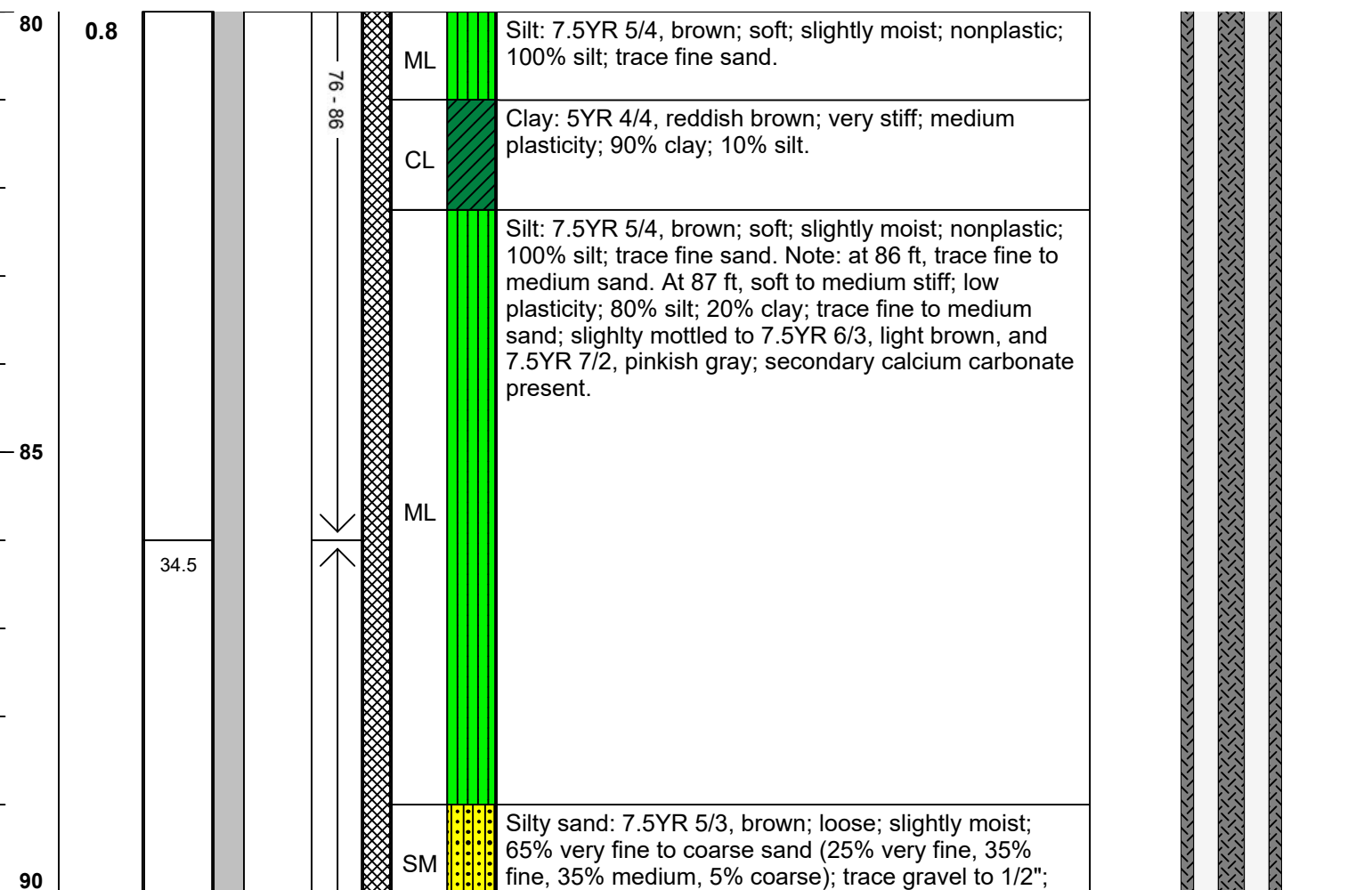
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

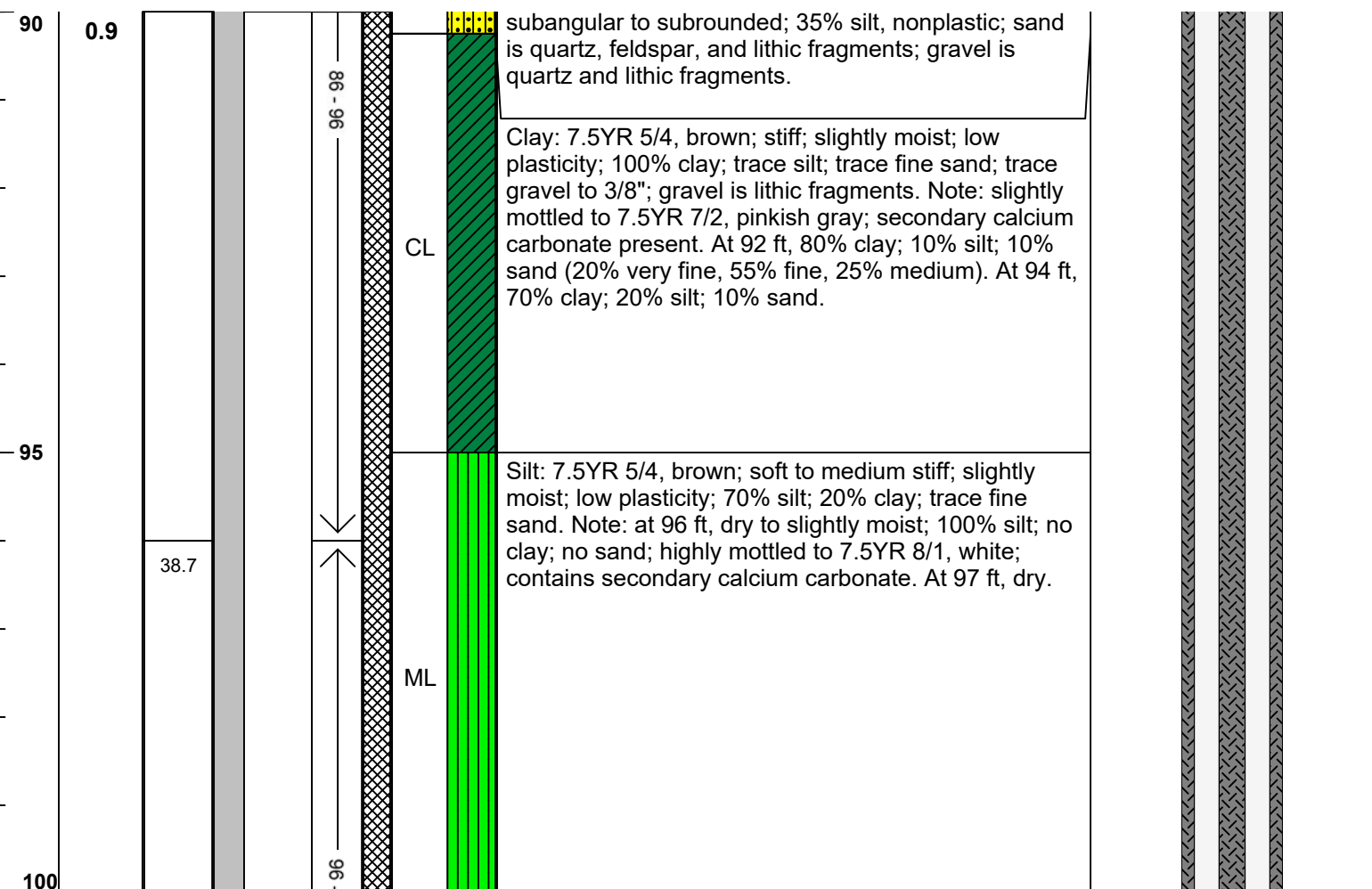
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

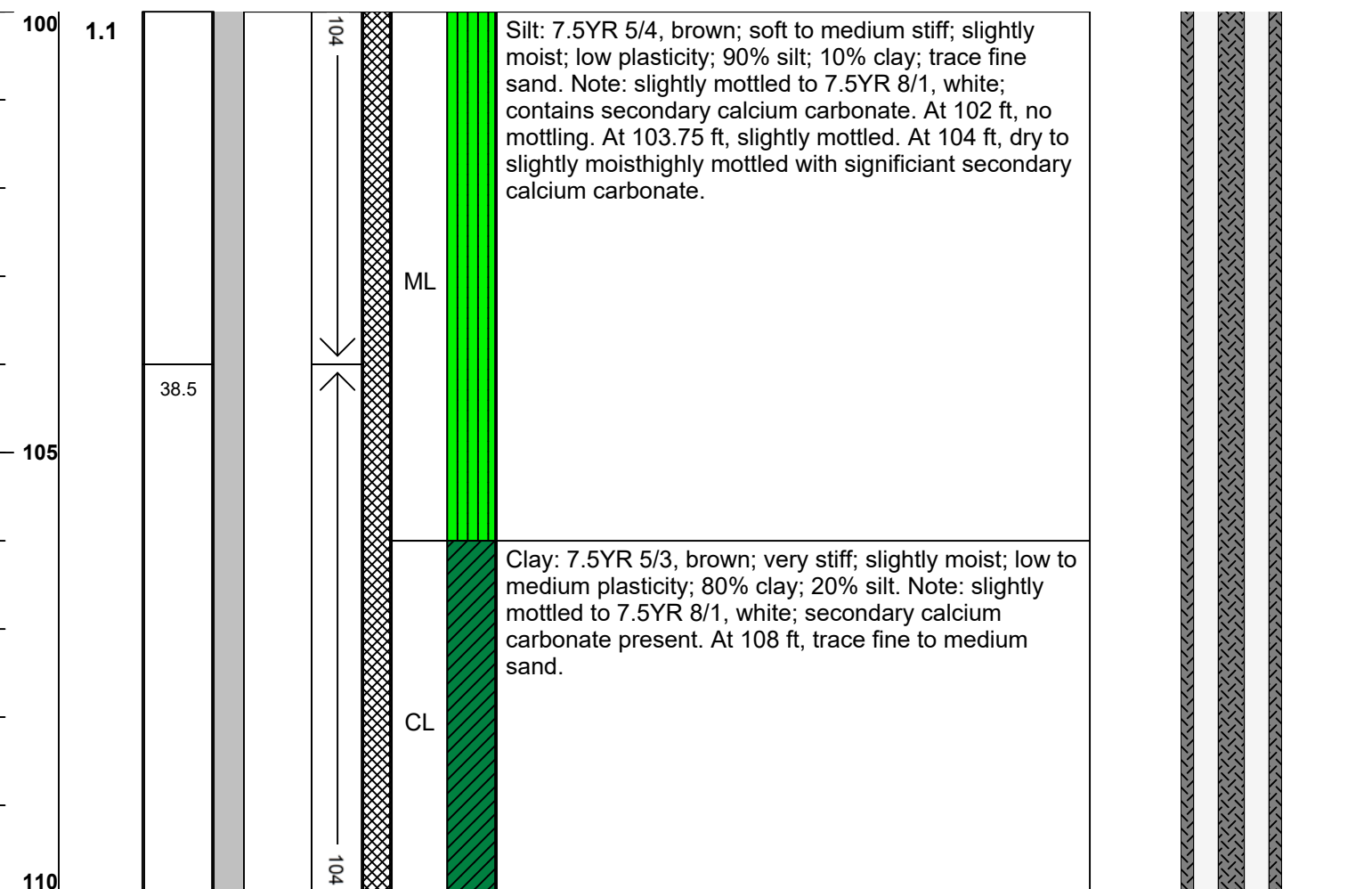
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

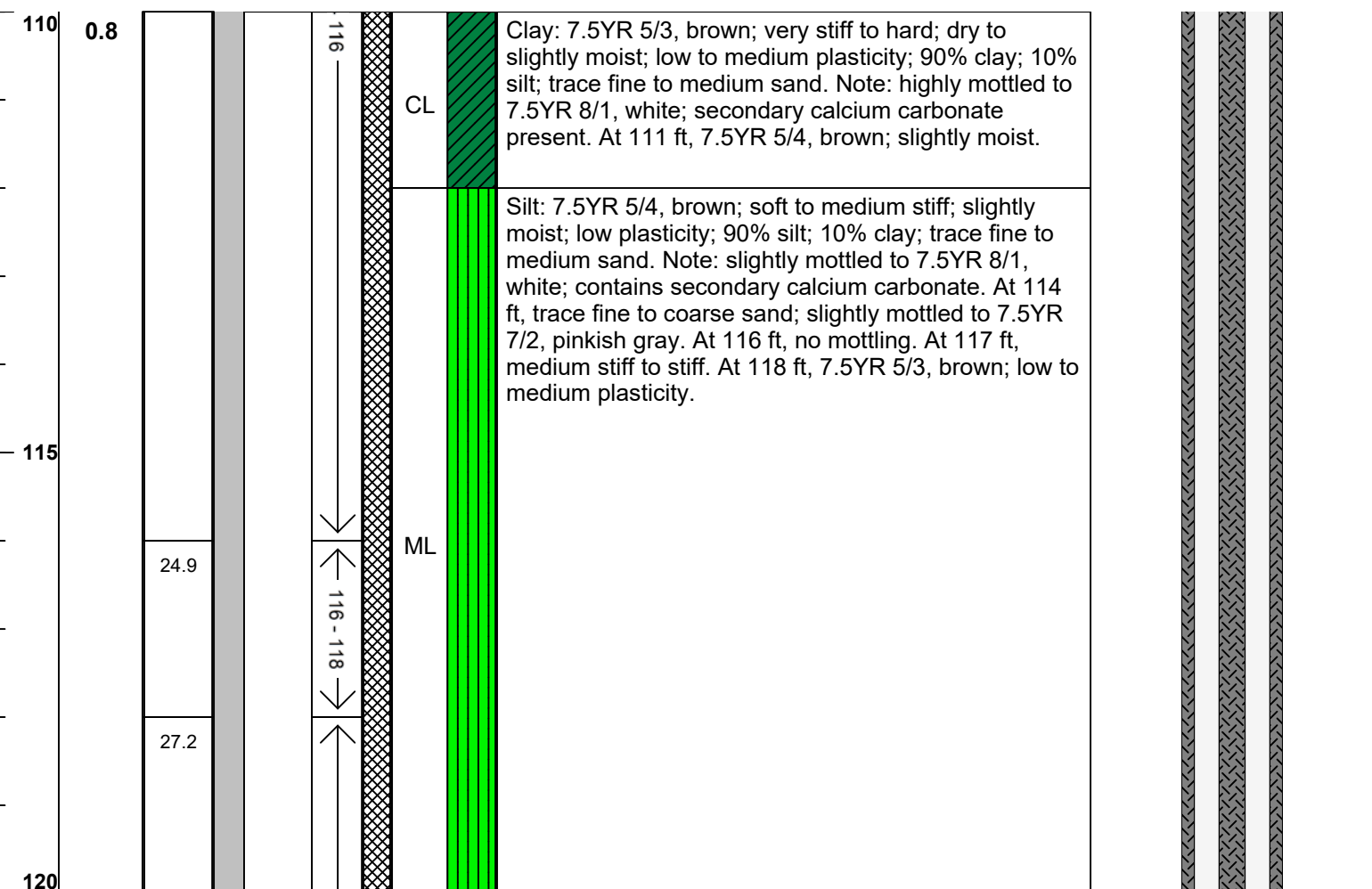
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

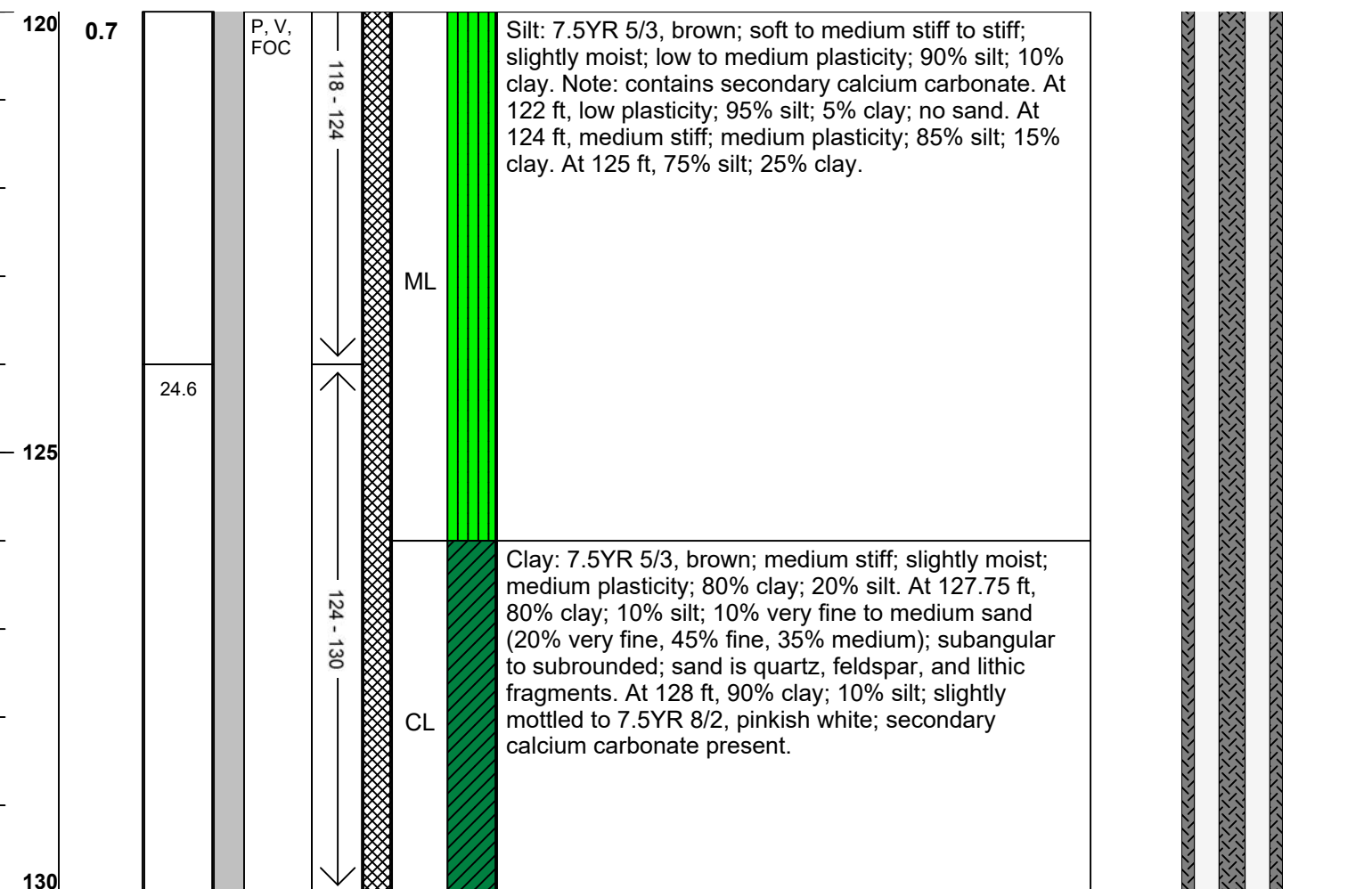
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

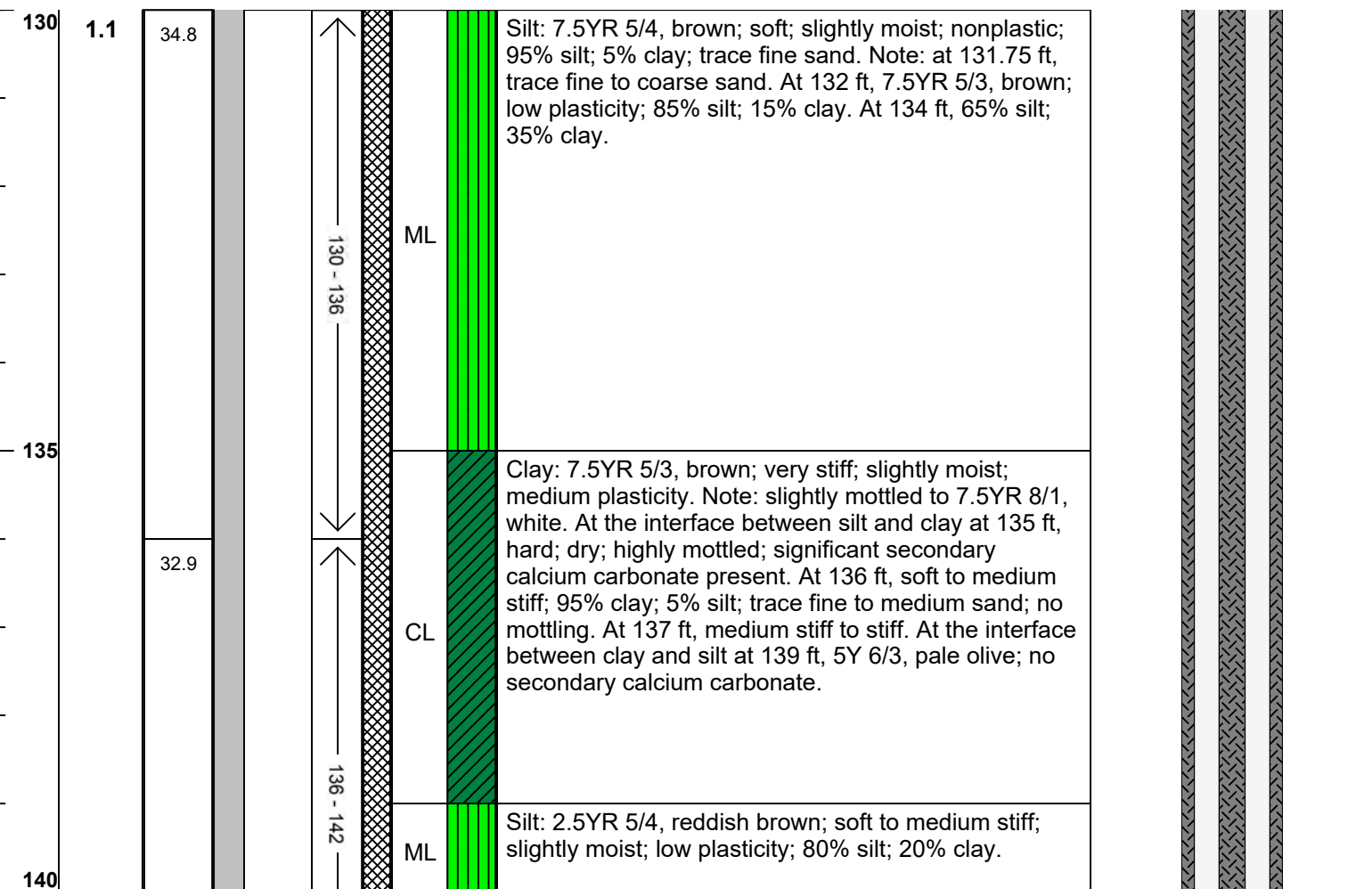
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

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ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

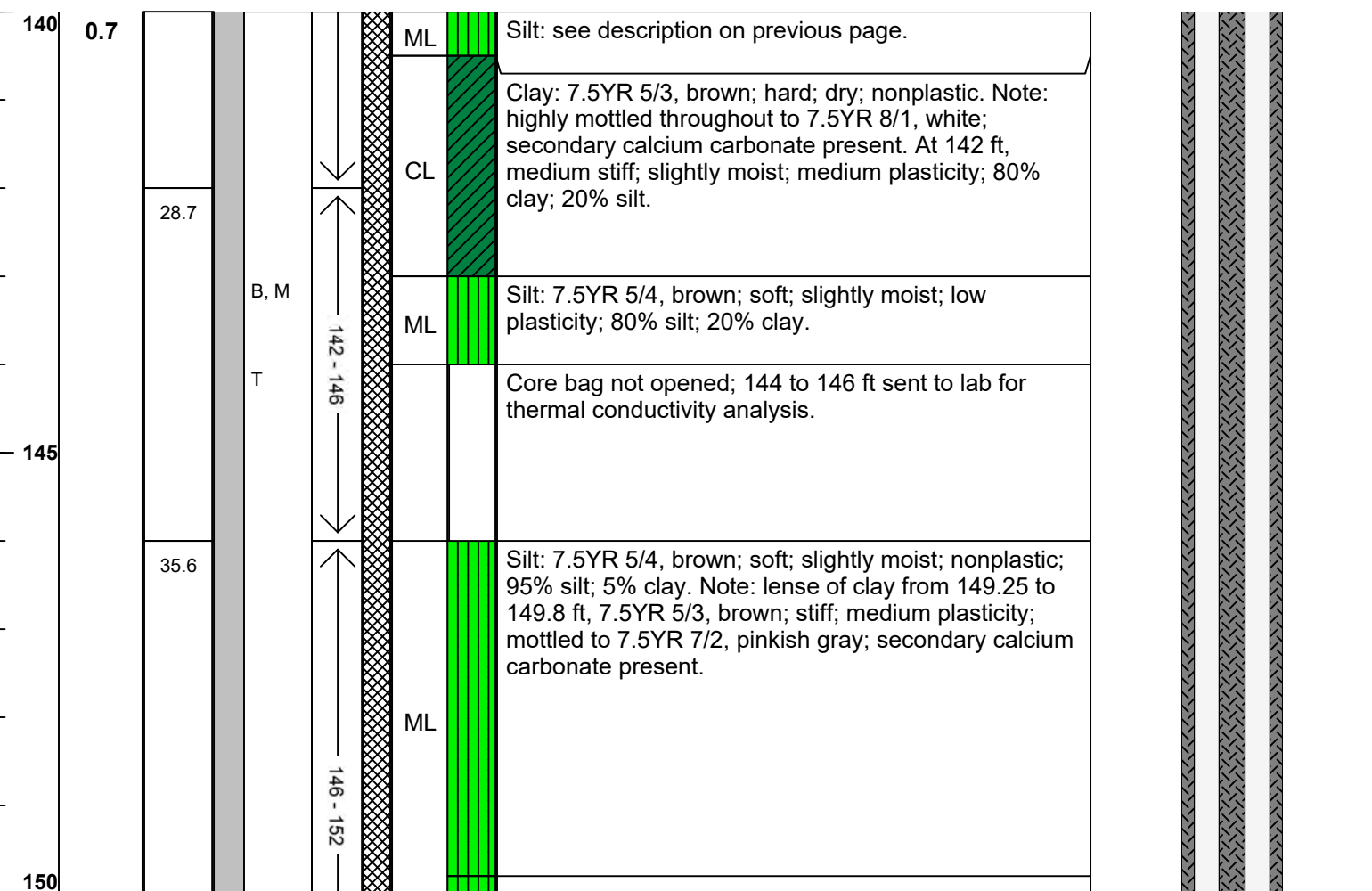
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

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Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Project: **62735DM02.1014**

Location: **Kirtland AFB, New Mexico**

Start Date: **1/4/19**

Completion Date: **3/1/19**

WELL LOG

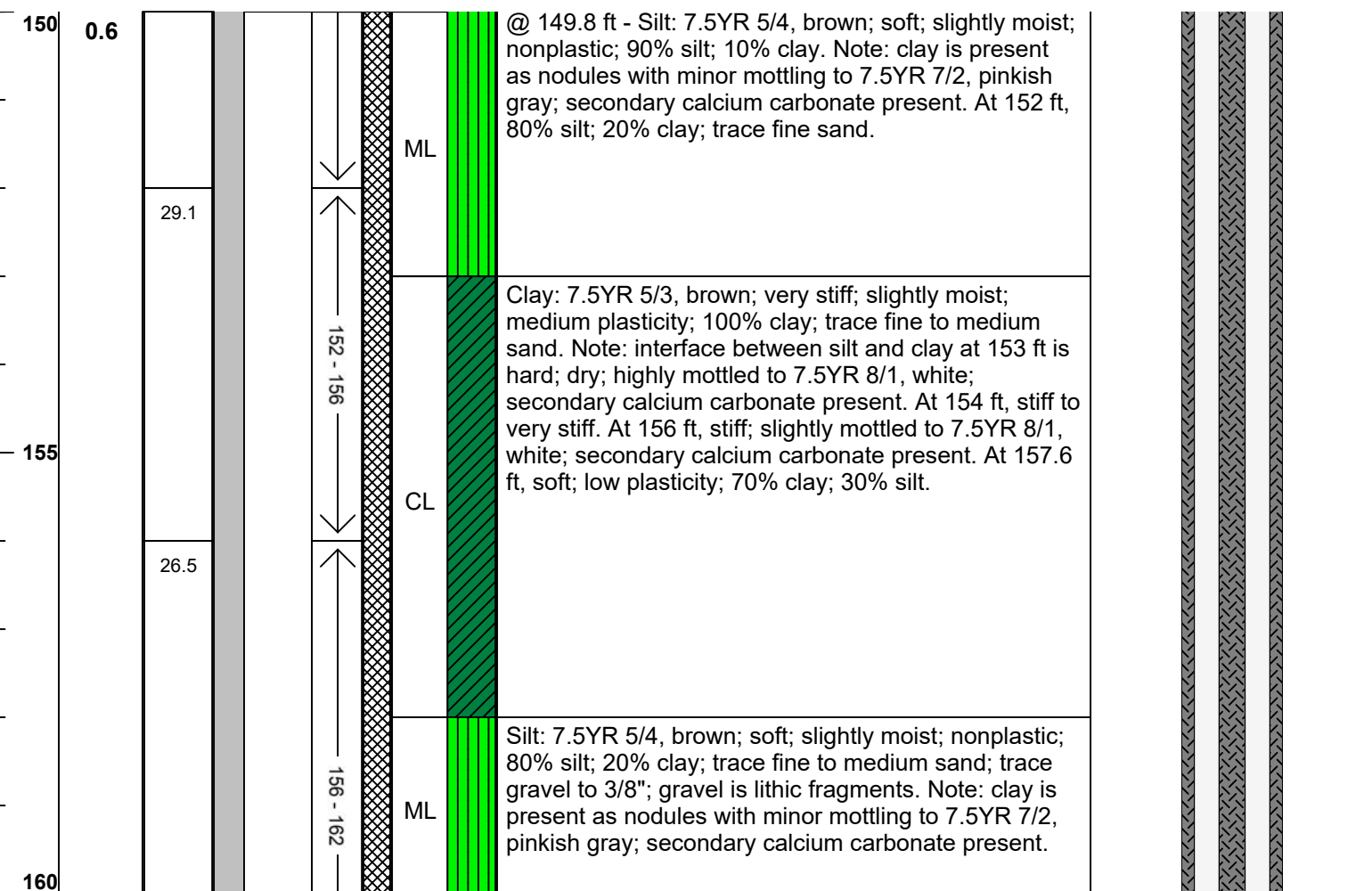
Well ID: **KAFB-106247**

Page: **16 of 52**

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

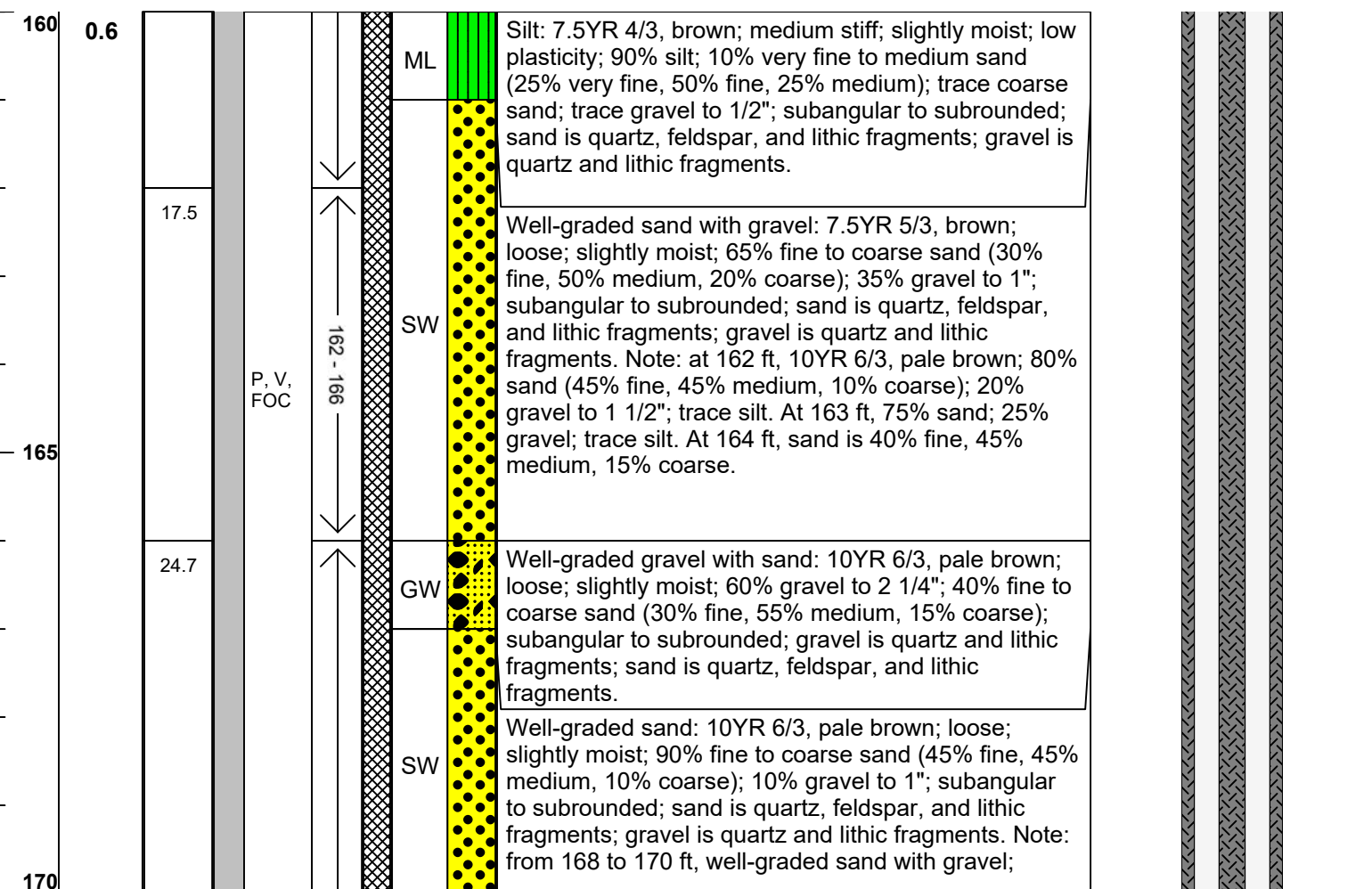
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

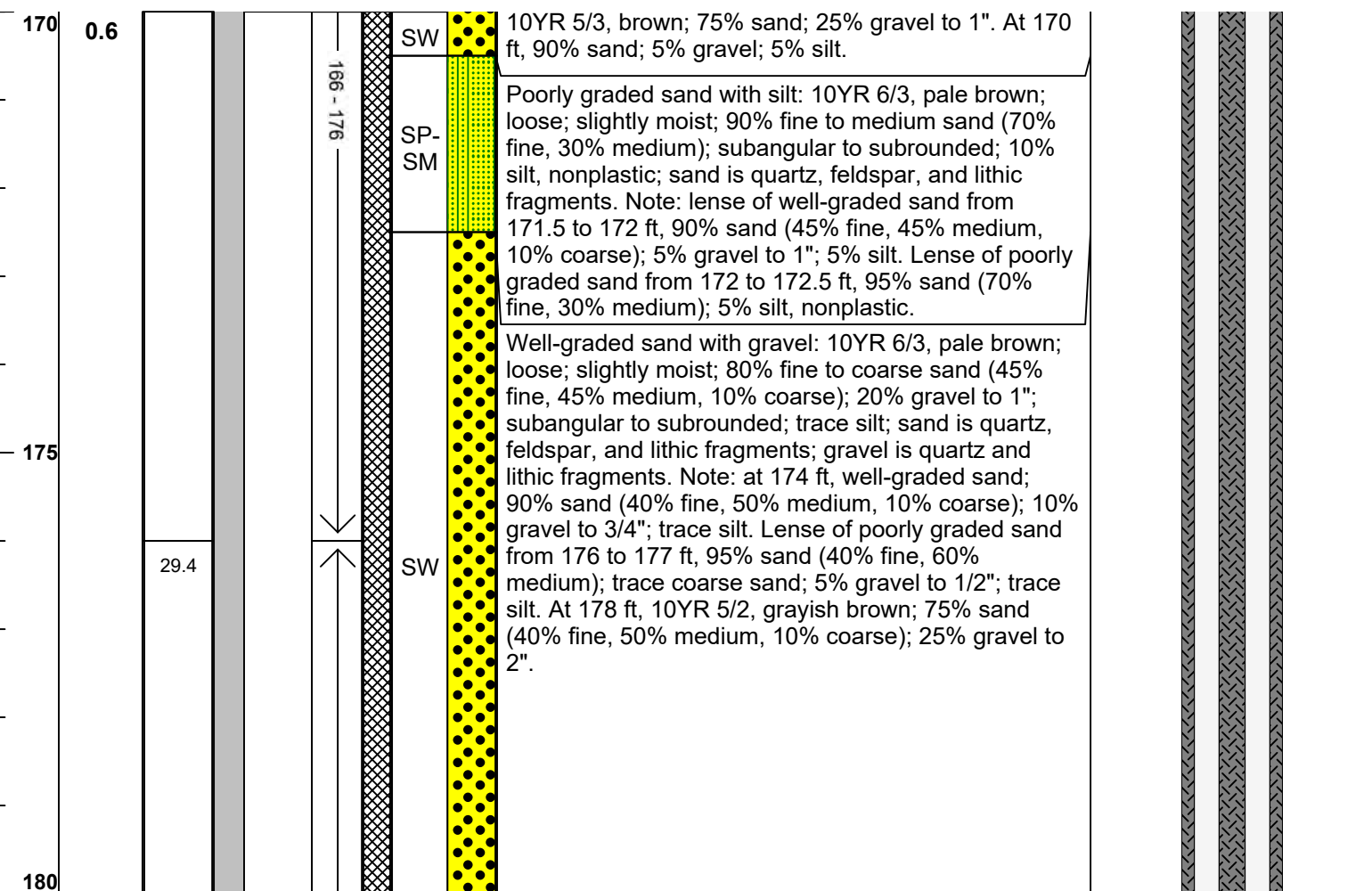
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

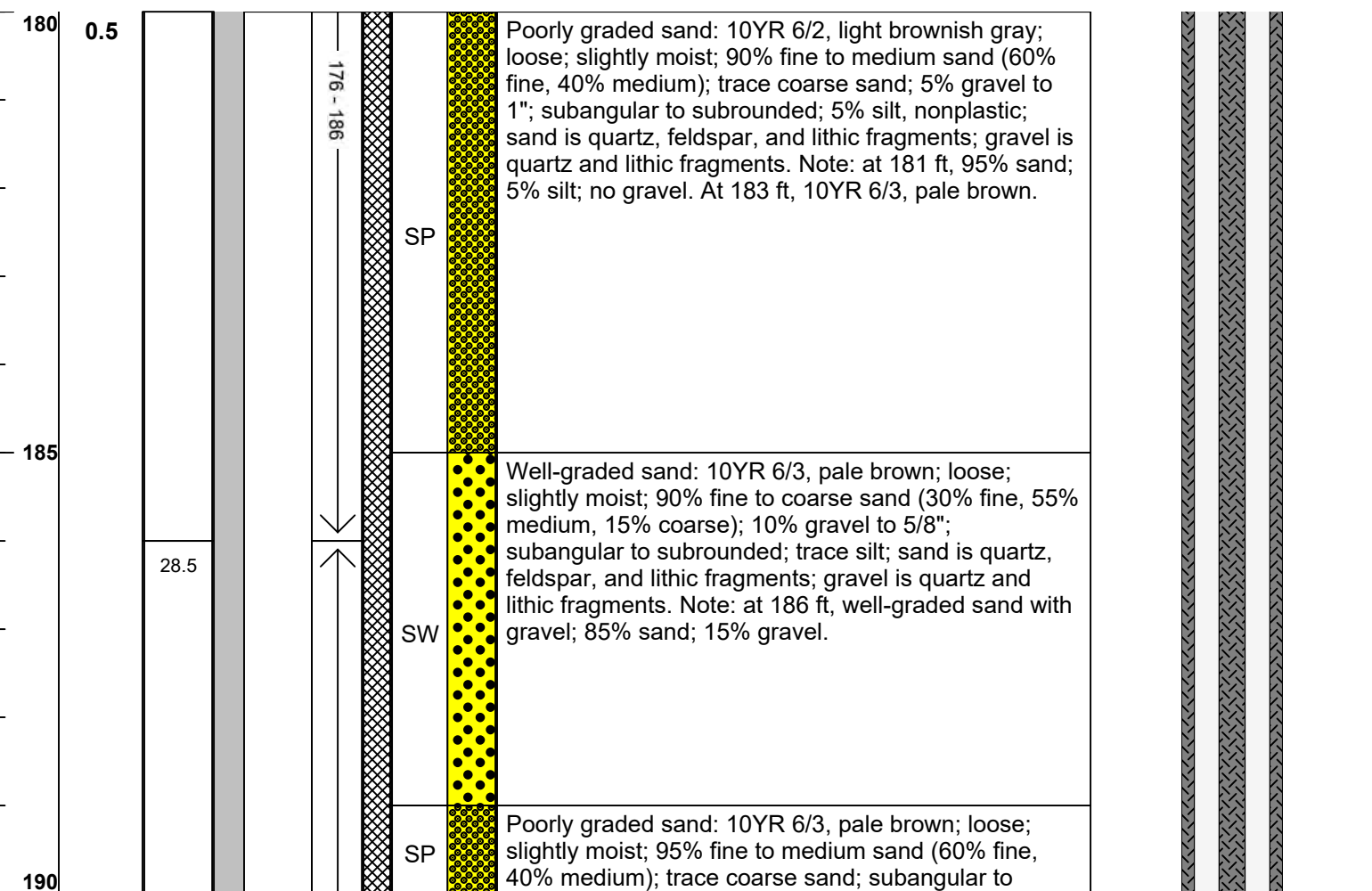
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

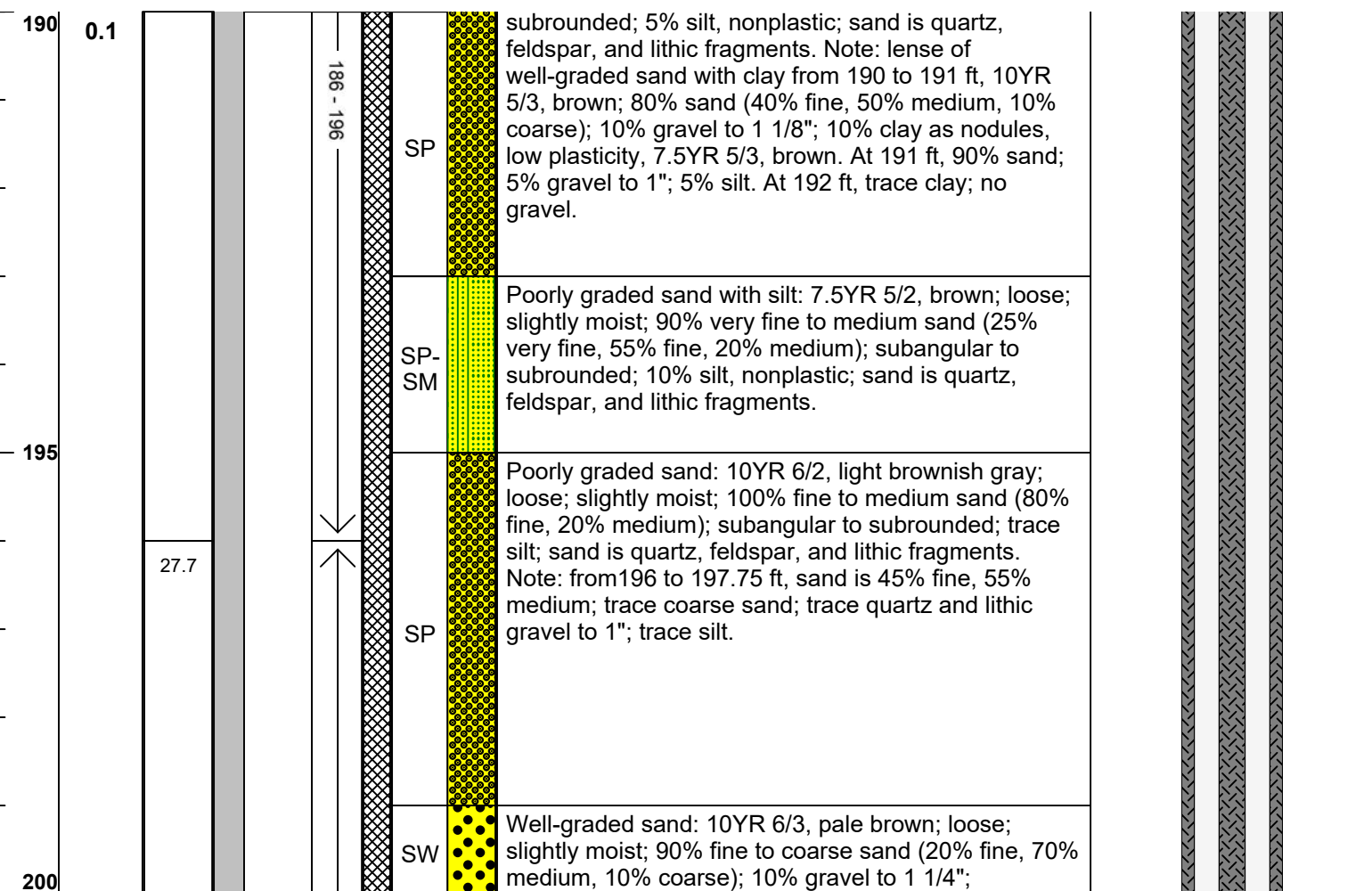
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

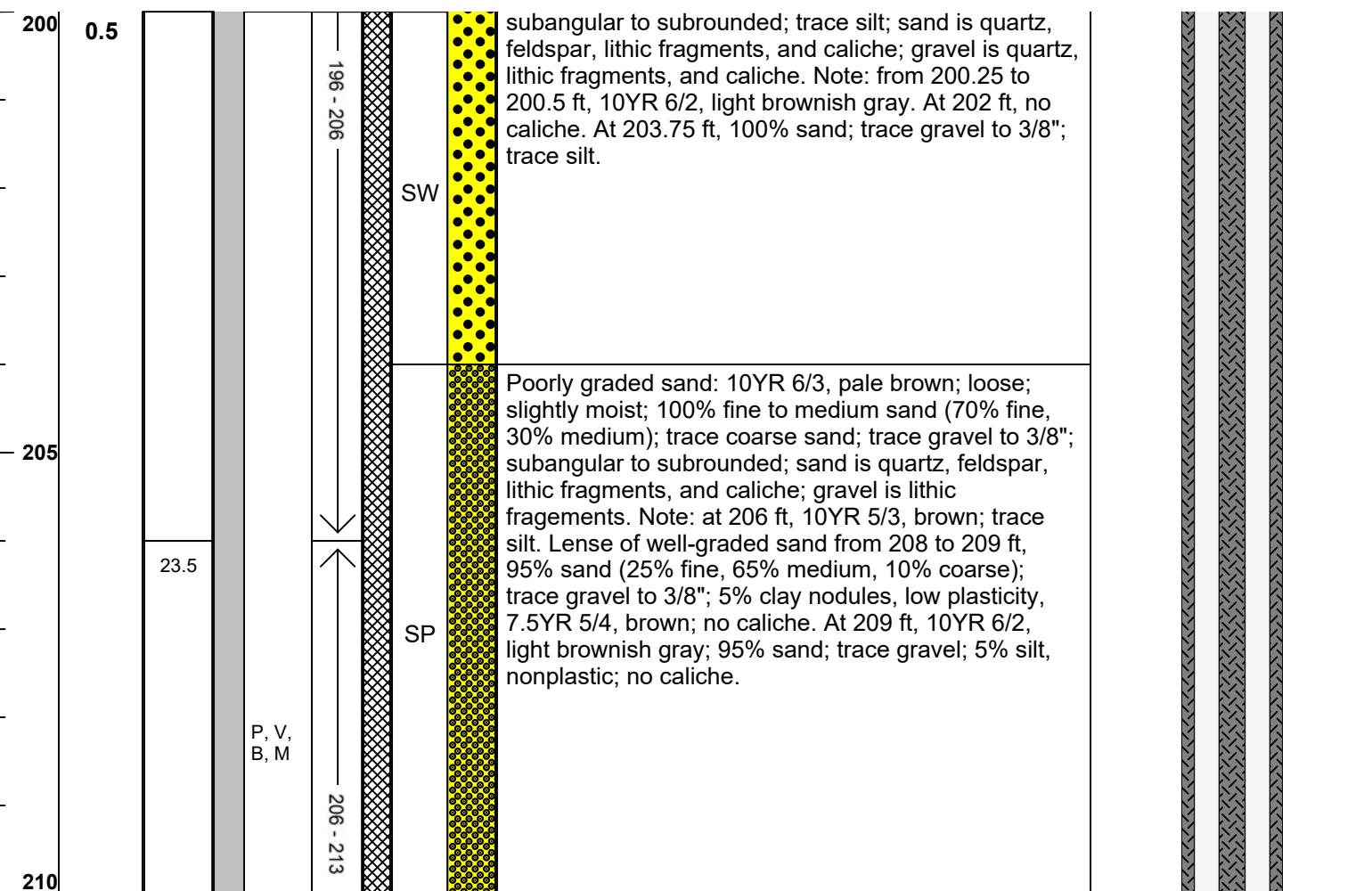
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
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	Not Tested		None
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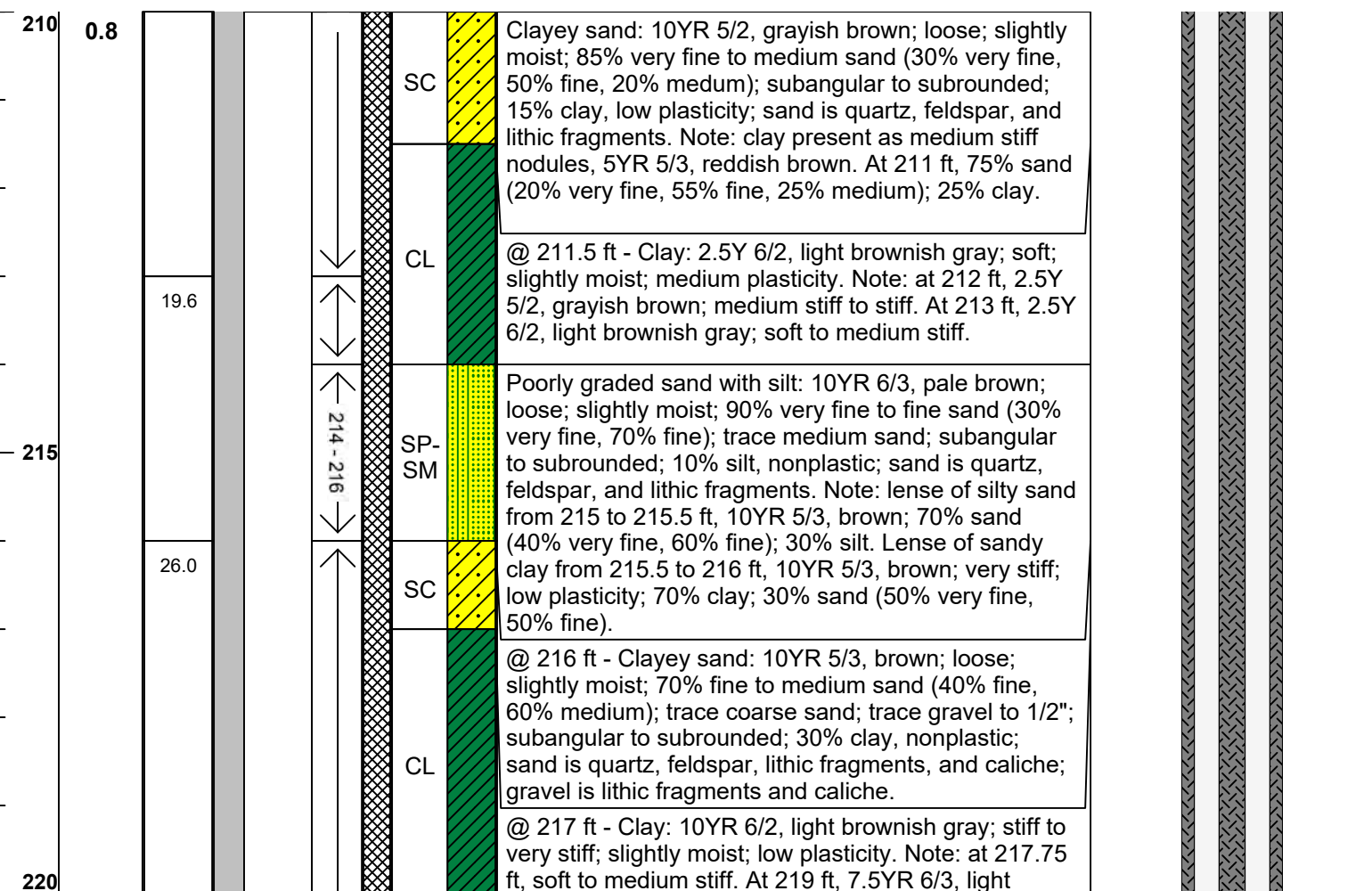
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
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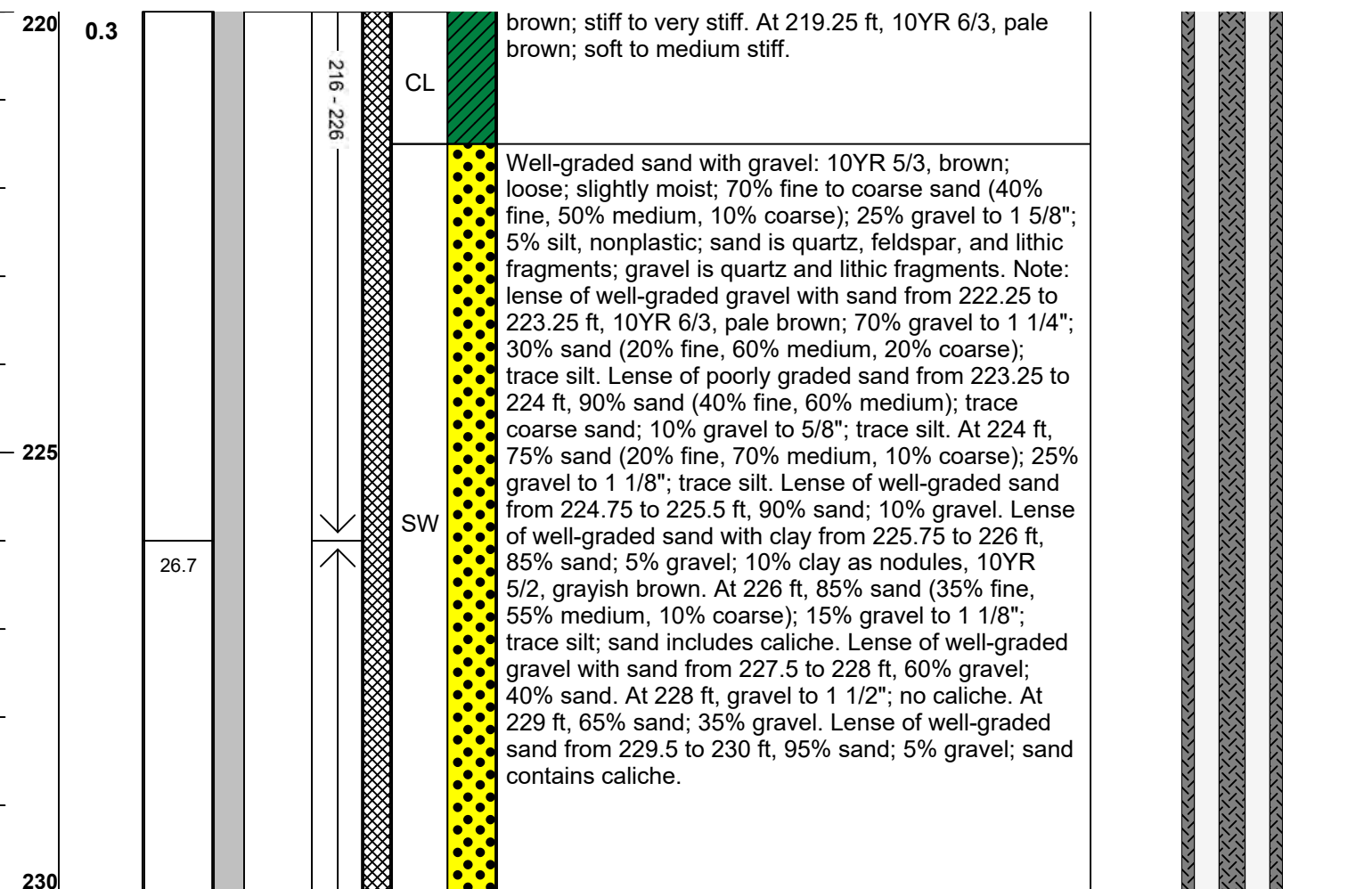
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Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

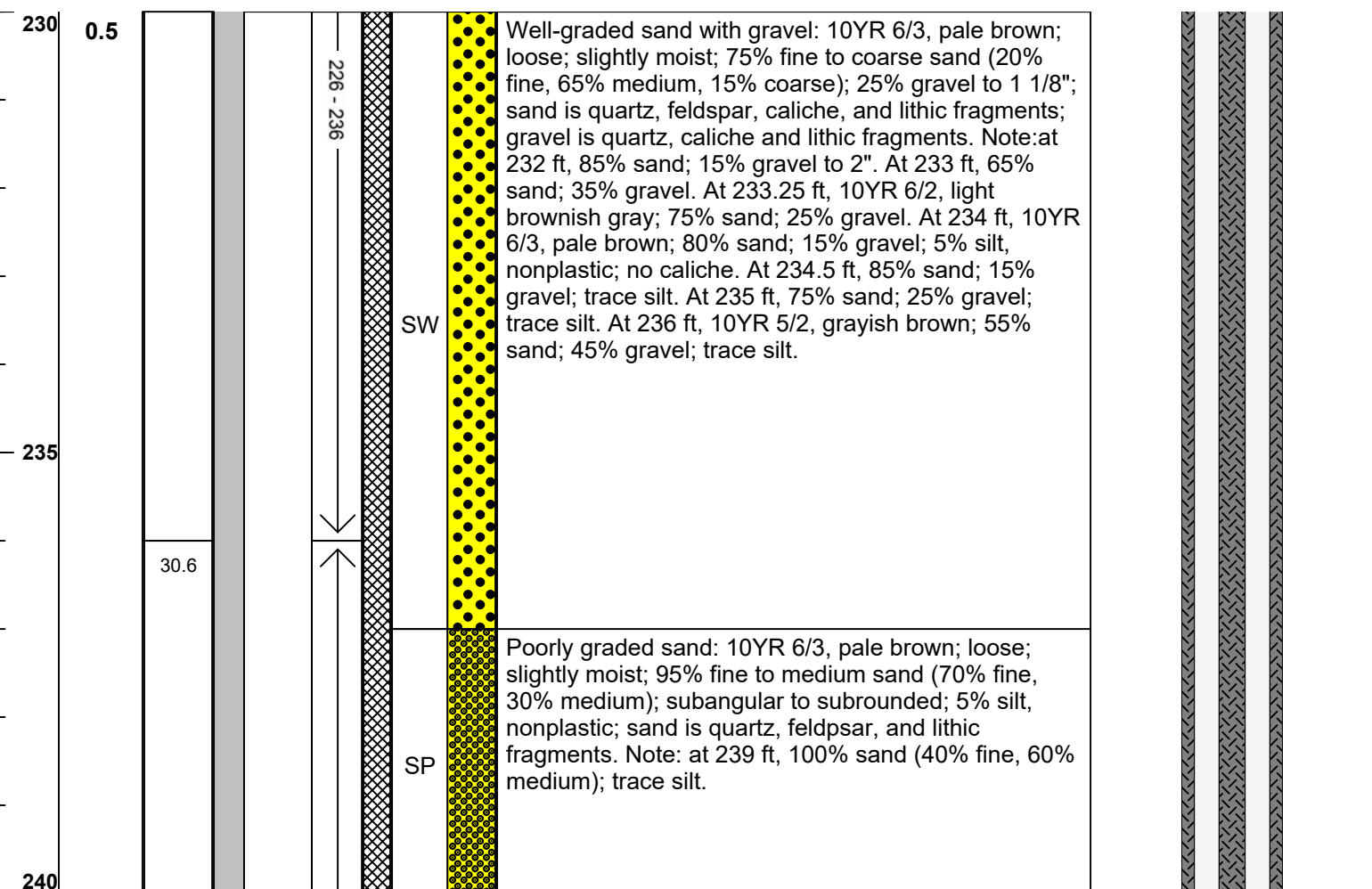
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
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Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

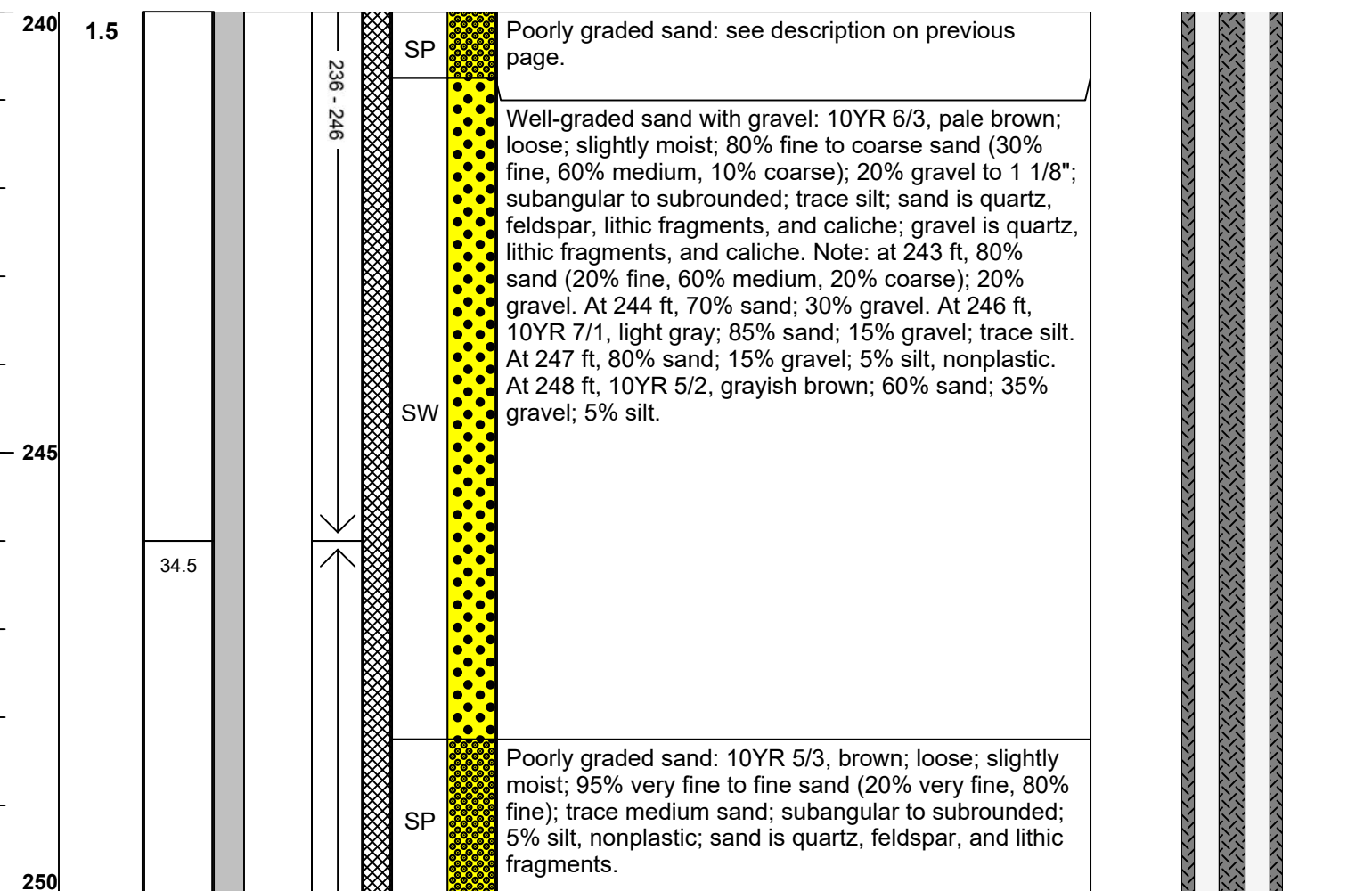
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	Disturbed Core		

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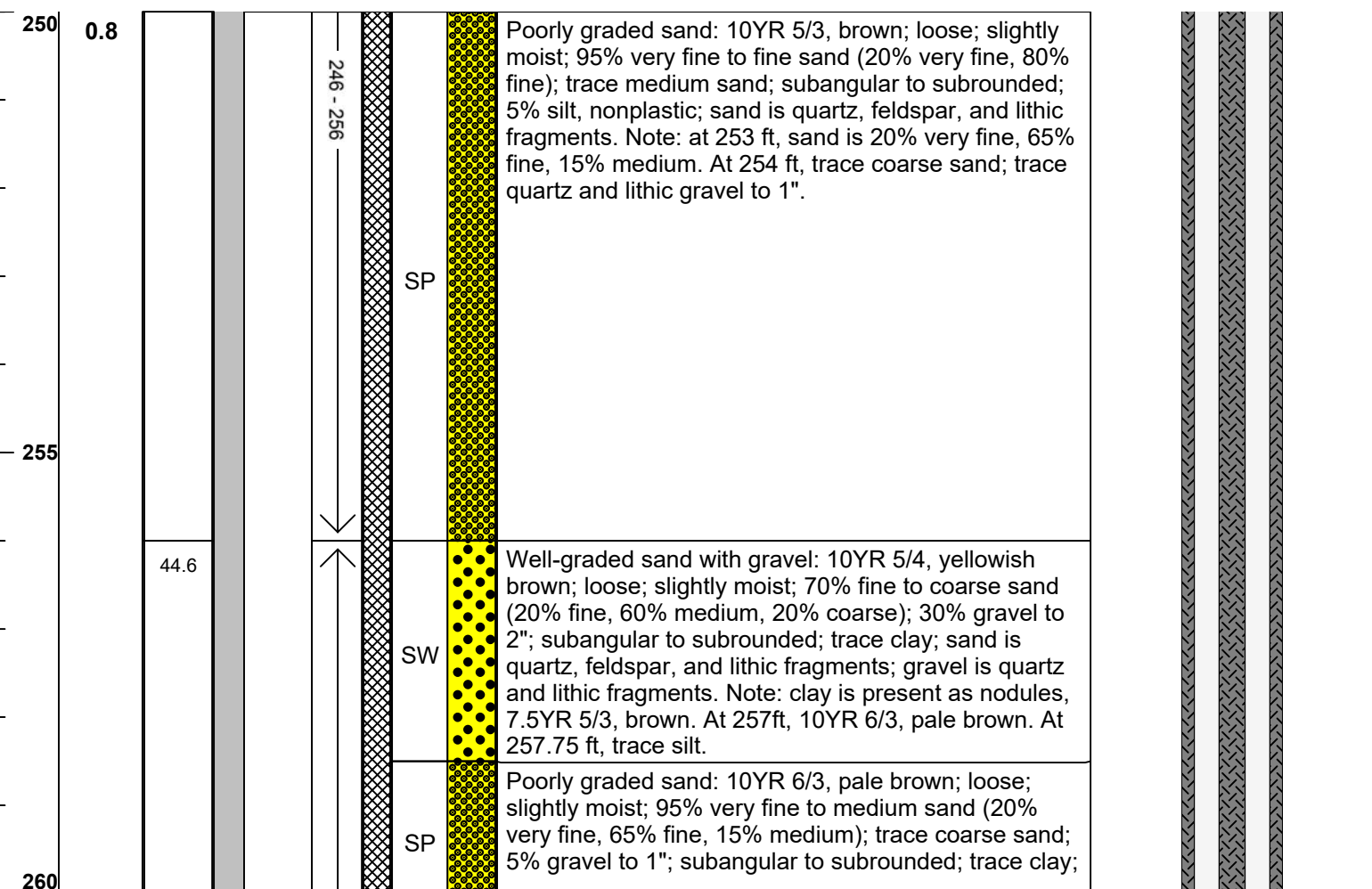
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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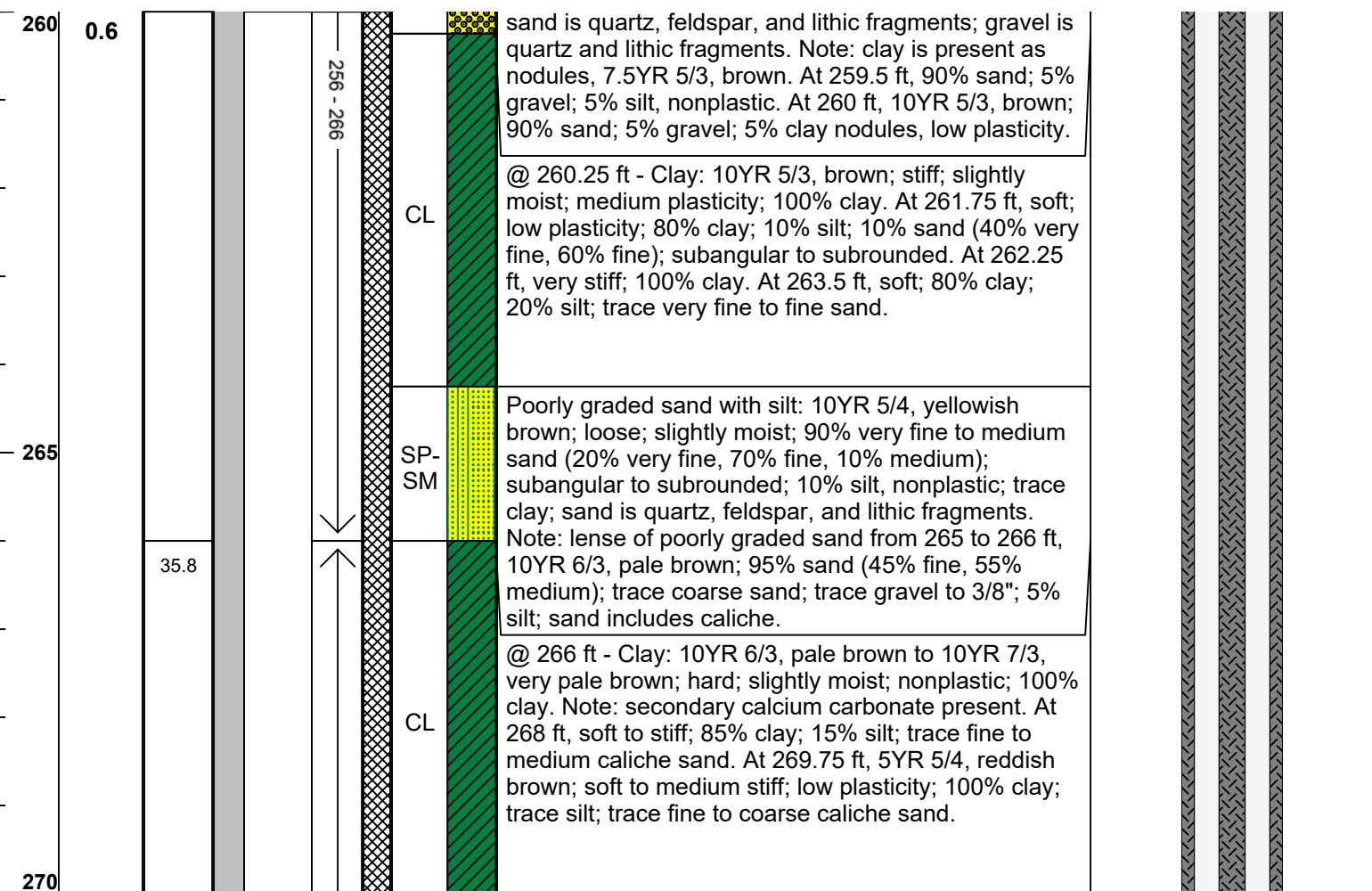
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
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ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

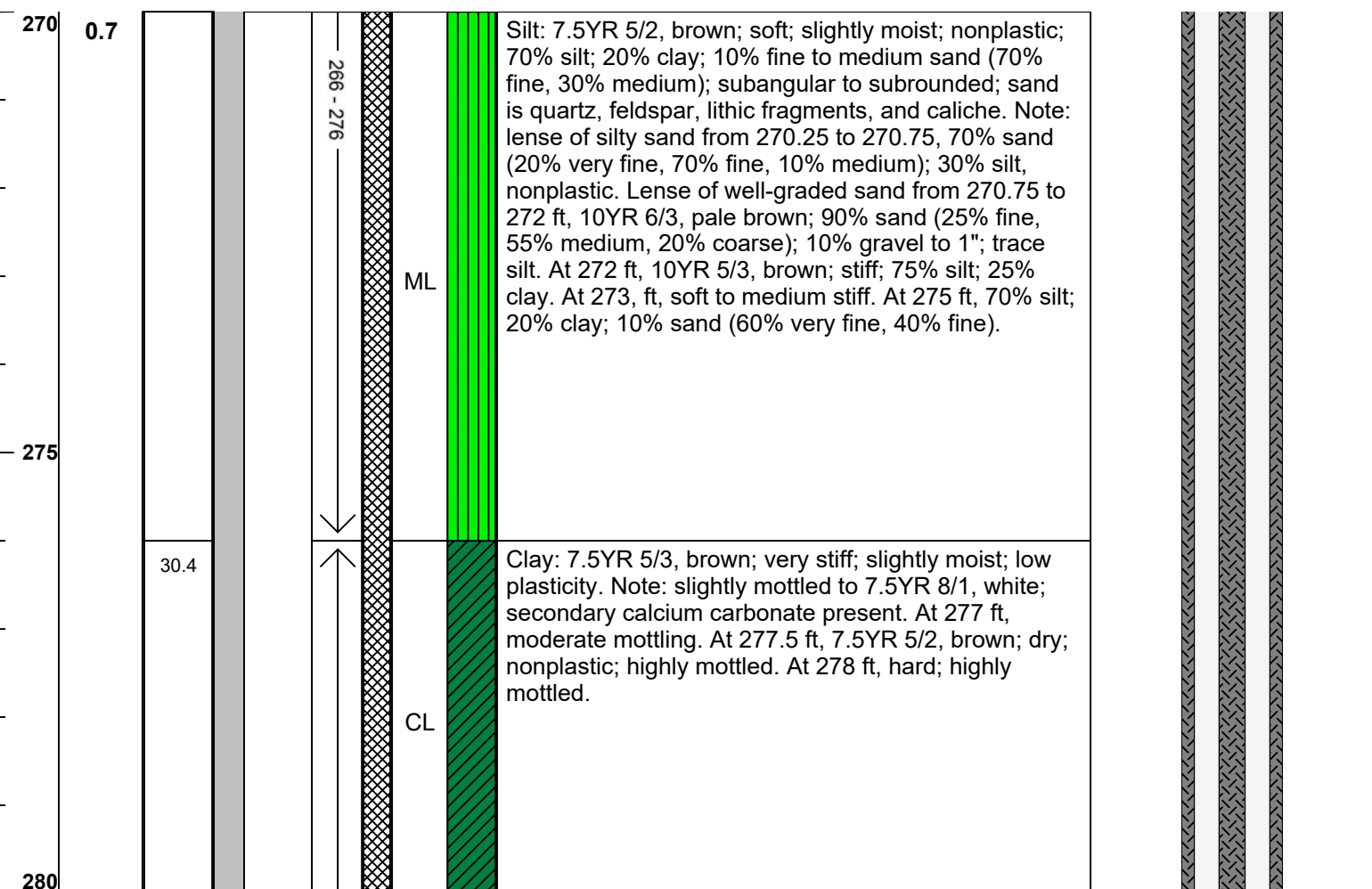
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

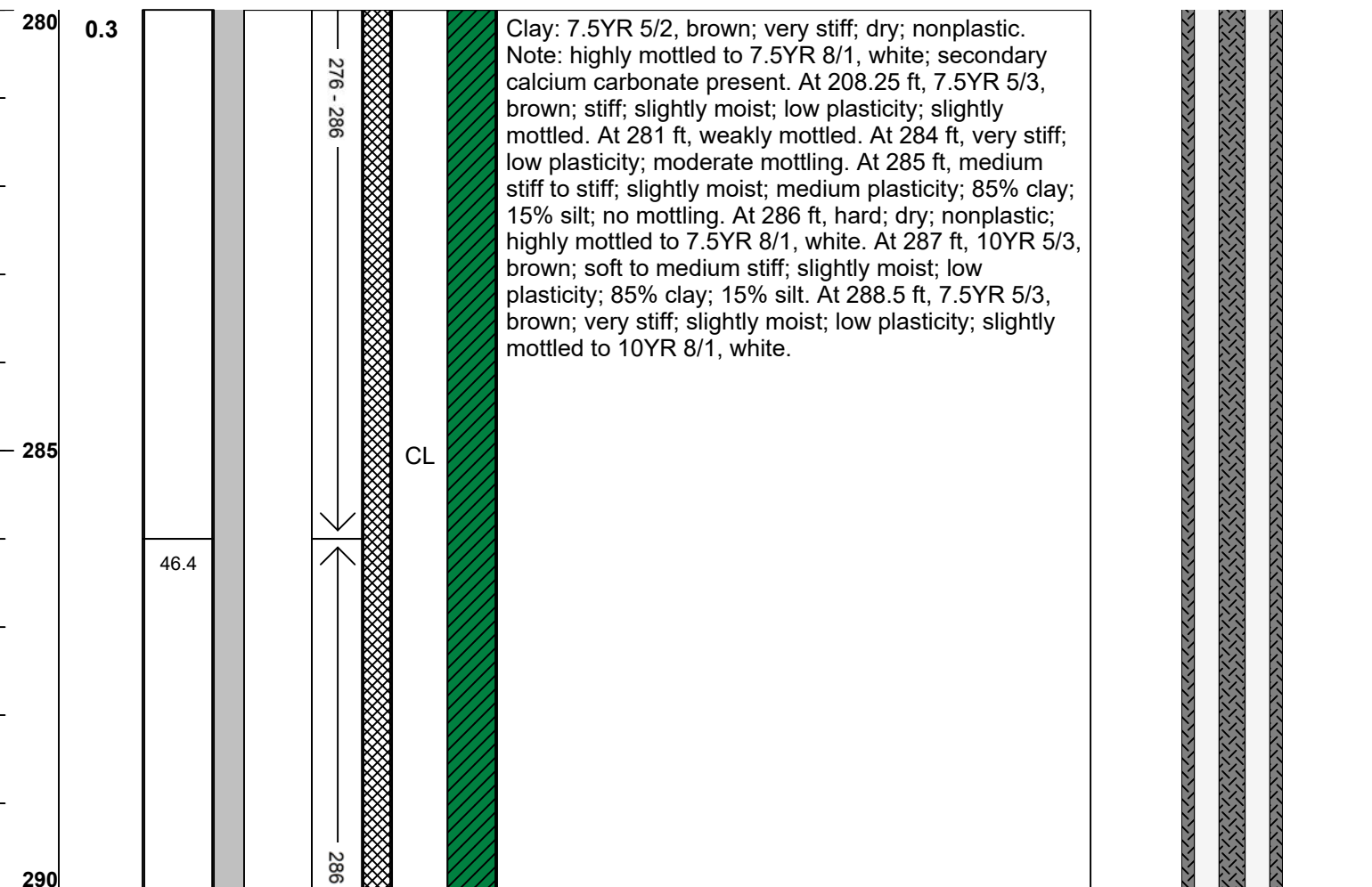
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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ft = feet

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USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

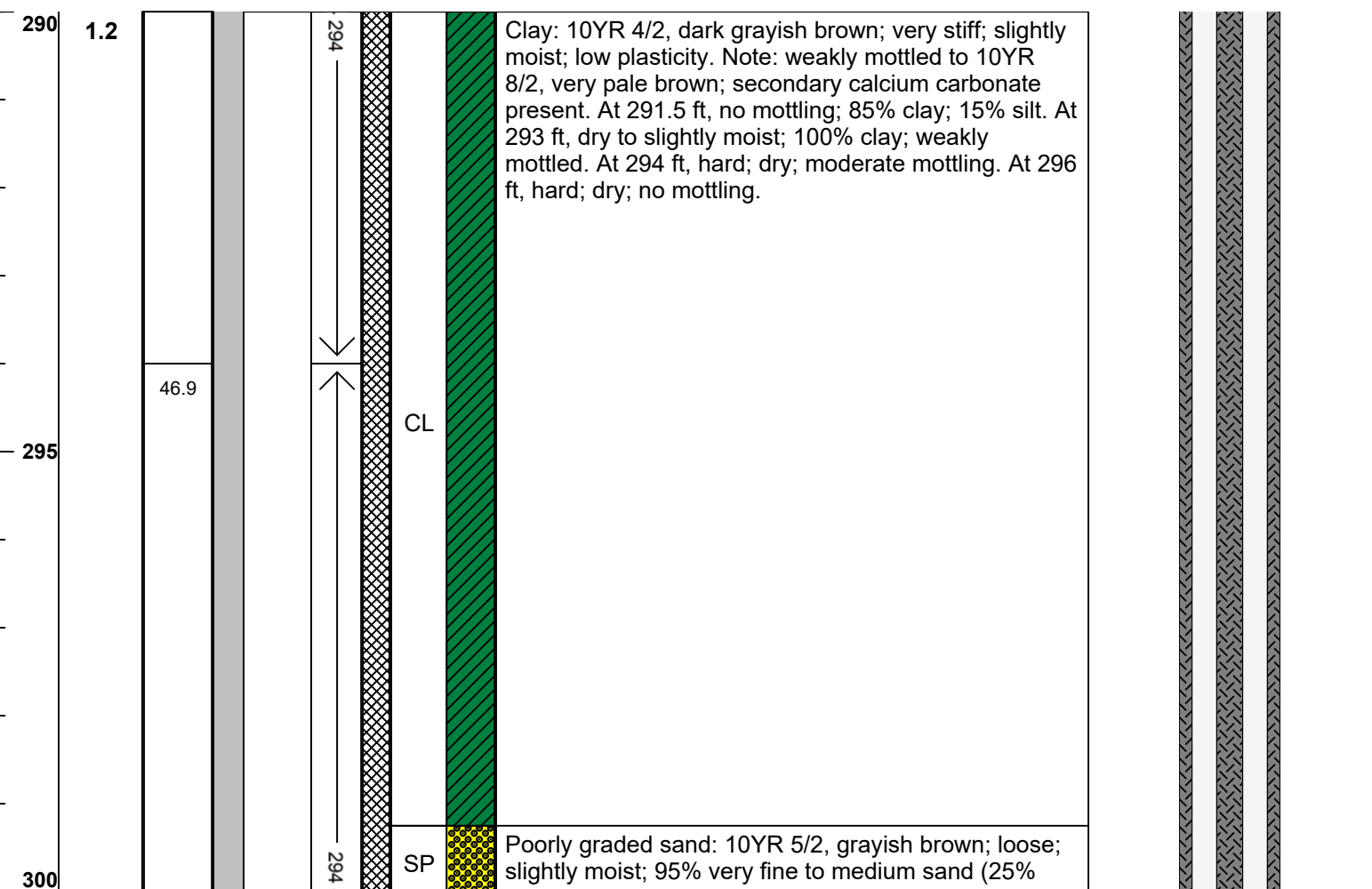
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

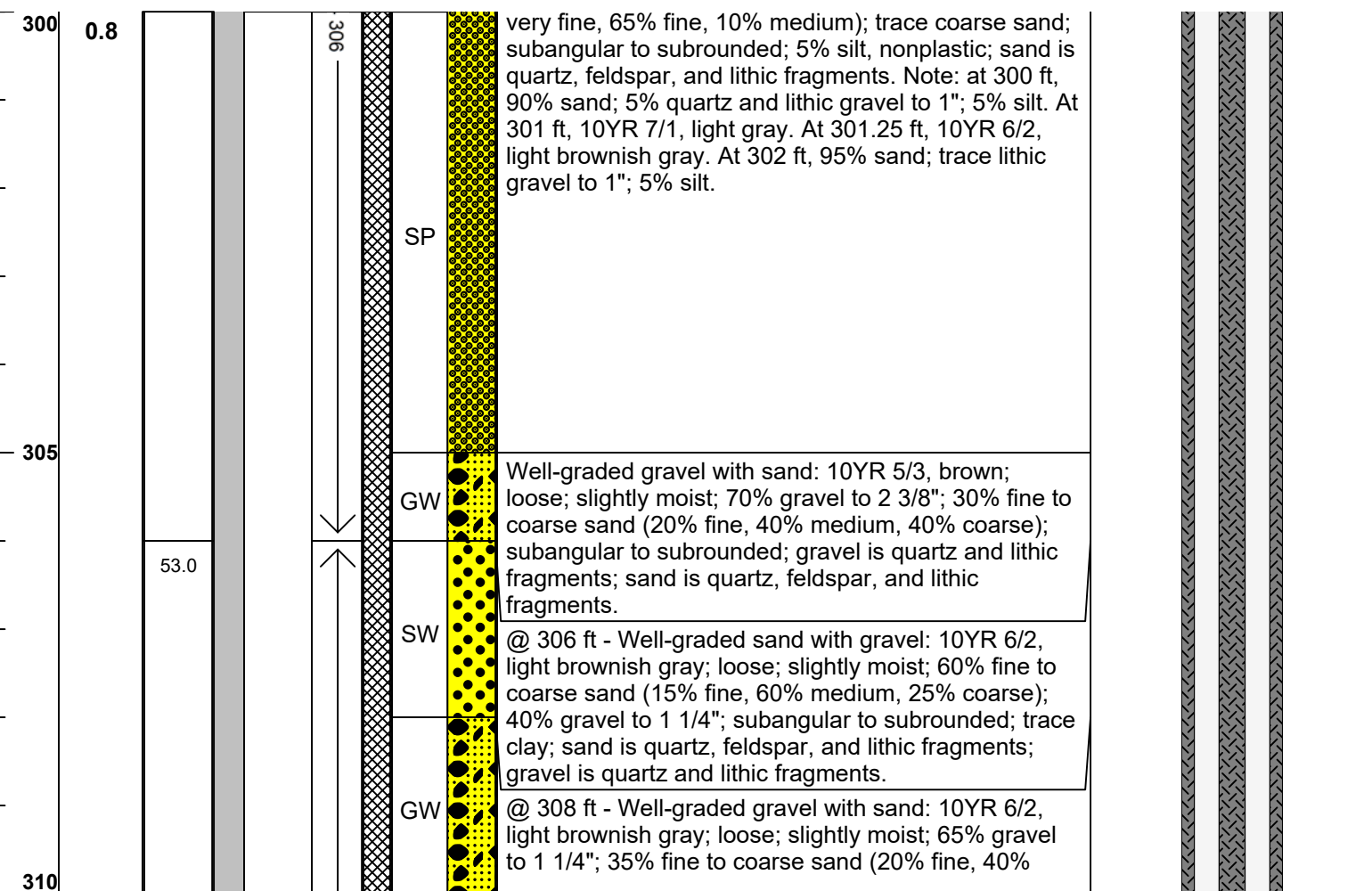
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
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UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

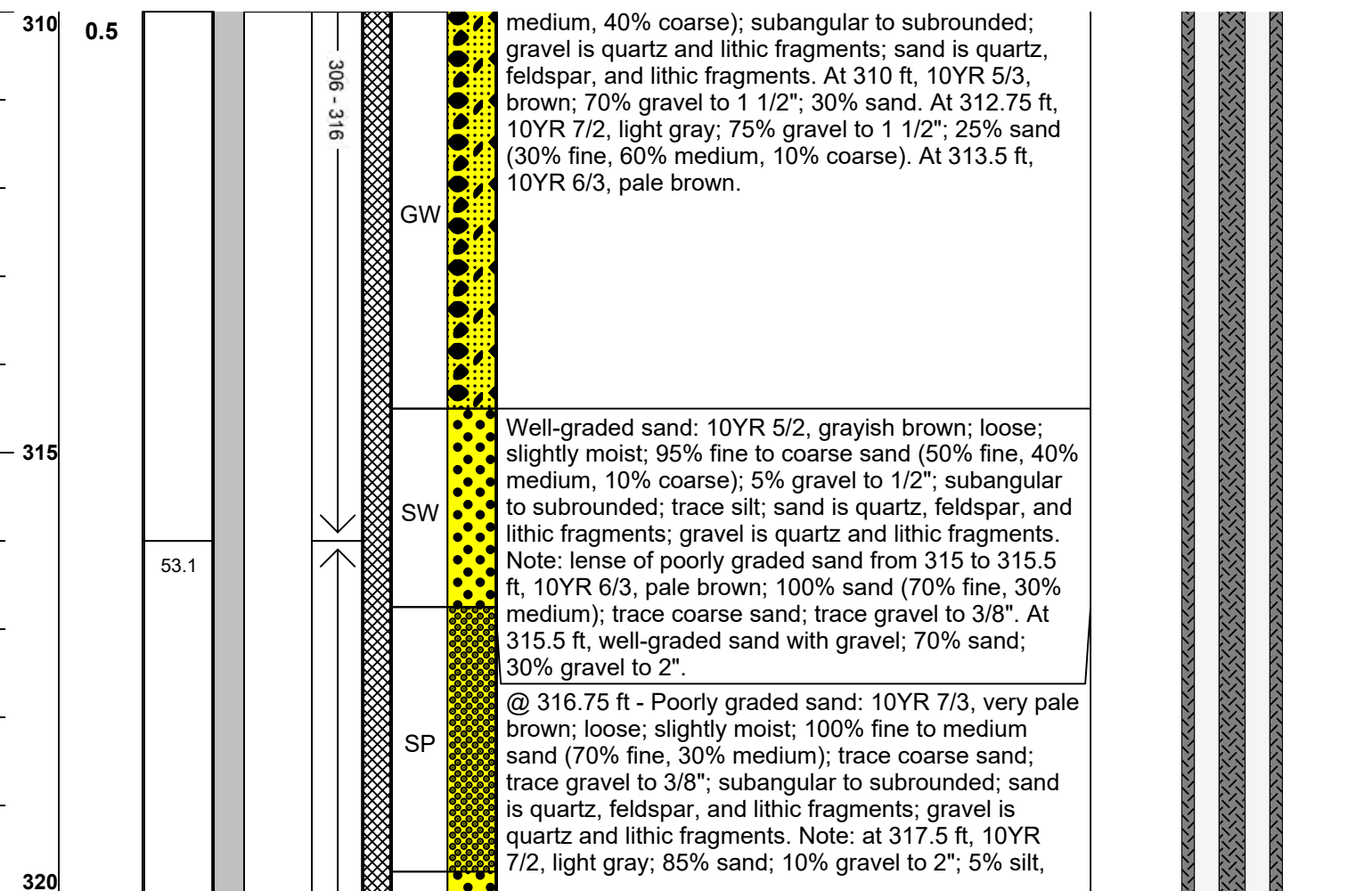
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
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UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

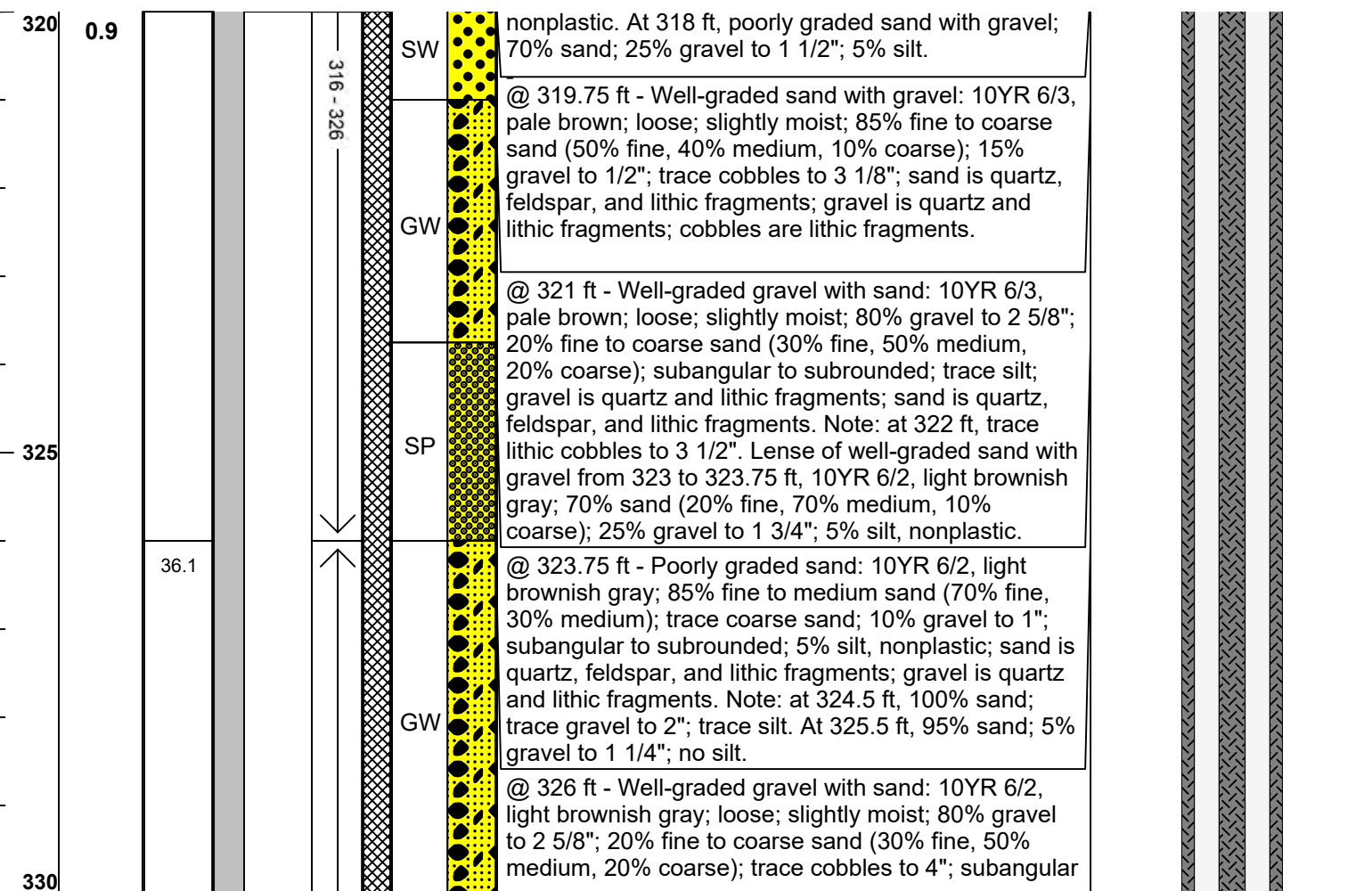
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

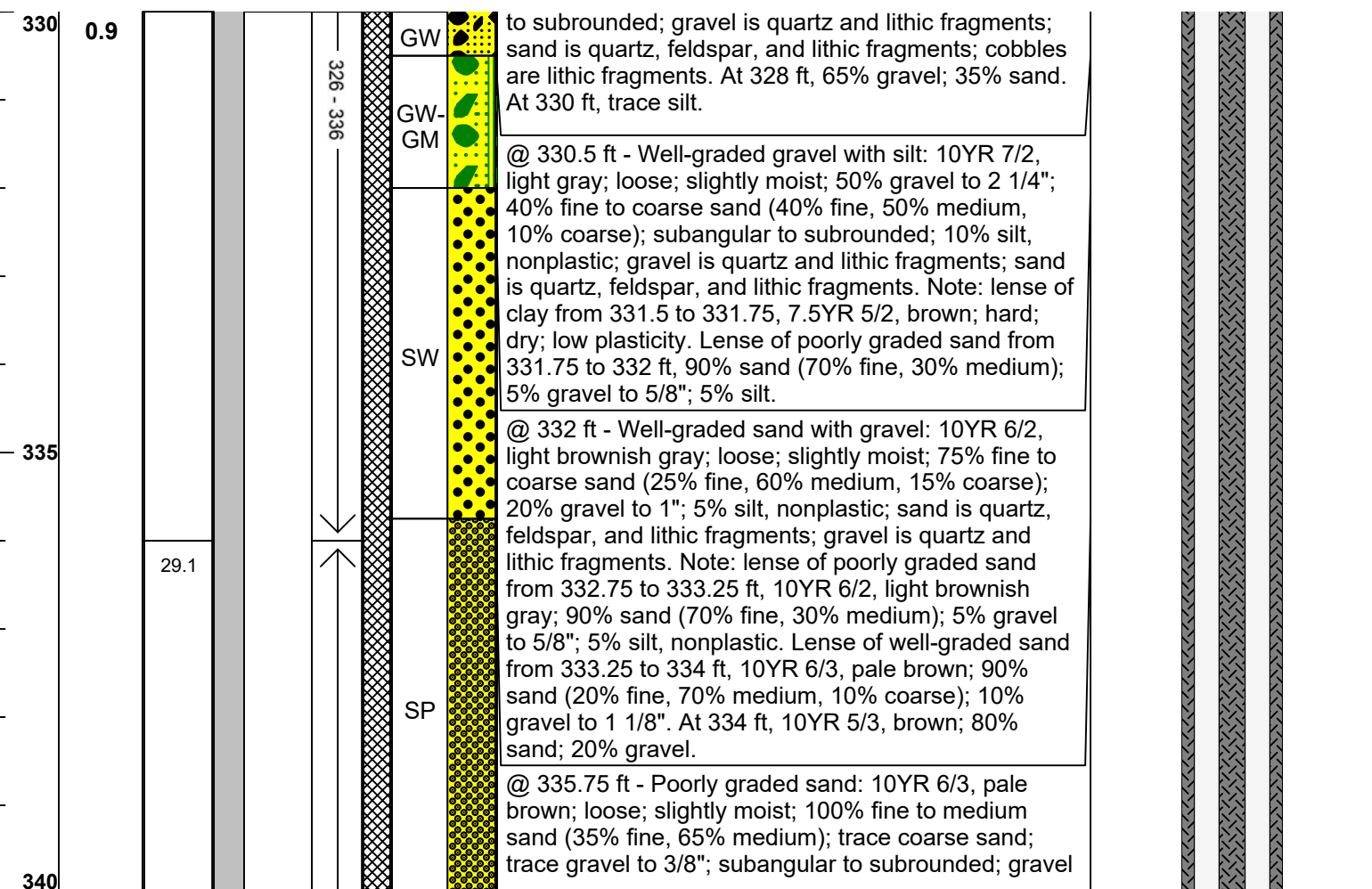
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
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	Not Tested		None
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Core Recovery

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Following coring, the borehole was overdrilled using ARCH for well installation

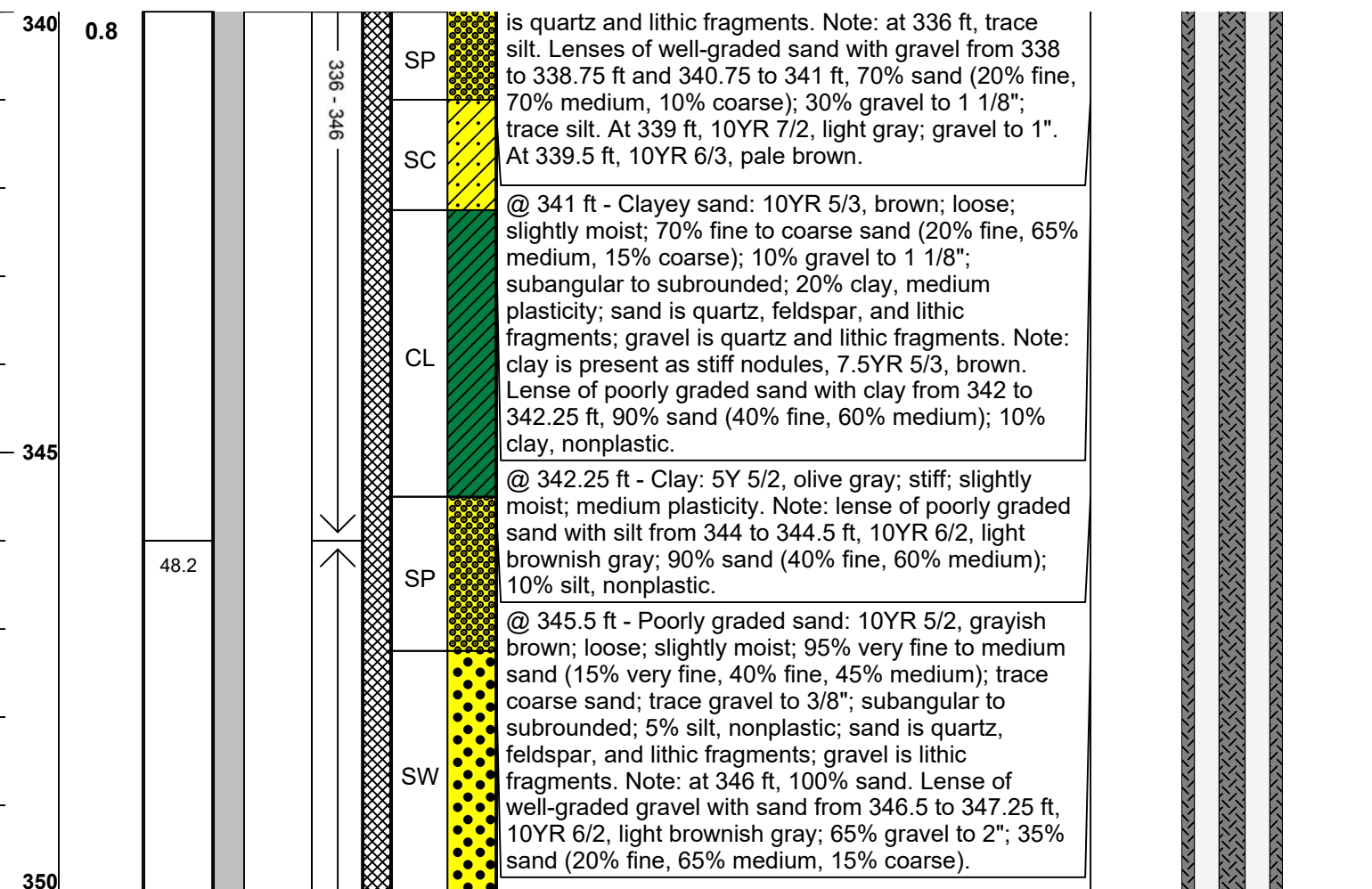
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Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

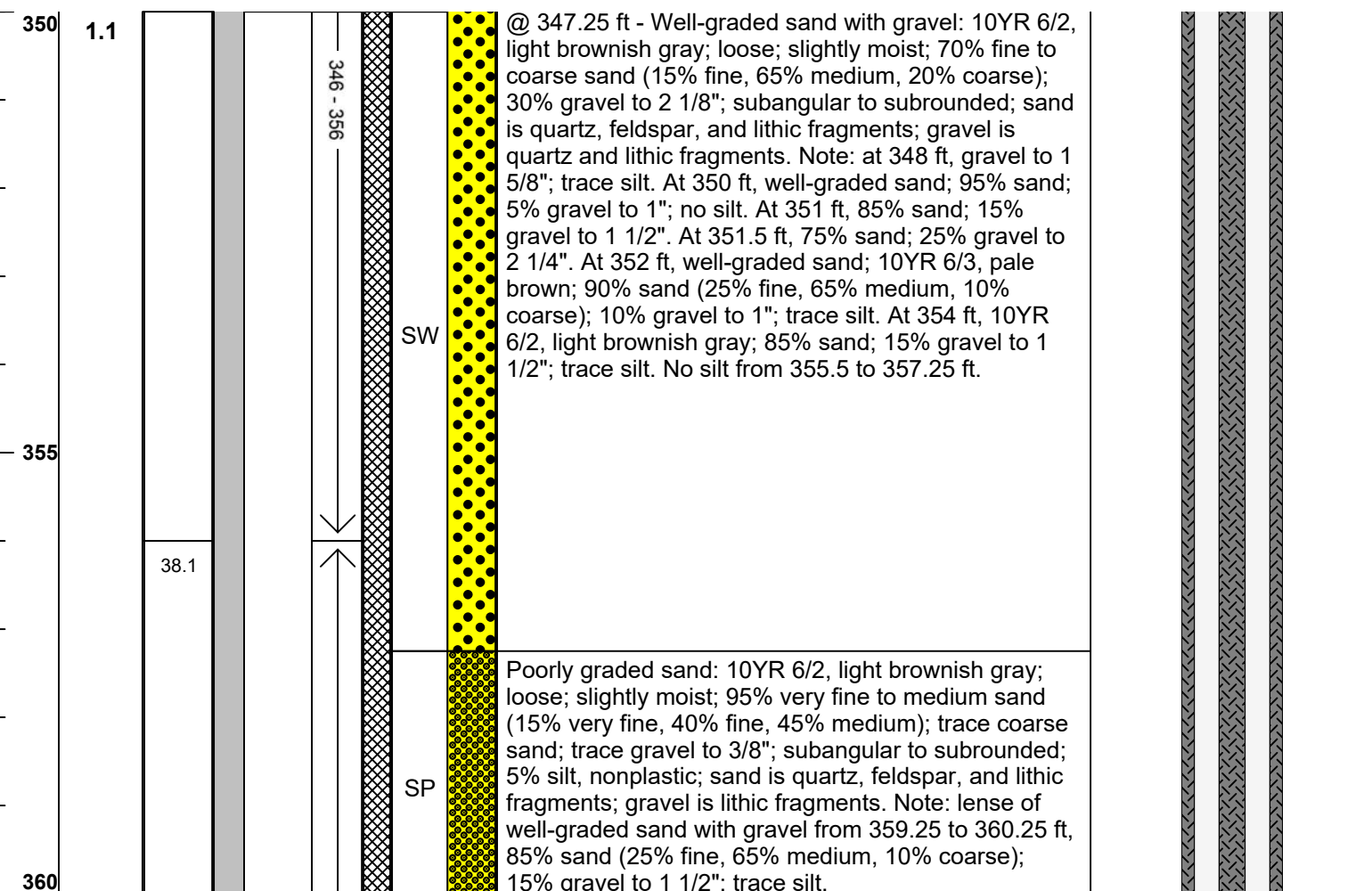
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
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Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

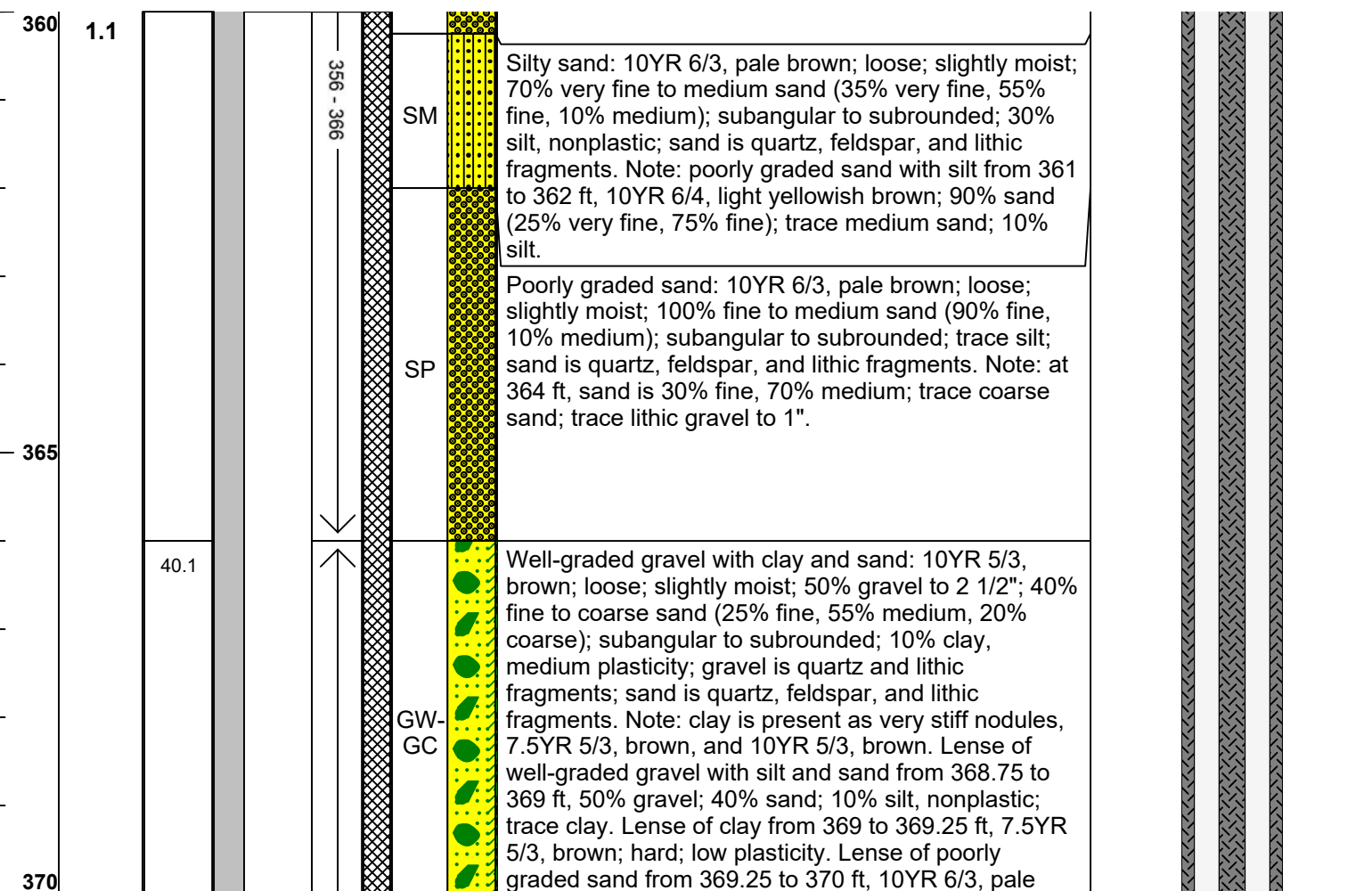
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
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Not Tested



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No Recovery



Complete



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Following coring, the borehole was overdrilled using ARCH for well installation

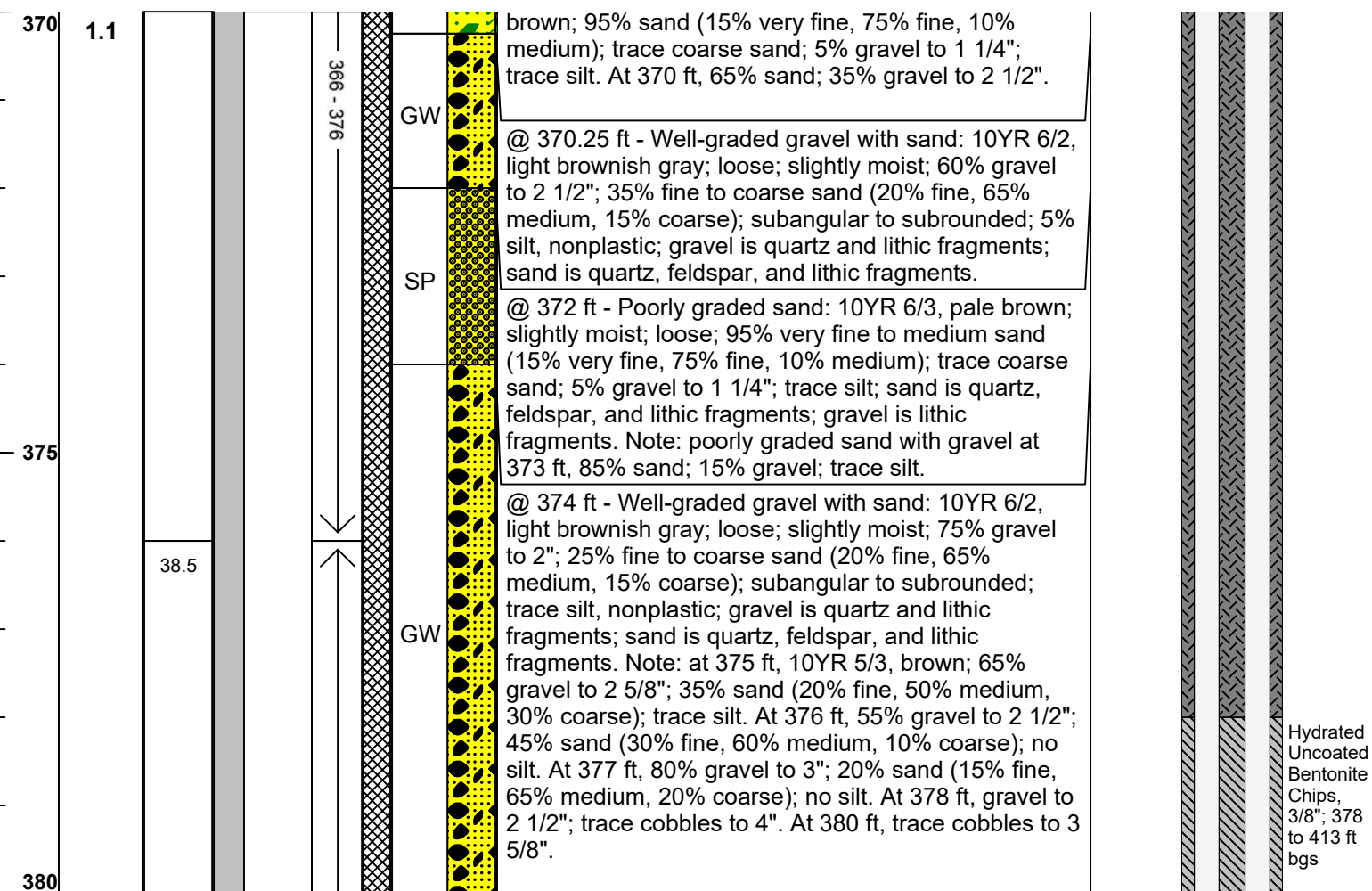
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

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Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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UV Fluorescence Field Test

	Not Tested		None
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Core Recovery

	No Recovery		Complete
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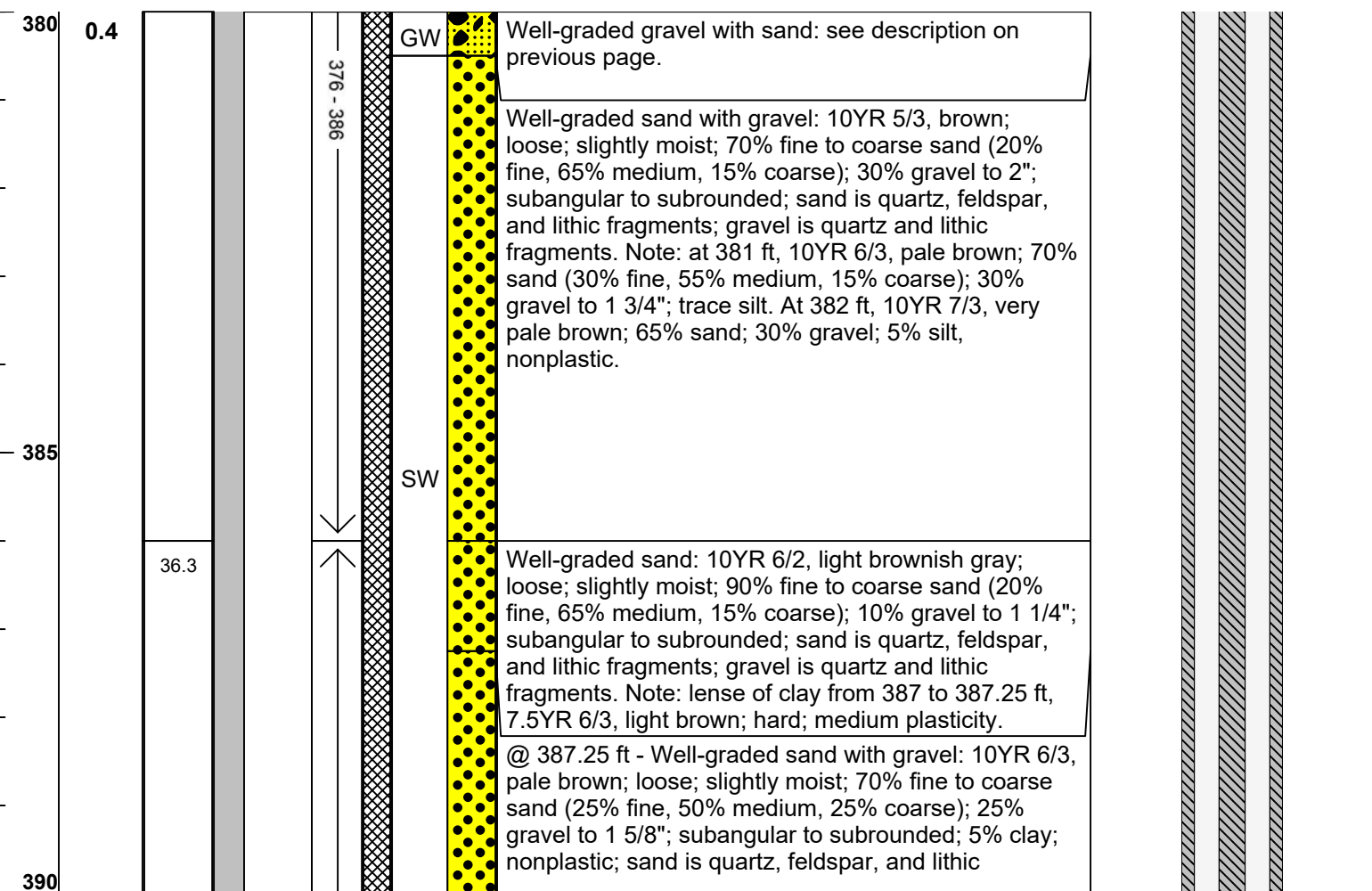
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Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
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Following coring, the borehole was overdrilled using ARCH for well installation

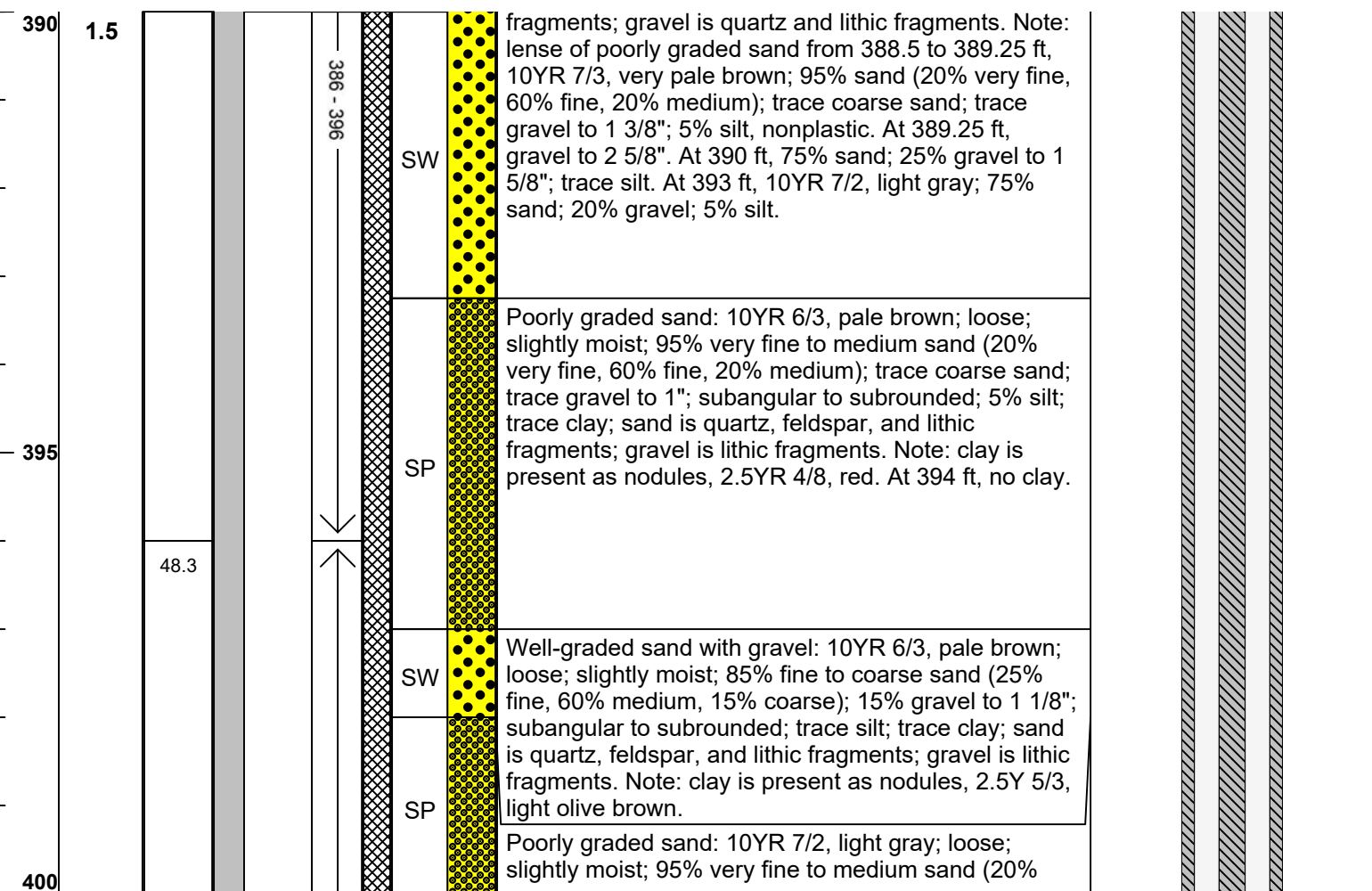
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
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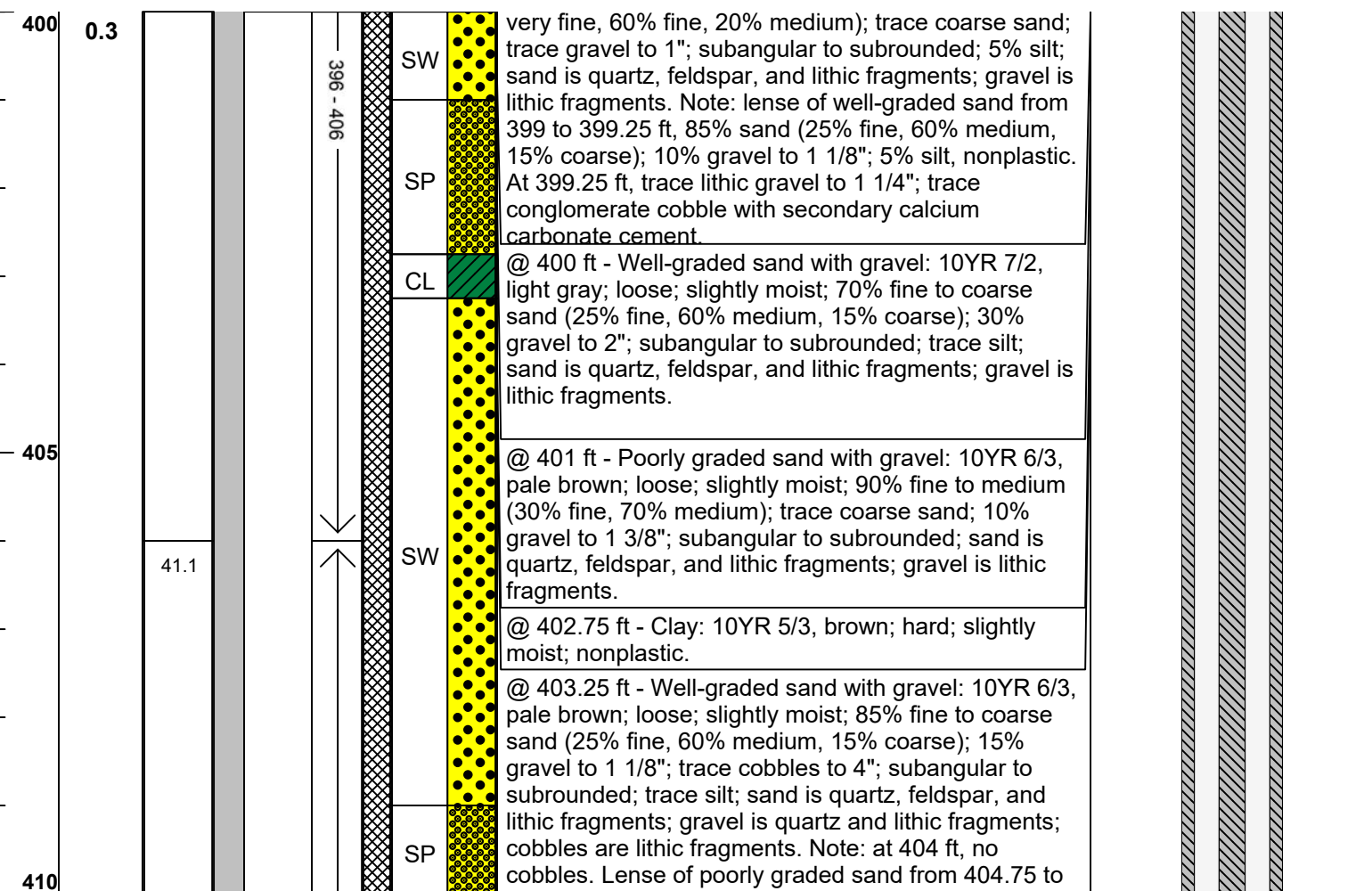
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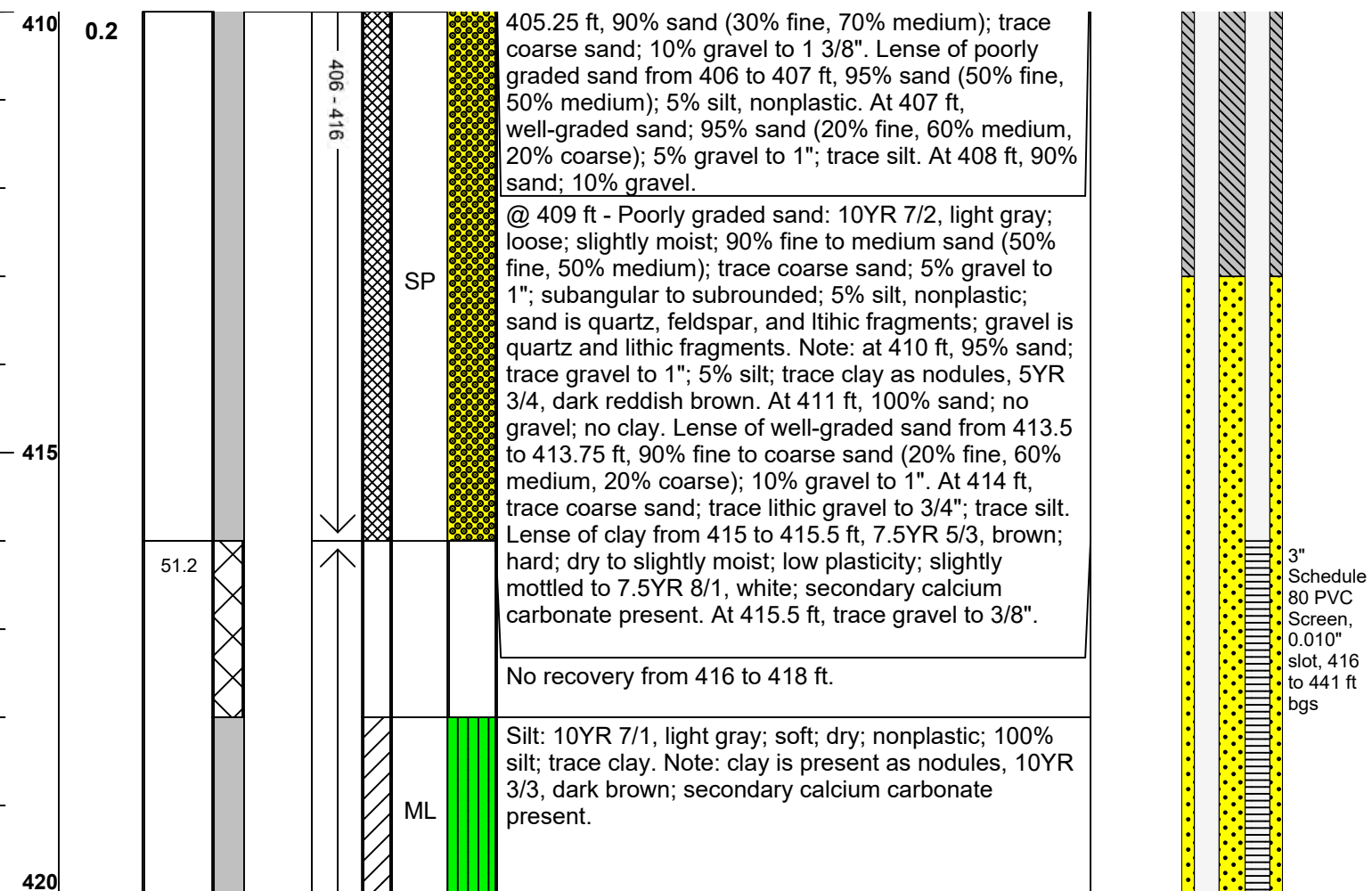
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Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
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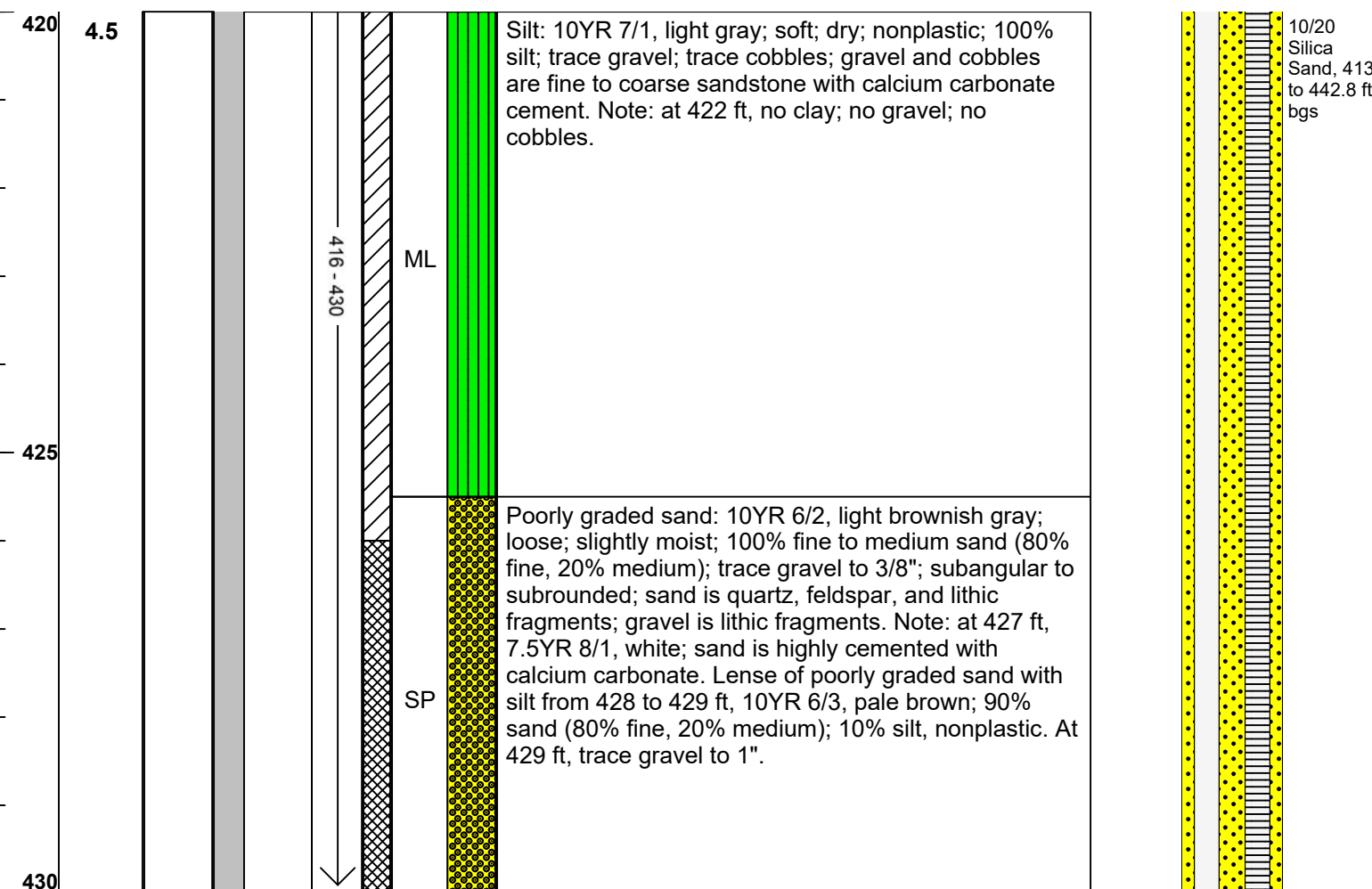
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Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

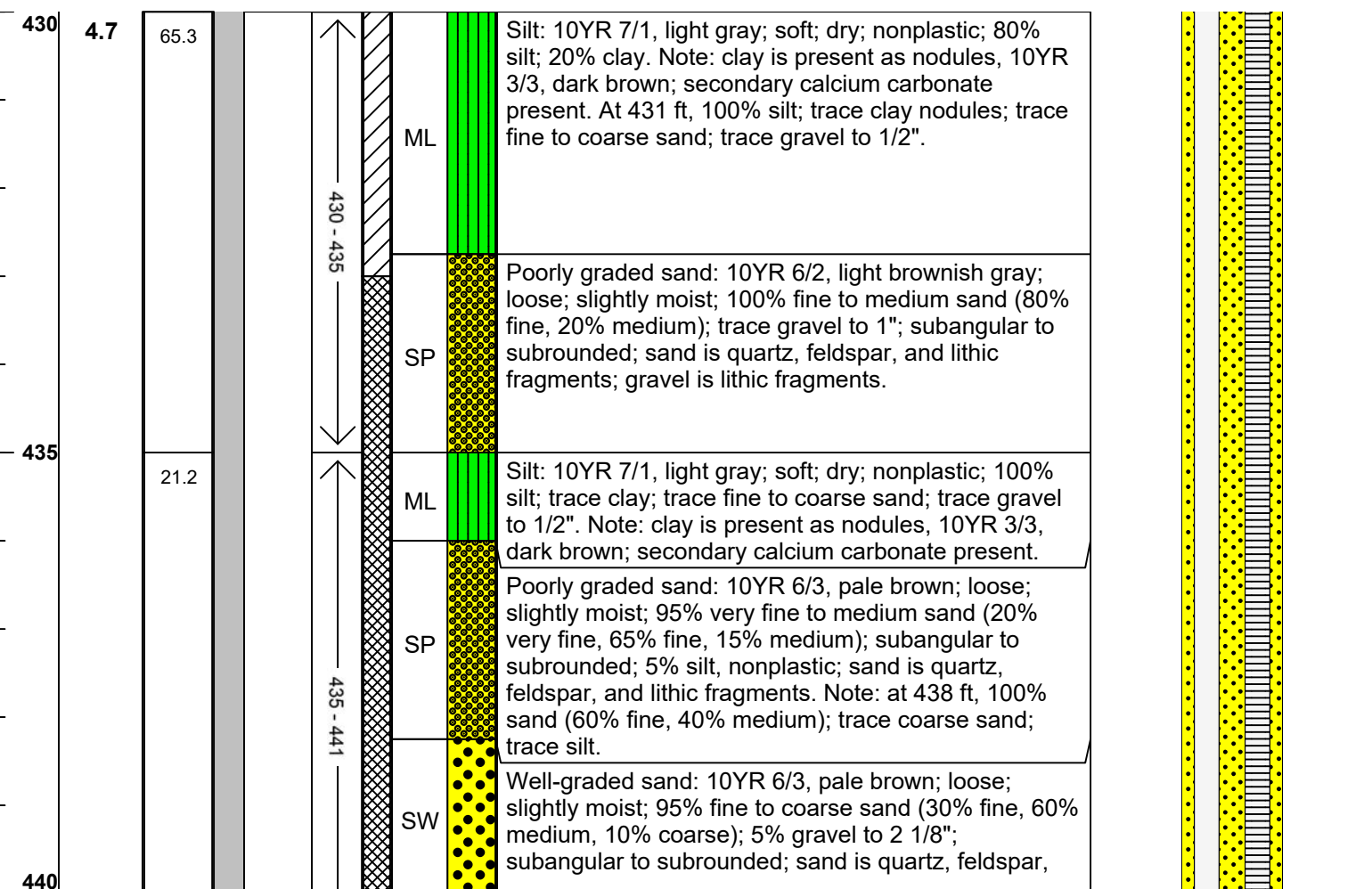
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

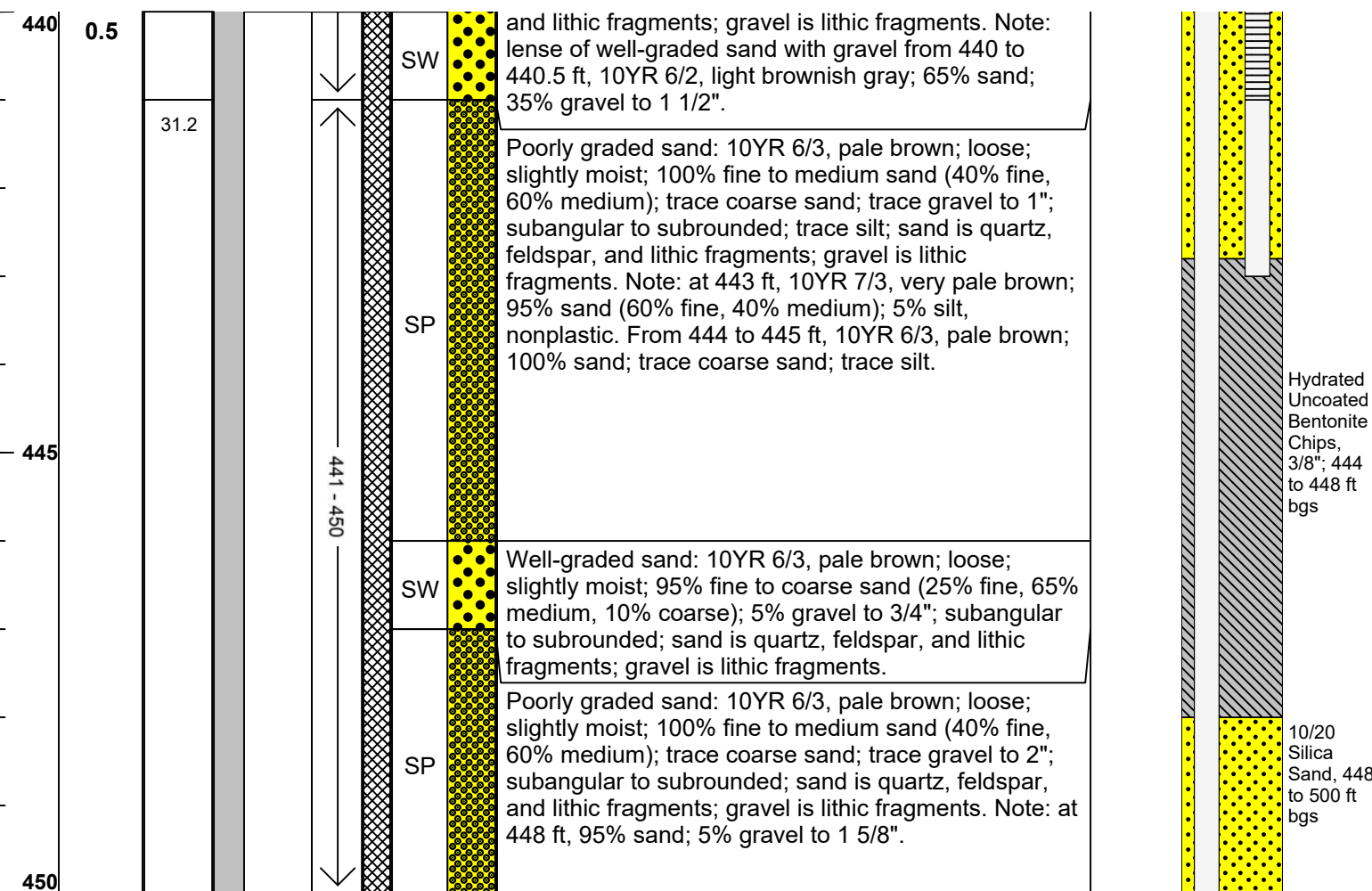
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

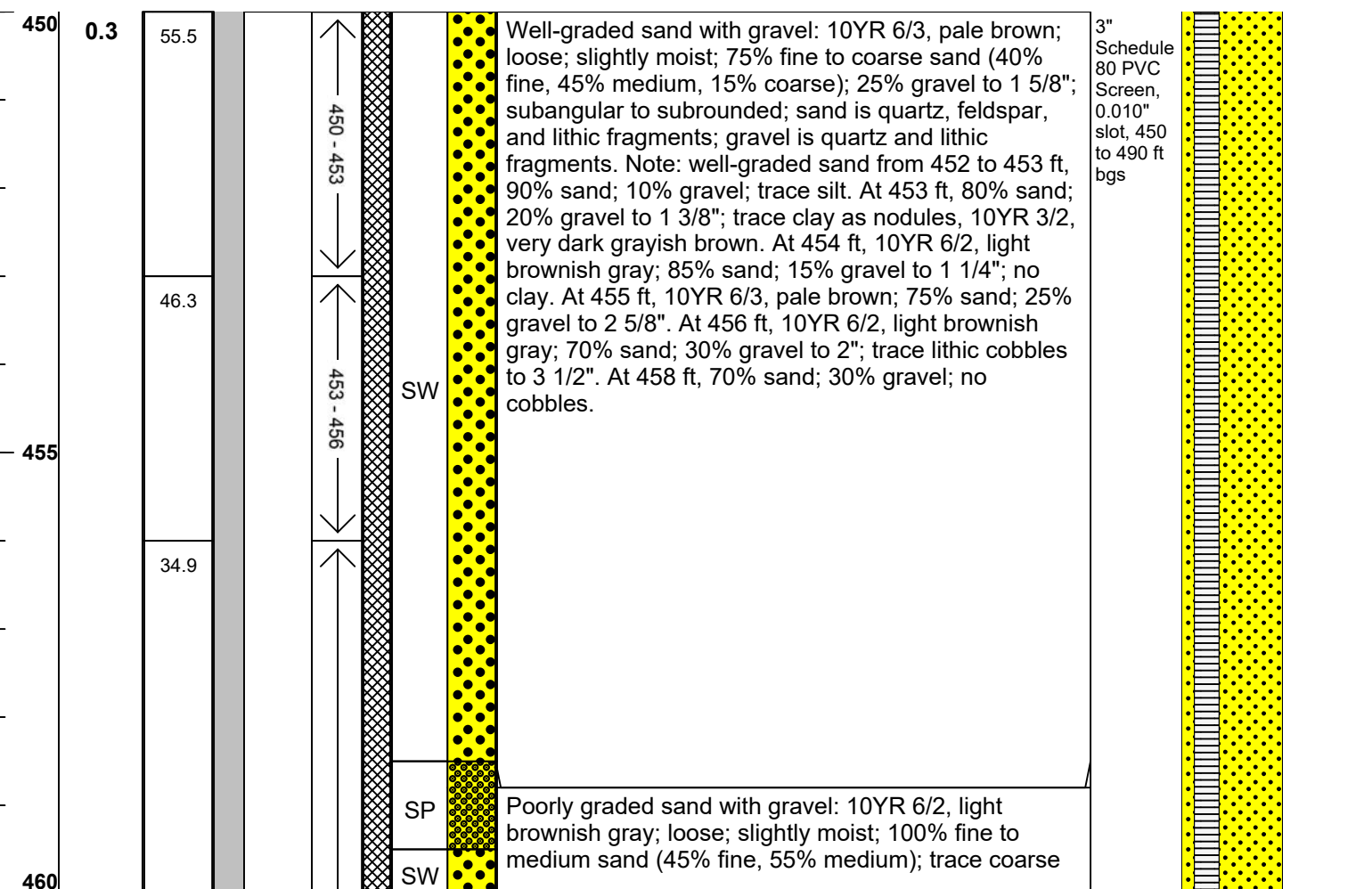
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

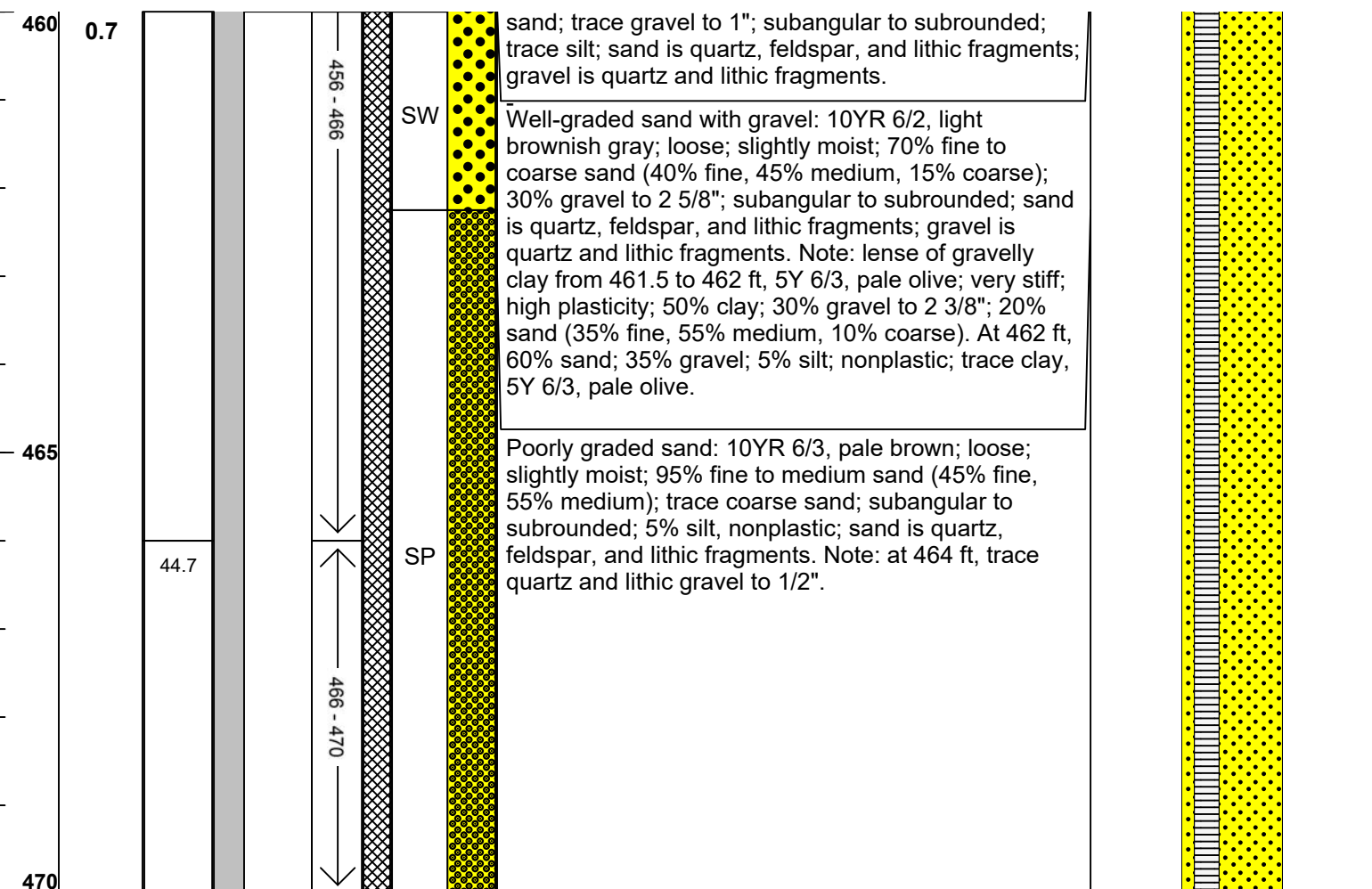
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

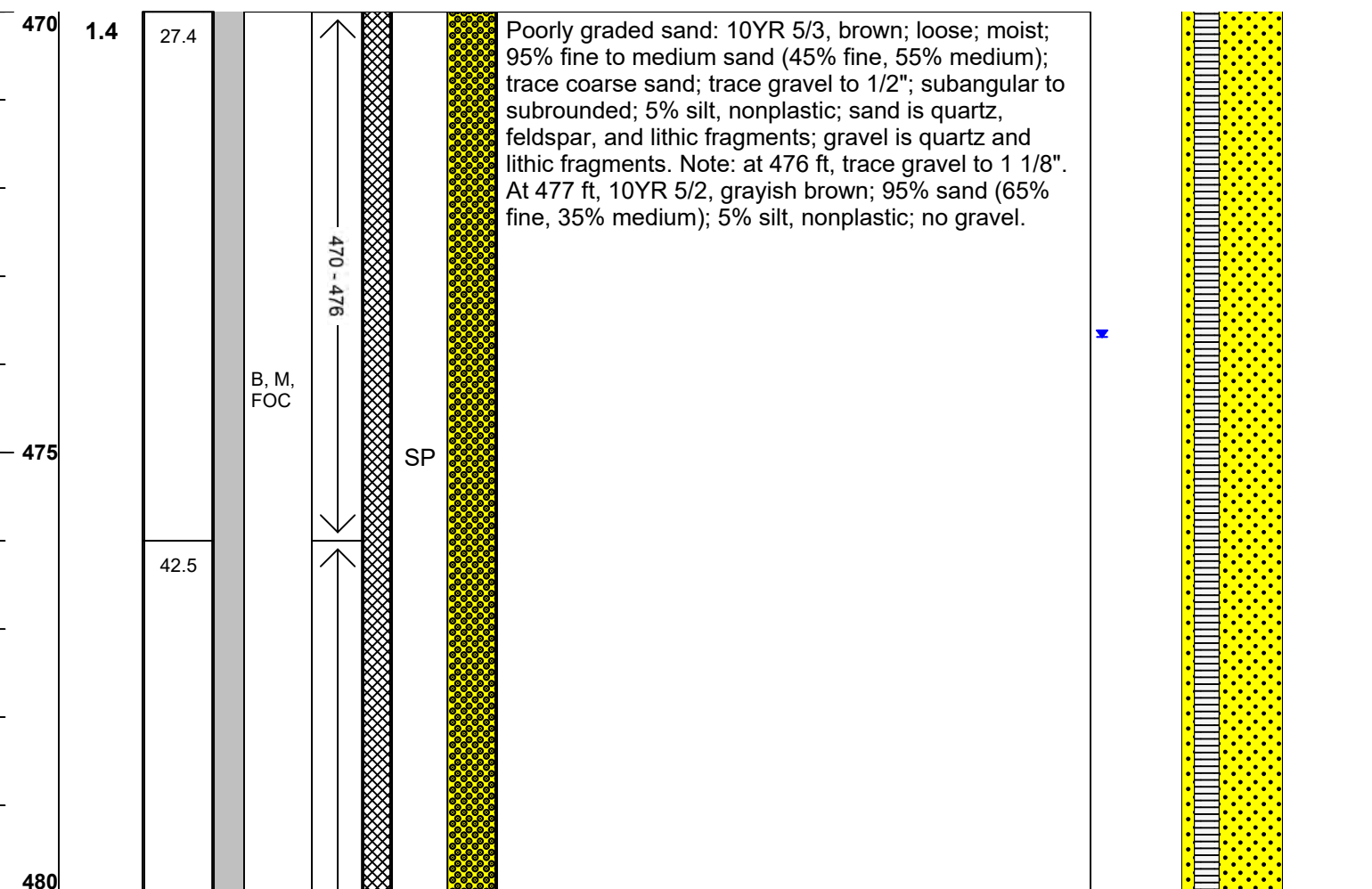
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

☒ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)

480	1.4			B, M, P, V, FOC	476 - 486			SP	Poorly graded sand: 10YR 5/2, grayish brown; loose; moist; 95% fine to medium sand (65% fine, 35% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: at 480.75 ft, 10YR 5/3, brown; trace quartz gravel to 1 1/8". At 482 ft, trace lithic gravel to 1 7/8".	
485		34.7						SW	Well-graded sand: 10YR 5/3, brown; loose; moist; 90% fine to coarse sand (25% fine, 65% medium, 10% coarse); 10% gravel to 2 7/8"; trace silt; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: well-graded sand with gravel at 487 ft, 75% sand; 25% gravel.	
490				B, M, P, V, FOC				SP	Poorly graded sand: 10YR 5/2, grayish brown; loose; moist; 95% fine to medium sand (65% fine, 35% medium); trace gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic	

Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
										(1) (2)

490	1.3		T		486 - 496				fragments. Core bag not opened, 490 to 492 ft sent to lab for thermal conductivity analysis.	3" Schedule 80 PVC Sump, 490 to 492 ft bgs
								GW	Well-graded gravel with sand: 10YR 4/2, dark grayish brown; loose; moist; 70% gravel to 2 7/8"; 30% fine to coarse sand (20% fine, 60% medium, 20% coarse); subangular to subrounded; trace clay; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments. Note: clay is present as nodules.	
495		34.3			496 - 500			SW-SC	Well-graded sand with clay and gravel: 10YR 5/2, grayish brown; loose; moist; 50% fine to coarse sand (20% fine, 65% medium, 15% coarse); 40% gravel to 2 1/4"; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
500			B, M, P, V					GW	Well-graded gravel with sand: 10YR 5/2, grayish brown; loose; moist; 50% gravel to 2 1/4"; 45% fine to coarse sand (20% fine, 65% medium, 15% coarse); subangular to subrounded; 5% clay, nonplastic; gravel is quartz and lithic fragments; sand is quartz, feldspar, and lithic fragments.	

Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

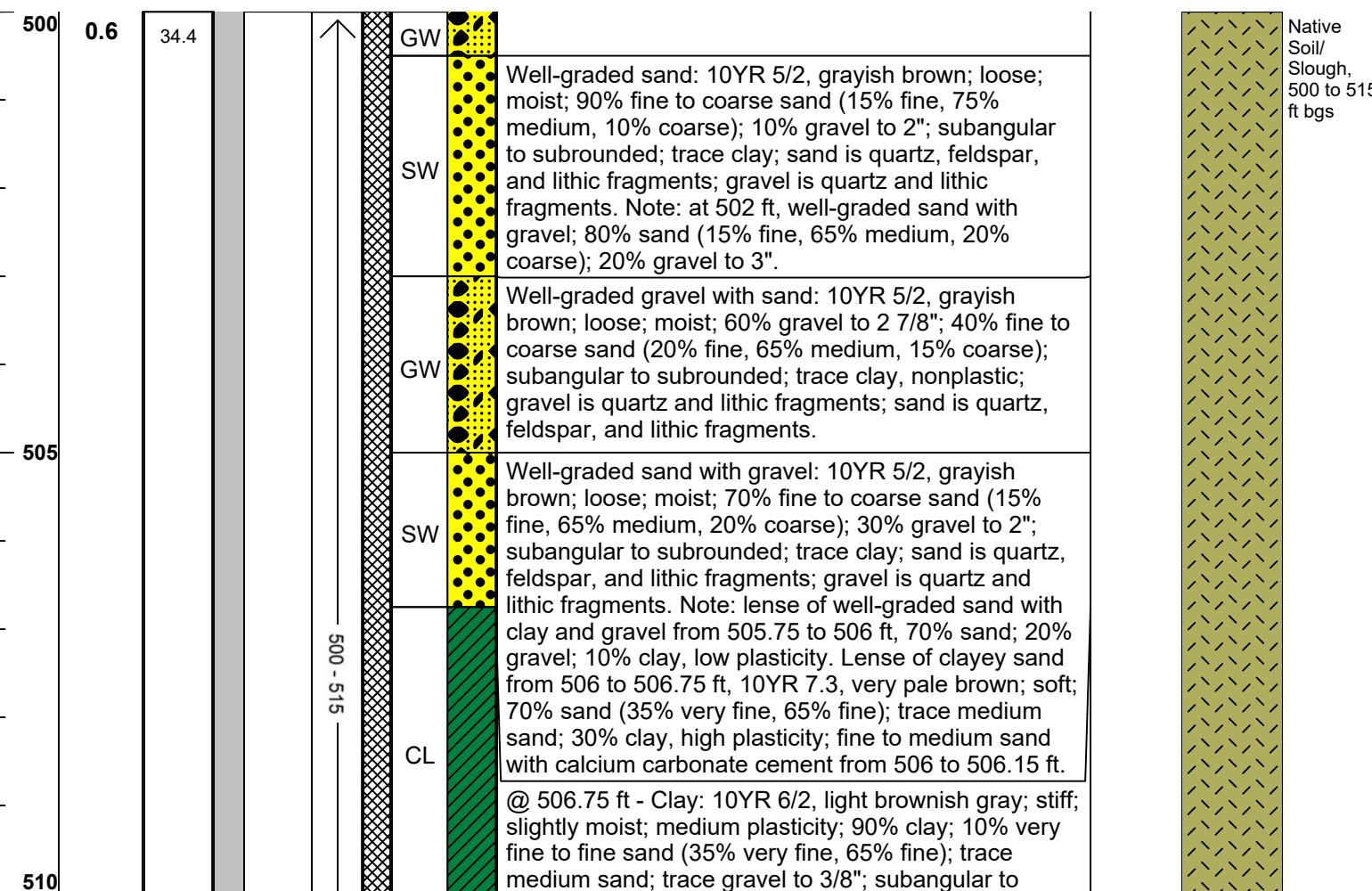
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

Drilling Company: Cascade	Boring Depth (ft): 515	Screen Material: 3" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriquez	DTW After Completion (ft bgs): 473.94	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

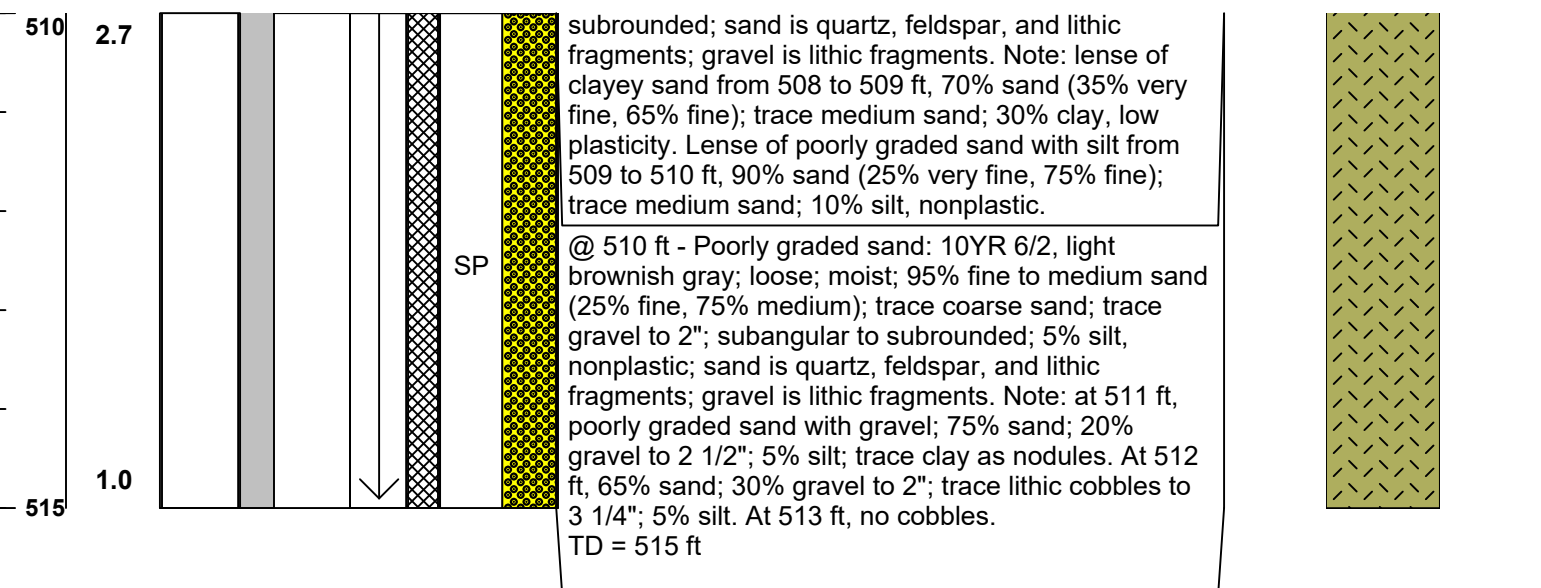
Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **515**
Boring Diameter (in): **7"**
Well Diameter: **3" ID**
DTW After Completion (ft bgs): **473.94**
Riser Material: **3" Sch. 80 PVC**

Screen Material: **3" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite,**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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(1) (2)



Notes:

(1) Current Water Table Well

(2) Contingency Well

∇ = Depth to water after completion

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NA = Not Applicable

bgs = below ground surface

DTW = depth to water

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

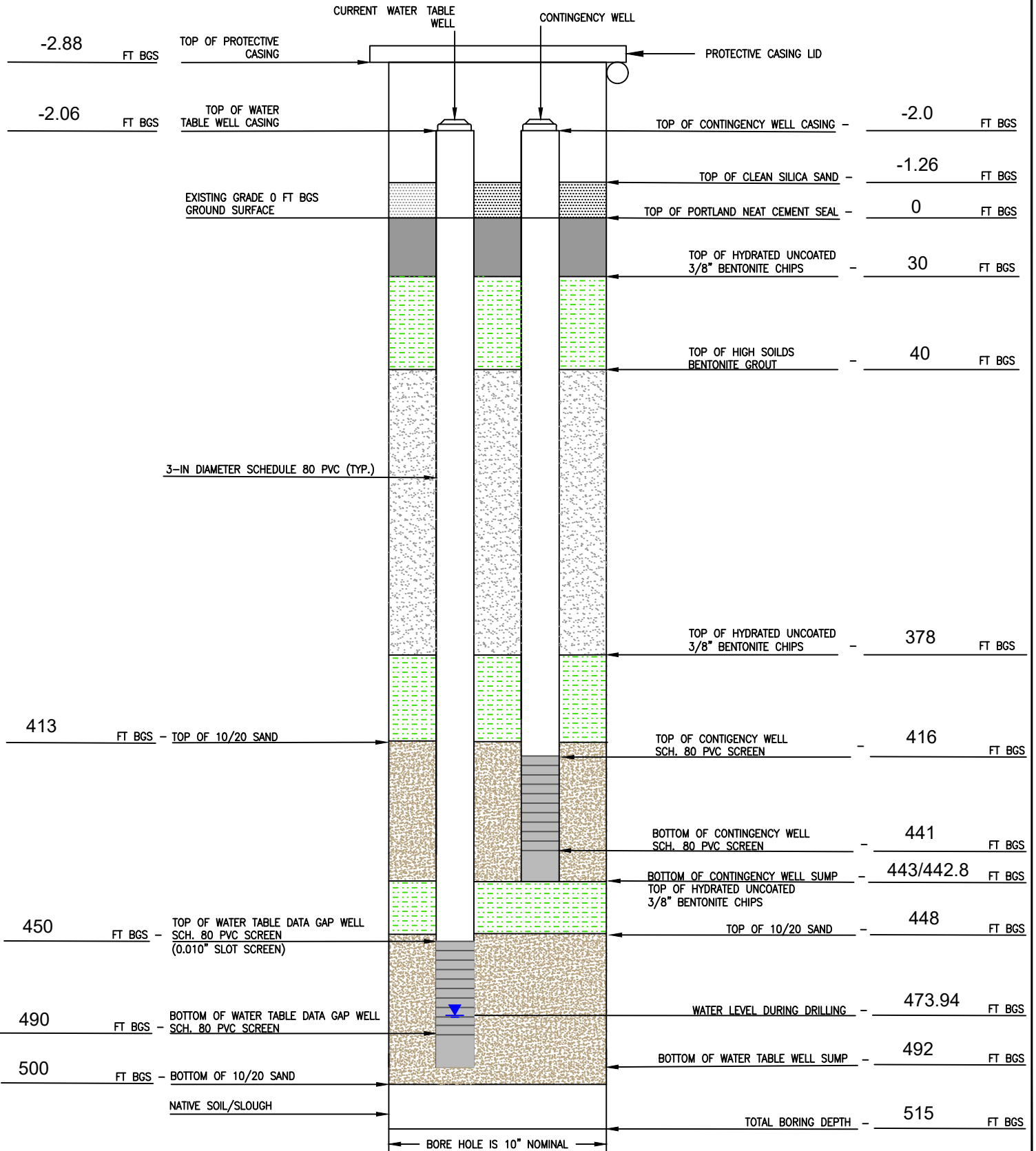
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical;

UV = ultraviolet; T = thermal conductivity; FOC = fraction organic carbon

NESTED MONITORING WELL CONSTRUCTION

KAFB- 106247



NOT TO SCALE
BGS=BELOW GROUND SURFACE
FT=FEET



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 29JAN19	INSTALLATION END DATE/TIME: 01MAR19
PROJECT NO.: 62735DM02.1014	WELL ID: KAFB-106247	GEOLOGIST: J. Messenger	DRILLER: R. Rodriguez

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/16/2018**

Completion Date: **1/24/2019**

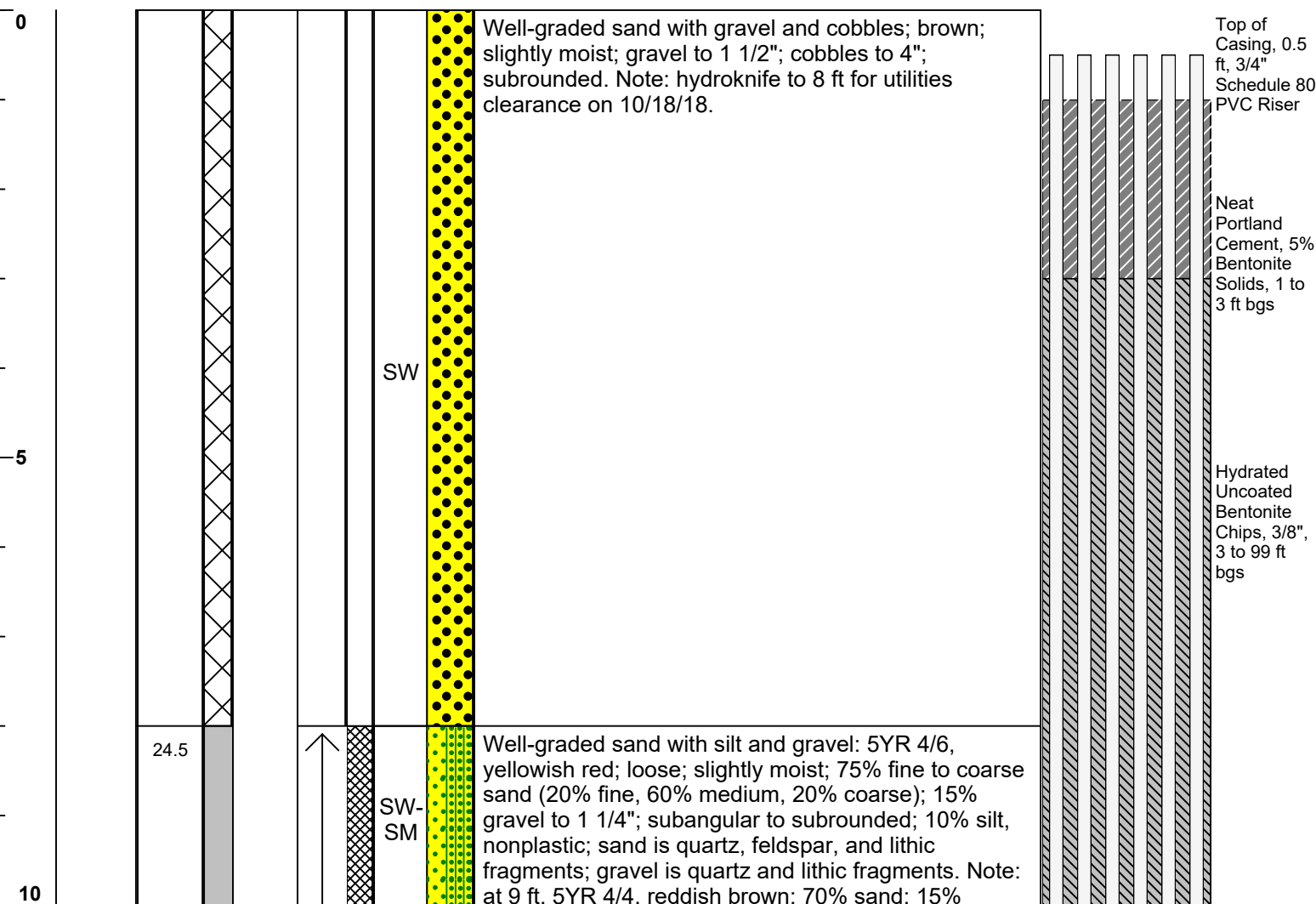
WELL LOG

Well ID: **KAFB-106V1**

Page: **1 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

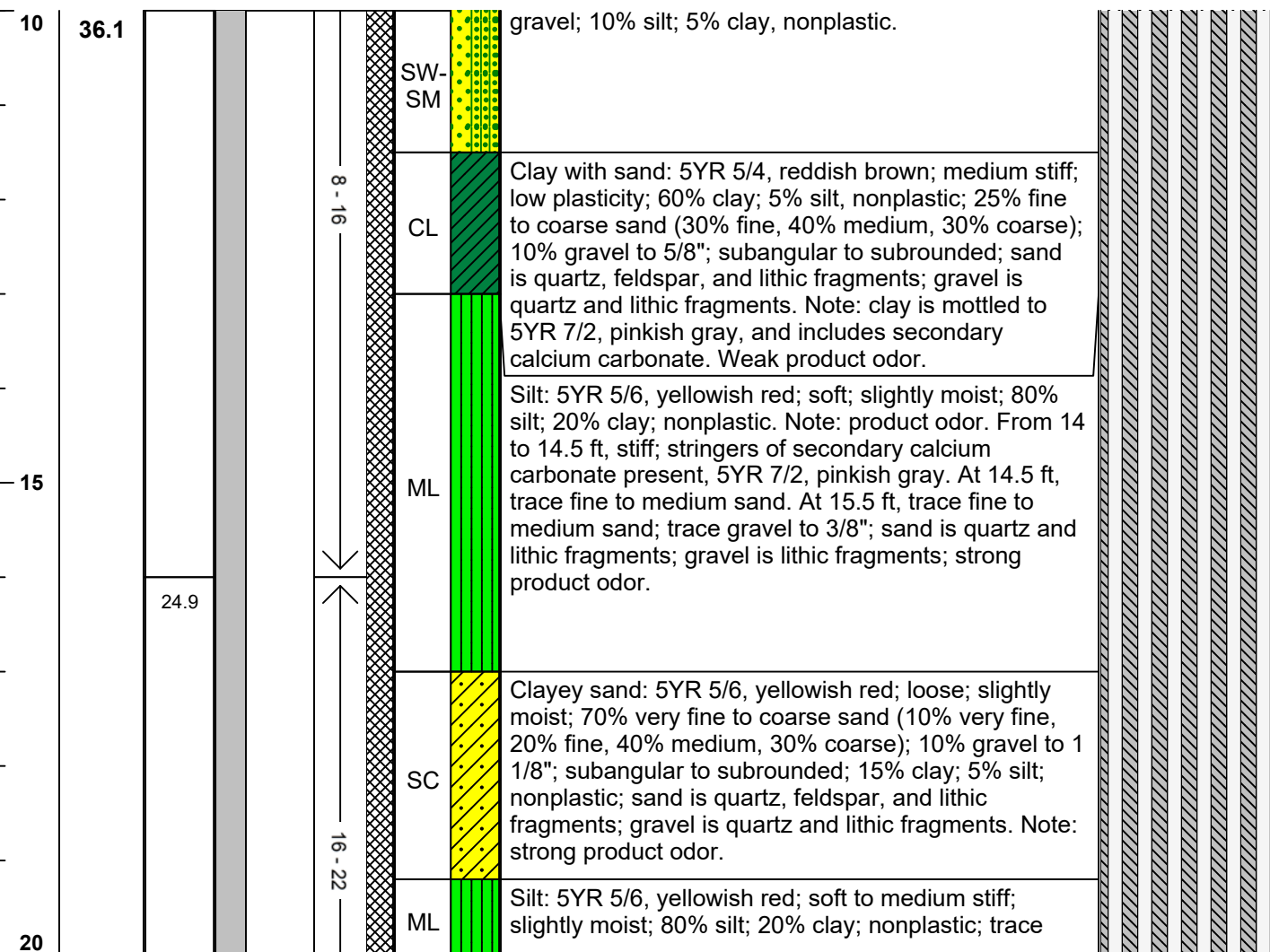
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

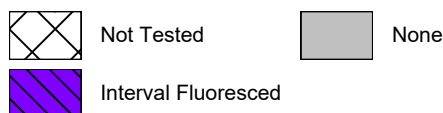
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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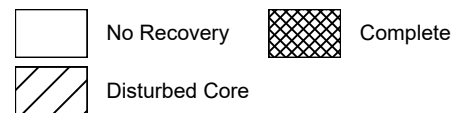
Notes:

UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test



Core Recovery



Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/16/2018**

Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**

Page: **3 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite,**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------

20	2547								fine to medium sand; sand is quartz, feldspar, and lithic fragments. Note: strong product odor. At 20 ft, trace lithic gravel to 1/2".	
		24.9			22 - 26				Silt with sand: 5YR 5/6, yellowish red; soft to medium stiff; slightly moist; 75% silt; 10% clay; nonplastic; 15% very fine to medium sand (30% very fine, 30% fine, 40% medium); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor.	
25		22.1			26 - 32			ML	Silt: 5YR 5/6, yellowish red; soft to medium stiff; slightly moist; 80% silt; 20% clay; nonplastic; trace fine to coarse sand; sand is quartz, feldspar, and lithic fragments. Note: strong product odor. At 24 ft, trace lithic gravel to 1/2". At 26 ft, 5YR 5/4, reddish brown.	
30										

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/16/2018**

Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**

Page: **4 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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30	2330								Silt: see description on previous page. At 31 ft, 5YR 6/4, light reddish brown; trace fine to coarse sand; trace gravel to 5/8"; sand is quartz and lithic fragments; gravel is lithic fragments.	
		22.7			32 - 36				Silt with sand: 5YR 5/6, yellowish red; soft to medium stiff; slightly moist; 75% silt; 10% clay; nonplastic; 15% very fine to medium sand (30% very fine, 30% fine, 40% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor. At 34 ft, gravel to 5/8"; sand and gravel include caliche.	
35								ML	Silt: 5YR 4/6, yellowish red; soft; slightly moist; 80% silt; 20% clay; nonplastic; trace fine to medium sand; sand is quartz, lithic fragments, and caliche. Note: strong product odor. At 39 ft, 5YR 5/4, reddish brown.	
		21.6			36 - 42					
40										

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/16/2018**

Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**

Page: **5 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite,**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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40	2434									
		22.7			42 - 46				Silt: 5YR 5/4, reddish brown; soft; slightly moist; 80% silt; 20% clay; nonplastic; trace fine to medium sand; sand is quartz, lithic fragments, and caliche. Note: strong product odor. At 44 ft, 5YR 5/6, yellowish red. Lense of silt with sand from 46.8 to 47.2 ft, 5YR 5/6, yellowish red; 75% silt; 10% clay; 15% very fine to medium sand.	
45		21.9			46 - 52			ML	Silt: 5YR 4/4, reddish brown; soft to medium stiff; slightly moist; low plasticity; 80% silt; 20% clay; trace fine to medium sand; sand is lithic fragments and caliche. Note: strong product odor. At 49 ft, 7.5YR 5/4, brown.	
50										

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/16/2018**

Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**

Page: **6 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite,**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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50	2991								Silt: 7.5YR 5/4, brown; soft to medium stiff; low plasticity; 80% silt; 20% clay; trace fine to medium sand; sand is lithic fragments and caliche. Note: strong product odor. At 52 ft, trace gravel to 3/8"; lithic fragments and caliche.	
		22.6			52					
55					55			ML	Silt: 7.5YR 5/4, brown; soft to medium stiff; low plasticity; 70% silt; 20% clay; 10% fine to coarse sand (40% fine, 50% medium, 10% coarse); trace gravel to 3/8"; subangular to subrounded; sand is quartz, lithic fragments, and caliche; gravel is lithic fragments and caliche. Note: strong product odor. At 56 ft, nonplastic; 80% silt; 20% clay; trace fine to medium sand; trace gravel to 1/2". At 58 ft, 75% silt, 20% clay; 5% fine to coarse sand; trace gravel to 3/8". At 59 ft, 7.5YR 5/6, strong brown.	
		22.1			56					
					56 - 62					
60										

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

WELL LOG

Well ID: **KAFB-106V1**

Page: 7 of 29

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger									Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC			Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand		
Depth (ft)	PI/D (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description			Completion Details		

60	3131	P, V		ML	Silt: 7.5YR 5/6, strong brown; soft; nonplastic; slightly moist; 75% silt; 20% clay; 5% fine to coarse sand (40% fine, 50% medium, 10% coarse); trace gravel to 3/8"; subangular to subrounded; sand is lithic fragments and caliche; gravel is lithic fragments. Note: strong product odor.
				SM	Silty sand: 5YR 5/4, reddish brown; loose; slightly moist; 80% fine to coarse sand (40% fine, 40% medium, 20% coarse); 5% gravel to 1"; subangular to subrounded; 15% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.
				ML	Silt: 5YR 5/6, yellowish red; soft; slightly moist; nonplastic; 90% silt; 10% very fine to medium sand (40% very fine, 40% fine, 20% medium); trace gravel to 5/8"; subangular to subrounded; sand is quartz and lithic fragments; gravel is lithic fragments. Note: strong product odor.
				SW-SM	Well-graded sand with silt: 7.5YR 5/3, brown; loose; slightly moist; 85% very fine to coarse sand (15% very fine; 35% fine, 30% medium, 20% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.
65				ML	
70					@ 68 ft - Silt: 7.5YR 5/4, brown; soft; nonplastic; 80% silt; 20% clay. Note: clay is present as nodules. Strong

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

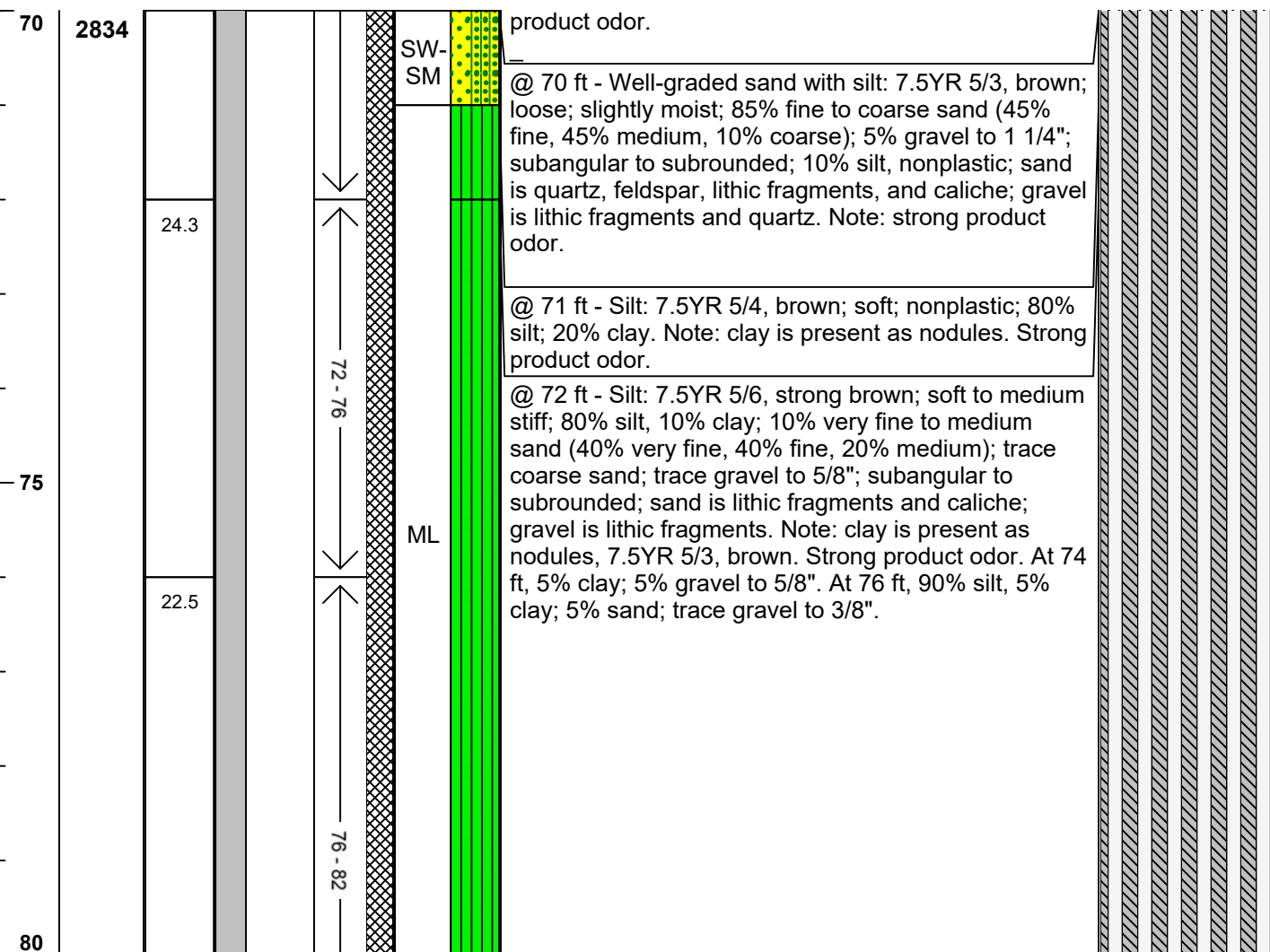
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

WELL LOG

Well ID: **KAFB-106V1**

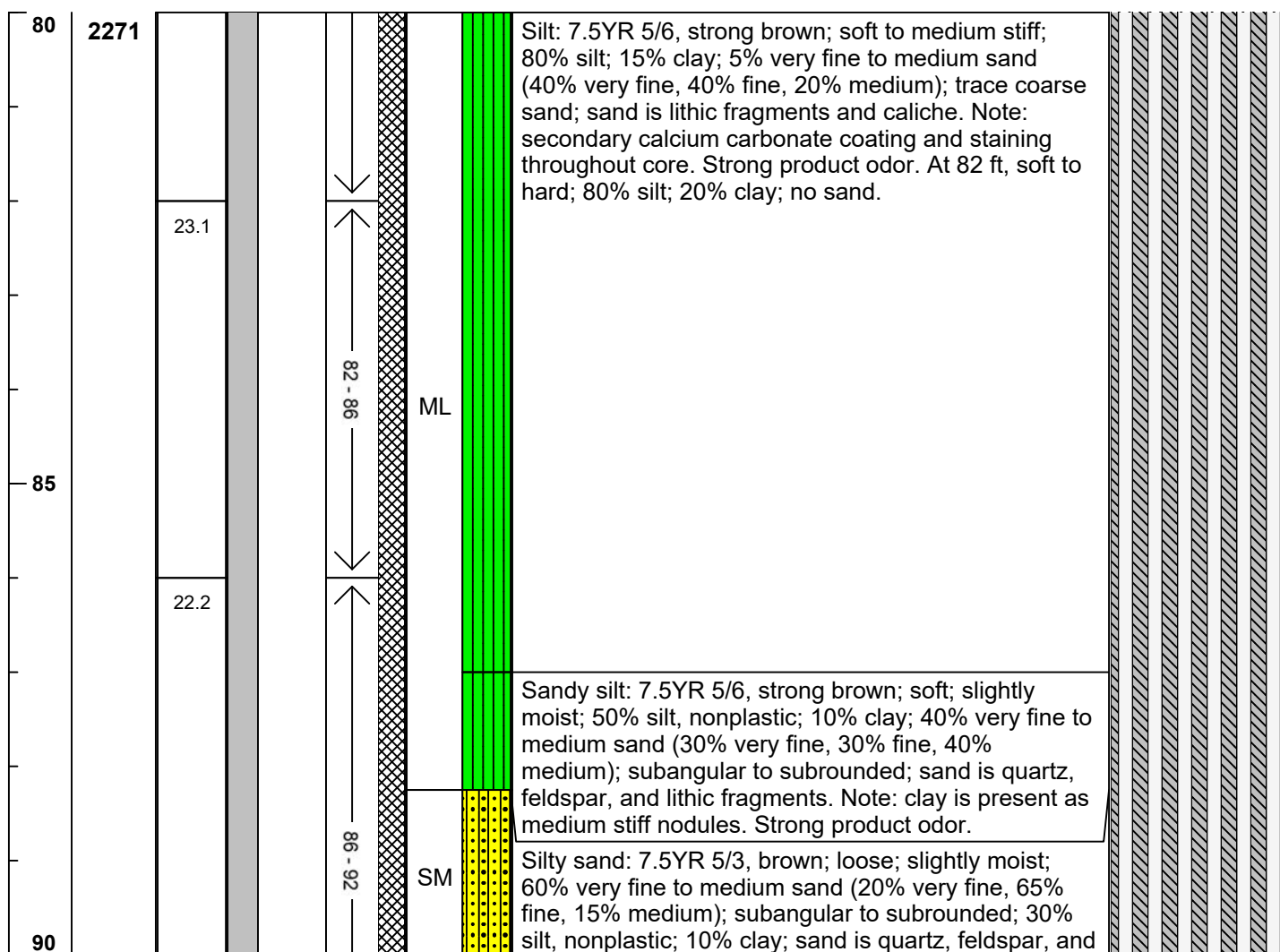
Page: 9 of 29

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriquez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite,**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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90	2546							SM	lithic fragments. Note: clay is present as nodules to 5" with calcium carbonate cement. At 89 ft, 80% sand; 15% silt; 5% clay; clay nodules are smaller and hard; strong product odor.	
		22.4			92 - 96			SP- SM	Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; slightly moist; 90% very fine to medium sand (30% very fine, 40% fine, 30% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.	
95								SP	Poorly graded sand: 10YR 5/4, yellowish brown; loose; slightly moist; 95% very fine to medium sand (30% very fine, 55% fine, 15% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is lithic fragments and caliche. Note: strong product odor.	
		23.2			96 - 102			SP- SM	Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; slightly moist; 90% very fine to medium sand (30% very fine, 40% fine, 30% medium); trace coarse sand; trace gravel to 1/2"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.	
								SP	Poorly graded sand: 10YR 5/4, yellowish brown; loose; slightly moist; 95% very fine to medium sand (30% very fine, 55% fine, 15% medium); trace coarse sand; trace gravel to 5/8"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong	
100										10/20 Silica Sand, 99 to 103.5 ft bgs

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

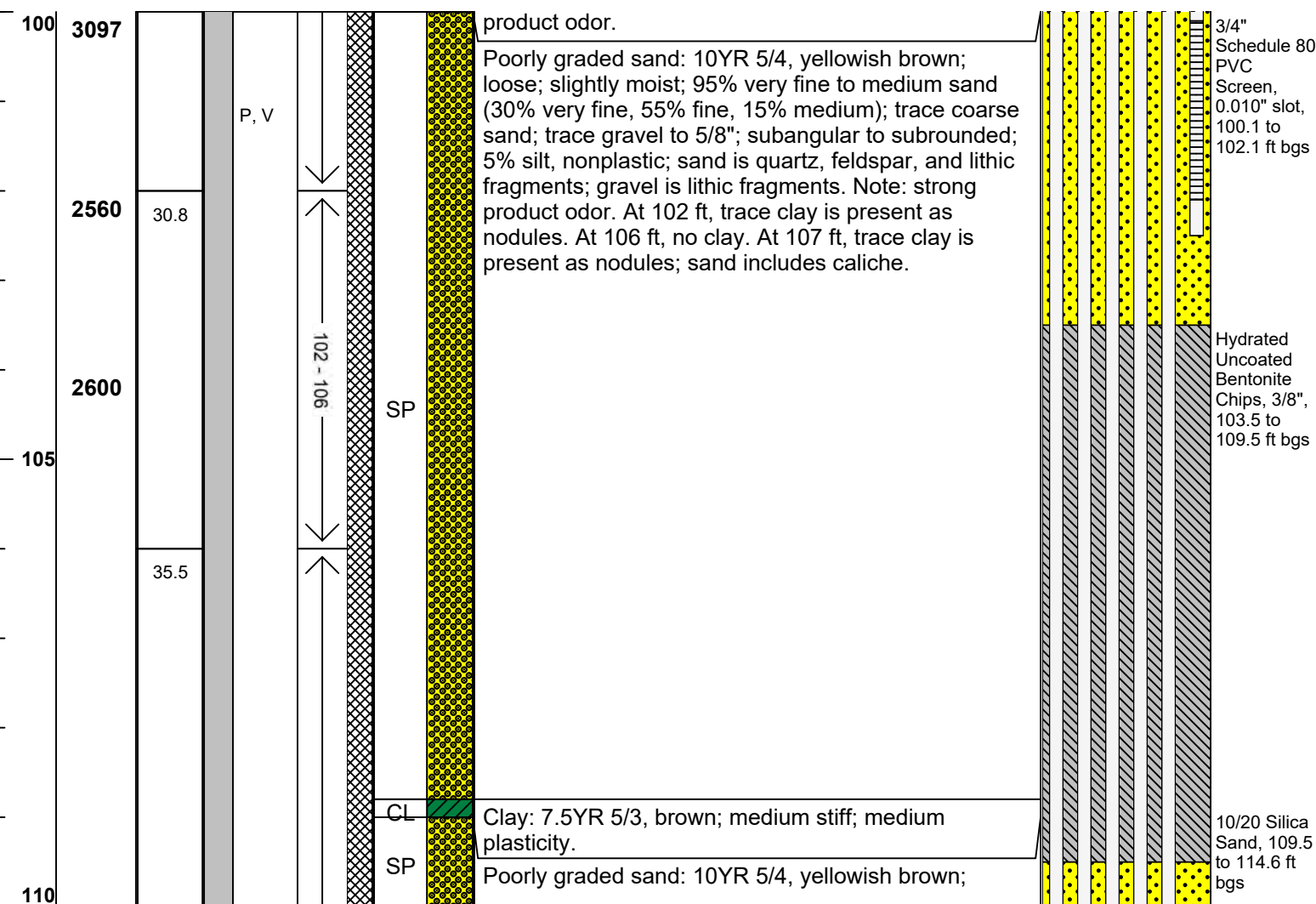
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

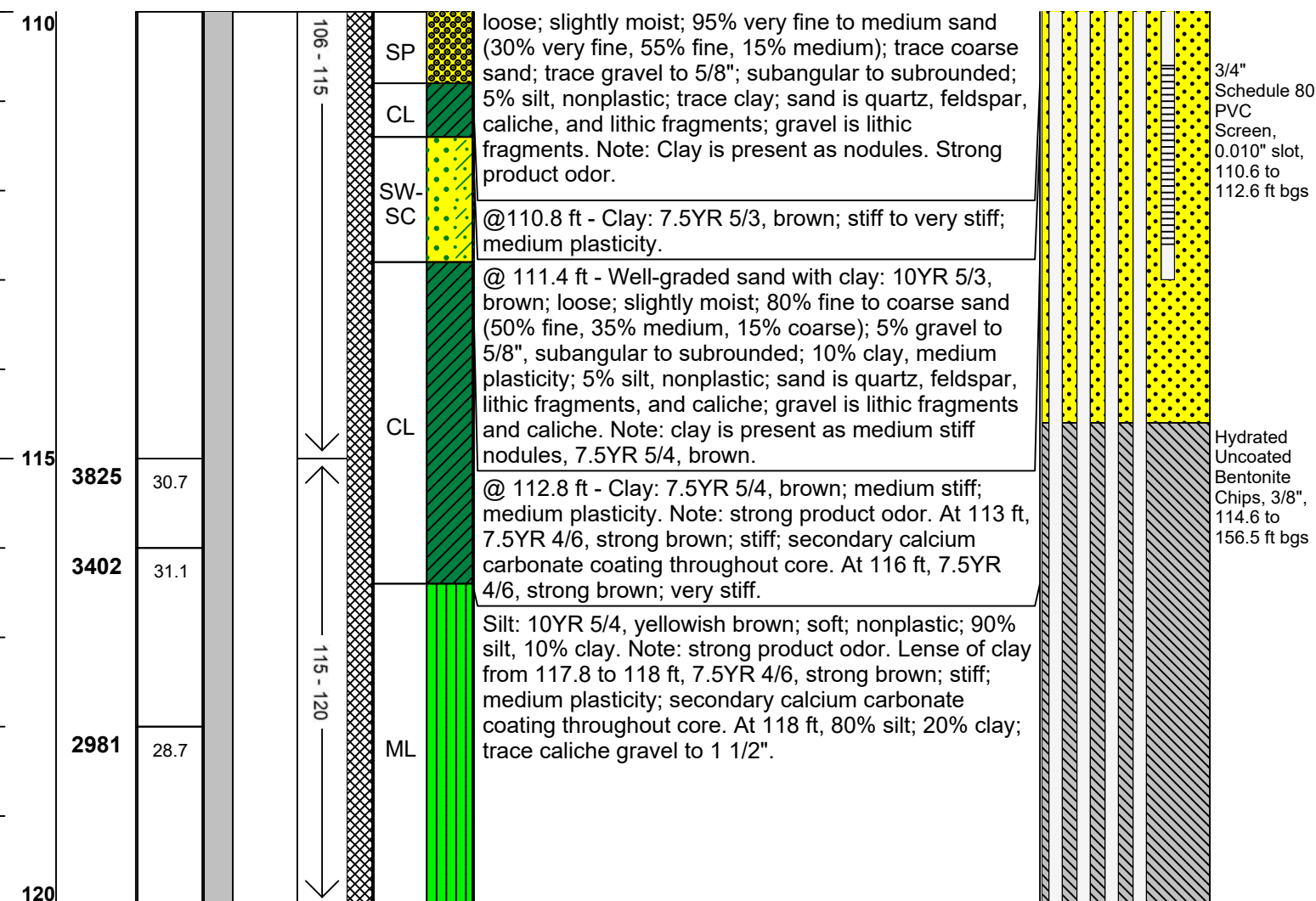
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface
ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Disturbed Core



Complete

Following coring, the borehole was overdrilled using ARCH for well installation

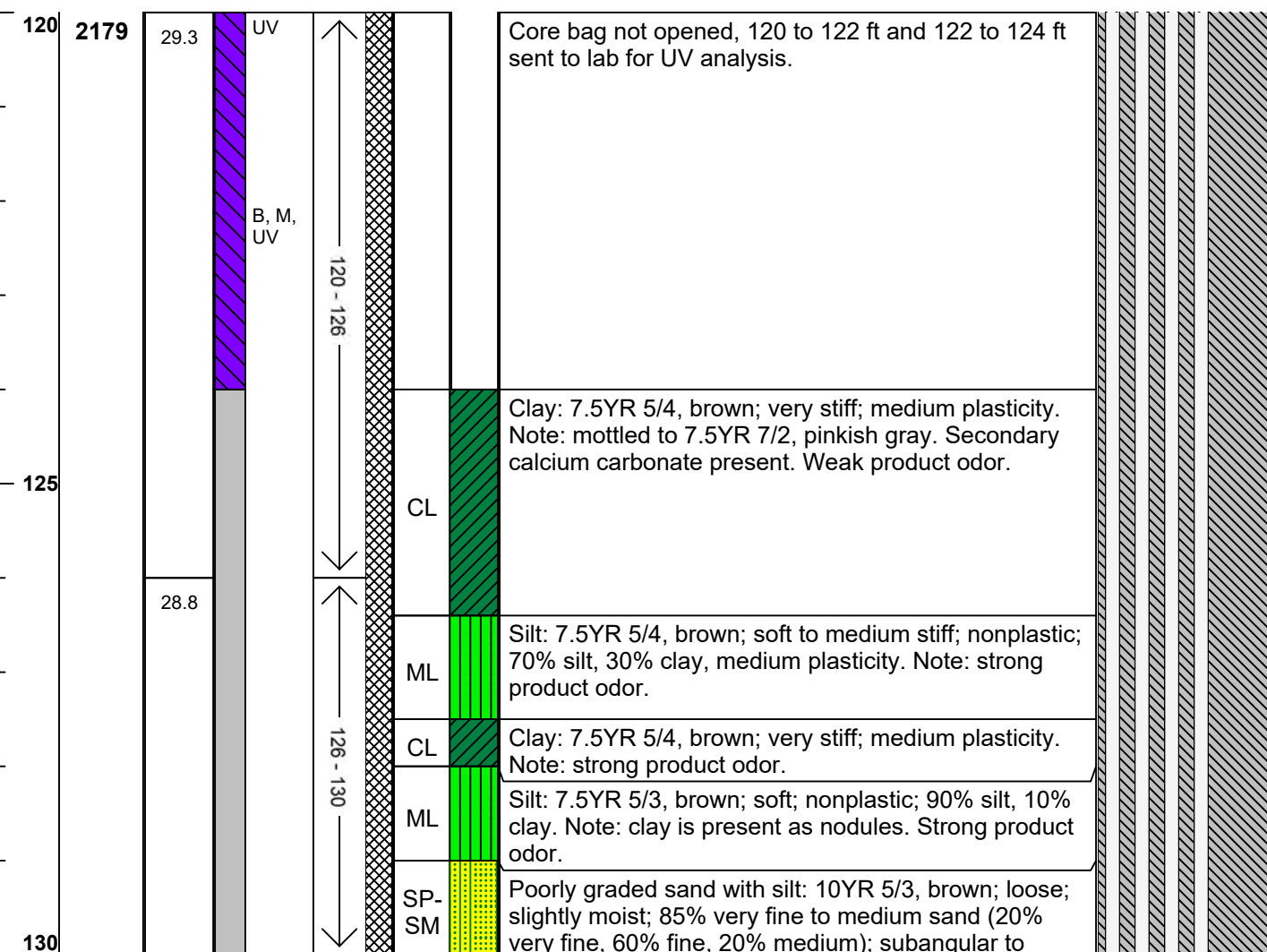
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/16/2018**

Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**

Page: **14 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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130	3278	25.1							subrounded; 10% silt, nonplastic; 5% clay; sand is quartz, feldspar, lithic fragments, and caliche. Note: clay is present as nodules. Strong product odor.	
				P, V					Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 60% fine, 20% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: strong product odor. From 132.8 to 133.8 ft, 95% sand (45% fine, 55% medium, trace coarse); 5% gravel to 1 1/4"; no silt; gravel is quartz and lithic fragments.	
					130 - 136			SP		
								SP-SM	Poorly graded sand with silt: 10YR 5/3, brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 60% fine, 20% medium); trace coarse sand; trace gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: Strong product odor.	
135		26.5						SW	@ 135 ft - Well-graded sand: 10YR 5/3, brown; loose; slightly moist; 90% fine to coarse sand (20% fine, 65% medium, 15% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 136 ft, well-graded sand with gravel; 80% sand (20% fine, 60% medium, 20% coarse); 15% gravel to 1"; 5% silt.	
	3246				136 - 140			SP	@ 137 ft - Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 60% fine, 20% medium); subangular to subrounded; 5% silt, nonplastic; sand is quartz,	
140										

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

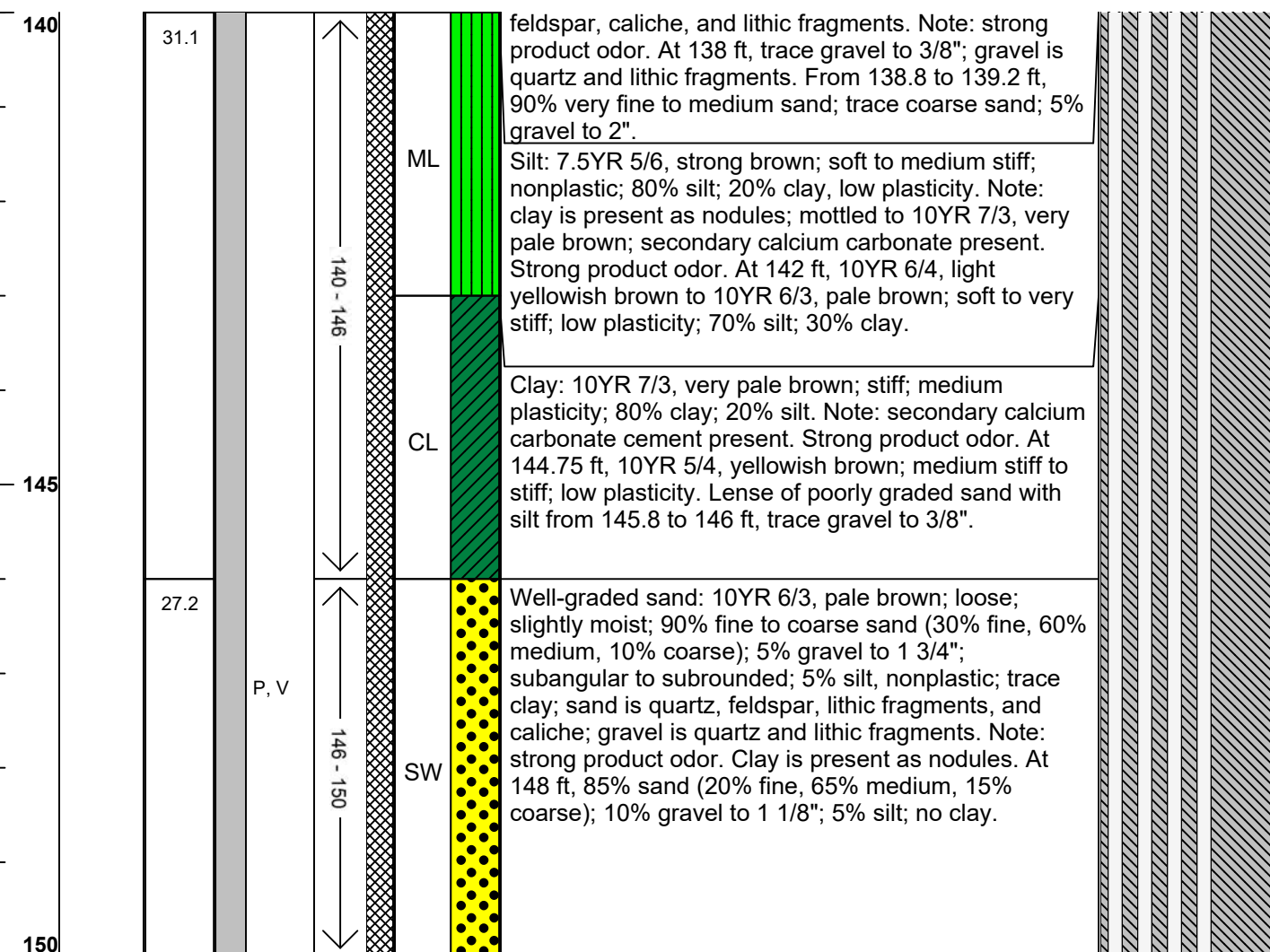
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

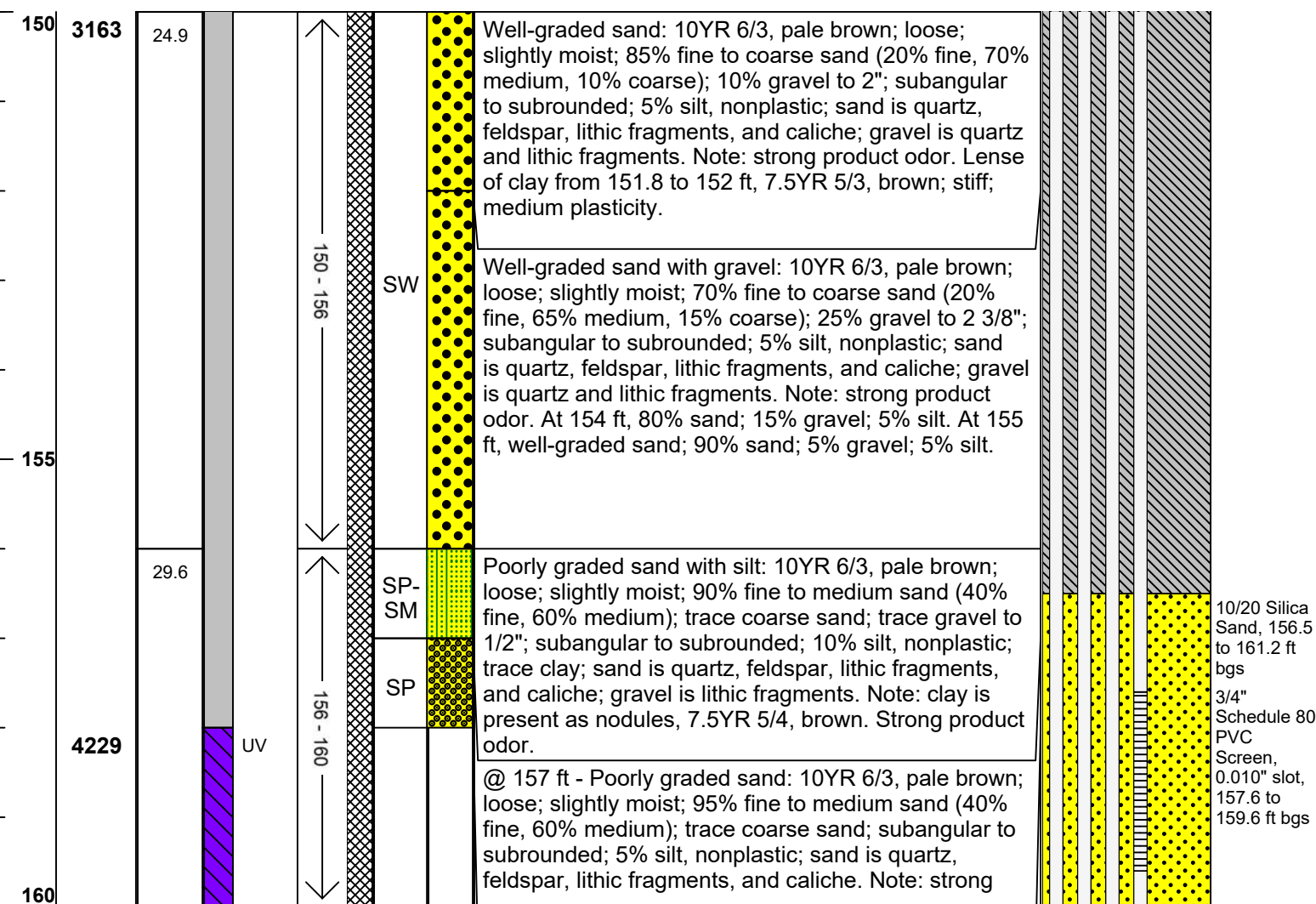
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

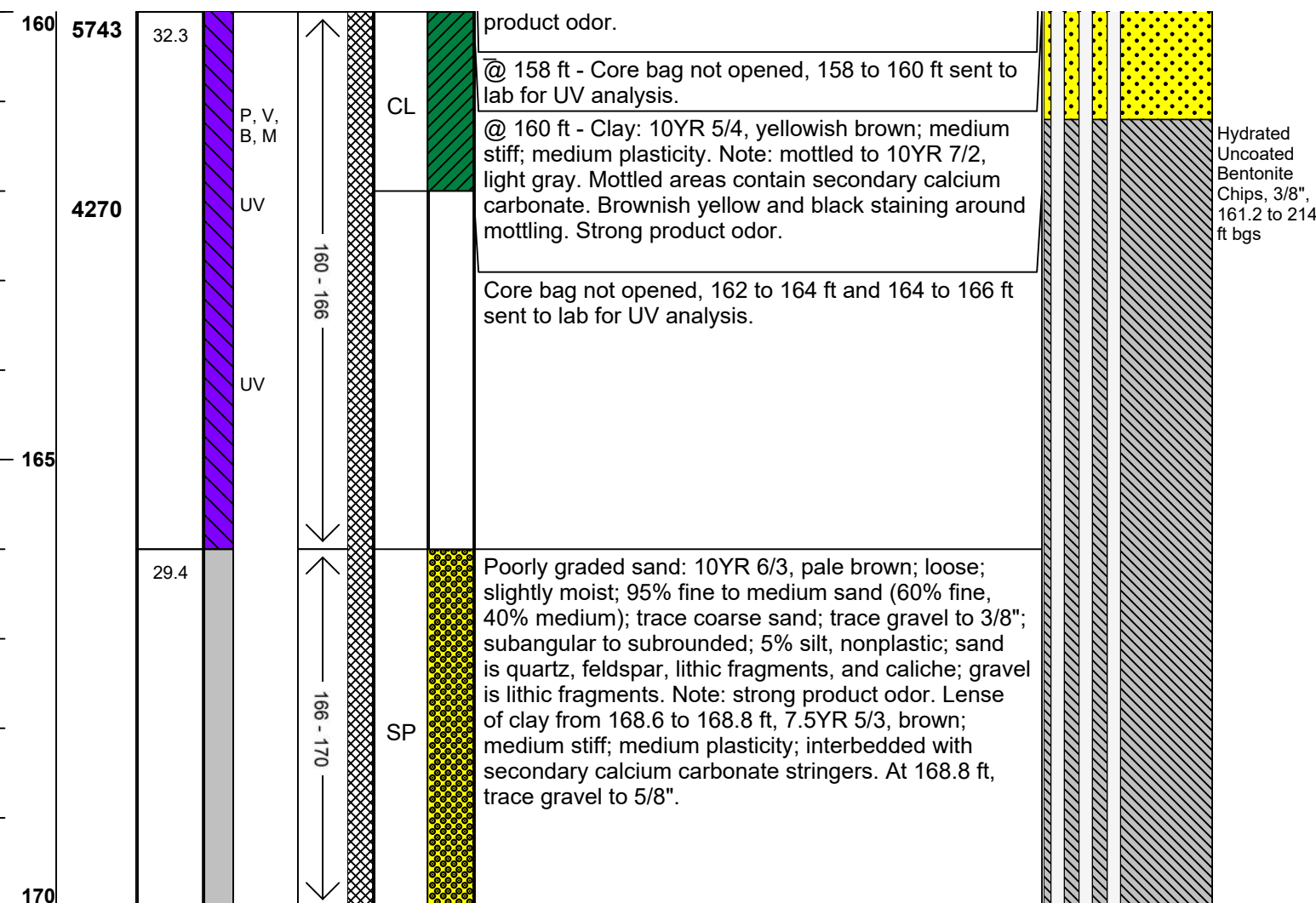
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

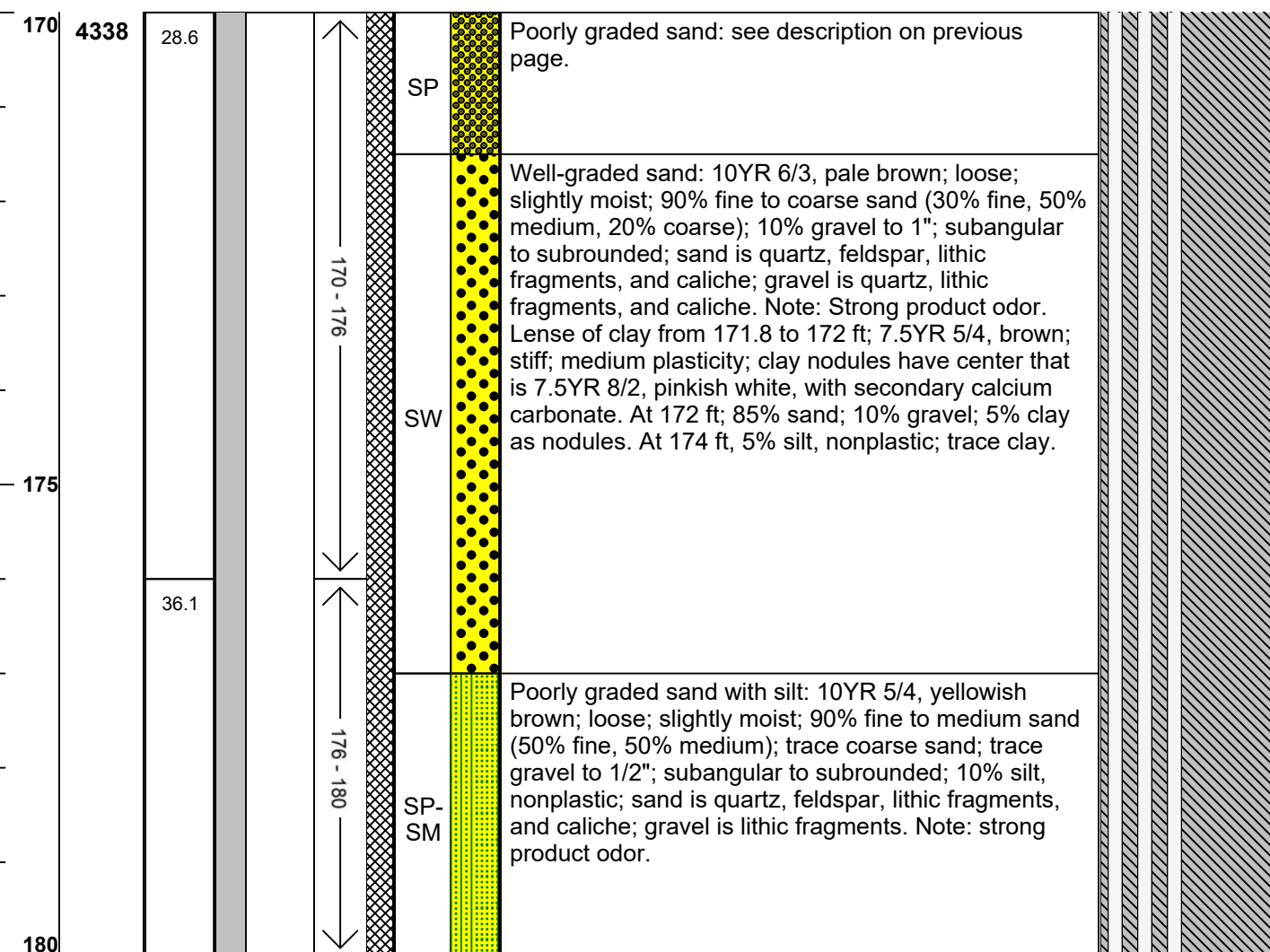
UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes:

UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

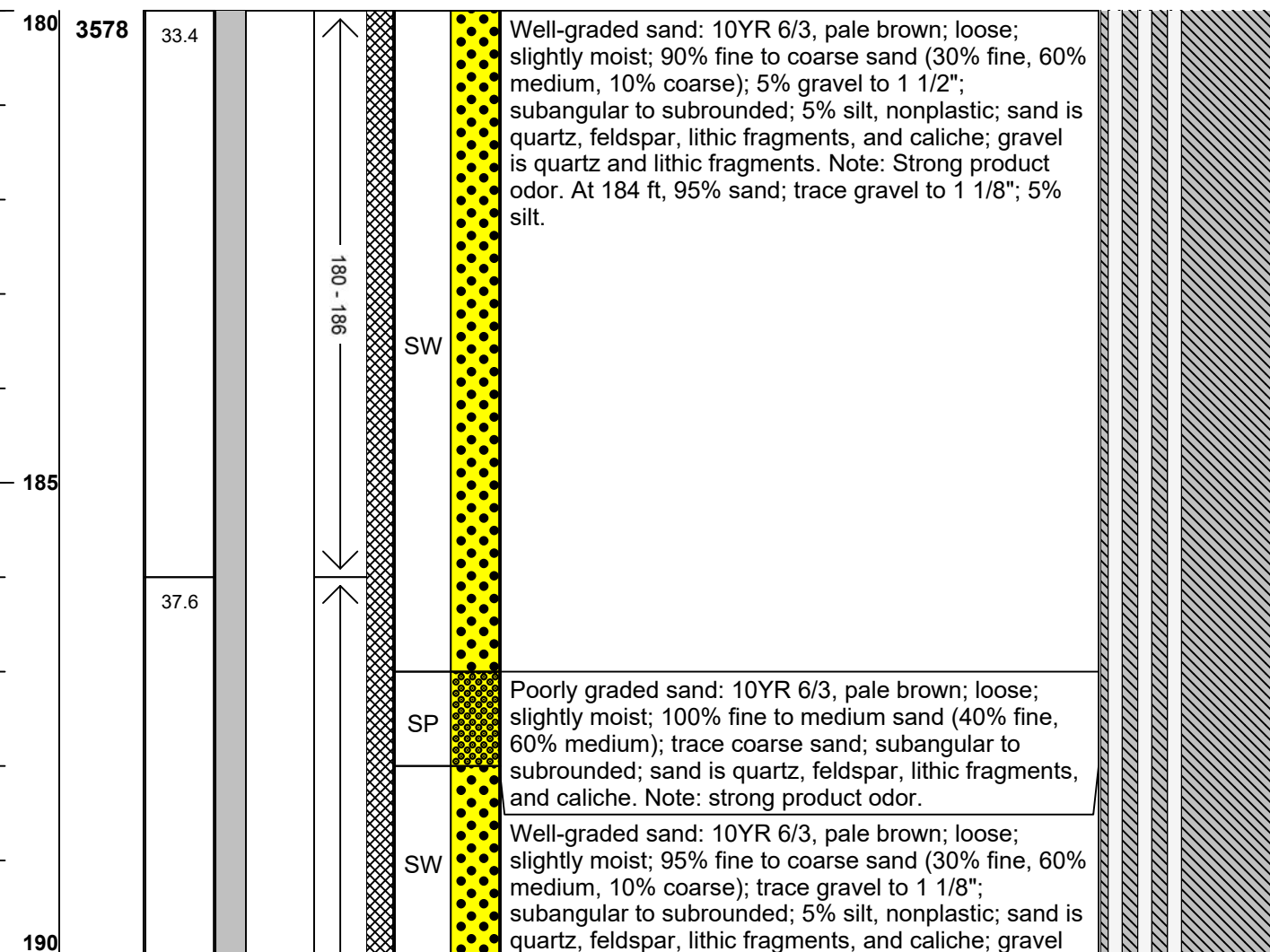
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

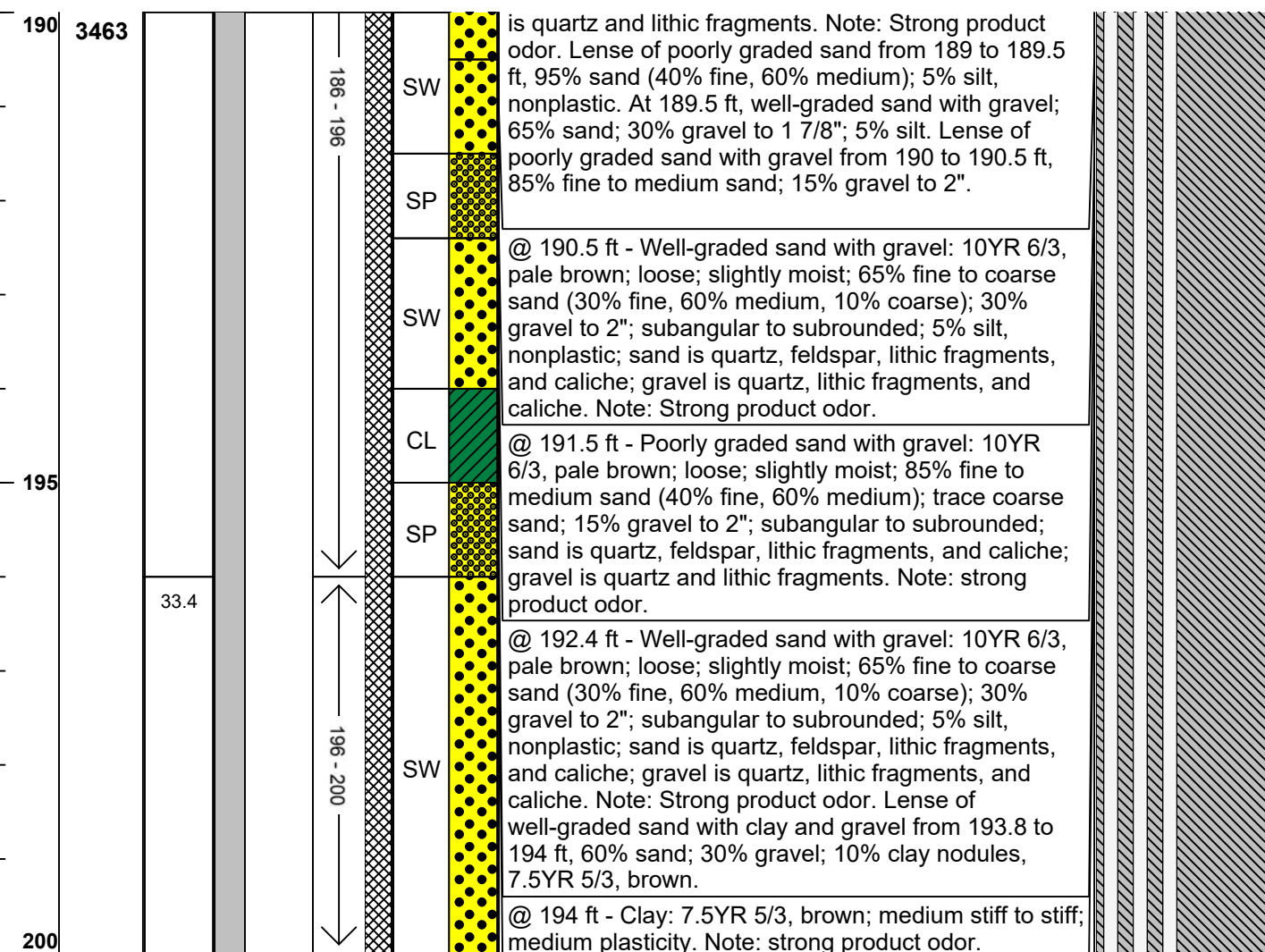
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

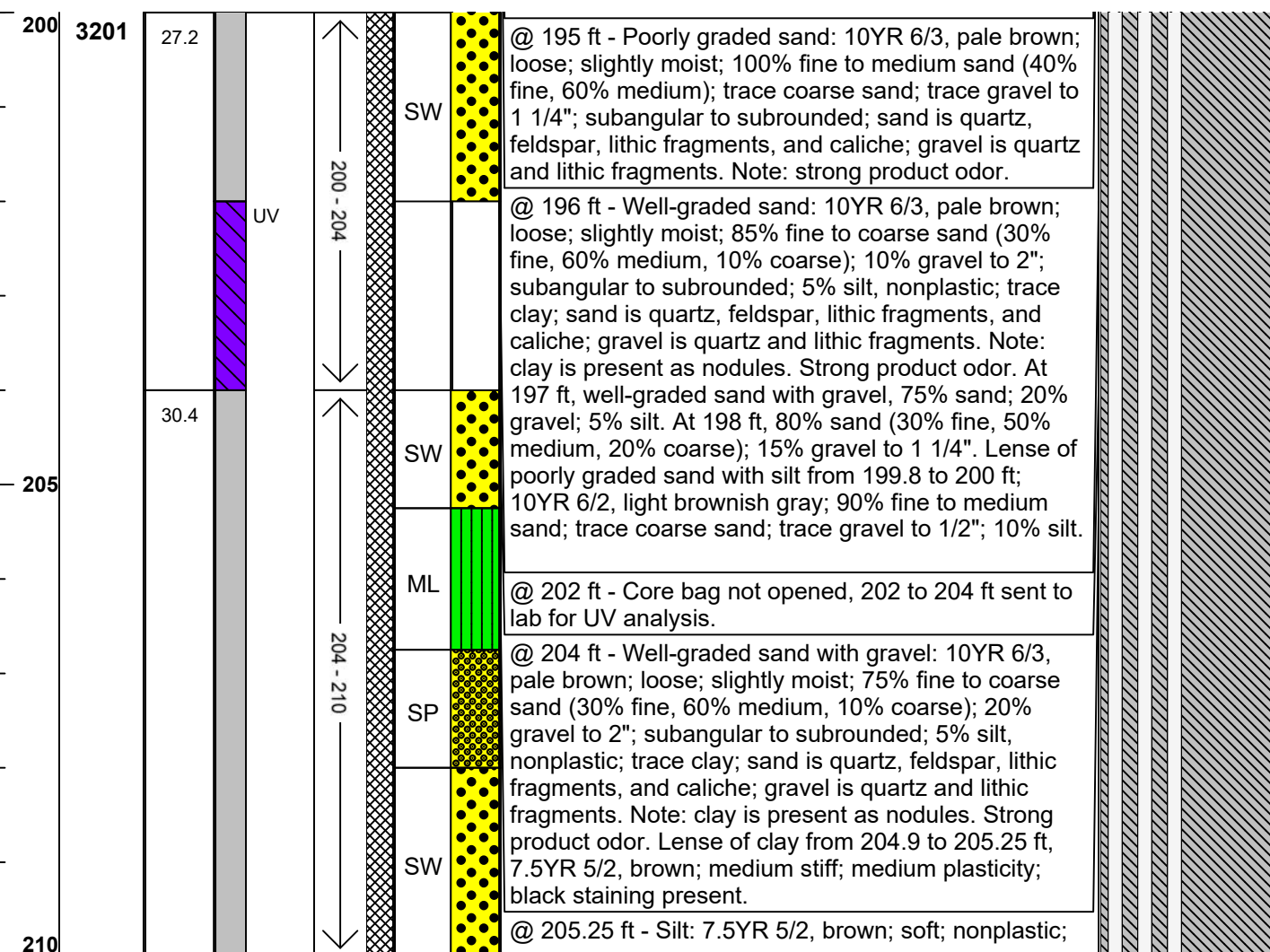
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

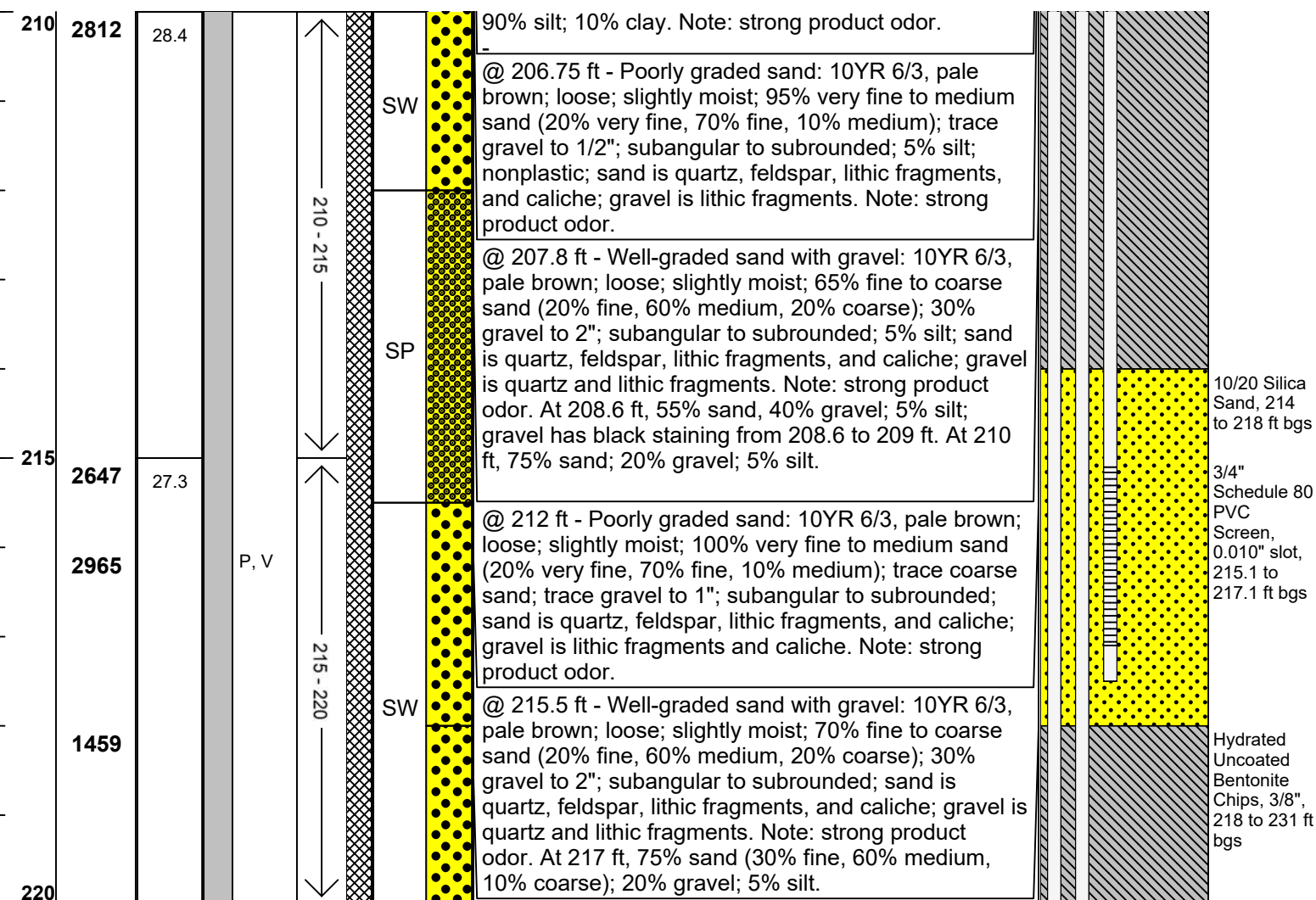
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

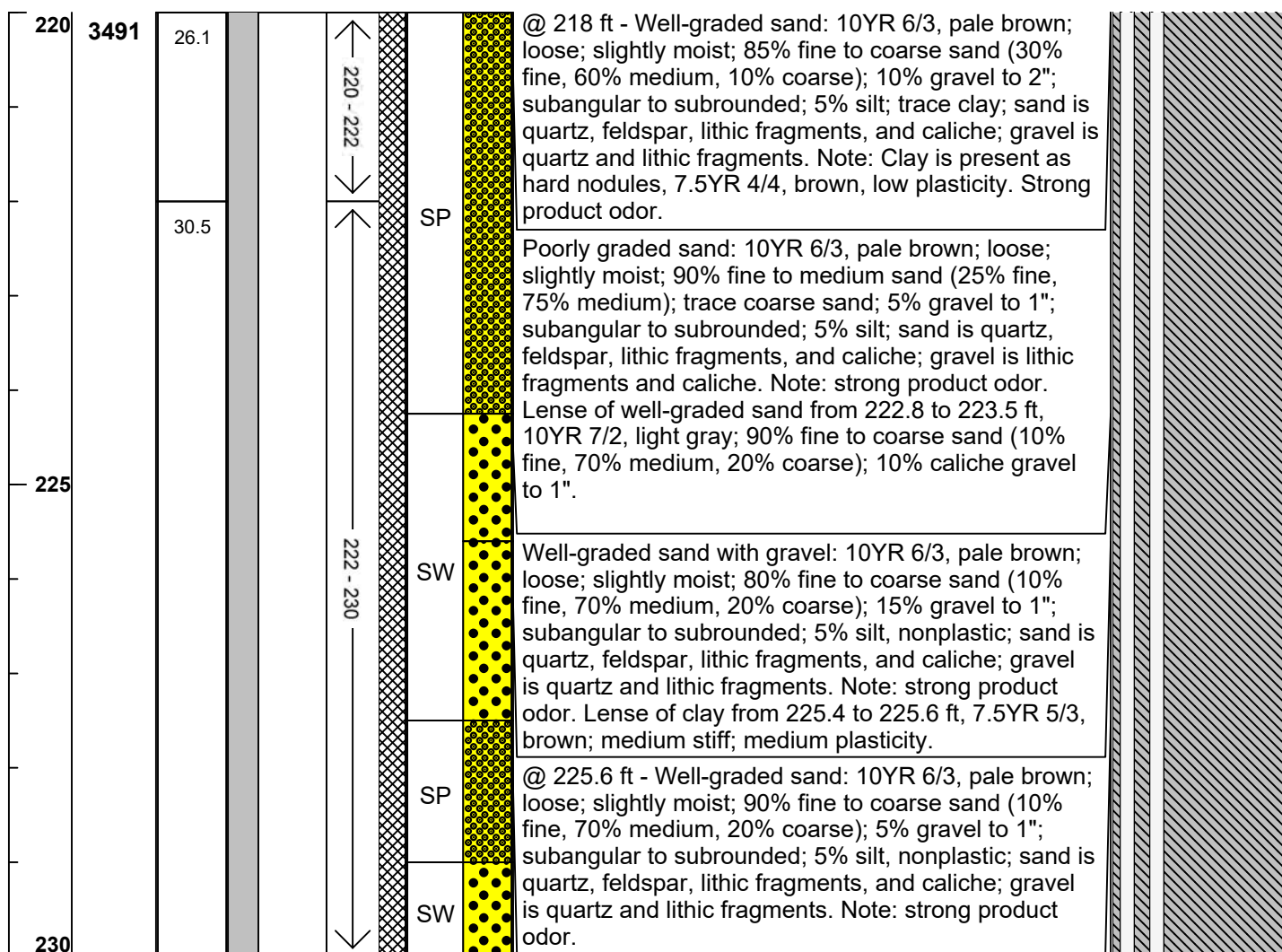
There is a 0.4 ft sump underlying each screen.

WELL LOG

Well ID: **KAFB-106V1**

Page: 23 of 29

Drilling Company: Cascade Drilling Method: Sonic Coring Drill Bit: Sonic Core Barrel, 6" ID Driller: Roger Rodriguez Geologist: J. Messenger									Boring Depth (ft): 285 ft Boring Diameter (in): 7" Well Diameter: 3/4" ID DTW After Completion (ft bgs): N/A Riser Material: 3/4" Sch. 80 PVC			Screen Material: 3/4" Sch. 80 PVC 0.010" Slot Screen Seal Material(s): Cement, Bentonite, High Solids Bentonite Grout Filter Pack: 10/20 Silica Sand		
Depth (ft)	PI/D (ppmv)	Temp (oC)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description			Completion Details		



Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/16/2018**

Completion Date: **1/24/2019**

WELL LOG

Well ID: **KAFB-106V1**

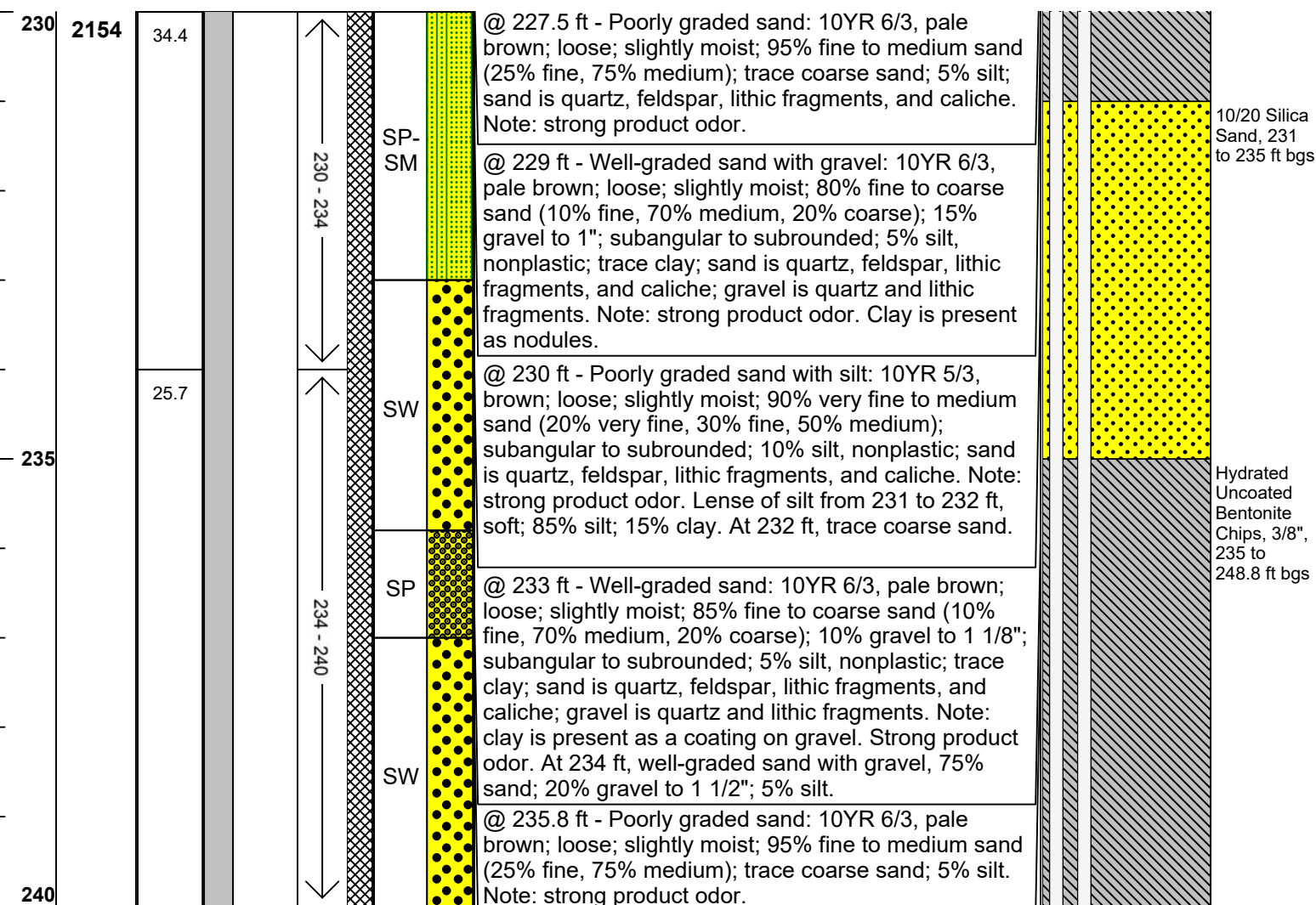
Page: **24 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **285 ft**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" Slot Screen
Seal Material(s): **Cement, Bentonite,**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

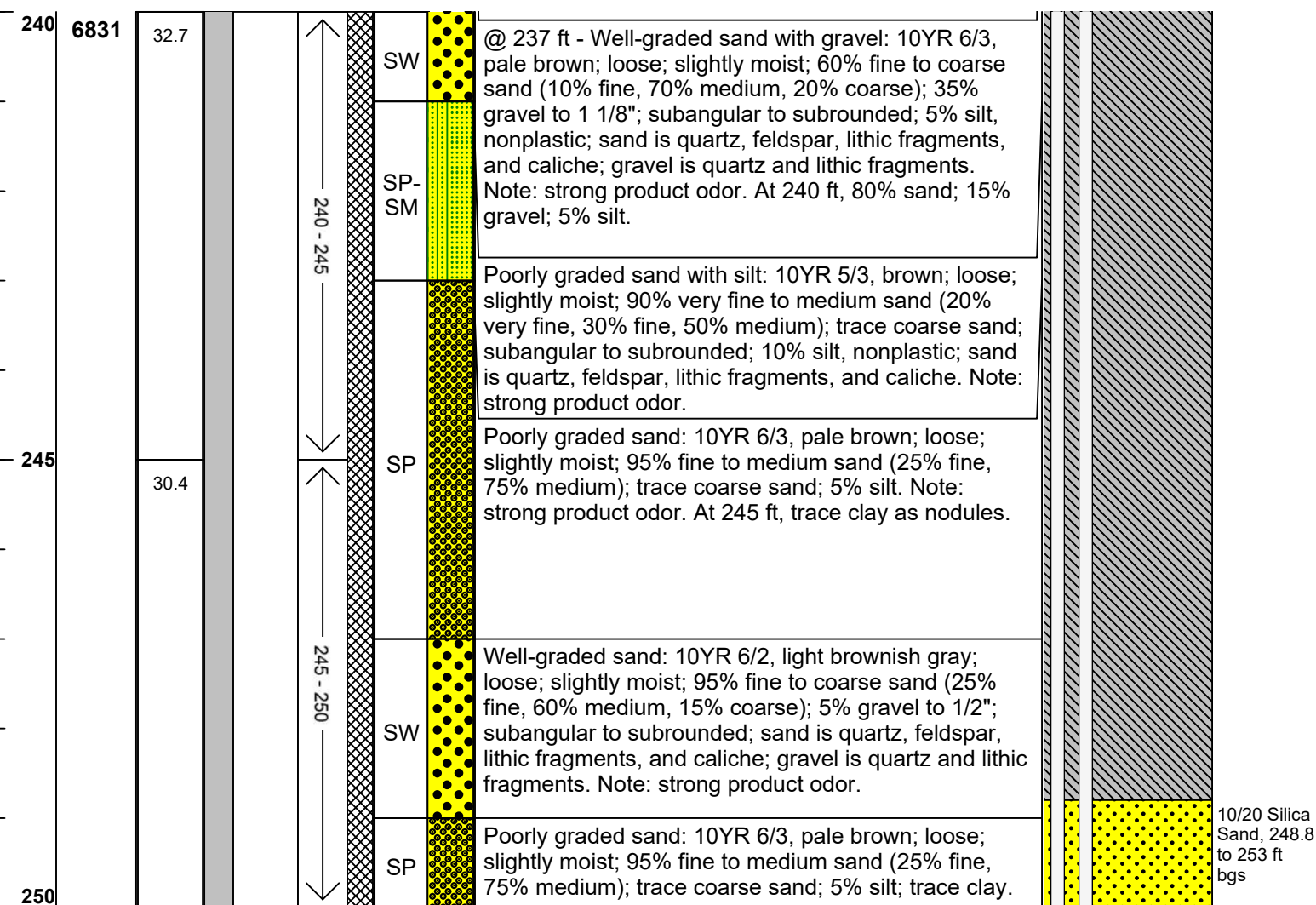
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

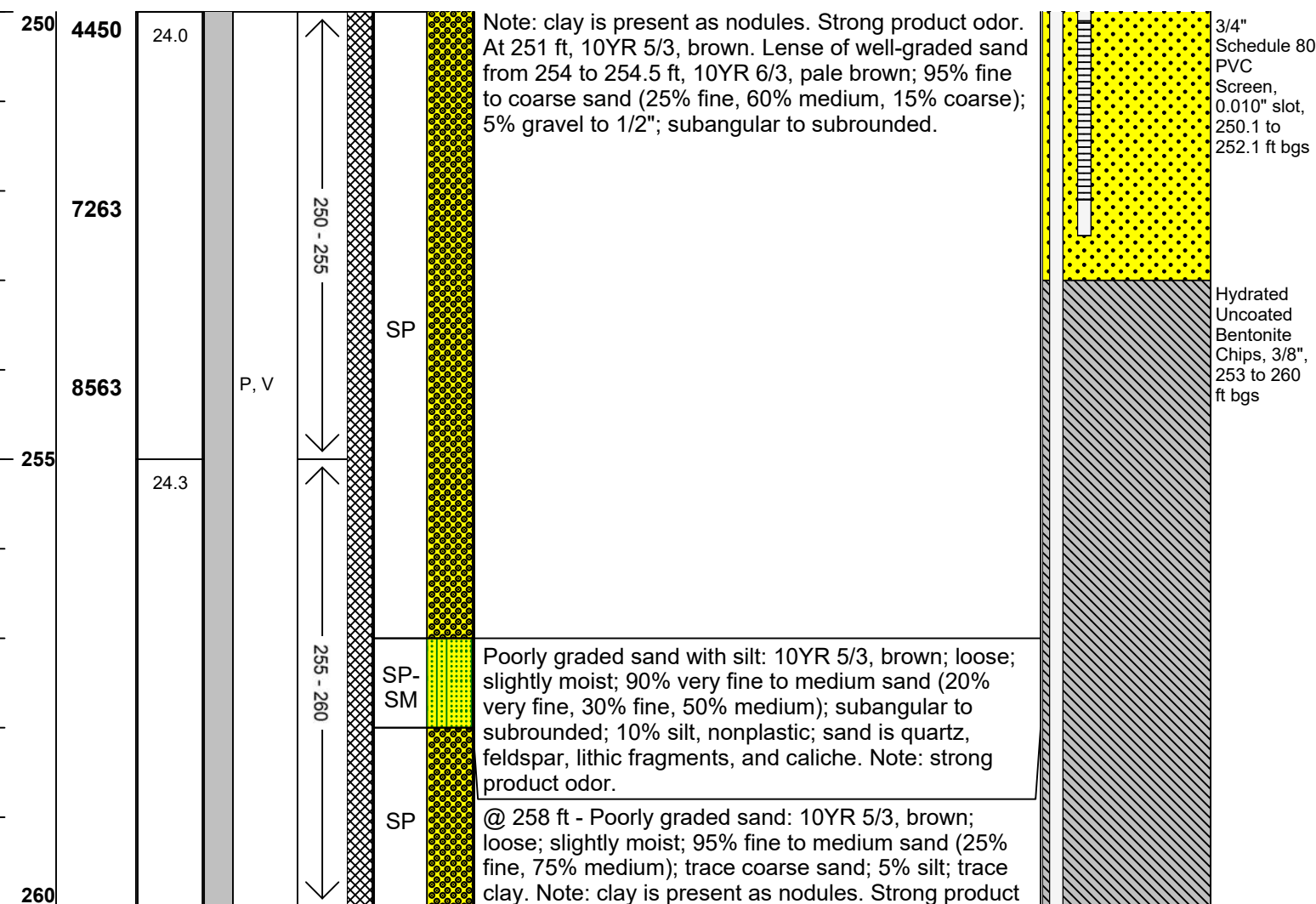
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

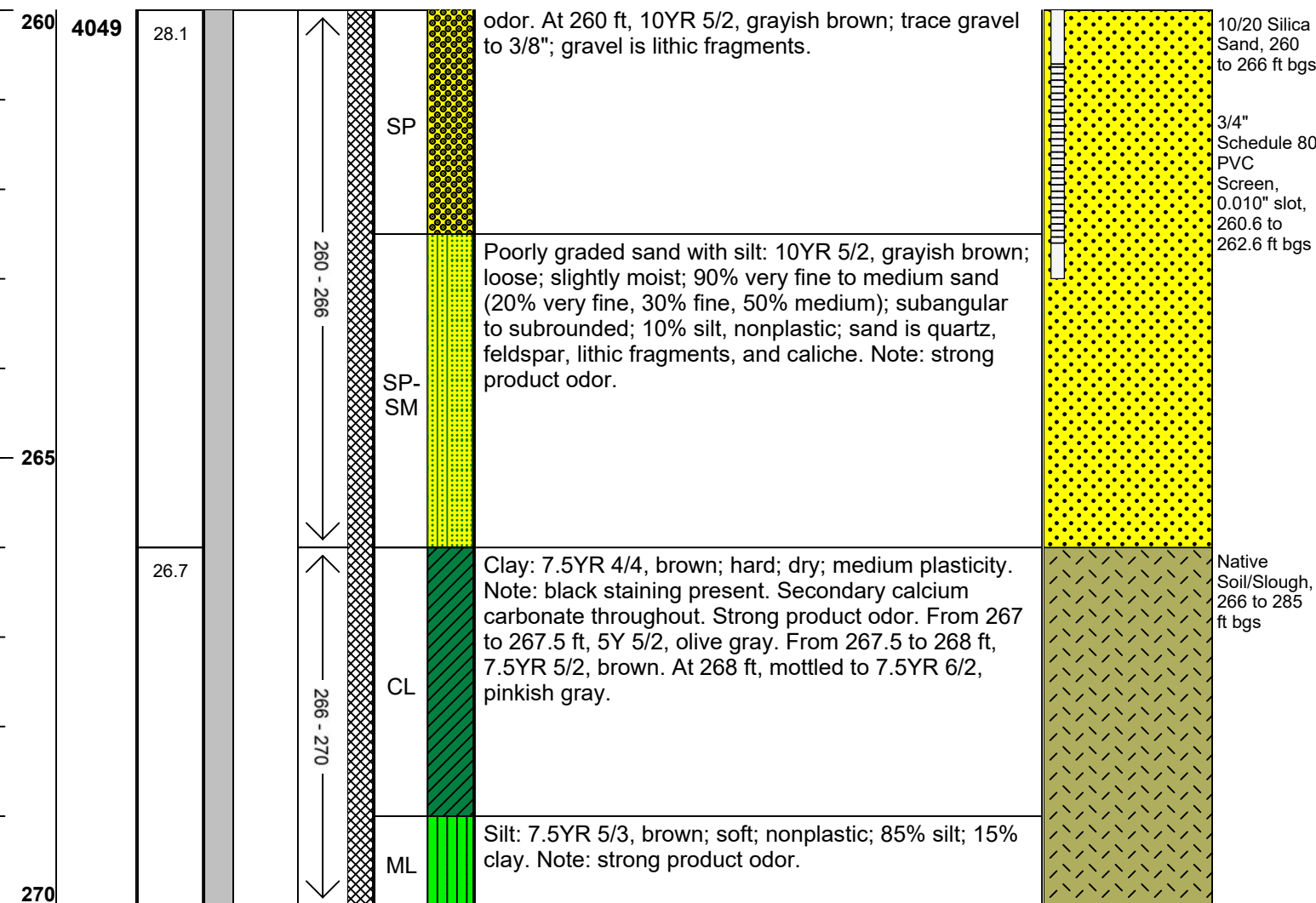
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/16/2018**

Completion Date: **1/24/2019**

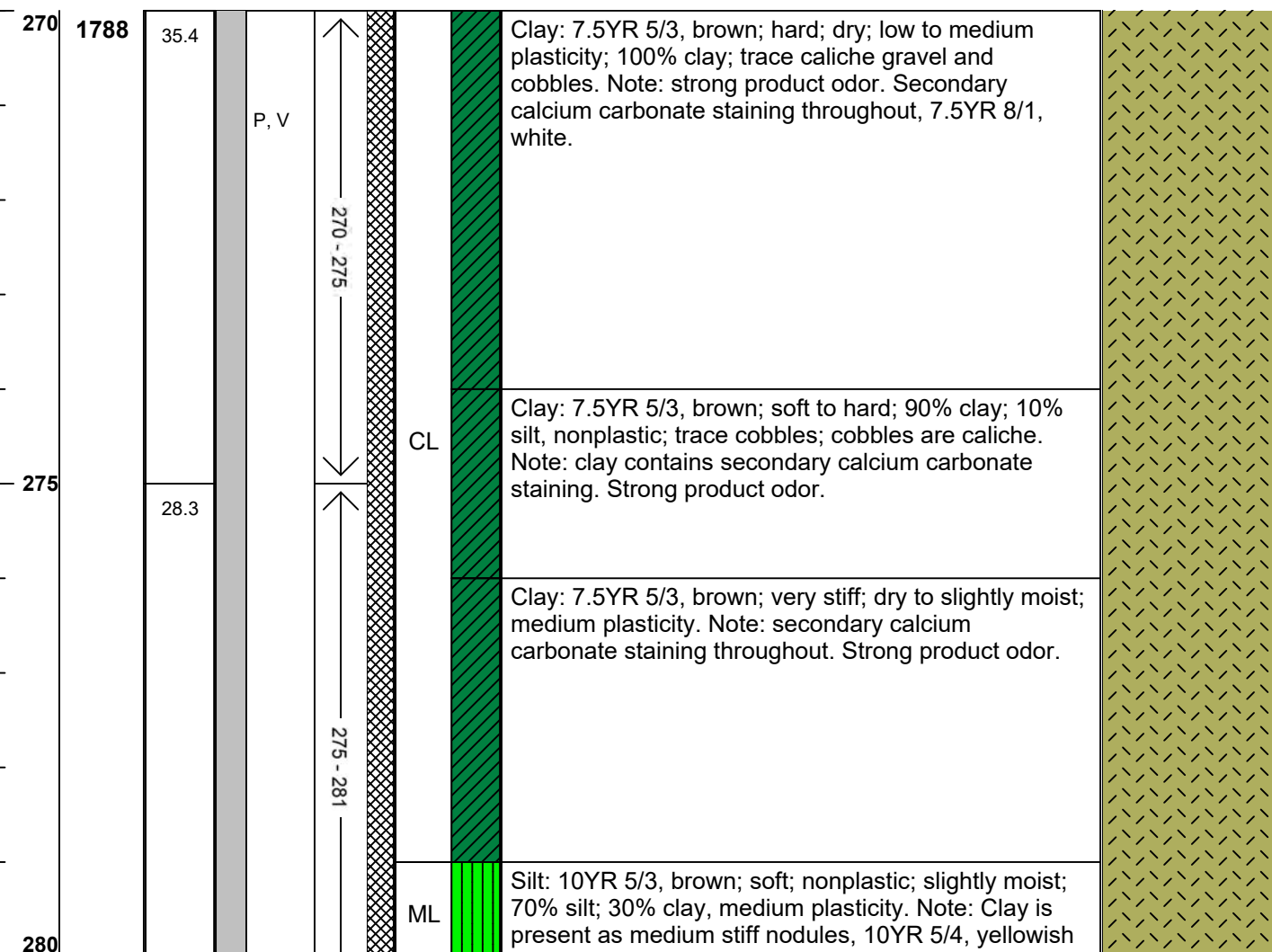
WELL LOG

Well ID: **KAFB-106V1**

Page: **28 of 29**

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

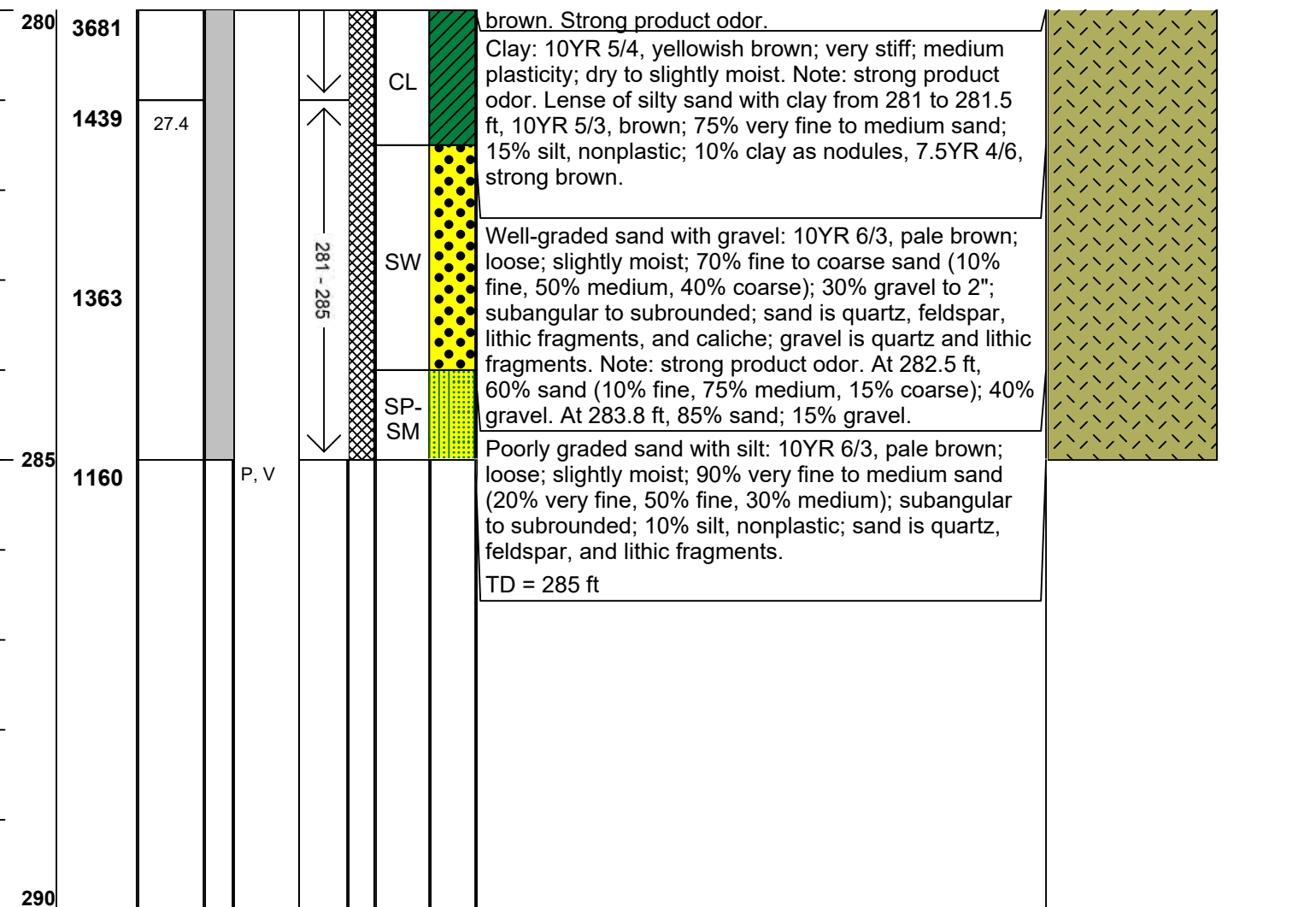
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 285 ft	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" Slot Screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement, Bentonite,
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



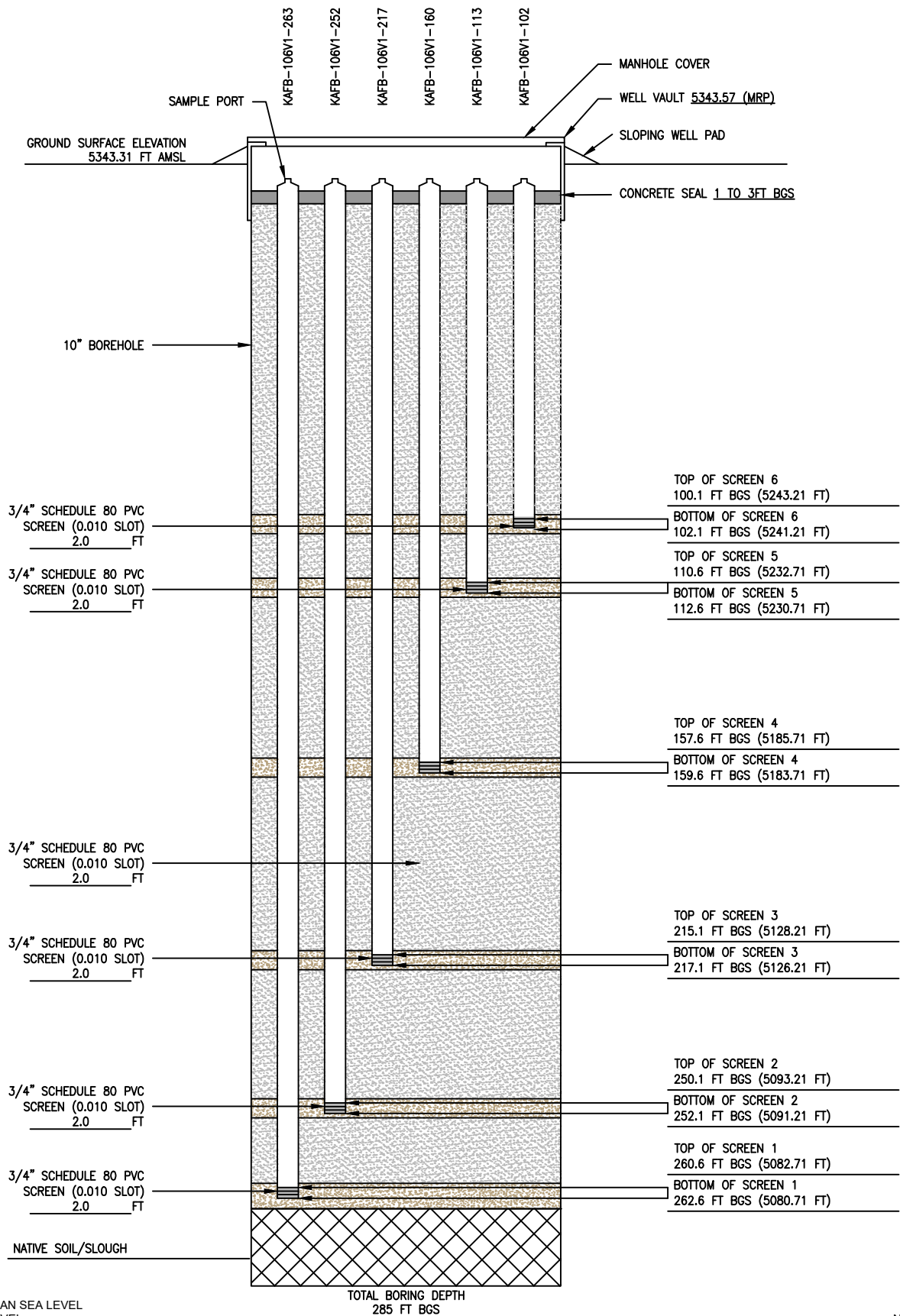
Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

Following coring, the borehole was overdrilled using ARCH for well installation
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity
 There is a 0.4 ft sump underlying each screen.

FIGURE B-1: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V1



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
ASML = ABOVE MEAN SEA LEVEL
MRP = MEASUREMENT REFERENCE POINT
ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

NOT TO SCALE
BGS = BELOW GROUND SURFACE
FT = FEET



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

PROJECT NO.:
62735DM02.1017

WELL ID:
KAFB-106V1

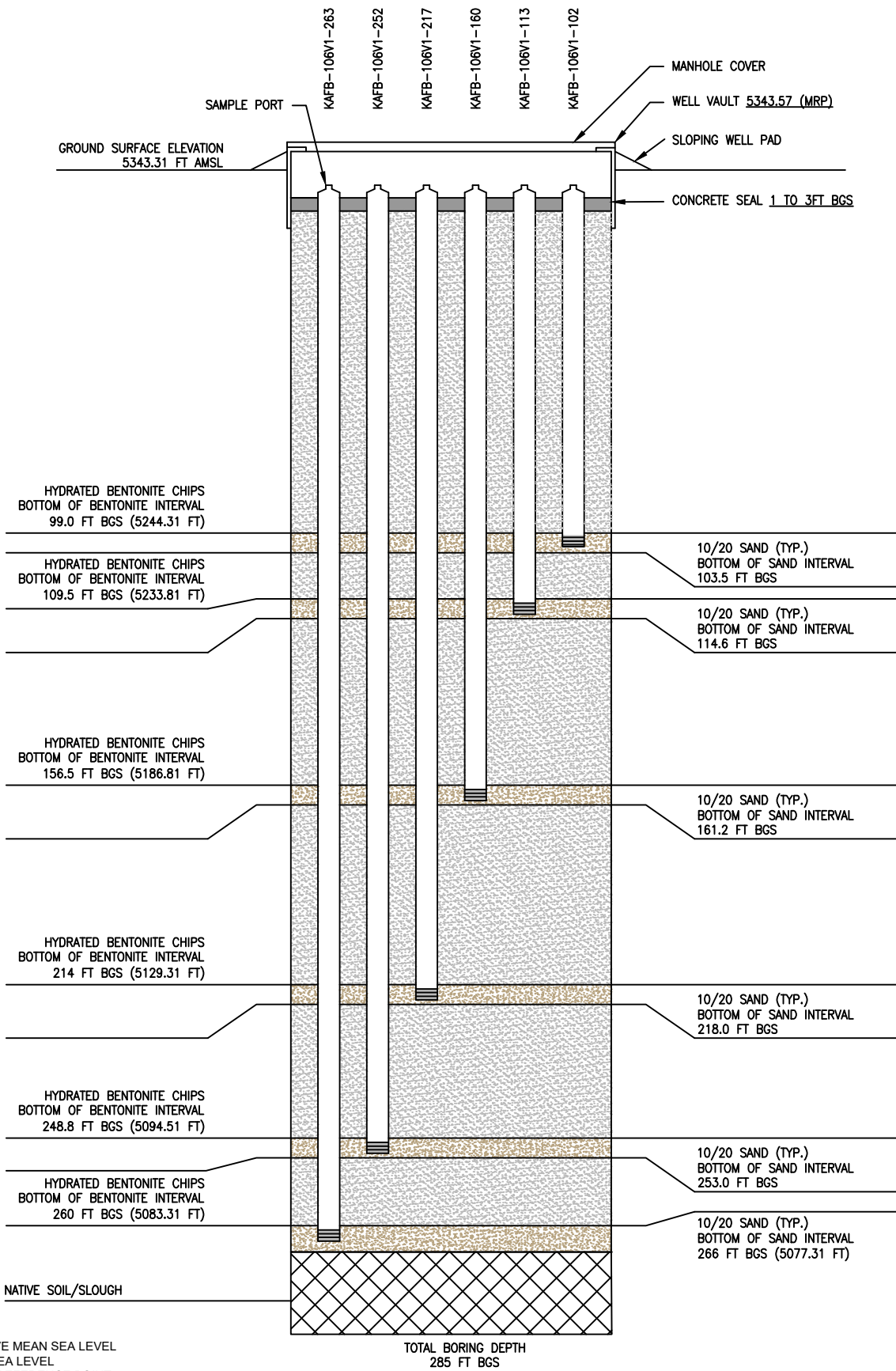
INSTALLATION START DATE/TIME:
16DEC18

INSTALLATION END DATE/TIME:
10JAN19

GEOLOGIST:
J. MESSENGER /
C. MONTOYA

DRILLER:
R. RODRIGUEZ /
F. CHATTIN-EVANS

FIGURE B-2: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V1



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
ASML = ABOVE MEAN SEA LEVEL
MRP = MEASUREMENT REFERENCE POINT
ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

NOT TO SCALE
BGS = BELOW GROUND SURFACE
FT = FEET

 320 Gold Avenue, SW Suite 1300 Albuquerque, NM 87102 Phone: (505) 224-9013 Fax: (505) 224-9016 EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC	KIRTLAND AIR FORCE BASE		INSTALLATION START DATE/TIME: 16DEC18	INSTALLATION END DATE/TIME: 10JAN19
	PROJECT NO.: 62735DM02.1017	WELL ID: KAFB-106V1	GEOLOGIST: J. MESSENGER / C. MONTOYA	DRILLER: R. RODRIGUEZ / F. CHATTIN-EVANS



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

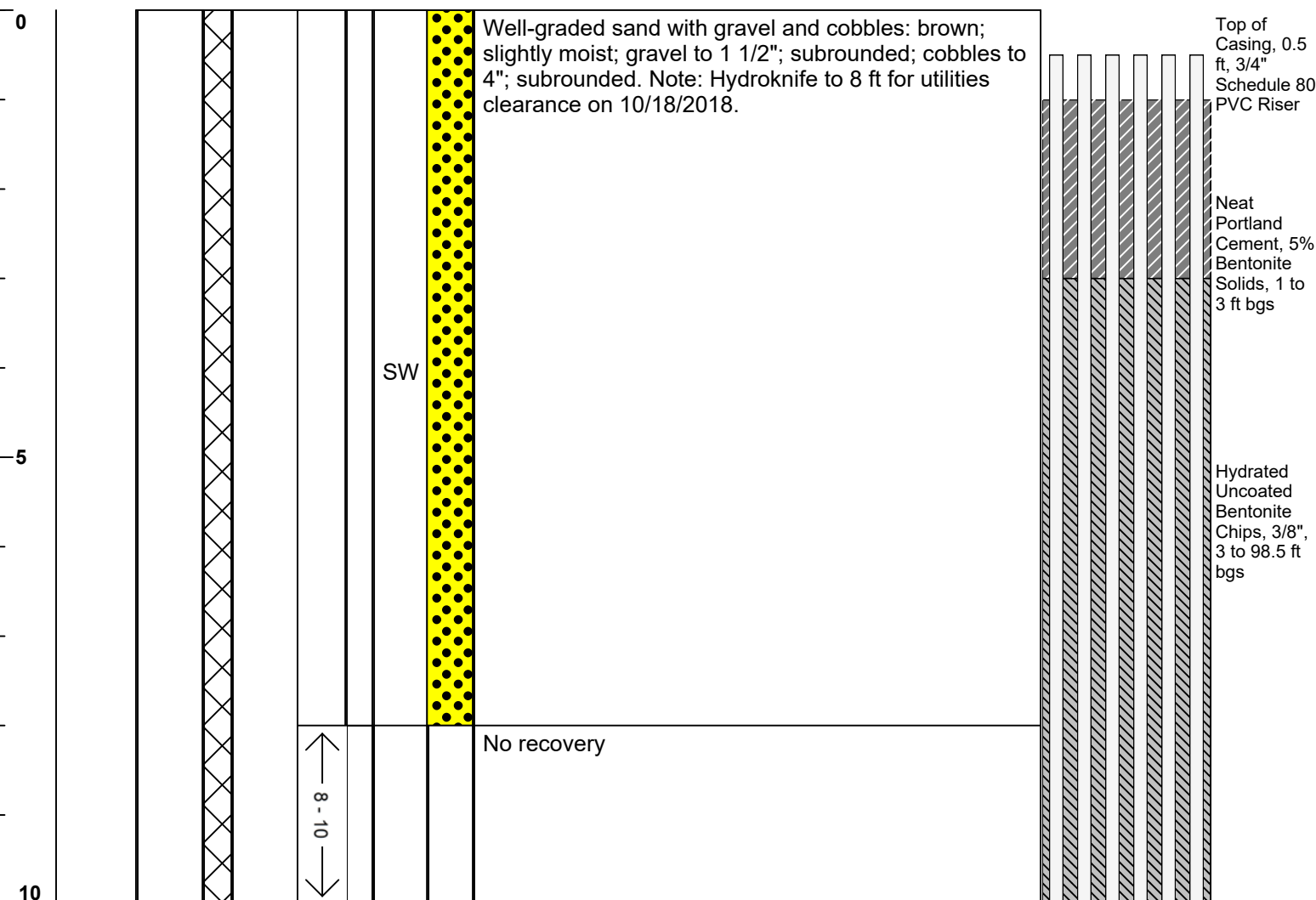
WELL LOG

Well ID: **KAFB-106V2**

Page: **1 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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10	173.0	23.0							ML Silt: 5YR 5/6, yellowish red; soft; slightly moist; nonplastic; 90% silt; 10% clay.	
									SC Clayey sand: 5YR 5/6, yellowish red; loose; slightly moist; 70% very fine to coarse sand (10% very fine, 20% fine, 50% medium, 20% coarse); 5% gravel to 3/8"; subangular to subrounded; 15% clay; 10% silt; nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments.	
									CL Clay: 5YR 5/4, reddish brown; soft to medium stiff; medium plasticity; 100% clay; trace sand. Note: at 13.5 ft, 80% clay; 20% silt.	
15									ML Clay with sand: 5YR 5/4, reddish brown; soft to medium stiff; medium plasticity; 70% clay; 10% silt; 20% fine to coarse sand (20% fine, 40% medium, 40% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
		24.5							ML Silt: 5YR 5/6, yellowish red; soft; slightly moist; medium plasticity; 70% silt; 20% clay; 10% fine to coarse sand (30% fine, 30% medium, 40% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments.	
									SC Clayey sand: 5YR 5/6, yellowish red; loose; slightly moist; 60% very fine to coarse sand (10% very fine, 20% fine, 50% medium, 20% coarse); subangular to subrounded; 20% clay; 20% silt; nonplastic; sand is quartz, feldspar, and lithic fragments.	
20									SM Silty sand: 5YR 5/6, yellowish red; loose; slightly	

Notes:

UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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20	384.0								moist; 50% very fine to coarse sand (10% very fine, 20% fine, 50% medium, 20% coarse); subangular to subrounded; 30% silt; 20% clay; nonplastic; sand is quartz, feldspar, and lithic fragments.	
		24.1							Silt: 5YR 5/6, yellowish red; soft; slightly moist; medium plasticity; 70% silt; 20% clay; 10% fine to coarse sand (30% fine, 30% medium, 40% coarse); subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: at 21 ft, 5YR 5/4, reddish brown; 70% silt; 25% clay; 5% sand.	
					21 - 26			ML		
								CL	Clay: 5YR 4/4, reddish brown; soft; slightly moist; medium plasticity; 75% clay; 25% silt.	
25									Silt: 5YR 5/3, reddish brown; soft; slightly moist; low plasticity; 80% silt; 20% clay. Note: at 26 ft, soft to very stiff; 60% silt; 40% clay. At 28 ft, 5YR 4/6, yellowish red; soft to stiff; trace sand. At 29 ft; trace gravel to 1 1/4".	
		24.4						ML		
					26 - 31					
30										

Notes:

UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Page: **4 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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30	221.9								Silt: see description on previous page.	
		27.4						ML	Clay: 7.5YR 5/4, brown; soft to medium stiff; slightly moist; medium plasticity; 60% clay; 40% silt; trace sand.	
					31 - 36			ML	Silt: 5YR 4/6, yellowish red; soft to stiff; slightly moist; low plasticity; 60% silt; 40% clay; trace sand; trace gravel to 1 1/4". Note: at 34 ft, 5YR 5/4, reddish brown.	
35		27.4						CL	Clay: 5YR 5/4, reddish brown; soft to stiff; slightly moist; medium plasticity; 75% clay; 25% silt; trace sand. Note: at 36 ft, 5YR 4/4, reddish brown; soft to medium stiff; 60% clay, 40% silt.	
					36 - 41			ML	Silt: 5YR 5/6, yellowish red; soft to stiff; slightly moist; low plasticity; 60% silt; 40% clay; trace gravel to 3/8"; trace sand.	
40										

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Page: **5 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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40	373.6								Silt: 5YR 5/6, yellowish red; soft to stiff; slightly moist; low plasticity; 60% silt; 40% clay; trace sand. Note: at 41 ft, weak product odor. At 42 ft, 50% silt; 40% clay; 10% fine to coarse sand (30% fine, 50% medium, 20% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments; product odor.	
		24.4			41 - 46					
45								ML	Silt with sand: 5YR 5/4, reddish brown; soft to stiff; slightly moist; low plasticity; 50% silt; 30% clay; 20% fine to coarse sand (30% fine, 50% medium, 20% coarse); trace gravel to 1/2"; subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: strong product odor.	
		27.7			46 - 51				Silt: 7.5YR 4/4, brown; soft to stiff; slightly moist; low plasticity; 60% silt; 30% clay; 10% fine to coarse sand (30% fine, 50% medium, 20% coarse); sand is quartz, feldspar, and lithic fragments. Note: strong product odor.	
50									Silt with sand: 5YR 5/4, reddish brown; soft to stiff; slightly moist; low plasticity; 50% silt; 30% clay; 20%	

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

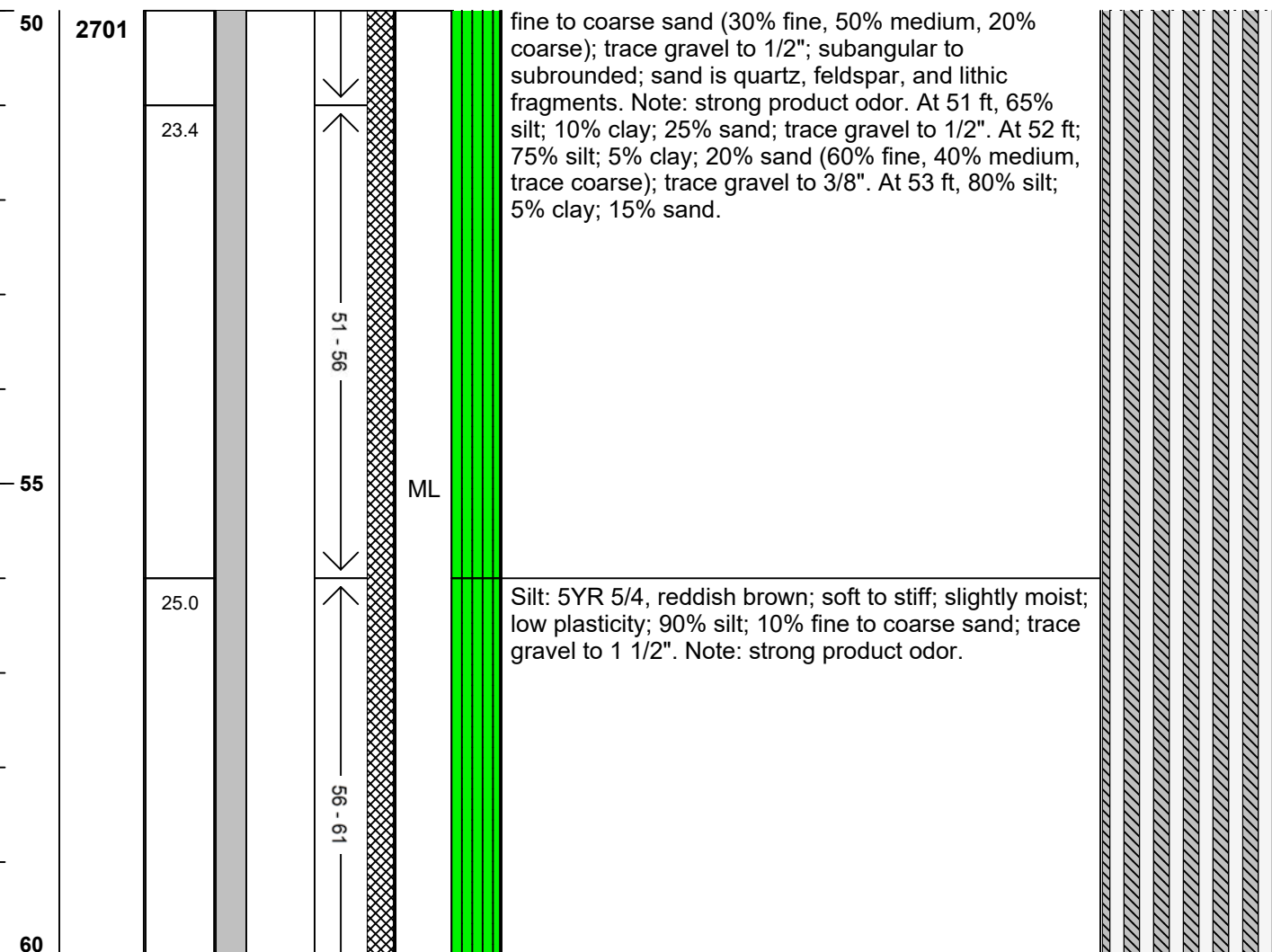
Page: **6 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

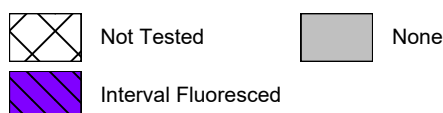
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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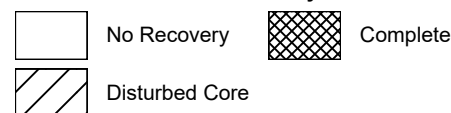
Notes:

UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test



Core Recovery



Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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60	3239								Silt: see description on previous page.	
		25.1							ML	
									SM	Silty sand: 7.5YR 4/4, brown; loose; slightly moist; 80% fine to coarse sand (20% fine, 60% medium, 20% coarse); 5% gravel to 1 1/4"; subangular to subrounded; 15% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.
									SW-SM	Well-graded sand with silt: 7.5YR 5/4, brown; loose; slightly moist; 80% fine to coarse sand (10% fine, 70% medium, 20% coarse); 10% gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.
65									ML	Silt: 5YR 5/4, reddish brown; soft to hard; 90% silt; 10% clay. Note: strong product odor.
		23.2							SW-SM	Well-graded sand with silt: 7.5YR 5/4, brown; loose; slightly moist; 80% fine to coarse sand (10% fine, 70% medium, 20% coarse); 10% gravel to 1"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor.
									ML	Silt: 5YR 5/4, reddish brown; soft; nonplastic; 90% silt; 10% clay. Note: strong product odor.
70										Sandy silt: 5YR 5/4, reddish brown; soft; slightly moist; 60% silt, nonplastic; 40% very fine to coarse sand (30% very fine, 30% fine, 30% medium, 10% coarse);

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Page: **8 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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70	2359								subangular to subrounded; sand is quartz, feldspar, and lithic fragments. Note: strong odor.	
		24.4			71 - 76				Silt: 5YR 5/4, reddish brown; soft; slightly moist; 80% silt; 10% clay; 10% very fine to coarse sand; trace gravel to 2". Note: strong product odor. At 71 ft; 7.5YR 5/4, brown; nonplastic; 90% silt; 10% clay. At 72 ft, soft to stiff.	
75								ML	Silt with sand: 7.5YR 5/4, brown; soft; nonplastic; slightly moist; 70% silt; 10% clay; 20% very fine to medium sand (20% very fine; 20% fine, 60% medium); trace coarse sand; trace gravel to 1/2"; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor. At 75 ft, 70% silt; 10% clay; 20% sand. At 77.75 ft, gravel to 1 1/4". At 79 ft; 75% silt; 10% clay; 15% sand.	
		28.9			76 - 81					
80										

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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80	3254			V, P						
		22.6			81 - 86			ML	Silt: 7.5YR 5/4, brown; soft; slightly moist; nonplastic; 75% silt; 15% clay; 10% very fine to medium sand. Note: strong product odor. At 81 ft, trace gravel to 1 1/2"; silt and clay present as nodules coated in secondary calcium carbonate. At 84 ft, trace coarse sand.	
					86 - 88					
85		25.4			88 - 88			SM	Silty sand: 5YR 5/4, reddish brown; loose; slightly moist; 65% very fine to coarse sand (30% very fine, 30% fine, 30% medium, 10% coarse); trace gravel to 3/8"; subangular to subrounded; 35% silt, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: At 88 ft; 60% sand; 5% gravel to 1"; 25% silt; 10% clay.	
					88 - 91			SP-SM	Poorly graded sand with silt: 10YR 5/4, yellowish brown; loose; slightly moist; 85% very fine to medium sand (40% very fine, 40% fine, 20% medium); trace	
90		67.9								

Notes:

UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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90	2288								coarse sand; 5% gravel to 3/8"; subangular to subrounded; 10% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note: strong product odor. At 91 ft, 10YR 6/3, pale brown.	
		24.7						SP-SM		
					91 - 96			SP	Poorly graded sand: 10YR 5/4, yellowish brown; loose; slightly moist; 95% very fine to medium sand (40% very fine, 50% fine, 10% medium); trace gravel to 1"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is lithic fragments. Note: strong product odor.	
95		59.9						SP-SC		
					96 - 100			SW	Poorly graded sand with clay: 10YR 6/2, light brownish gray; loose; slightly moist; 90% very fine to medium sand (30% very fine, 50% fine, 20% medium); trace coarse sand; subangular to subrounded; 10% clay, nonplastic; sand is quartz, feldspar, and lithic fragments. Note: strong product odor.	
100									@ 97 ft - Well-graded sand: 10YR 6/3, pale brown; loose; slightly moist; 85% very fine to coarse sand (20% very fine, 50% fine, 20% medium, 10% coarse); 10% gravel to 5/8"; subangular to subrounded; 5% silt; nonplastic; sand is quartz, feldspar, and lithic fragments; gravel is quartz and lithic fragments. Note:	10/20 Silica Sand, 98.5 to 103.5 ft bgs

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

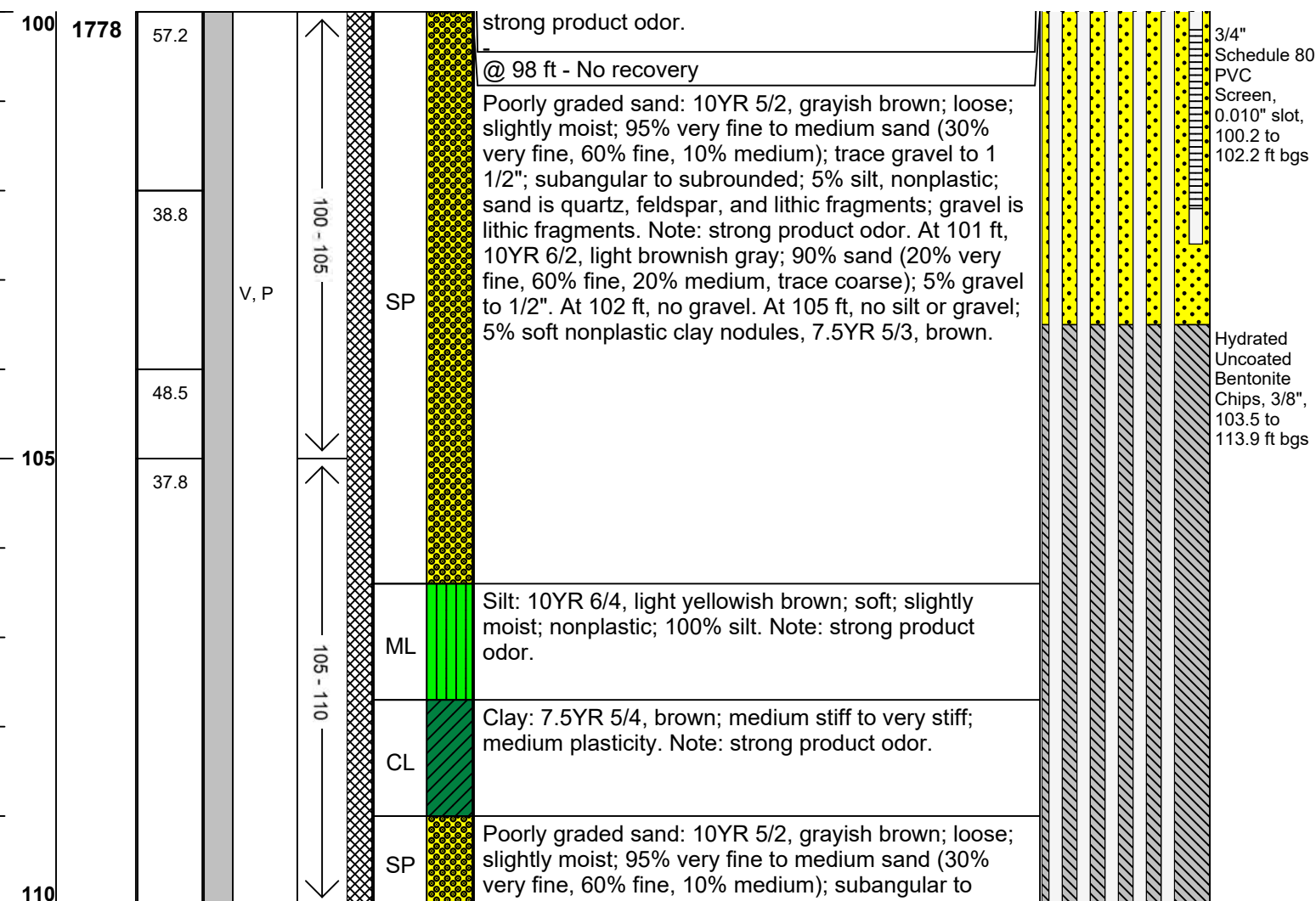
Page: **11 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

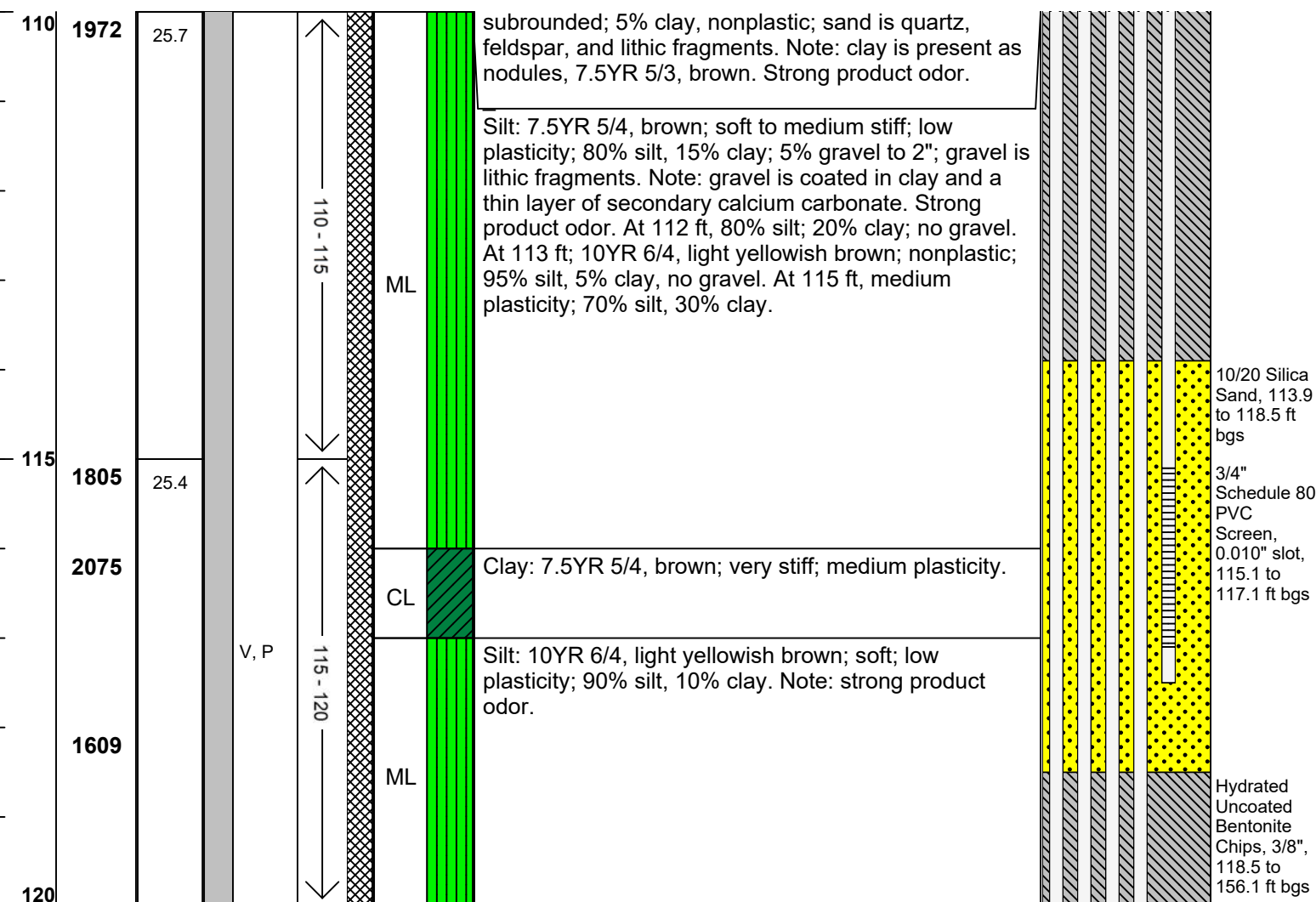
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface
ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

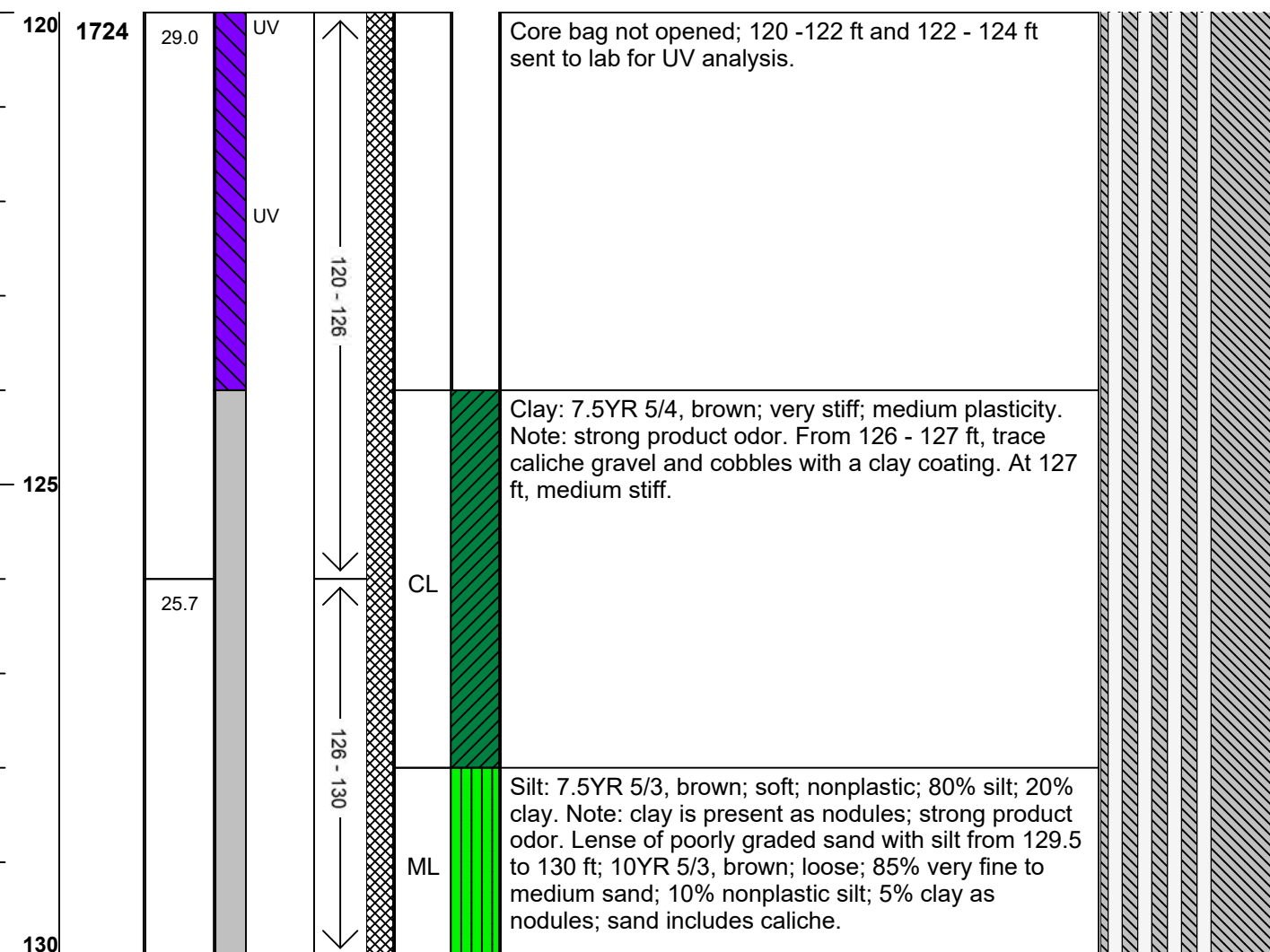
Page: **13 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

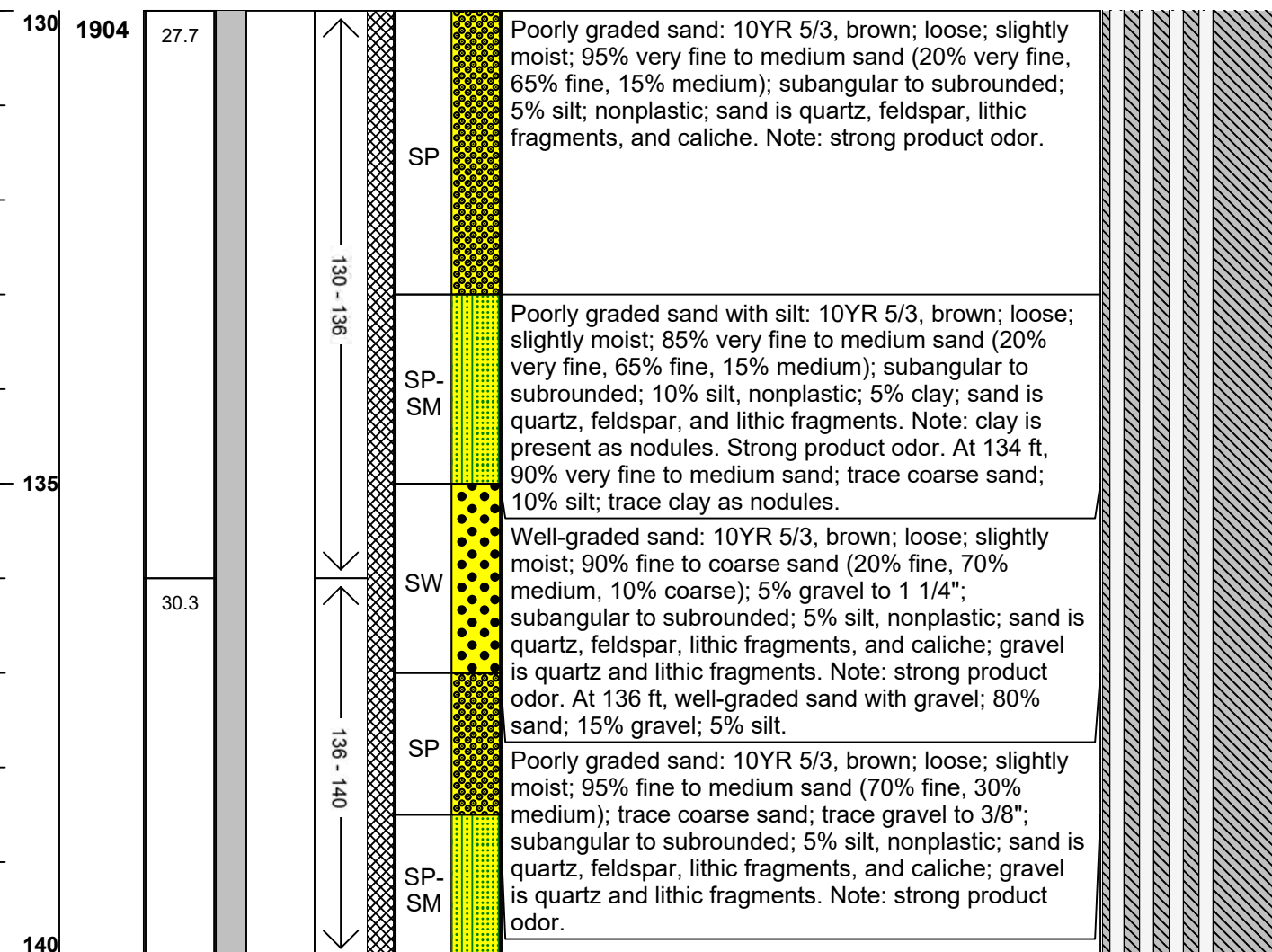
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes: UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test	
	Not Tested
	Interval Fluoresced
	None

Core Recovery	
	No Recovery
	Disturbed Core
	Complete

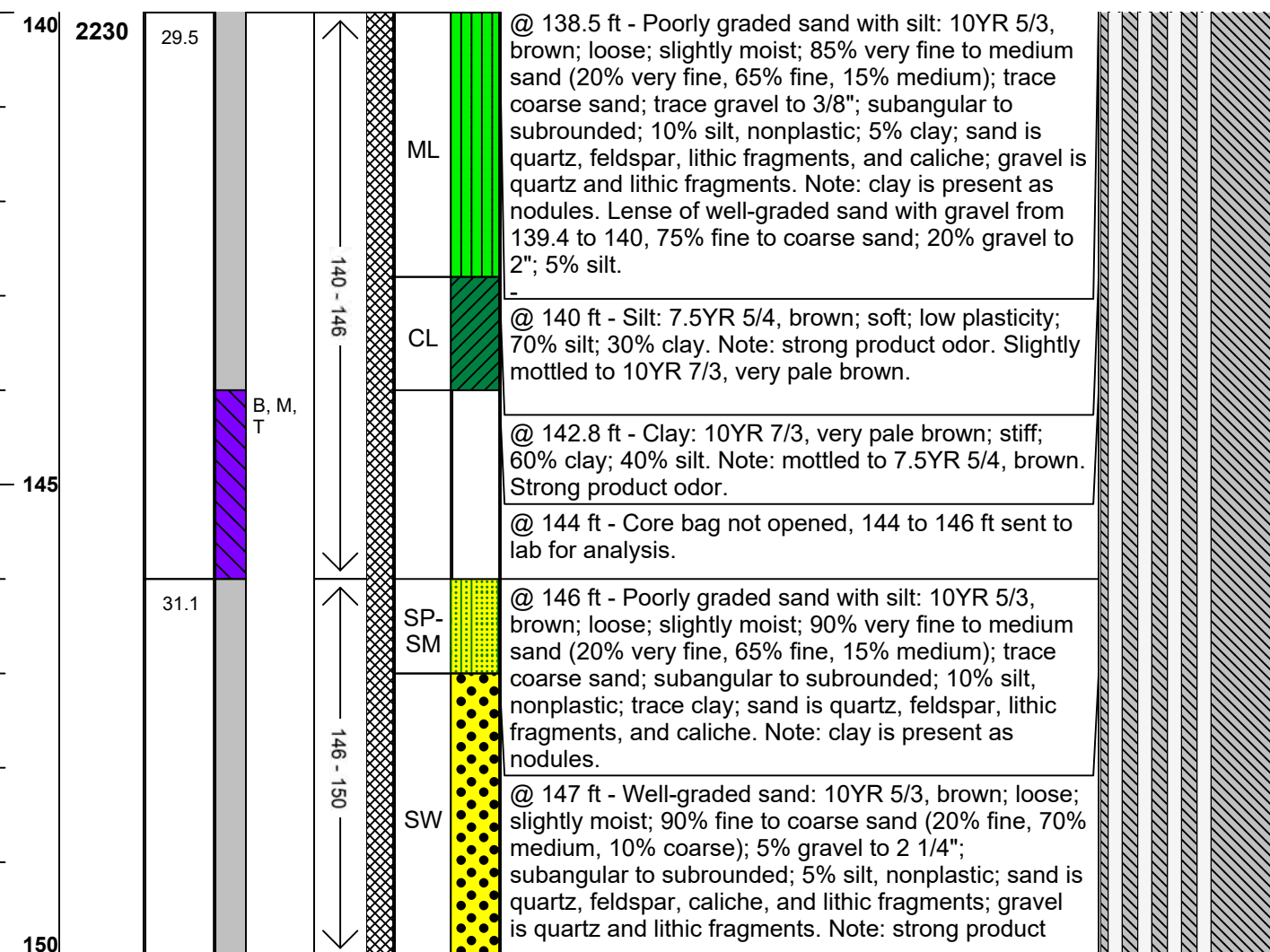
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

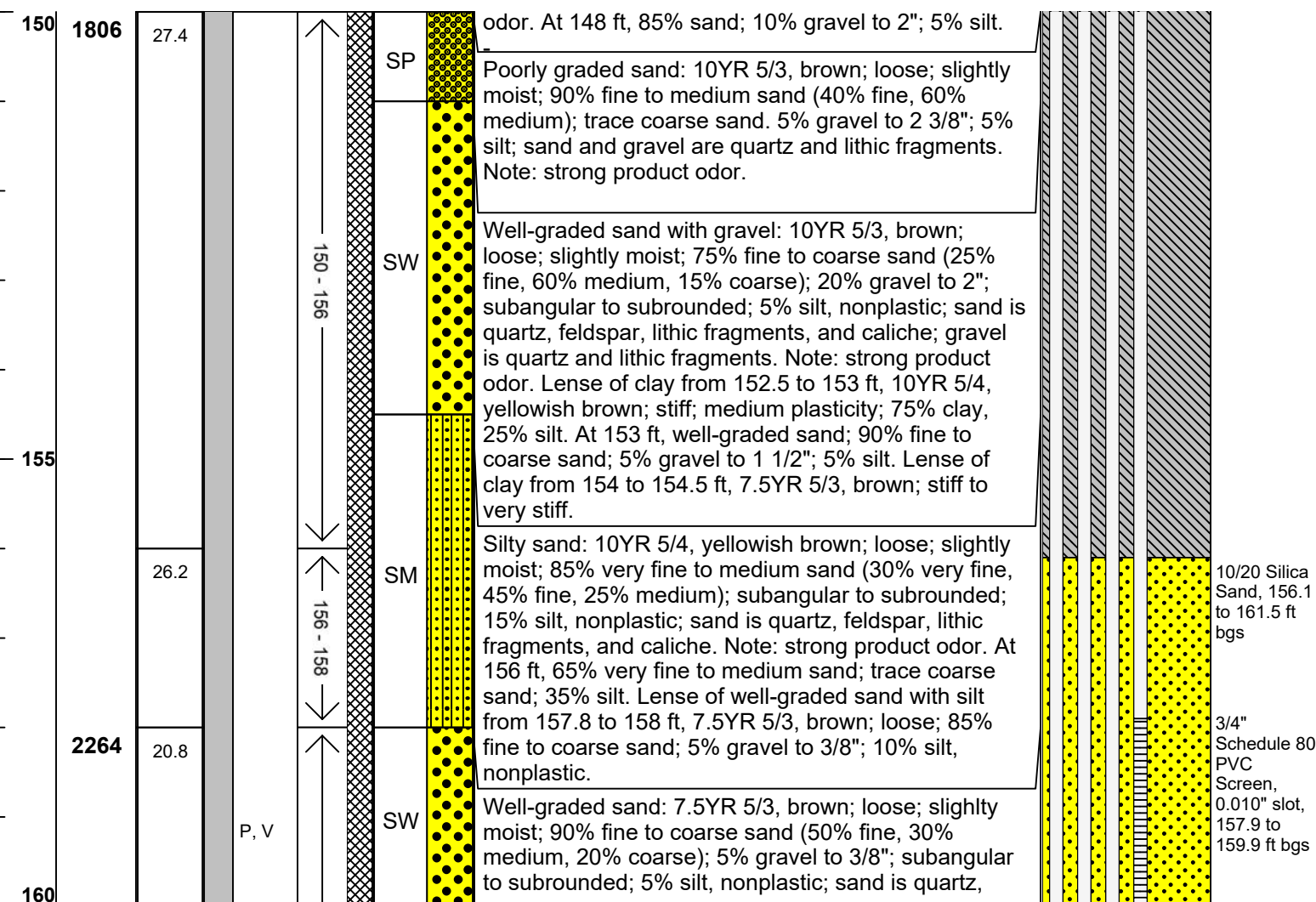
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

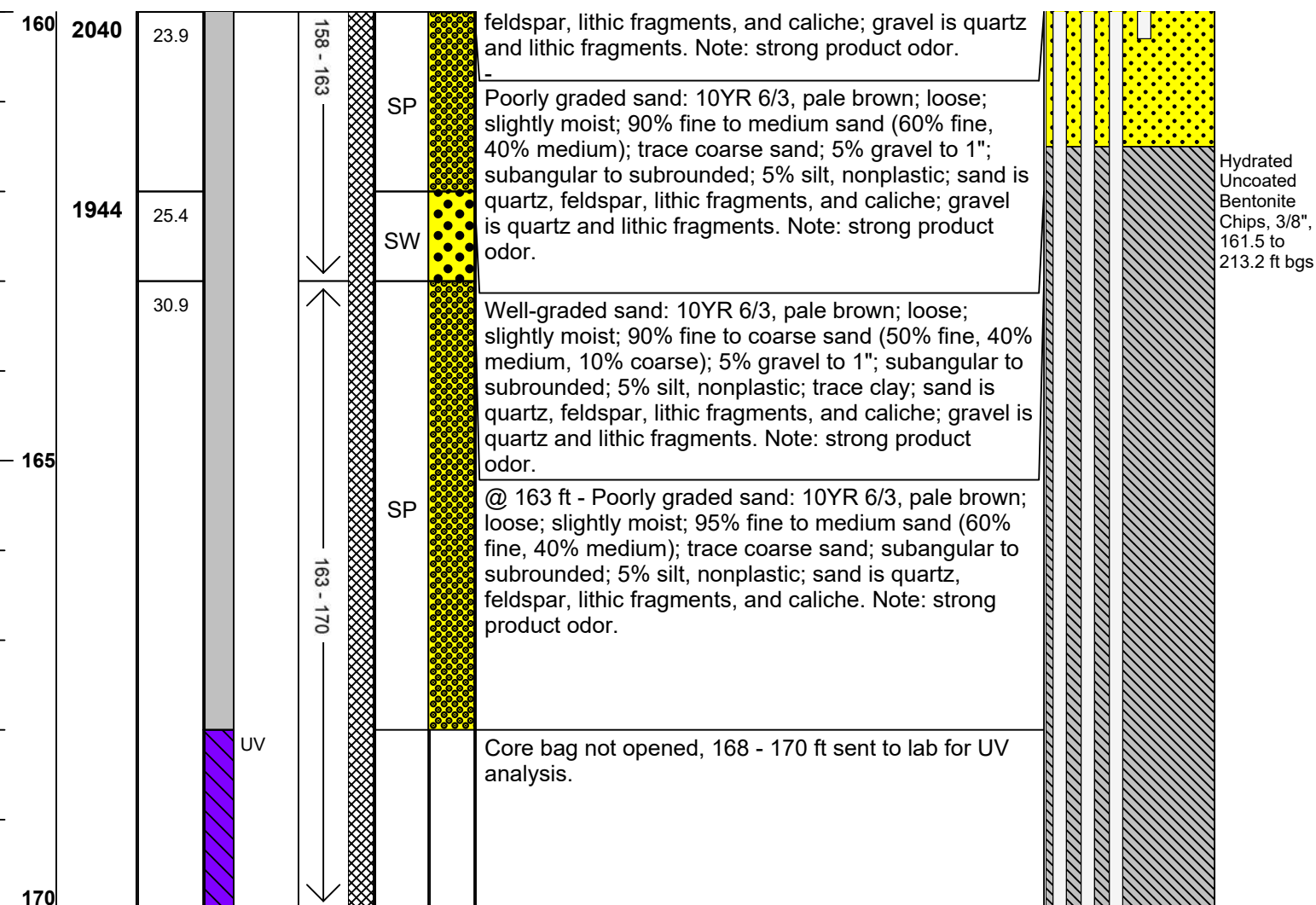
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

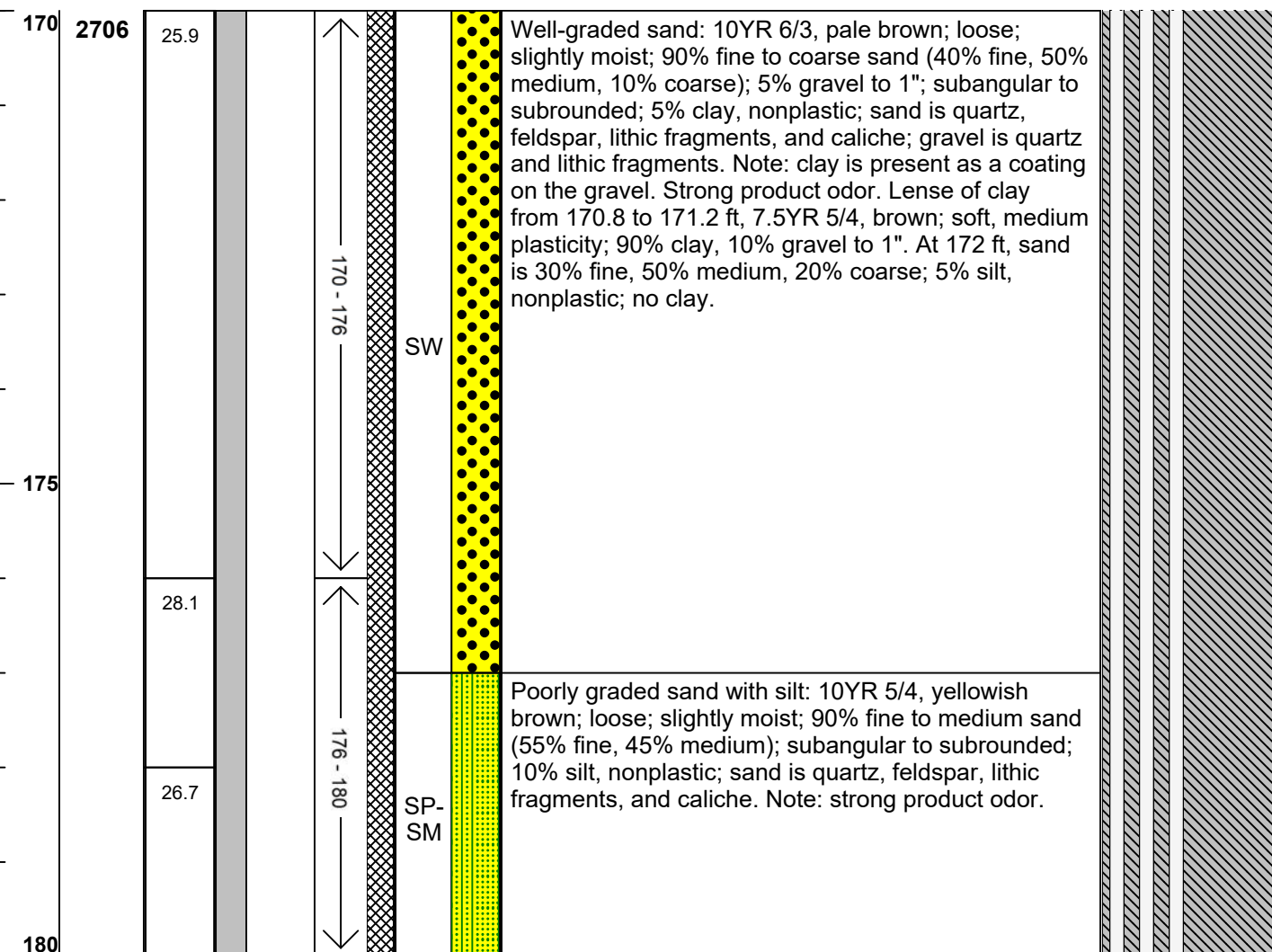
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

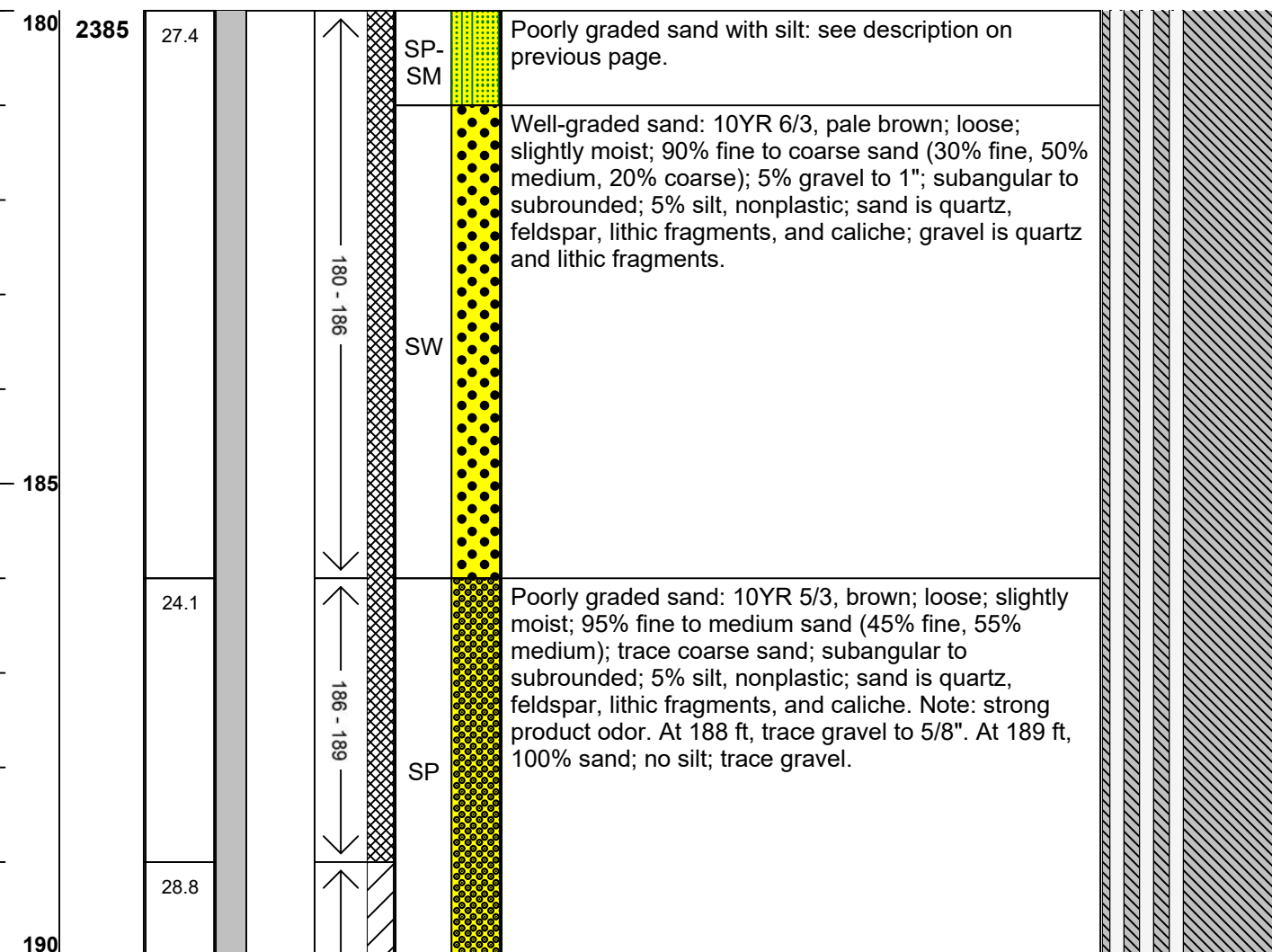
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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190	2687							SP	Poorly graded sand: see description on previous page.	
								SW	Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 55% fine to coarse sand (25% fine, 50% medium, 25% coarse); 40% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 192 ft, 65% sand, 30% gravel; 5% silt; gravel includes caliche.	
195			UV		189 - 196				Core bag not opened, 194 - 196 ft sent to lab for UV analysis.	
		30.2			196 - 198			SW	Well-graded sand with gravel: 10YR 5/3, brown; loose; slightly moist; 65% fine to coarse sand (25% fine, 50% medium, 25% coarse); 30% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz, lithic fragments, and caliche. Note: strong product odor. At 198 ft, 10YR 6/3, pale brown; 80% sand; 15% gravel.	
200		32.8								

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

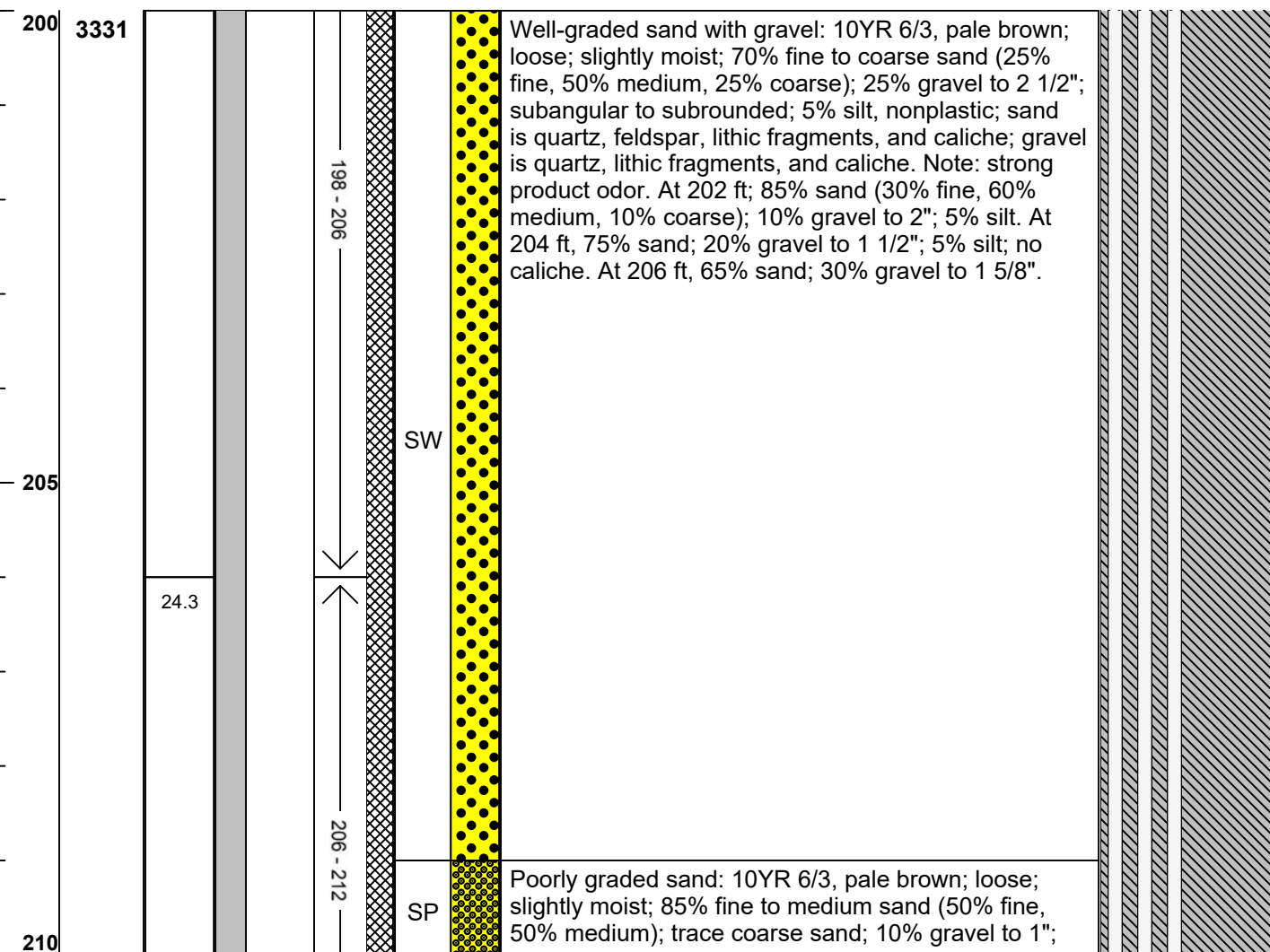
Page: **21 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

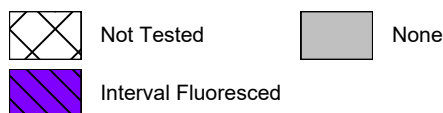
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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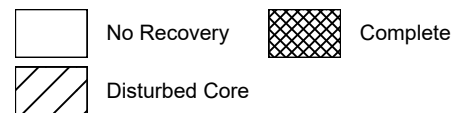
Notes:

UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test



Core Recovery



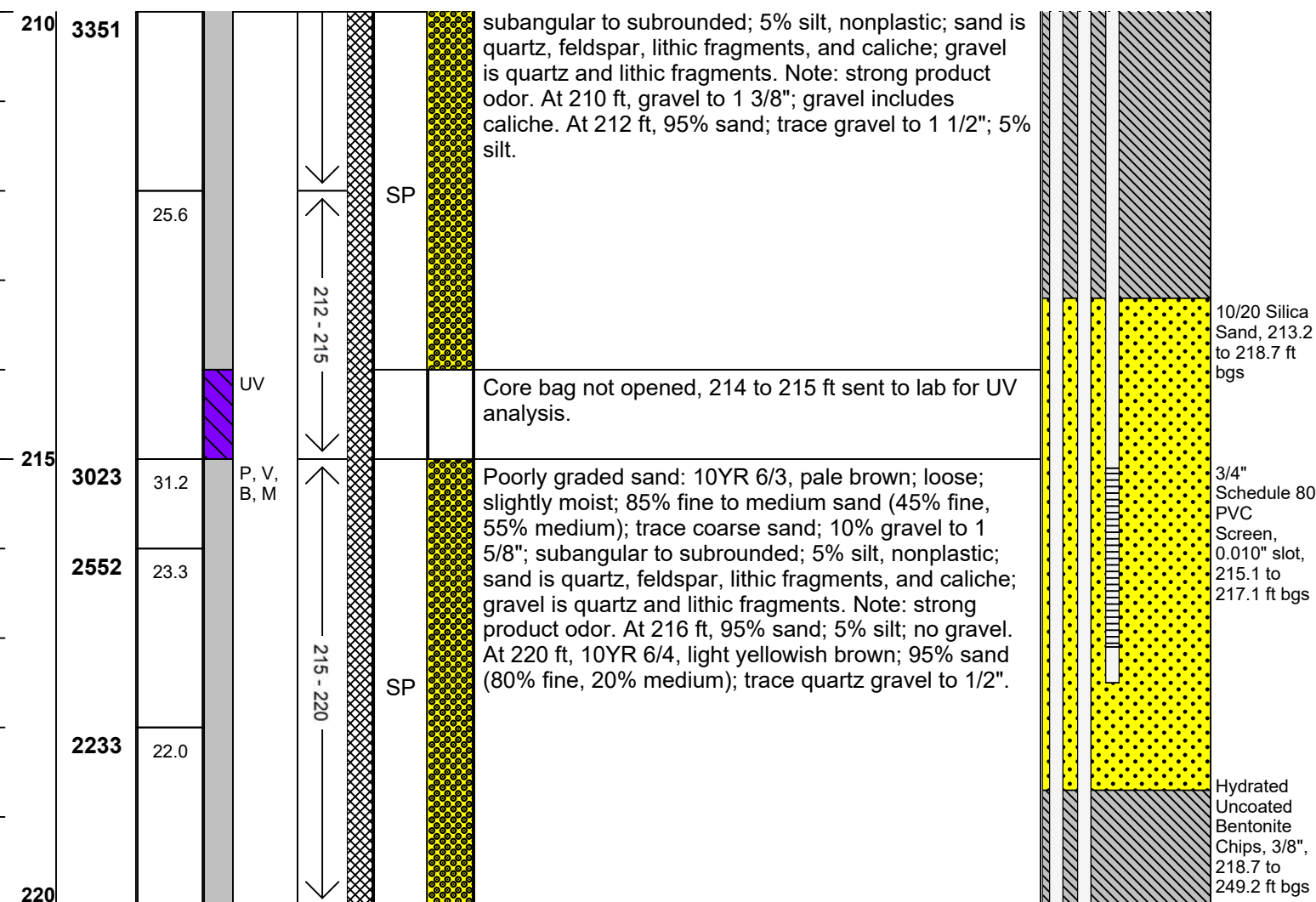
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



**EA Engineering, Science,
and Technology, Inc., PBC**

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

Page: **23 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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220	3087	34.5							SP	Poorly graded sand: 10YR 6/4, light yellowish brown; loose; slightly moist; 95% fine to medium sand (80% fine, 20% medium); trace gravel to 1/2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor.
									SW	Well-graded sand with gravel: 10YR 5/4, yellowish brown; loose; slightly moist; 80% fine to coarse sand (40% fine, 50% medium, 10% coarse); 15% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 222.5 ft, 70% sand; 25% gravel; 5% silt.
225									SP	Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 90% very fine to medium sand (20% very fine, 70% fine, 10% medium); subangular to subrounded; 5% silt; 5% clay; nonplastic; sand is quartz, feldspar, lithic fragments, and caliche. Note: clay is present as small nodules. At 224 ft, 95% sand; 5% silt; trace clay; trace lithic gravel to 1/2". Strong product odor.
		32.2							SW	Well-graded sand with gravel: 10YR 5/8, yellowish brown; loose; slightly moist; 80% fine to coarse sand (30% fine, 45% medium, 25% coarse); 15% gravel to 2"; subangular to subrounded; 5% silt, nonplastic; sand is quartz, feldspar, lithic fragments, and caliche; gravel is quartz and lithic fragments. Note: strong product odor. At 226.8 ft, 10YR 5/4, yellowish brown; 90% sand; 5% gravel; 5% clay as nodules.
									SP	
230									SW	@ 227 ft - Poorly graded sand: 10YR 5/3, brown; loose; slightly moist; 95% very fine to medium sand (20% very fine, 70% fine, 10% medium); trace gravel

Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

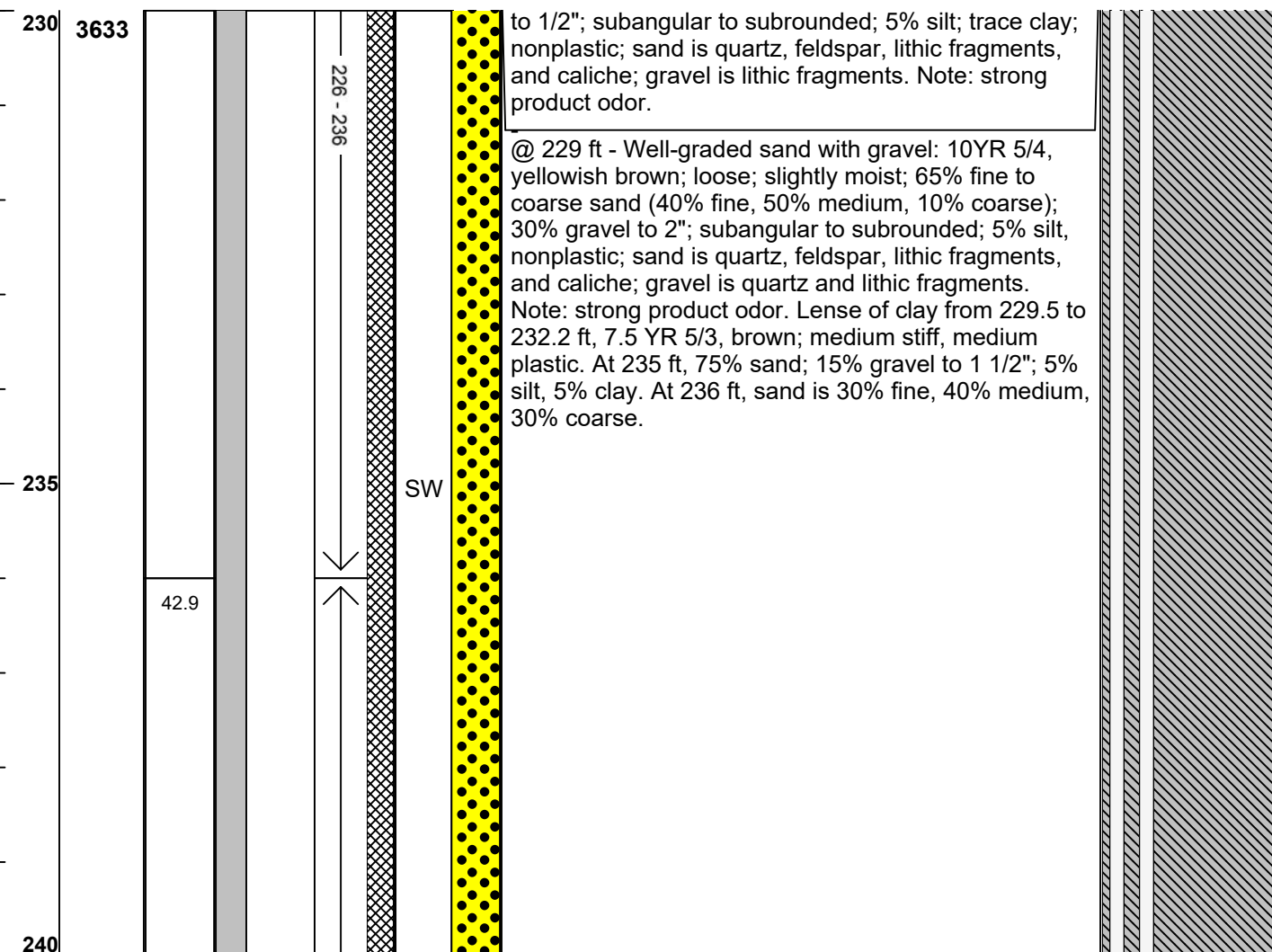
WELL LOG

Well ID: **KAFB-106V2**

Page: **24 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

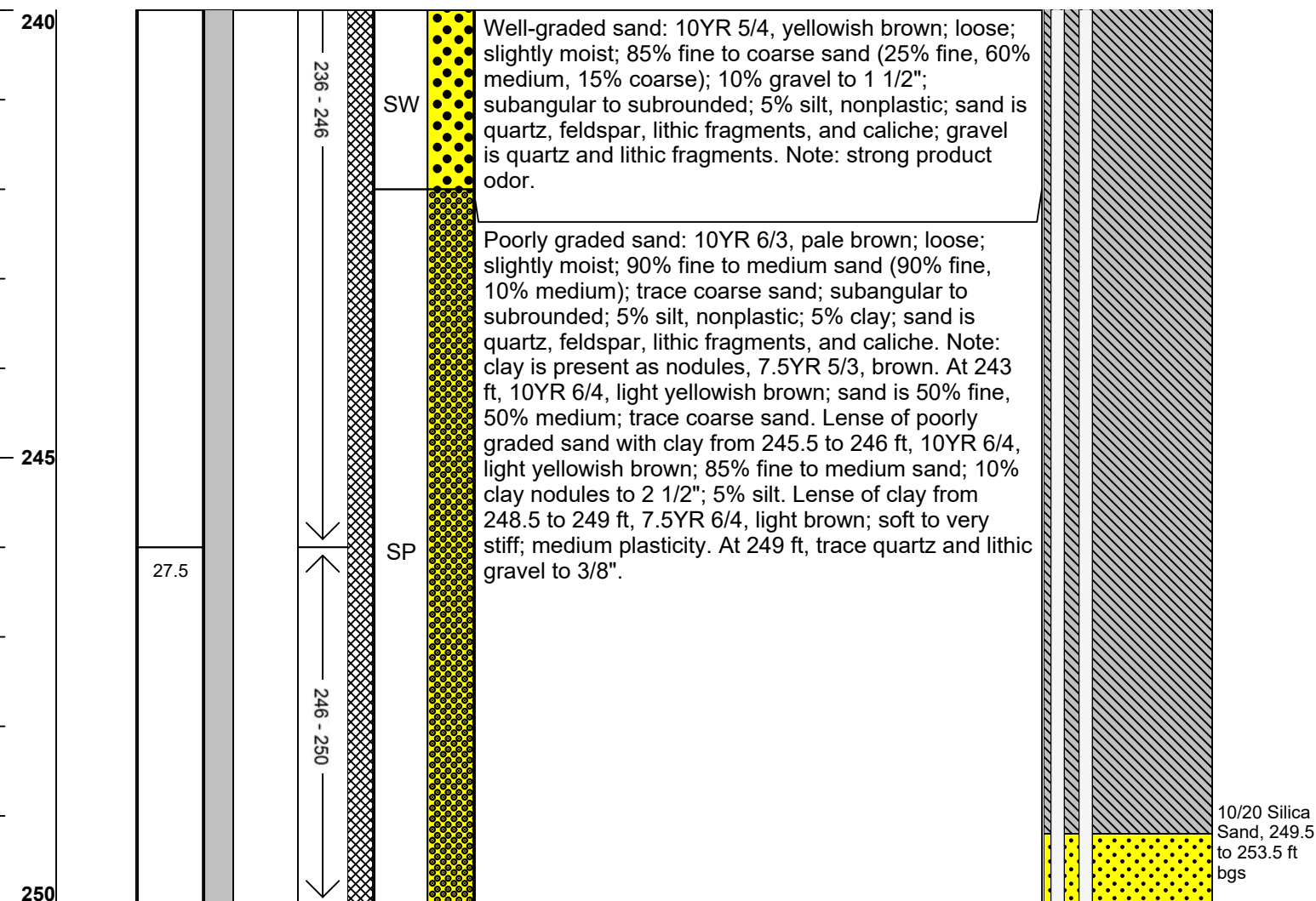
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

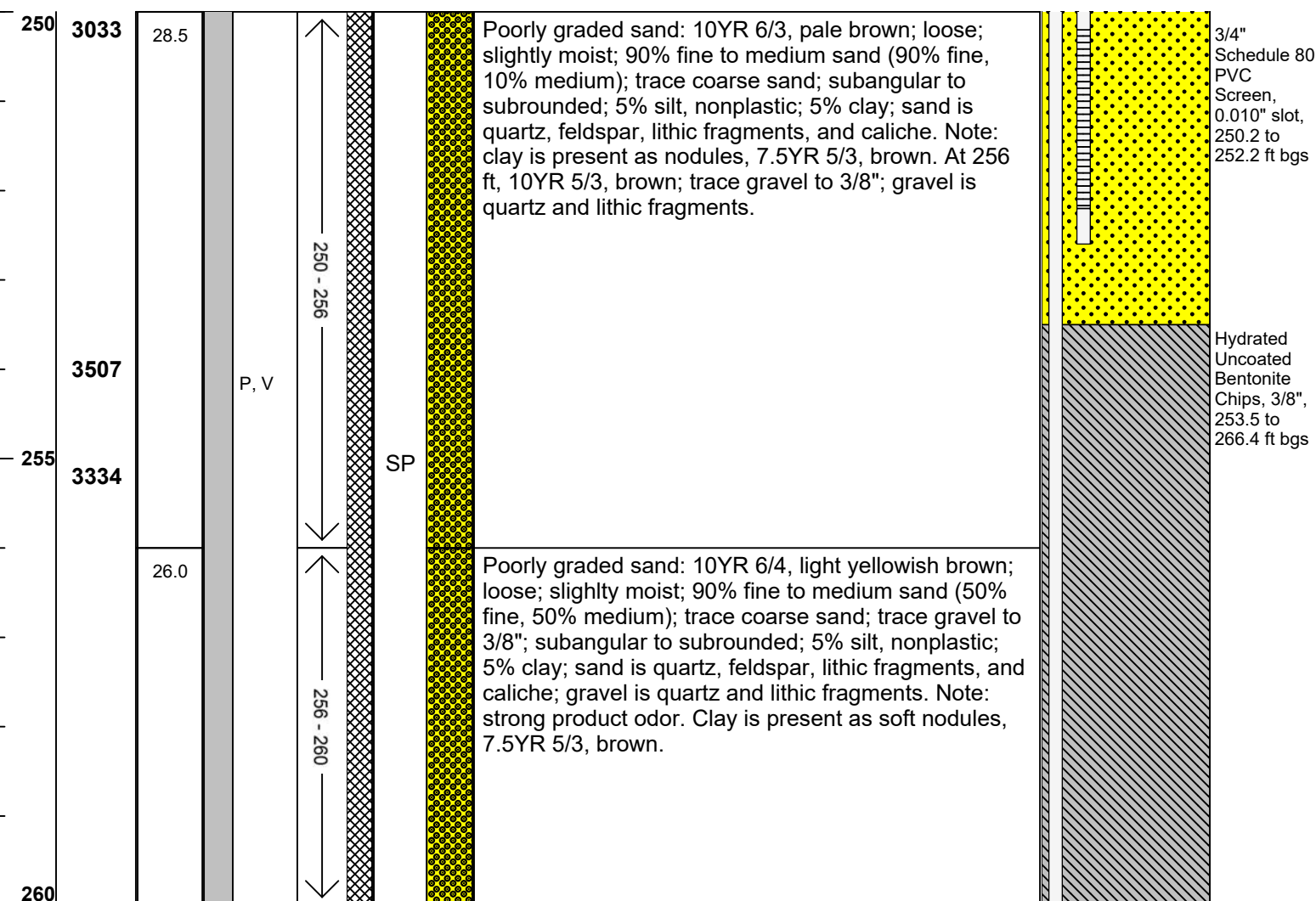
WELL LOG

Well ID: **KAFB-106V2**

Page: **26 of 29**

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence
 NA = Not Applicable
 bgs = below ground surface
 ft = feet
 ID = inner diameter
 ppmv = parts per million by volume
 USCS = Unified Soil Classification System

UV Fluorescence Field Test

	Not Tested		None
	Interval Fluoresced		

Core Recovery

	No Recovery		Complete
	Disturbed Core		

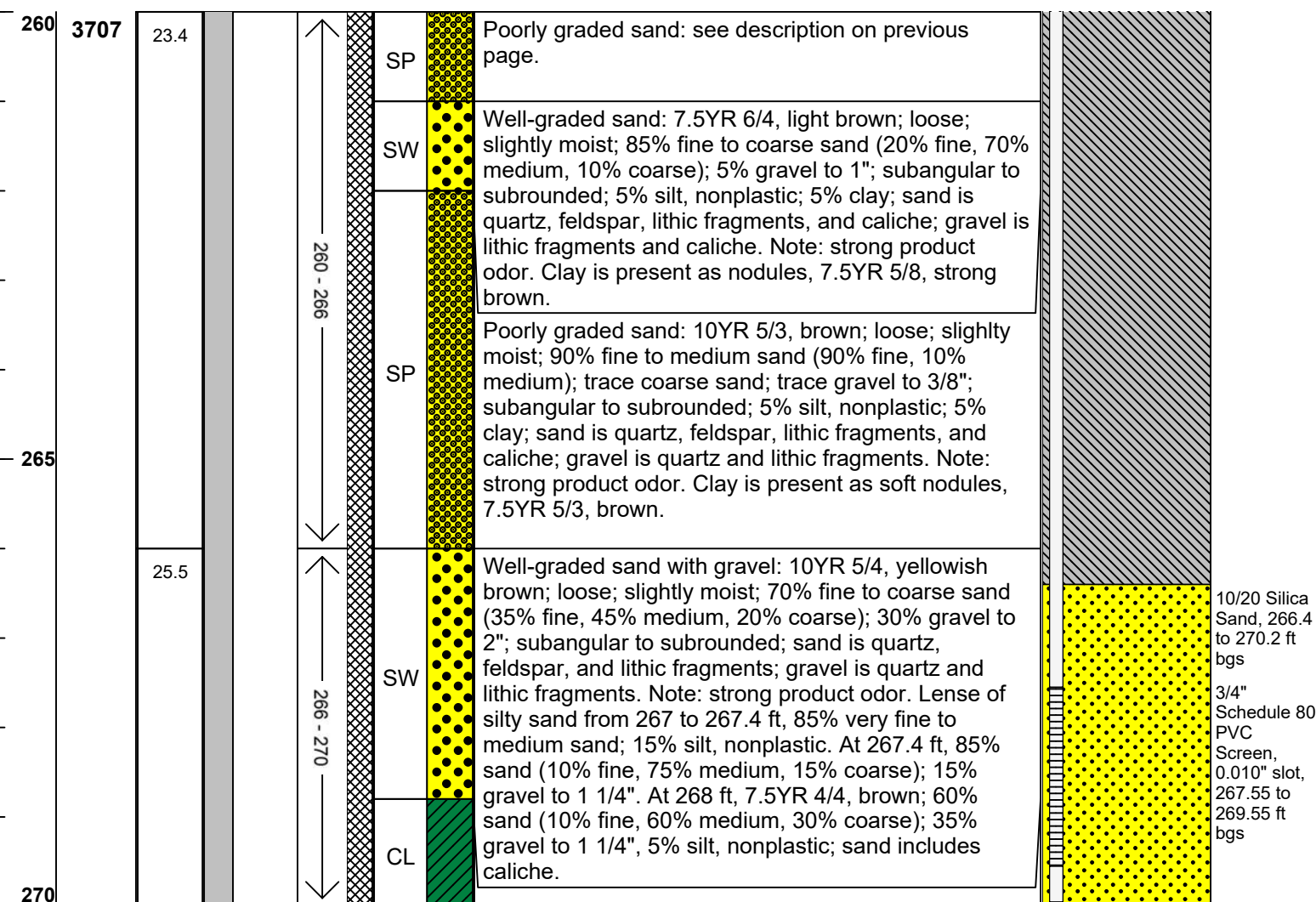
Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
 T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

Drilling Company: Cascade	Boring Depth (ft): 287	Screen Material: 3/4" Sch. 80 PVC
Drilling Method: Sonic Coring	Boring Diameter (in): 7"	0.010" slot screen
Drill Bit: Sonic Core Barrel, 6" ID	Well Diameter: 3/4" ID	Seal Material(s): Cement; Bentonite;
Driller: Roger Rodriguez	DTW After Completion (ft bgs): N/A	High Solids Bentonite Grout
Geologist: J. Messenger	Riser Material: 3/4" Sch. 80 PVC	Filter Pack: 10/20 Silica Sand

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

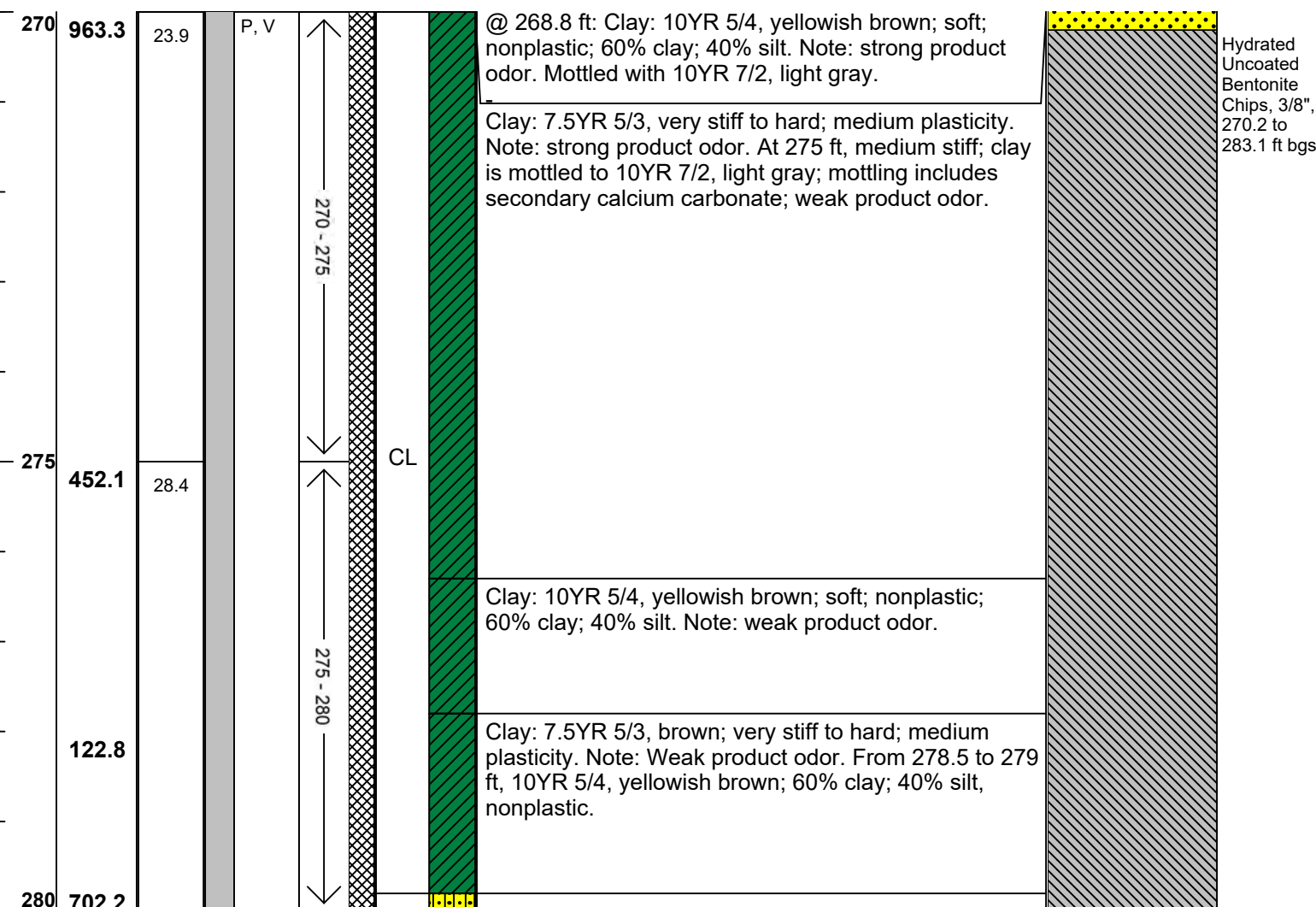
Page: **28 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

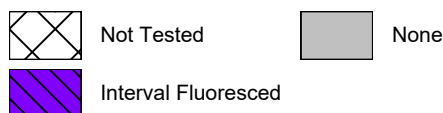
Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
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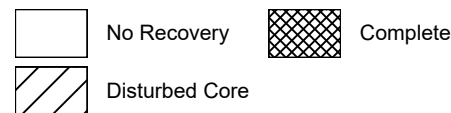
Notes:

UV = ultraviolet fluorescence
NA = Not Applicable
bgs = below ground surface
ft = feet
ID = inner diameter
ppmv = parts per million by volume
USCS = Unified Soil Classification System

UV Fluorescence Field Test



Core Recovery



Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;
T = thermal conductivity

There is a 0.4 ft sump underlying each screen.



EA Engineering, Science,
and Technology, Inc., PBC

Project: **62735DM02.1017**

Location: **Kirtland AFB, New Mexico**

Start Date: **12/11/2018**

Completion Date: **1/24/19**

WELL LOG

Well ID: **KAFB-106V2**

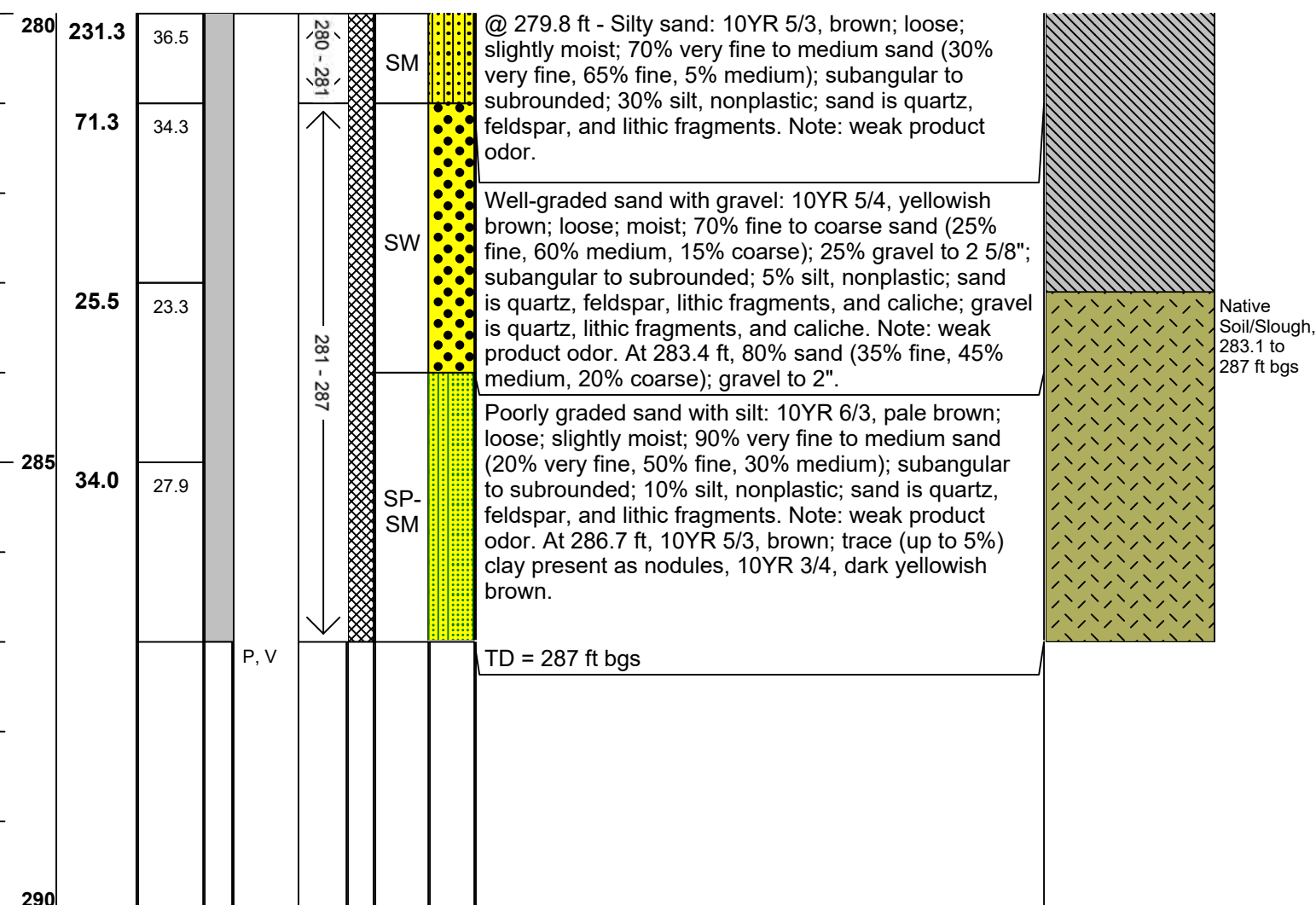
Page: **29 of 29**

Drilling Company: **Cascade**
Drilling Method: **Sonic Coring**
Drill Bit: **Sonic Core Barrel, 6" ID**
Driller: **Roger Rodriguez**
Geologist: **J. Messenger**

Boring Depth (ft): **287**
Boring Diameter (in): **7"**
Well Diameter: **3/4" ID**
DTW After Completion (ft bgs): **N/A**
Riser Material: **3/4" Sch. 80 PVC**

Screen Material: **3/4" Sch. 80 PVC**
0.010" slot screen
Seal Material(s): **Cement; Bentonite;**
High Solids Bentonite Grout
Filter Pack: **10/20 Silica Sand**

Depth (ft)	PID (ppmv)	Temp (°C)	Field UV	Samples Collected	Core Run (ft)	Recovery	USCS	Lithology	Sample Description	Completion Details
---------------	---------------	--------------	----------	----------------------	------------------	----------	------	-----------	--------------------	-----------------------



Notes:

UV = ultraviolet fluorescence

NA = Not Applicable

bgs = below ground surface

ft = feet

ID = inner diameter

ppmv = parts per million by volume

USCS = Unified Soil Classification System

UV Fluorescence Field Test



Not Tested



None



Interval Fluoresced

Core Recovery



No Recovery



Complete



Disturbed Core

Following coring, the borehole was overdrilled using ARCH for well installation

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet;

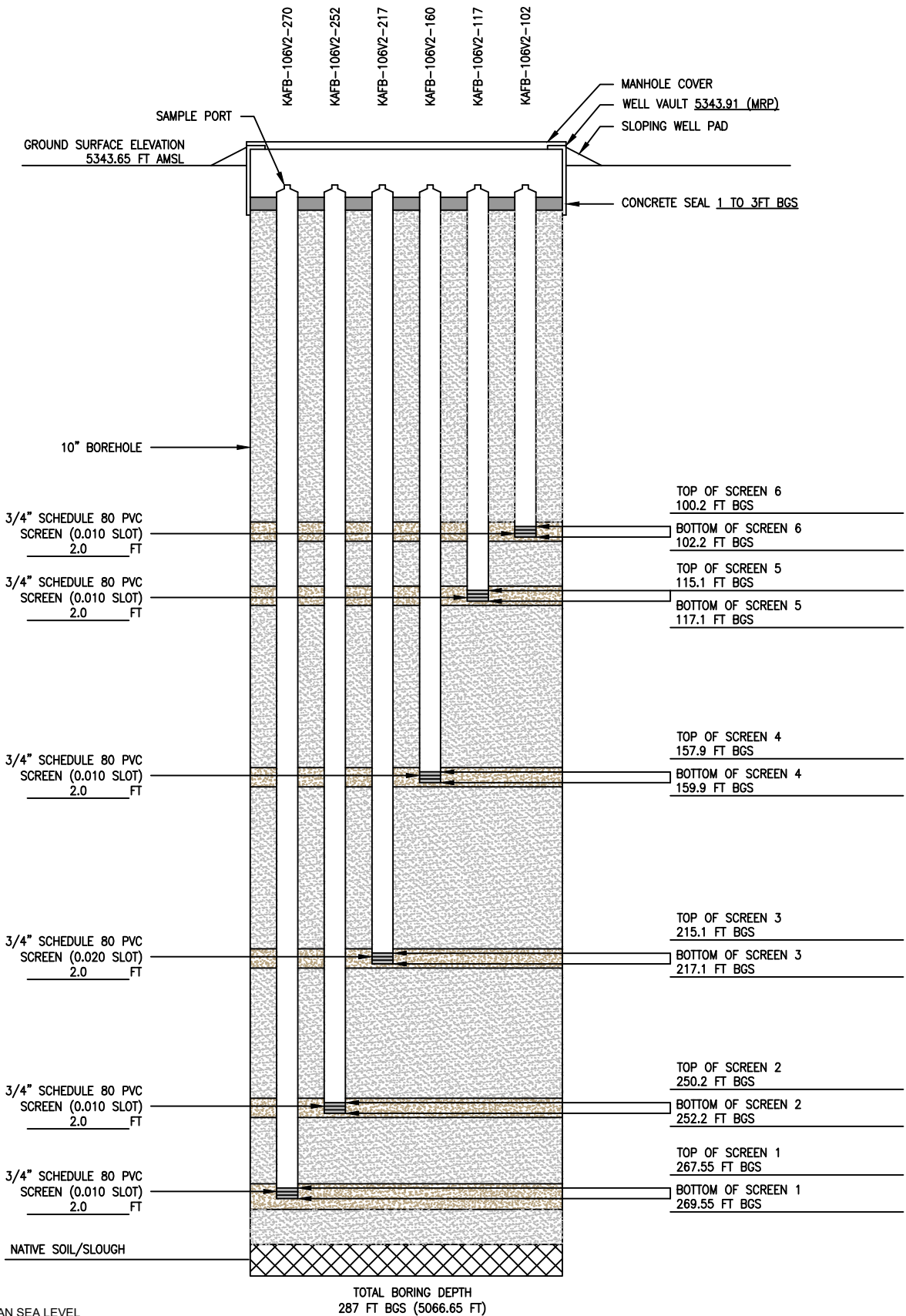
T = thermal conductivity

There is a 0.4 ft sump underlying each screen.

FIGURE B-4: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V2

PLOT DATE/TIME: 4/12/2019 - 12:37pm

CAD FILE: P:\Active Projects\62735DM02 Kirtland Vadose Zone\01_1_VZ Coring Work Plan_R0\04_VZ WP App B_R0 - Well Construction\CADD\Well Completion Diagram - KAFB-106V2.dwg



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
ASML = ABOVE MEAN SEA LEVEL
MRP = MEASUREMENT REFERENCE POINT
ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

NOT TO SCALE
BGS = BELOW GROUND SURFACE
FT = FEET



320 Gold Avenue, SW Suite 1300
Albuquerque, NM 87102
Phone: (505) 224-9013
Fax: (505) 224-9016
EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

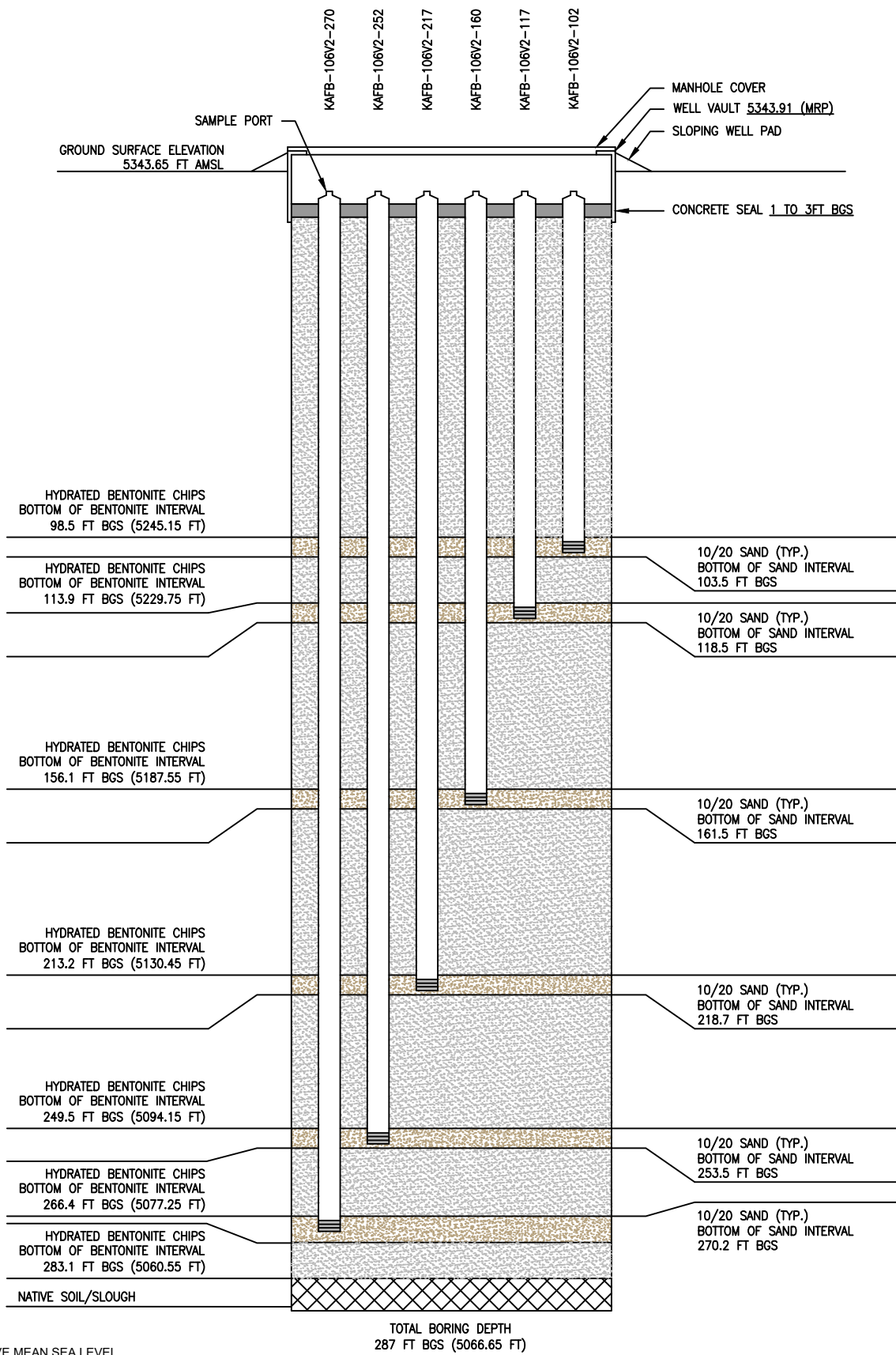
PROJECT NO.: 62735DM02.1017

WELL ID: KAFB-106V2

INSTALLATION START DATE/TIME: 12DEC18
GEOLOGIST: J. MESSENGER / C. MONTOYA

INSTALLATION END DATE/TIME: 10JAN19
DRILLER: R. RODRIGUEZ / F. CHATTIN-EVANS

FIGURE B-5: NESTED SOIL VAPOR WELL COMPLETION DIAGRAM FOR KAFB-106V2



(ELEVATION) IS IN ABOVE MEAN SEA LEVEL
ASML = ABOVE MEAN SEA LEVEL
MRP = MEASUREMENT REFERENCE POINT
ALL WELLS HAVE A 0.4 FT SUMP BELOW BOTTOM OF SCREEN

NOT TO SCALE
BGS = BELOW GROUND SURFACE
FT = FEET



320 Gold Avenue, SW Suite 1300
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EA ENGINEERING, SCIENCE, AND TECHNOLOGY, INC., PBC

KIRTLAND AIR FORCE BASE

PROJECT NO.:

62735DM02.1017

WELL ID:

KAFB-106V2

INSTALLATION START DATE/TIME:

12DEC18

INSTALLATION END DATE/TIME:

10JAN19

GEOLOGIST:

J. MESSENGER /
C. MONTOYA

DRILLER:

R. RODRIGUEZ /
F. CHATTIN-EVANS



BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: CascadeStart Time/Date: 11-27-18/0815Lead Driller: Roger Rodriguez

Completion Time/Date:

Drilling Method: SONIC

Final Depth:

Casing Diameter OD:

Bit Type and Outer Diameter

Boring/Well ID: KAFB-10631Logged By: Lane Andrews

Page 1

of

JM

57

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
	↑	↑	↑	↑	↑		0	0-8' - cuttings removed w/ hydroknife	
							1		
							2		
							3		
							4		
							5		
							6		
							7		
							8		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

NA = Not Applicable

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KAFB-70651

Logged By: Lane Andress

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Soil Description							Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run Recovery	Depth, ft bgs	
-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)							
ML		↑			8	Silt - reddish brown (5YR 5/4) - Loose to med dense ~20% coarse sand/gravel up to 1/4" of cemented carbonate (caliche) SR/SA - mottling of white (5YR 8/1) ~5% @ 8.25' one 4" SA limestone cobble	
ML	3.1		N		9	@ 9ft SAA - minor clay - very low plasticity	
ML			N		10		
CL			N		11	SAA - @ 10.5 ft - silty clay - reddish brown (5YR 5/4) dense, slightly moist, medium plasticity	
CL			N		12		
CL		28.2°C	N		13	SAA @ 10.5 ft increased density - occasional white specks up to 3mm -	
CL			N		14		
CL			N		15	SAA @ 10.5 ft	
ML			N		16	@ 15 ft - silt - reddish brown (5YR 5/4) - dense, SLM, non plastic w/ caliche spots up to 1/2" (<5%)	
ML	3.3	↑	N		17	SAA @ 15' but medium dense	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KAPB-10G51

Logged By:

Page 3 of 57

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				17	SAA @ 16'	
ML		31.3°C	N				18		
ML			N				19	SAA @ 16' - loose to medium dense	
ML			N				20		
ML	3.0		N	P			21	Silt - reddish brown (5 YR 5/4) dense - to medium dense - dry to slightly moist - + clay - non-plastic to low plasticity - < 5% white caliche spots up to 3mm	
ML			N				22	SAA @ 20ft	
ML			N				23		
ML	25.5		N				24	SAA @ 20ft	
ML			N				25	@ 25 ft - silt - reddish brown (5 YR 5/4) - slightly moist - medium dense - no clay - occasional white caliche specks up to 2mm	
ML			N				26		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18
Page 34 of 57

Boring/Well ID: KAFB-10651

Logged By:

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				26	clay w/ silt (5YR 5/4) - dense, moist, plastic,	
CL			N				27	↓	
CL			N				28	@ 27 ft decreasing clay to a silt w/ clay	
ML			N				29	@ 28' - as above @ 26' (color, density -) non-plastic	
ML			N				30	silt - light reddish brown (5YR 6/4) - very dense dry to SLM - occasional white caliche specks up to 2 mm (~5%) non-plastic	
ML	2.8	47.9	N				31	↓	
ML			N				32	silt - yellowish red (5YR 5/6) - medium dense to dense, SLM, trace clay - very low plasticity - caliche fragments & specks up to 2mm (<5%)	
ML			N				33	↓	
ML			N				34	SAA @ 30'	
ML			N				35	@ 30.5 - 33.5' - silt - yellowish red (5YR 5/6), loose to medium dense, SLM - non plastic	
ML			N				36	@ 32.5' - 33.5'	
ML			N				37	@ 33.5 ft - silt w/ minor clay - light reddish brown 5YR 6/3 - medium dense, SLM - slightly plastic	
ML			N				38	SAA @ 33.5 ft	
ML			N				39		
ML			N				40		
ML			N				41		
ML			N				42		
ML			N				43		
ML			N				44		
ML			N				45		
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ML			N				94		
ML			N				95		
ML			N				96		
ML			N				97		
ML			N				98		
ML			N				99		
ML			N				100		

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date: 11-27-18		
Boring/Well ID: KAFB-10651					Logged By: Lam Address		Page 45 of 57		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML/CL		17.9	N		10'		35	SAA @ 33.5 ft	
ML/CL			N				36		
ML/CL		25.7	N		2'		37	@ 37.5 ft - silt - reddish brown (5YR 5/4) - medium dense to loose - SLM, non plastic	
ML			N				38	SAA @ 37.5	
ML			N				39		
ML			N				40		
CL	23		N				41	clay w/ silt - reddish brown (5YR 4/4) dense, SLM, plastic when wetted - silt ~ 20%	
CL		28.2	N		10'		42	clay - light brown (7.5YR 6/3) - dense, SLM, plastic	
ML/CL			N				43	@ 43 ft - silt w/ clay - clay ~ 20% - reddish brown (5YR 5/4) - dense to medium dense - dry to SLM - low to medium plasticity ~ 10% white caliche spots up to 3mm	
			N				44		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KAFB-106S1

Logged By:

Page 6 of 57

USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML/cl								44	5AA @ 43ft to 44.6ft	
my cl			26.2	N				45	@ 44.5ft - silt w/ clay - reddish brown (5YR 5/3) dense, dry to SLM - ~20% clay - low to medium plasticity - ~15% caliche specks & stringers up to 2mm	
my cl				N				46	@ 45.5 color change to light reddish brown (5YR 6/3)	
ML				N				47	silt - reddish brown (5YR 5/4) - dense to medium dense - SLM, non plastic - ~5% caliche specks up to 3mm	
ML				N				48	silt w/ minor clay - reddish brown (5YR 5/4) - dense SLM - non to weakly plastic - ~5% white caliche specks up to 3mm	
ML				N				49	@ 49' - silt w/ minor clay - yellowish red (5YR 5/6) medium dense - low plasticity to non-plastic, SLM trace caliche specks	
ML		1.8	31.5	N				50	5AA @ 49'	
ML				N				51		
ML				N				52		
cl/my				N				53	silty clay - reddish brown (5YR 4/3) dense - must to SLM medium plasticity	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

5AA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 11-27-18	
Boring/Well ID: KAFB-10651					Logged By: Lane Address			Page 67 of 57	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML/CL		31.5	N				53	-- soil type: Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML/CL			N				54	@ 53' silt w/ clay - reddish brown (5YR 5/3) med dense, SLM, low to med plasticity. clay ~ 30% ~ 8% caliche specks up to 3mm	
ML/CL			N				55	SAA @ 53'	
SW			N				56	SAA @ 55.5' @ 55.5' sand, brown (7.5YR 5/3), loose, SLM, well graded F-5% M-25% C-50% G-20% up to 1" SR Gravel (1 1/2" max)	
SW			N				57	SAA @ 55.5 ft	
SW			N				58		
SW		30.6	N				59	@ 59.5 ft SAA @ 55.5' w/ gravel up to 2"	
ML/CL	1.5		N				60	silt w/ clay - reddish brown (5YR 4/3) - medium dense to dense - SLM, clay ~ 30% - medium to low plasticity	
ML			N				61	@ 61 ft - silt - reddish brown (5YR 4/3) medium dense, SLM, non to low plastic - clay < 10%	
							62		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KAFB-10GS1

Logged By: Lane Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
ML			N				62	Silt - reddish brown (5YR 5/4) - medium dense to loose, SLM - non plastic			
ML			N				63				
SW		30.6	N				64	Silty sand w/ trace gravel - reddish brown (5YR 5/4) - loose, SLM, well graded			
SW			N				65	Silt 80% F 5% M 5% C 15% G trace up to 1" of SS conglomerate Qtz, lithic calcine			
			N				66	@ 65' decreasing silt w/ depth			
SW			N				67	Sand - brown (7.5YR 5/3) - loose - Dry to SLM well graded - F 15% M 60% C 25% trace G up to 1/2" s/sa lithic, calcine			
CL			N				68	@ 67' - Silty clay - reddish brown (5YR 5/4) very dense, hard, dry to SLM, medium plasticity when wetted			
ML		40.5	N				69	Silt w/ clay (~20%) - medium dense, SLM, low plasticity			
ML			N				70				
ML	1.3		N				71	SAA @ 67'			

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

SLM = Slightly Moist

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KAT-B-10651

Logged By: Lane Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
CL/ML							71	SAA @ 67'			
							72				
ML/CL							73	Silt w/ clay (30%) - reddish brown #1 (5YR 5/4) dense, dry to SLM - low to medium plasticity			
ML/CL							74				
ML/SM							75	Silt w/ vfg sand - brown (7.5 YR 5/4) - loose to medium dense, SLM			
ML/SM							76				
ML/ML							77	Silt - brown (7.5 YR 5/3) medium dense - SLM, @ 76.5 - silt - brown (7.5 YR 5/3) dense to medium dense, SLM - w/ pinkish white color (redox) spots up to 1/2" ~ 10%			
ML							78				
ML							79	SAA @ 76.5'			
							80	pinkish white redox areas up to 20%			

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KAFB-10651

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
CL	1.3		N				80	clay - reddish brown (5YR 5/3) - dense, dry to SLM, high plasticity - ~15% white calcareous spots & stringers up to 2mm			
CL			N				81				
CL			N				82				
CL			N				83	clay - brown (7.5YR 5/3) - very dense, SLM, plastic - med - high plasticity when wetted			
CL			N				84				
CL			N				85	clay As above at 82'			
CL			N				86				
CL			N				87	clay - brown (7.5YR 4/4) - very dense - DRY to SLM - plastic when wetted - pinkish white (7.5YR 8/1) Redox areas ~20% increasing to 80% at 87.5ft			
CL			N				88				
CL			N				89	SAA @ 86'			

Additional Comments:

Recovery: None ☐

Partial ☐

Complete ☒

SLM = slightly more

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KA-FB-10651

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML							89	@ 89' - silt w/ vfg sand - reddish brown (5YR 5/4), loose to medium dense, SLM - sand ~ 40%	
SM							90		
ML	2.0						91		
SM							92		
SM							93	Silty sand - reddish brown (5YR 5/4) - loose to medium dense, SLM - sand ~ 70%	
ML							94	Silt - reddish brown (5YR 5/4) very dense - dry to SLM, Non plastic	
SW	541						95	@ 93' - silty sand - reddish brown (5YR 5/4) loose w/ medium dense pieces up to 1.5" - smooth with graded silt 40% F 40% M 20% C trace	
SW							96	SAA @ 93' - no silt F 80% M 20% C 0%	
SW							97	SAA @ 93' 94'	
SW	342						98	@ 97 ft SAA w/ ~5% G up to 1/2-1" of medium to coarse medium grained sand - SA of same composition	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

Project Number: 62735DM02.1017

Boring/Well ID:

KAFB-10651

Logged By:

Love And Res

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW				N				98	SAA @ 97'	
SW				N				99	@99' - 1" coarse grained sandstone lense - well cemented - made of sand as below. Sand - brown (7.5 YR 5/3) - Loose, SLM well graded - F 100% M 15% C 80% G 5% of sandstone pieces up to 1"	
SW	1.3			N				100	Sand - brown (7.5 YR 5/3) - Loose - SLM, WG F 70% M 30% C trace	
SW				N				101		
SW				N				102		
SW				N				103	Sand - brown (7.5 YR 5/3), Loose, SLM, WG F 5% M 40% C 50% G 5% up to 3/4" sandstone (of cemented sand in this interval) SA etc. fcl, lithes	
SW				N				104	@103.5 - silt w/clay - brown (7.5 YR 5/3) dense, SLM ~20% Non to low plasticity	
SW				N				105	Sand - pinkish gray (7.5 YR 6/2) Loose, SLM, WG VF 85% F 10% M 5% C trace	
SW				N				106	@105.5 - silt w/clay - brown (7.5 YR 4/3) - dense - SLM - clay ~20% Non to slightly plastic	
SM				N				107	Silt - brown (7.5 YR 5/4) medium dense - SLM trace vfg sand & trace clay - non plastic	

Additional Comments:

Recovery: None

Partial

Complete

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

$$N = N_0$$

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KAFB-10651

Logged By: Lave Andress

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SM			N				107	SAA @ 106' - Loose to Medium dense			
							108	↓			
SM/a			N				109	silt w/ clay (30%) - brown (7.5YR 5/4) medium dense to dense - SLM, low plasticity to medium plasticity			
SM/a			N				110	↓			
ML	1.6		N				111	silt - brown (7.5YR 5/3) - loose, SLM - non plastic			
SM			N				112	↓			
							113	@ 111 - silty sand - brown (7.5YR 5/3) - Dense to very dense - SLM - vfg sand (50%)			
SM		42.2	N				114	SAA @ 111'			
ML			N				115	↓			
							116	@ 113 - silt - brown (7.5YR 5/4) - medium dense, SLM			
ML			N					↓			
ML/cl			N					SAA as at 113'			
								@ 115' - silt w/ clay - brown (7.5YR 5/4) dense, ~30% clay - SLM, low to medium plasticity			

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KAFB-106 S1

Logged By: Lore Anderson

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily)
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML SM			N				116	silt-brn (7.5 YR 5/4) - medium dense, SLM w/ sand ~ 20% vfg sand	
ML SM			N				117		
ML SM			N				118		
ML SM			N				119	silt-brn (7.5 YR 5/4) - dense, SLM, non plastic @ 119' - limestone cobble 4" SA - fizzes w/ HCl	
ML			N				119	@ 119' - silt as above very dense, hard dry to SLM	
ML	27		N				120		
ML		53.7	N				121	silt-brn (7.5 YR 5/4) - dense to medium dense - SLM trace clay - non to very low plasticity	
ML			N				122		
SW CL			N				123	silty sand-brn (7.5 YR 5/3) loose, SLM, w/ G VF 65% F 10% M 25% C + trace @ 122.5 - silty clay brn (7.5 YR 5/4) - very dense - dry to slightly moist - plastic when wet.	
CL			N				124		
ML			N				125	silt-brn (7.5 YR 5/4) - dense, SLM, trace clay non plastic	

Additional Comments:

SLM = Slightly Moist

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KAFB-10651

Logged By: Low Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
a		53.7	None				125	@ 125' - clay - dense, dry to SLM, plastic when wetted	
							126		
cl			N				127	clay - brown (7.5YR 5/3) - very dense, dry to SLM plastic @ 126.25 a fracture in clay w/ calcium carbonate staining	
cl			N				128		
cl			N				129		
cl			N				130	@ 130' 2" zone of calcium carbonate staining SAA @ 126'	
cl	2.2	53.8	N				131		
cl			N				132	@ 131.75 1" zone of calcium carbonate staining	
SM cl			N				133	silty sand w/ clay balls/pieces - brown (7.5YR 5/3) medium dense clay - Loose silty sand - SLM - clay (30%) balls pieces 1" up to 3" - plastic - sand vfg ~ 20%	
SM			N				134	@ 133' - silty sand - brown (7.5YR 5/3) - Loose, SLM, vfg sand	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: LAEB-10651

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP		53.8	N				134	Sand - light brown (7.5 YR 6/3) - Loose, SLM poorly graded - Vfg	
SP			N				135	@ 135 Sand as above w/ trace silt	
CL			N				136	clay w/ silt (20%) - reddish brown (7.5 YR 5/4) very dense, SLM, highly plastic	
CL			N				137		
CL			N				138	SAA @ 136'	
CL		53.8	N				139	@ 139' - clay - as above @ 138' - Dense	
SM/CL	6.6		N	P, V			140	Silty clayey silt - reddish brown (5 YR 5/4) Dry to SLM, very dense, silt ~ 40%	
SM/CL			N				141	@ 141 - SAA @ 140 - SLM & medium dense	
SW		86.7					142	silty sand - pinkish gray (7.5 YR 7/2) loose, dry, well graded	
							143	silt 60%, F 5% M 30% C 5%	

Additional Comments:

142'-146' disturbed - fell out of core barrel & re-retrieved

Recovery: None ☐

Partial ☒

Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-27-18

Boring/Well ID: KAFB-106.S1

Logged By: L. Address / J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW							143	SAA @ 142'	
							144	↓	
SW							145	sand - light brown (7.5 YR 6/3) loose, SLM, well graded	
CL							146	clay - light brown (7.5 YR 6/3) - very dense, dry plastic when wetted ~ 20% silt	
CL							147	clay - light brown (7.5 YR 6/4) - soft to stiff, dry, low plasticity when wetted ~ 30% silt	
CL							148	no odor clay is loose and exist as clay clumps up to 3" (silt)	
SC							149	↓ SAA @ 146'	
SM							150	clayey sand with silt - light brown (7.5 YR 6/4) loose, soft - clay clumps stiff to very stiff - Sand 60%: VF: 20% F: 70% M: 10% SA-SR (Qtz, feld, lithics); clay 30% soft to stiff silt ~ 10% non plastic no odor	
SM							151	silty sand with clay - light brown (7.5 YR 6/4) loose, soft - clay clumps up to 1 1/2" stiff - very stiff; sand 70%: F: 70% M: 30% SA-SR (Qtz, feld, lithics); silt 20% non plastic; clay 10% soft to very stiff (clumps) no odor	
SW-SM							152	↓ SAA @ 150'	
								well graded sand with gravel - light brown (7.5 YR 6/3) loose, moist sm SLM; sand 80%: F: 30% M: 40% C: 30% SA-SR (Qtz, feld, lithics); gravel 10% up to 1 3/8" (Qtz + lithics); silt 10% non plastic no odor	

Additional Comments:

142' - 146' disturbed core fell out of core barrel & re-retrieved

Recovery: None ☐

Partial ☒

Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-28-18

Boring/Well ID: KAFB-106 S1

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								Jm	
SW-SM			N				152	SAA @ 150-151' gravel 5% up to 1/2" (silt 10%) Moist - no odor	
SW-SM			N				153	152.8 - 153.5' clay clumps up to 3" stiff to very stiff	
							154	153.5 - 154' gravel up to 2" (lithics) ~ 5%	
SW-SM		39.5	N				155	brown (7.5 YR 5/3) SAA @ 154' well graded sand: F=15% M=60% C=25% gravel 5% up to 2" (Qtz + lithics + caliche) (silt 10%) no odor	
SW-SM			N				156		
SW			N				157	Well graded sand w/gravel - brown (7.5 YR 5/3) loose, SLM Sand = 80% F=20% M=60% C=20% SA-SR (Qtz, feld, lithic) gravel = 15% up to 2 1/4" (Qtz + lithics); silt = 5% non plastic No odor	
SW			N				158	Well graded sand w/clay - brown (10 YR 5/3) loose, SLM, Sand = 80% F=10% M=75% C=15% SA-SR (Qtz, feld, lithics); gravel = 10% up to 1" (Qtz, caliche, lithics); clay = 10% non plastic no odor	
SW-SC		22.3	N				159	159-160' = clayey sand with gravel - brown (7.5 YR 5/4) loose, moist, Sand 65% F=45% M=25% C=30% SA-SR (Qtz, feld, lith.) clay = 30% soft to medium, non-plastic; gravel 15% up to 1 1/4" (Qtz + lithics) silt = 5% non plastic no odor	
SC			N				160		
SM	4.3		N				161	SM SAA @ 160' silty sand with gravel Sand = 65% M=70% C=65% brown (7.5 YR 5/4) gravel = 15% clay = 5% silt = 10% 15% no odor	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-28-18

Boring/Well ID:

KAFB-10651

Logged By:

J. Messmer

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								SM	
SM			N				161	SAA @ 160-161' Sand = 65% gravel = 20% silt = 15% clay = trace No odor	
SM			N				162		
SM			N				163	SAA @ 160-161' SAA No odor	
SM			N				164	SAA @ 160-161' No odor	
SM			N				165	SAA Sand = 70% F = 10% M = 70% C = 20% gravel = 15% up to 1/4" NO CLAY NO odor	
SM			N				166	164.5-165.5' = poorly graded sand w/silt - pale brown (10YR 6/3) loose, SLM; SAND 60% VF = 40% F = 60% SA-SR (Qtz, feld, lithics); silt = 40% soft, non plastic NO odor	
SM			N				167	silty sand - brown (7.5YR 4/4) - loose, SLM - SAND 80% F = 40% M = 30% C = 30% SA-SR (Qtz, feld, lithics); silt = 15% soft, non plastic; gravel = 5% up to 1/2" (Qtz + lithics) NO odor	
SW-SM			N				168	Well graded sand with silt - pale brown (10YR 6/3) loose, SLM, SAND = 85% F = 30% M = 50% C = 20% SA-SR (Qtz, feld, caliche, lith); silt = 10% soft, non plastic; gravel = 5% up to 1/4" (Qtz + lithics) NO odor	
CL			N				169	Clay with sand - brown (7.5YR 5/4) medium stiff, SLM medium plasticity - clay = 90% sand = 10% F = 70% M = 30% SA-SR (Qtz, feld, lithics) NO odor	
SM			N				170	168.2' Silty sand with clay - light brown (7.5YR 6/4) loose, SLM Sand = 70% VF = 20% F = 65% M = 15% SA-SR (Qtz, feld, caliche, lith); silt = 20% non plastic; clay 10% low plasticity - exists as nodules NO odor	
SM			N					SAA @ 168.2-169'	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-28-18

Boring/Well ID:

KAFB-106S1

Logged By:

J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SM	4.2		N				170	SAA: silty sand - no clay Sand = 85% silt = 15% no odor	
SP-SM			N				171		
SP-SM			N				171.5	SAA @ 170 - 171.5' sand poorly graded = 90%: F=60% M=40% silt = 10%	
SW-SM			N				172	171.5' - 172' SAA @ 171 - SP-SM - sand 90% F=20% M=80% trace coarse grain sand SA-SR (qtz, calcite, feld, lithics); silt 10% non plastic	
SC	32.2		N				173	Well graded sand with silt - light brown (7.5 YR 6/4) loose, SL M sand 90%: F=50% M=35% C=15% SA-SR (qtz, feld, lith, calcite) silt 10% non plastic - trace gravel (<3%) up to 1/2" (lithics) no odor	
SW-SM			N				174	clayey sand with gravel - light brown (7.5 YR 6/4) clay exists as nodules (7.5 YR 4/4 - brown) - sand 60%: F=15% M=30% C=25% SA-SR (qtz, feld, lithics, calcite); clay nodules; brown; medium density, low plasticity; gravel = 10% up to 1/2" (calcite + lithics) Well graded sand with silt - dark gray (7.5 4/1) SAA @ 172-173' no odor	
SP-SM			N				175	174.5 - 176' poorly graded sand with silt - pale brown (10 YR 6/3) loose, SL M sand = 90%: F=95% M=10% SA-SR (qtz, feld, lithics) silt = 10% non plastic	
SP-SM			N				176	no odor	
SP-SM			N				177	SAA @ 174.5 - 176' no odor	
SP-SM	27.5		N				178	to 178.5'	
SP-SM			N				179	SAA - trace coarse grained sand trace gravel up to 1/2" (qtz + lithics) no odor	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 21	
Boring/Well ID: KAFB-106 S1					Logged By: J. Messenger			Page 20 of 57	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW			N				179	Well graded sand w/silt - light brown (7.5YR 6/3) loose, SLM Sand = 85% : F = 35% M = 45% C = 20% SA-SR (Qtz, feld, lith.) silt = 10% nonplastic Gravel = 5% up to 1 1/2" (lithics)	
SW	2.5		N				180		
SW			N				181	SAA - W.G. sand with gravel sand = 85% - same percentages gravel = 10% up to 1/2" silt = 5% nonplastic	
SW		27.5	N		10'		182	SAA : W.G. sand = 80% gravel = 10% clay = 5% brown (7.5YR 5/4) chunks med. dense nonplastic silt = 5% nonplastic	
SW			N				183	SAA - W.G. sand gravel = 5% silt = 5% no clay	
SW			N				184	Well graded sand with gravel - light brown (7.5YR 6/3) loose, SLM sand = 80% : F = 15% M = 60% C = 25% SA-SR (Qtz, feld, lith.) gravel 20% up to 1/2" (Qtz + lithics)	
SP			N				185	Poorly graded sand - light brown (7.5YR 6/3) loose, SLM Sand = 95% : F = 60% M = 40% trace coarse grain sand - SA-SR (Qtz, feld, lith.) - gravel = 5% up to 3/8" (Qtz + lithics)	
SW			N				186	SAA @ 184-185' : W.G. sand = 95% : F = 25% M = 60% C = 15% - gravel = 5% up to 3/8"	
SP	33.3		N				187	186.8-187.2' = clay - yellowish brown (7.5YR 5/6) med. dense low plasticity Poorly graded sand - SAA @ 185-186'	
							188		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Boring/Well ID: KAFB-106 S1					Logged By: J. Messenger				
					Date: Page 27 of 57				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP			N				188	SAA @ 188' trace clay - strong brown (7.5YR 4/6)	
SP			N				189		
SP	2.2		N				190		
SP		33.3	N				191	SAA trace coarse sand trace gravel ~ 5% trace clay (7.5YR 4/6)	
SP			N				192		
SP			N				193	SAA	
SW			N				194	well graded sand - pale brown (7.0YR 6/3) loose, SLM sand = 95% : F = 15% M = 70% C = 15% SA-SR (at, feld, lith.) gravel = 5% up to 5/8" (lithics)	
SW			N				195	SAA with gravel up to 1/2" @ the 195' mark some clay chunks exist - strong brown (7.5YR 4/6)	
SW			N				196	SAA gravel = 1/2" no odor	
SW	41.3		N				197	SAA	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Boring/Well ID: KAFB-10651					Logged By: J. Messenger				
					Date: Page 23 of 57				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW			N				197	SAA SAA no odor	
SW			N				198		
SW			N				199		
CL	4.4		N				200		clay - brown (7.5YR 5/3) med. density, low plasticity no odor
SC			N				201	clayey sand - yellowish tan light brown (7.5YR 6/4) loose, SLM SAND = 85% : F = 75% M = 25% trace coarse grain sand SA-SR (Qtz, feld, lith.) - clay 15% soft - low plasticity no odor poorly graded sand - light brownish gray (7.0YR 6/2) loose, SLM sand = 100% : F = 90% M = 10% SA-SR (Qtz, feld, lithics, caliche)	
SP	41.3		N				202	trace clay	
SP			N				203	SAA @ 201'	
SP			N				204		
SW			N				205	well graded sand with gravel - pale brown (10YR 6/3) loose, SLM Sand = 80% : F = 30% M = 30% C = 40% SA-SR (Qtz, feld, lithics) gravel = 20% up to 2 3/4" (Qtz + lithics) - some of the gravel has black coating - suspect it burnt (?) no odor	
SW			N				206		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFFB - 106 S1

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				206	SAA @ 204.5' - 206' w.b. sand w/gravel gravel up to 1 3/4" same "burnt" observation on gravel no odor	
SW			N				207		
SW			N				208		
SW			N				209	poorly graded sand - light brownish gray (10PR 6/2) loose, SLM sand = 95% : F = 85% M = 15% SA-SR (qtz, feld, lithic) silt = 5% nonplastic; trace gravel up to 3/4" (qtz, lithics) no odor	
SP			N				210		
SW	2.1	33.9	N				211	well graded sand with gravel - light brownish gray (10PR 4/2) loose, SLM - sand 70% : F = 15% M = 60% C = 25% SA-SR (qtz, feld, lithics); gravel 30% up to 1 3/4" (qtz, feld, lithics) no odor	
SW			N				212		
SW			N				213	SAA @ 210-211' @ 212' sand = 65% gravel = 30% silt = 5% nonplastic no odor	
SW			N				214		
SW			N				215	SAA @ 212-214'	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB - 106 S					Logged By: J. Messenger			Page 25 of 57	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							215	Soil Description -- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				215.5	SAA @ 215.5' light gray (10YR 7/2) NO odor	
SW			N				216	SAA - brown (7.5YR 5/3) no odor	
SW			N				217		
SW			N				218		
SW			N				219	well graded sand w/silt - pinkish gray (7.5YR 6/2) loose, SLM sand = 85% : F = 60% M = 20% C = 20% SA-SR (Qtz, feld, lithics) silt = 10% nonplastic; gravel = 5% up to 1" (Qtz, lithics) no odor	
SW			N				220	well graded sand w/gravel - light brown (7.5YR 6/3) loose, SLM sand 85% : F = 50% M = 30% C = 20% SA-SR (Qtz, feld, lithics + caliche) gravel = 10% up to 1" (Qtz, lithics, caliche) silt = 5% nonplastic no odor	
SW			N				221	SAA @ 219-220' no odor	
SW			N				222		
SW			N				223	SAA @ 218' light brown (7.5YR 6/3)	
SW			N				224	SAA @ sand = 75% : F = 35% M = 35% C = 30% gravel = 20% up to 1 1/2" silt = 5%	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106S1

Logged By:

J. Messenger

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW				N				224	SAA @ 223-224' no odor	
SW				N				225		
SW				N				226		
SW				N				227	SAA - sand = 85%: F = 30% M = 40% C = 30% gravel = 10% up to 1" (Qtz, lithics, caliche) Silt = 5% nonplastic	
SW				N				228	@ 226.5' clumps of clay exist - pale olive (5Y 6/3) up to 2 1/2" @ 227' clumps of clay exist - yellowish brown (10YR 5/4) up to 1 1/2" well graded sand with gravel - pinkish gray (7.5YR 6/2) loose, SLM - sand = 75%: F = 15% M = 60% C = 25% SA-SR (Qtz, feld, lithics, caliche); gravel 20% up to 1 1/2" (Qtz, lithics, caliche) Silt = 5% nonplastic	
SW				N				229	well graded sand - pale brown (10YR 6/3) loose, SLM - sand = 95%: F = 20% M = 70% C = 10% SA-SR (Qtz, feld, lithics, caliche) Silt 5% nonplastic - trace gravel up to 3/8" no odor	
SW-SM				N				230	SAA w/ silt - sand = 80%, silt = 10%; gravel = 10% up to 1" NOTE: section contains secondary cementation (calcium carbonate = caliche) silty sand - pale brown (10YR 6/3) loose, SLM, sand = 80% F = 50% M = 50% - trace coarse grain; SA-SR (Qtz + caliche) silt = 20% nonplastic; soft SAA @ 228-229 no odor	
SW		2.4		N				231	SAA @ 228-229 - sand = 85%: F = 20% M = 50% C = 30% gravel = 10% up to 1/2" silt = 5% no odor	
SW				N				232		
SW				N				233		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Boring/Well ID: KAFB-10651					Logged By: J. Messenger				
					Date: 2/27/2007				
					Page 26 of 57				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW			N				233	soil type: Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
			N				234	SAA - Sand = SM @ 228-229' - same percentages no odor	
SP			N				235	Poorly graded sand - brown (7.5YR 5/3) loose, SLM; sand = 90% F = 70% M = 30% SA-SR (qtz, feld, lithic, caliche) gravel = 5% up to 3/8" (lithics) silt = 5% nonplastic no odor	
SW			N				236	well graded sand with gravel - light brown (7.5YR 6/3) loose, SLM Sand 90% : F = 25% M = 60% C = 15% SA-SR (qtz, feld, lithic); gravel 10% up to 2 3/4" (lithics) no odor	
SW			N				237	brown (7.5YR 5/3) sand = 80% gravel = 20%	
SW		42.7	N				238		
SW			N				239		
SW			N				240		
SW	3.0		N				241		
SP			N				242	Poorly graded sand - light brown (7.5YR 6/3) loose, SLM Sand = 95% : F = 65% M = 35% SA-SR (qtz, feld, lith, caliche) Silt = 5% nonplastic trace coarse grain no odor	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/FDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106 S1

Logged By:

J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP							242	SAA @ 241-242' sand = 90% 10 odor silt = 5% gravel = 5% up to 1/4" (lithics)	
ML		42.7	N				243	242.8-243' silt - pale brown well graded sand - very (10YR 6/3 non plastic; soft pale brown (10YR 7/3) loose, SLM sand 95%: F = 30% M = 50% C = 20% SA-SR (qtz, feld, lith.) gravel 5% up to 1" (lithics) no odor	
SW			N				244	SAA to 245.2' no odor	
SN			N				245	clay - strong brown (7.5YR 4/6) medium dense medium plasticity no odor	
CL			N				246	clay with sand - strong brown (7.5YR 4/6) medium to stiff, medium plasticity - clay 85%; sand 15% F to C graded (lithics + caliche) SA-SR no odor	
CL			N				247		
CL			N				248		
CL		46.4	N				249		
CL			N				250	CL to 250.2' no odor	
ML		22.7	N				251	silt with clay - light brownish gray (10YR 6/2) - silt = 80%; soft non plastic; clay 20% - brown (10YR 5/3) exists as clumps - clumps = medium dense + medium plasticity no odor	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 2/27

Boring/Well ID: KAFB-10651

Logged By: J. Messenger

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Soil Description								Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)
ML			N				251	SAA
CL			N				252	SAA @ 246-247 clay = 90% Sand = 10% stiff to very stiff F to M grain medium plasticity
CL	46.4		N		10'		253	no odor
CL			N				254	SAA - color = pale olive (5Y 6/3)
CL			N				255	SAA @ 252-253'
			N				256	no odor
SM			N				257	silty sand - pale brown (10YR 6/3) loose, soft, SLM - sand: 70%: VF = 25% F = 60% M = 15% SA-SR (Qtz, feld, lith, caliche) silt = 30% nonplastic
SW-SM			N				258	well graded sand with silt - pale brown (10YR 6/3) loose, SLM Sand = 85%: VF = 15% F = 10% M = 50% C = 25% SA-SR (Qtz, feld, lithics, caliche); silt = 10% nonplastic; gravel = 5% up to 1/2" (caliche + lithics)
SW-SM	56.2		N		10'		259	SAA @ 257-258 sand = 90% F = 10% M = 70% C = 20% silt = 10% trace gravel up to 1/2"
CL	X		N	X			260	258.7' = clay - strong brown (7.5YR 4/6) medium to stiff medium plasticity
CU								SLM

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 30	
Boring/Well ID:					Logged By:			Page 29 of 57	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML	25.1		N	P, V			260	clayey silt - brown (7.5R 5/3) soft, low plasticity silt = 60% non plastic clay = 40% SLM no odor	
ML			N				261		
SM			N				262	261.5 - silty sand - brown (10YR 5/3) loose, SLM - sand = 70% VF = 35% F = 55% M = 10% SA-SR (qtz, feld, lith, caliche); silt = 30% non plastic	
SM		56.2	N		10'		263	SAA sand = 85% silt = 15% no odor	
SM			N				264	SAA - silty sand with clay - sand color same - clay chunks are (10YR 4/3) sand = 65% silt = 25% clay = 10% silt, med plastic secondary calcium carbonate cementation exists in clay chunks	
SM			N				265	264 - SAA @ 262-263' 264-264.8 no odor	
SP-SM			N				266	poorly graded sand w/silt - pale brown (10YR 6/3) loose, SLM sand = 90% VF = 20% F = 70% M = 10% SA-SR (qtz, feld, lith); silt = 10% non plastic - trace gravel up to 1/2" (qtz + lith) no odor	
SP			N				267	SAA - sand 95% silt 5% trace gravel same no odor	
SP			N				268	SAA no odor	
SP-SM		48.8	N				269	SAA @ 264-264.8 m w/ trace clay 264.8 - 265.7 no odor	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 31
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Boring/Well ID:

Logged By:

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP-SM			N				269	SAA	no odor
SP-SM	11.2		N				270		
SP-SM			N				271	SAA	no odor
SP-SM			N				272		
SP-SM	48.8		N				273	SAA	no odor no trace gravel
SP-SM			N				274		
SP-SM			N				275	SAA to 275.7'	no odor
SP-SM			N				276		
CL			N				276	CLAY - brown (7.5YR 5/3) sh. & med. plasticity, SLM	
CL			N				277		
CL	60.1		N				278	SAA stiff to very stiff	no odor
CL			N				279		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type: Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				278	SAA	no odor
CL			N	P, V			279		
CL	24.1		N				280	SAA	no odor
CL			N				281		
CL		60.1	N				282	CL to 282.2'	
SP			N				283		
SP			N				284	SAA	no odor
SR			N				285		
SP	41.3		N				286	100% P.G. sand	SAA - no odor trace gravel to 1 1/4" (lithics) no silt no clay
SW	41.7		N				287		

poorly graded sand - brown (10YR 5/3) loose, SLM
sand 90%: F = 95% M = 5% SA-SR (Qtz, feld, lithics)
silt 5% nonplastic; clay 5% soft, nonplastic
trace gravel to 3/8" (lithics)

well graded sand with gravel - light brownish gray (10YR 6/2)
loose, dry; sand = 85%: F = 25% M = 60% C = 15% SA-SR
(Qtz, feld, lithics); gravel = 10% up to 2" (Qtz + lithics); silt = 5%
non plastic

no odor

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID:					Logged By:			Page 33 of 57	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW-SM			N				287	Well - sm SAA - w.g. sand w/silt and gravel sand = 80% F = 35% M = 50% C = 15% silt = 10% nonplastic gravel = 10% same	
SW-SM			N				288		
SP			N				289		
SP	2.7		N				290	289-290 - Poorly graded sand - brown (7.5 YR 5/2) loose, SLAM SAND = 100% : F = 65% M = 35% trace coarse sand trace gravel up to 3/4" (lithics + Qtz) G SA-SR (at, feld, lith.)	
SW		41.7	N				291	Well graded sand w/gravel - brown (7.5 YR 5/2) loose, SLAM Sand = 85% : F = 50% M = 35% C = 15% SA-SR (Qtz, feld, lithics) gravel = 15% up to 3/4" (Qtz + lithics)	
SP			N				292	SAA @ 289-290'	
SW			N				293	SAA @ 291-292'	
SW			N				294		
SW			N				295	SAA @ 291-292'	
SW			N				296		
Additional Comments:									
292-296 disturbed									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SW			N				296	SAA - w.g. sand sand = 90% gravel = 10% up to 1" <u>no odor</u>			
SW			N				297				
SW			N				298				
SW			N				299	SAA - larger coarse sand fraction Sand = 80% : F = 35% M = 40% C = 25% gravel = 20% up to 3" <u>no odor</u>			
SW			N				300				
SW	0.8	37.2	N				301				
SW			N				302	SAA @ 302 - back to w.g. sand w/gravel Cobble up to 4 1/4" (lithic) Poorly graded sand - light brown (7.5YR 6/3) loose, SLM Sand = 90% : F = 95% M = 5% SA-SR (qtz, feld, lithic) silt = 5% nonplastic ; gravel = 5% up to 1 5/8" (lithic) <u>no odor</u>			
SP-SM			N				303				
SW			N				304				
SP			N				305				

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 3/35

Boring/Well ID:

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				305	Well graded sand - light brown (7.5YR 6/3) loose, SLM sand = 90%: F = 50% M = 35% C = 15% SA-SR (qtz, feld, lith.) gravel = 10% up to 1 1/2" (lithics) no odor	
			N				306	Poorly graded sand - light brown (7.5YR 6/3) loose, SLM sand = 95%: F = 90% M = 10% SA-SR (qtz, feld, lithics) silt = 5% non plastic trace gravel up to 3/8" (lithics) no odor	
SP			N				307	Well graded sand - light brown (7.5YR 6/3) loose, SLM sand = 95%: F = 25% M = 60% C = 15% SA-SR (qtz, feld, lith.) gravel = 5% up to 1" (qtz + lithics) no odor	
SW			N				307.5	SAA @ 306-307' - sand = 90%; silt = 5%, gravel = 5% up to 1/2" (lithics + qtz) no odor	
SP			N				308		
SP			N				309		
SW-SC			N				309.5	Well graded sand with clay - gray (10YR 6/1) loose, SLM sand = 85%: F = 45% M = 35% C = 20% SA-SR (qtz, feld, lithics); clay = 10% soft, non plastic; gravel = 5% up to 3/8" (qtz + lithics) no odor	
SW	1.9		N				310	Well graded sand with gravel - yellowish brown (10YR 5/4) loose, SLM sand = 85% F = 65% M = 25% C = 10% SA-SR (qtz, feld, lith.) gravel = 10% up to 2 3/4" (qtz + lithics); silt = 5% non plastic no odor	
SW			N				311		
SW			N				312		
SM			N				312.5'	Silty sand - pale brown (10YR 6/3) loose, SLM - sand = 70% VF = 30% F = 70% SA-SR (qtz, feld, lith.) silt = 20% non plastic gravel = 10% up to 2" (qtz + lithics) no odor	
SM			N				313		
SM			N				314		

Additional Comments:

SAA @ 313.7' - clayey sand - grayish brown (10YR 5/2) loose, SLM - sand = 70% F = 50% M = 20% C = 30%
with gravel clay = 15% as clumps - brown (2.5YR 4/4) medium dense, low plasticity
gravel = 15% up to 1 1/2" (qtz + lithics)

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID:					Logged By:			Page 36 of 57	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SC							314.2'	SAA	
SW-SC		44.6			6'		315	well graded sand with clay and gravel - pale brown (10 YR 6/3) loose, SLM Sand = 70% F = 65% M = 20% C = 15% SA-SR (Qtz, feld, lith) gravel = 20% up to 3" (Qtz + lithics) trace cobble up to 4 3/8" lithics clay = 10% non plastic	
SW-SC							316	NO odor	
SW							317	well graded sand - brown (10 YR 5/3) loose, moist; sand = 85% F = 60% M = 30% C = 10% SA-SR (Qtz, feld, lith); gravel = 10% up to 1 1/2" (Qtz + lithics); silt = 5% non plastic	
SW							318	NO odor	
SW							319	SAA sand = 85%; gravel = 10%; clay = 5%	
SW							320	NO odor	
SW	2.9	50.4			10'		321	well graded sand Sand = 75%; gravel = 20%; clay = 5% F = 20% M = 60% C = 20%	
SW							322	NO odor	
CL							322.8'	clay - strong brown (7.5 YR 5/6) very stiff, med. plasticity	
SW							323	SAA @ 320-321' gravel up to 2 1/2"	
								NO odor	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID:					Logged By:			Page 37 of 57	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW							323		
SP		50.4	N				324	SAA	
CL			N				325	SAA sand = 90% F = 50% M = 50% trace coarse gravel = 5% up to 1" silt = 5% non plastic	
SW			N				326	clay - brown (7.5YR 5/4) stiff - very stiff; med. plasticity No odor	
SW			N				327	well graded sand - pale brown (10YR 6/3) loose, SLM sand = 90% F = 40% M = 40% C = 20% SA-SR (Qtz, feld, lithics) gravel = 10% up to 5/8" (Qtz + lithics) No odor	
SW			N				328	SAA sand = 80% F = 20% M = 40% C = 40% gravel = 20% up to 1" No odor	
SW		28.3	N				329	SAA @ 327-328 have cobble up 4" sand 75% gravel 20% silt 5% No odor	
SC			N				330	well graded sand with clay - brown (10YR 5/3) loose, SLM sand = 80% F = 40% M = 50% C = 10% SA-SR (Qtz, feld, lith) clay = 15% strong brown (7.5YR 5/6) stiff to med. stiff thin low to medium plasticity; gravel 5% up to 5/8" (Qtz + lithics)	
SW	3.6		N				331	well graded sand - brown (10YR 5/2) loose, SLM sand = 95% F = 60% M = 30% C = 10% SA-SR (Qtz, feld, lithic) gravel 5% up to 3/8" (Qtz + lithics) No odor	
SW			N				332		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID:					Logged By:			Page 38 of 57	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW			N				332	SAA	
SW		28.3	N				333	NO odor	
SW			N				334	SAA sand = 85% : F = 50% M = 30% C = 20% gravel = 15% up to 2" (qtz + lithics)	
SW			N				335	NO odor	
SC			N				336	clayey sand with gravel - brown (7.5YR 5/3) loose, SLM	
SC			N				337	sand = 40% : F = 10% M = 60% C = 30% SA-SR (qtz, feld, lith) gravel = 35% up to 1 1/4" (qtz + lithics) clay = 25% - brown (7.5YR 5/4) soft - red. dense, low plasticity	NO odor
SC			N				338	well graded sand with gravel and clay - pale brown (10YR 6/3) loose, SLM → sand = 75% F = 10% M = 80% C = 10% SA-SR (qtz, feld, lith); gravel = 15% up to 1 1/2" (qtz + lith) clay = 10% soft, non plastic	
SW		38.4	N				339	silty sand -	
SW			N				340	SW-SC	NO odor
SM	2.5		N				341	silty sand - light brown (7.5YR 6/3) loose, SLM sand = 85% : F = 80% M = 20%, trace coarse sand SA-SR (qtz, feld, lith); silt = 15% non plastic trace clay trace gravel up to 3/8" (lithics)	NO odor
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type: Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SM			N				341	SAA	
SW SM		38.4	N				342	no odor well graded sand with silt - yellowish brown (10YR 5/4) loose, SLM sand = 80% F = 70% M = 20% C = 10% SA-SR (qtz, feld, lith) silt = 10% nonplastic	
SW			N				343	gravel = 10% up to 5/8" (qtz + lith) well graded sand - yellowish brown (10YR 5/4) loose, SLM sand = 85% F = 40% M = 40% C = 20% SA-SR (qtz, feld, lith) gravel = 10% up to 5/8" (qtz + lith) silt = 5% nonplastic	no odor
SC			N				344	@ 343.5' clayey sand with gravel - brown (7.5YR 5/4) loose, SLM sand = 50% F = 20% M = 40% C = 40% SA-SR (qtz, feld, lith) gravel = 30-35% up to 1/2" (qtz + lith) clay = 15% non plastic,	343-343.5 no odor
SM		65.6	N				345	no odor silty sand with clay - brown (10YR 5/3) loose, M SLM sand = 65% F = 80% M = 20% trace coarse SA-SR (qtz, feld, lith) silt = 20% nonplastic gravel = 5% up to 1/2" (lithics) clay = 10% strong brown (7.5YR 4/6) exists as clumps	
SP-SM			N				346	poorly graded sand with silt - brown (10YR 5/5) loose, SLM sand = 85% F = 70% M = 20% trace coarse sand SA-SR (qtz, feld, lith) silt = 10% nonplastic - clay = 5%	no odor
SP-SM			N				347	trace gravel up to 1" (lithics)	
SW-SC		32	N				348	well graded sand with clay and gravel - pale brown (10YR 6/3) loose, SLM - sand = 75% F = 35% M = 40% C = 25% SA-SR (qtz, feld, lithics); clay = 10% nonplastic	no odor
SW-SC			N				349	gravel = 15% up to 1 5/8"	
							350		

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID:					Logged By:			Page 40 of 57	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP-SM	3.8		N				350	poorly graded sand with silt - pale brown (10YR 6/3) loose, SLM sand = 85% : F = 70% M = 30% trace coarse sand SA-SR (Qtz, feld, lithics); silt = 10% nonplastic; gravel 5% up to 1/2" (Qtz+lith) no odor	
SW-SM			N				351	well graded sand with gravel + silt - pale brown (10YR 6/3) loose, SLM - sand = 50% : F = 10% M = 60% C = 30% SA-SR (Qtz, feld, lithics) gravel = 40% up to 3" (Qtz+lith) trace cobble up to 3/4" (lithic) no odor	
GW		32	N		10'		352	well graded gravel with sand - pale brown (10YR 6/3) loose SLM - gravel = 60% up to 3" (lithics) trace cobble up to 1/2" (lith) sand = 35% : F = 25% M = 50% C = 25% SA-SR (Qtz, feld, lith) silt = 5% nonplastic no odor	
GW			N				353		
SW-SM			N				354	SAA @ 251-252' gravel = 35% up to 2 1/2" no trace cobble no odor	
SW-SM			N				355		
SW-SM			N				356	@ 355.5' SAA @ 248-249' sand = 85% clay = 10% gravel = 5%	
GW			N				357	SAA @ 352-353 no trace cobble no odor	
GW		29.1	N		10'		358		
SP-SM			N				359	SAA @ 350-351' sand = 70% gravel = 20% up to 1 1/4" silt = 10% no odor	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID:					Logged By:			Page 41 of 57	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW-SM							359	SAA @ 351-352'	
SW-SM	2.8						360	Sand = 75% F=30% M=55% C=15% gravel = 15% up to 1 1/2" silt = 10%	
SW-SM							361	light brown 7.5YR 6/3	no odor
SW-SM		29.1					362	SAA @ 360-362'	no odor
SW-SM							363		
SW-SM							364	well graded sand w/ gravel - light brown (7.5YR 6/3) loose, SLH Sand = 70% F=35% M=40% C=25% SA-SZ (Qtz, feld, lith); gravel = 25% up to 2" (lithics) silt = 5% non plastic	no odor
SW							365		
SW							366		
SW							367	brown (7.5YR 5/3) trace clay	no odor
SW		30.2					368		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Boring Well ID:

Project Number: 62735DM02.1017

Logged By:

Date:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW							368	soil type: Munsell color: density (primarily coarse) consistency & plasticity % sand (include grain size %: fine, medium, coarse, etc.) sand mineralogy % gravel gravel mineralogy angularity/roundedness % fines (silt/clay)	
GN							369	SAA @ 364-365' sand = 80% gravel = 15% up to 1" silt = 5% trace clay NO odor	
GN	3.2						370	↓ to 370.7'	
SP-SM		38.2					371	poorly graded sand w/ silt - pinkish gray (7.5 YR 6/2) loose, SLM sand = 85% F = 70% M = 30% trace coarse sand SA-SR (qtz, feld, lith); silt = 10% nonplastic gravel = 5% up to 1 1/2" (lithics)	
SW							372	well graded sand - yellowish brown (10 YR 5/4) loose, SLM sand = 85% F = 40 M = 40% C = 20% SA-SR (qtz, feld, lith); gravel = 10% up to 1 1/2" (lithics) silt = 5% nonplastic NO odor	
SW							373	↓	
SW							374	SAA	
SW							375		
SW							376	well graded sand = light brown (7.5 YR 6/3) loose, SLM sand = 80% F = 45% M = 35% C = 20% SA-SR (qtz, feld, lith) gravel = 10% up to 1 3/8" (qtz + lithics); silt = 5% nonplastic clay = 5% suff NO odor	
SW	42.5						377		

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

AA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Boring Well ID:					Logged By:				
					Date: Page 43 of 57				
USCS Soil Type	PH Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW			N				377	SAA @ 376-377'	
SW-SC		42.5	N				378	SAA @ 376-377' sand = 75% gravel = 10% clay = 10% silt = 5% clay (378.4-378.6') brown - 7.5YR 5/3 stiff med. plasticity	377.5'
SW-SC			N				379	SAA @ 378-378.4' (stratified) @ 379.4 - 379.6' flat horizontal bed of well sorted/properly graded sand cemented by secondary calcium carbonate (caliche)	
SW-SC	0.4		N				380	SAA @ 378-378.4' NO odor well graded sand w/ gravel - brown (7.5YR 5/3) loose moist sand = 65%: F = 25% M = 45% C = 30% sh-sr (Qtz, feld, lith) gravel = 30% up to 2 1/2" (Qtz + lith); silt = 5% non plastic	
SW			N				381	NO odor	
SW-SM			N				382	well graded sand with silt - brown (7.5YR 5/3) loose, SLM sand = 85%: F = 65% M = 25% C = 10% sh-sr (Qtz, feld, lith) silt = 10% non plastic	
SW-SM		26.1	N				383	gravel = 5% up to 1 1/4" (Qtz + lith) NO odor	
SW			N				384	SAA @ 382-384 sand = 90% F = 60% M = 20% C = 10% silt = 5% F = 50% M = 25% C = 25%	
SW			N				385	NO odor	
SW			N				386		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SC		47	N		41		386	clayey sand — gray (10YR 6/1) loose, SLMT sand = 70% FVF = 20% F = 45% M = 35% trace coarse SA-SR (qtz, feld, lith) clay = 30% soft, non plastic	
SC			N				387	gravel = trace up to 5/8" (lithics) SAA — sand = 75% F = 25% M = 60% C = 15% clay = 15% soft, non plastic gravel = 10% up to 1 1/4"	
CL			N				388	Clay — brown (7.5YR 4/3) medium to stiff; medium plasticity	
SW-SC			N				389	well graded sand with clay and gravel — Pale brown (10YR 6/3) loose SLMT — sand = 80% F = 60% M = 30% C = 10% SA-SR (qtz, feld, lith) clay = 10% soft, low plasticity — clay nodules throughout — brown (7.5YR 4/3) gravel = 10% up to 1" (lithics)	
CL	0.5		N				390	Clay with sand + gravel — brown (7.5YR 4/3) very dense, very stiff; medium plasticity clay = 60%; sand = 30% F = 50% M = 35% C = 15% SA-SR (qtz, feld, lith); gravel = 10% up to 1" (lithics)	
CL		37.5	N				391		
CL			N				392		
CL			N				393		
CL			N				394		
SW-SM			N				395		
SW-SM			N				396		

Additional Comments:

Recovery: None

Partial

Complete

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse) consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW-SM							395	394.5-395.5 W.G. sand w/silt - brown (10YR 5/3) loose, SLM sand = 80% : F=30% M=50% C=20% SA-SR (Qtz, feld, lith.) silt = 10% nonplastic; gravel = 10% up to 1/4" (Qtz + lith.) no odor	
SM							396	silty sand - yellowish brown (10YR 5/4) loose, SLN - sand = 70% : VF=30% F=60% M=10% SA-SR (Qtz, feld, lith.); silt = 30% nonplastic no odor	
SC							397	clayey sand with gravel - light gray (10YR 7/2) loose, dry - sand = 65% F=50% M=40% C=10% SA-SR (Qtz, feld, lith.); clay = 30% soft, nonplastic gravel = 15% up to 3/8" (lithics) no odor 395.8	
SM							398	@ 396-397: clayey sand - brown (7.5YR 5/3) loose, SLM sand = 50% : VF=70% F=30% SA-SR (Qtz, feld, lith.); clay = 40% soft, nonplastic silt = 10% nonplastic no odor	
SM							399	silty sand - brown (10YR 5/3) loose, SLM - sand = 70% : VF=30% F=70% SA-SR (Qtz, feld, lith.); silt = 30% nonplastic	
SW-SM							400	398.5' - well graded sand with silt - pale brown (10YR 6/3) loose, SLM - sand = 80% : F=60% M=30% C=10% SA-SR (Qtz, feld, lith.) silt = 10% nonplastic; gravel = 10% up to 1" (Qtz + lithics)	
SW-SM							401	@ 399.5 SAA sand 75% : F=50% M=30% C=20% silt = 10% gravel = 15% no odor	
CL							402	399.8 = clay with sand - brown (7.5YR 5/3) med to very stiff; med. plasticity clay = 80% - sand = 15% : F=30% M=60% C=10%; gravel = 5% up to 1"	
SW							403	@ 400' - well graded sand with gravel - brown (7.5YR 5/2) loose, SLM sand = 80% F=15% M=55% C=30% SA-SR (Qtz, feld, lith.); gravel = 15% up to 1 1/2" (Qtz + lith.); silt = 5% nonplastic no odor	
SW							404	poorly graded sand - brown (10YR 5/2) loose, SLM : sand = 90% F=50% M=45% C=5% SA-SR (Qtz, feld, lith.); gravel = 5% up to 2 1/2" (lithics); clay = 5% exists as nodules - brown (7.5YR 5/4) soft - low plasticity	
SP								no odor	

Additional Comments:

Recovery: None

Partial

Complete

SAA = Same as Above

Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW		27.7	N				404	SAA @ 400' sand=85%, gravel=10%, silt=5%	
SP			N				405	no odor	
SW			N				406	SAA @ 402-403'	
SP-SM			N				407	no odor well graded sand - brown (7.5YR 5/6) loose, SLM sand = 90% F = 35% M = 45% C = 20% SA-SR (Qtz, feld, lith.) gravel = 10% up to 1 1/2" (Qtz + lith.)	
SP-SM			N				408	poorly graded sand with silt - pale brown (10YR 6/3) loose, SLM sand = 85% F = 90% M = 10% SA-SR (Qtz, feld, lith.); silt = 10% nonplastic; gravel = 5% up to 3/8" (lith.)	
SP			N				408.5	odor present	
SP			N				409	SAA @ 406-407' sand = 90% silt = 5% gravel = 5%	
SM	12.2		N				410	odor present silty sand w/gravel - pinkish gray (7.5YR 6/2) loose, SLM - sand = 65% F = 55% M = 35% C = 10% SA-SR (Qtz, feld, lith.); gravel = 20% up to 1 1/2" (lithics) silt = 15% nonplastic	
SM			N				411	SAA - 410-411' : sand = 65%; silt = 15%; clay = 10% gravel = 10% up to 2.5" trace cobble up to 3 3/4" - clay nodules (brown 7.5YR 5/4)	
SM			N				412	411-412' = SAA @ 409.8-410'	
SP			N				413	SAA @ 408.5-409.8' S.P. sand = 95% silt = 5% trace gravel to 3/8" F = 90% M = 10% odor present	

Additional Comments:

* Weak odor 406-408' - slight @ 408' - noticeable > 408'

Recovery: None

Partial

Complete

SA = Same as Above

Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

l = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SOIL CORING BORING/WELL CONSTRUCTION LOG									
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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW			N				413	SAA @ 406-407' odor present	
SC							414	SAA @ 395.5' - 396' same 10YR 7/2 odor present	
SC			N	P, V				Core not logged - maintained in plastic in refrigerated unit - sampling	
CL			N				415	SAA odor	
SW			N				416	Clay - brown (7.5YR 4/4) stiff, med. plasticity	
SM		18.5	N		5		417	well graded sand with silt - brown (10YR 6/3) loose, SLM sand = 80% : F = 50% M = 40% C = 10% SA-SR (qtz, feld, lith) silt = 10% nonplastic gravel = 10% up to 1/4" (qtz + lith) odor	
SP			N				418	poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 85% : F = 70% M = 30% trace coarse sand - SA-SR (qtz, feld, lith); gravel = 5% up to 1" (lith + qtz); clay = 5% exists as nodules - dark yellowish brown (10YR 4/4) soft, low plasticity; silt = 5% nonplastic odor present	
SW			N				419	SAA @ 416-418' but larger coarse sand fraction : F = 60% M = 30% C = 10% gravel = 5% up to 2 inches silt = 5% clay exists as nodules = 5% odor present	
SP			N				420	SAA @ 416-418' but no clay and trace gravel odor present	
SP			N				421	SAA @ 418.5' sand = 95% silt = 5% trace coarse sand trace clay as nodules odor present	
SC			N				422	SAA @ 420.5' sand = 90% silt = 5% clay = 5% odor present	
CL			N				423	@ 420.5' - clayey sand - light brown (7.5YR 4/3) loose, SLM, sand = 60% : F = 40% M = 55% C = 25% SA-SR (qtz, feld, lith); clay = 20% soft nonplastic; gravel = 20% up to 1/2" (lith + qtz)	
SW			N				424	@ 420.7' - CLAY - reddish brown (5YR 5/4) stiff, dense, medium plasticity odor present	
SM			N				425	@ 420.9' SAA @ 420.5' odor present	
			N				426	@ 421' - well graded sand with silt - light brown (7.5YR 4/3) loose, SLM sand = 75% : F = 10% M = 65% C = 25% SA-SR (qtz, feld, lith); gravel = 15% up to 1 1/2" (qtz + lith); silt = 10% nonplastic odor present	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

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USCS Soil Type	PH Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW-SM			N				422	soil type: Munsell color; density (primarily coarse) consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				423	422.7' odor present silt/clay sand - brown (10YR 5/3) loose, SLM - sand = 45% VF = 40% F = 50% M = 10% trace coarse sand - SA-SR (qtz, feld, lith); silt = 50% nonplastic clay = 5% strong odor	
SP-SM		54.2	N				424	poorly graded sand with silt - light brown (10YR 6/3) loose, SLM sand = 90% F = 80% M = 20% trace coarse sand SA-SR (qtz, feld, lith) silt = 10% nonplastic trace gravel up to 3/8" odor present	
SW-SM			N				425	SAA @ 421-423' sand = 80% silt = 10% gravel = 10% gravel up to 5/8" (lithic) odor present sand: F = 60% M = 50% C = 10%	
SP-SC			N				426	poorly graded sand with clay - light brown (10YR 6/3) loose, SLM sand = 80% F = 80% M = 20% trace coarse sand SA-SR (qtz, feld, lith) clay = 10% as clumps and nodules - reddish brown (5YR 4/1) soft to stiff medium plasticity; silt = 5% nonplastic; gravel = 5% up to 1/2"	
SP-SM		29.7	N				427	strong odor	
SP-SC			N				428	SAA	
CL			N				429	428.7' clay - brown (10YR 5/3) stiff - very stiff - med. plasticity - two cobbles coated by clay 4 1/4" + 4"	
SP-SM		32.9	N				430	SAA @ 423.3' - 424' trace gravel up to 2 1/8" strong odor	
SP-SM	21.7		N				431	430.7' well graded sand w/ gravel - brown (10YR 5/3) loose, SLM sand = 75% F = 40% M = 40% C = 20% SA-SR (qtz, feld, lith); gravel = 20% up to 3" (lith + qtz); silt = 5% nonplastic	

Additional Comments:

Recovery: None

Partial

Complete

SA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

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USCS Soil Type	PTD Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run Recovery	Depth, ft bgs	Soil Description	Well Details
							-- soil type: Munsell color; density (primarily coarse) consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW						431	SAA strong odor to 435.2'	
SW						432		
SW						433		
SW						434		
SW						435		
SM		32.9				436	silty sand - brown (7.5YR 5/3) loose, SLM - sand = 80% VF = 20% F = 70% M = 10% SA-SR (Qtz, feld, lith); silt = 20% non plastic trace gravel up to 1" (Qtz, lith)	
SW						437	gravel with sand and clay - brown (10YR 5/3) loose, SLM gravel = 50% up to 2 1/2" (Qtz + lithics) - cobble up to 3 5/8" sand = 40% F = 10% M = 50% C = 40% SA-SR (Qtz, feld, lith); clay = 10% soft, non plastic odor present	
GC						438	clay - strong brown (7.5YR 4/6) stiff - med. plasticity clay - light olive brown - 2.5Y 5/3 stiff - med. plasticity	
CL						439	clay brown (10YR 5/3) clay - light brownish gray - 2.5Y 6/2 soft to medium low to med. plasticity	
CL		52.1				440		

Additional Comments:

Recovery: None

Partial

Complete

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
 R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SOIL CORING BORING/WELL CONSTRUCTION LOG

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USCS Soil Type	PH Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
CL	150.0						440	soil type: Munsell color; density (primarily coarse) consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt clay)	
ML							441	SAH silt with sand - pale brown (10YR 6/3) loose, SLM - silt = 50% non plastic - sand = 45% VF = 58% F = 45% M = 5% SA-SR (qtz, feld, lith); clay = 5% soft, non plastic	
ML							442	strong odor	
ML	52.1						443		
ML							444	to 444.2'	
CL							445	clay - reddish brown (7.5YR 4/4) med. stiff, med. plasticity	
ML							446	SAH @ 441-442	
ML							447	strong odor	
CL							448	446.9 CLAY - yellowish red (5YR 4/6) very stiff - med. plasticity	
SM	53.7						449	447.1 silty sand - brown (10YR 5/3) loose, SLM - sand = 70% VF = 40% F = 40% M = 20% SA-SR (qtz, feld, lith); silt = 20% non plastic gravel = 5% up to 3/8" (qtz + lith); clay = 5%	
SM							450	SAH clay = 10%, gravel = 5%, sand = 65%, silt = 20%	
SC							451	@ 448.5 - clayey sand with gravel - brown (10YR 5/3) loose, SLM sand = 70% VF = 20% F = 40% M = 20% C = 20% SA-SR (qtz, feld, lith) clay = 5% soft, non plastic; gravel = 15% up to 3/4" (qtz + lith)	
Additional Comments:								clay = 15% gravel = 15%	

Recovery: None ☐

Partial ☒

Complete ☐

AA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

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USCS Soil Type	PH Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SM	452.8		N				449	silty sand - light pale brown (10YR 6/3) loose, SLM Sand = 60% - VF = 60% F = 40% SA-SR (Qtz, feld, lith) silt = 40% non plastic trace gravel up to 3/8"	
SM			N				450		
SM			N				451	sand = 60% silt = 35% clay = 5%	strong odor
SM			N				452		strong odor
SM		70.4	N				453	Same as above to 453.2'	
SW			N				454	well graded sand with gravel - yellowish brown (10YR 5/4) loose, SLM sand = 80% - F = 35% M = 45% C = 20% SA-SR (Qtz, feld, lith) gravel = 15% up to 2" (Qtz + lith) silt = 5% non plastic	strong odor
SW			N				455		
MA			N				456	SAA @ 452-454 446-447 silt = 50% sand = 40% clay = 10%	strong odor
ML			N				456	@ 455.8' SAA silt = 65% clay = 15% sand = 20%	
SW			N				457	SAA to 456.2'	
SW			N				457	well graded sand with gravel and silt - brown (7.5YR 5/3) loose, SLM sand = 75% F = 55% M = 45% C = 20% SA-SR (Qtz, feld, lith); gravel = 15% up to 2 3/4" (Qtz + lith); silt = 10% non plastic	
SW		31.4	N				458	457.4' strong odor well graded sand - brown (7.5YR 5/3) loose, SLM sand = 85% F = 50% M = 40% C = 10% SA-SR (Qtz, feld, lith) gravel = 10% up to 3/4" (Qtz + lith); silt = 5% non plastic	strong odor

Additional Comments:

Recovery: None

Partial

Complete

AA = Same as Above Qtz = quartz

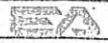
Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse) consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt, clay)	
SP-SM		31.4	N		3'		458	Partly graded sand with silt - brown (7.5 YR 5/3) loose, SLM, sand = 90% : F = 70% M = 30% trace coarse sand SA-SR (atq, fld, lith); silt = 10% nonplastic trace gravel up to 1 1/2" (atq + lith)	
CL							459	CLAY - yellowish red (5 YR 4/1) med. stiff, med dense, med plasticity	
CL		25.3	N	P, V, M			460	clay to 460.3'	
SM	652.8		N				461	SAB @ 462-462.4	
SM		35.6	N	P, V			462	462-462.4 silty sand - pale brown (10 YR 6/3) loose, SLM, sand = 75% : VF = 30% F = 60% M = 10% trace coarse sand SA-SR (atq, fld, lith); silt = 25% nonplastic	
SM			N				463	well graded sand with silt and gravel - brown (10 YR 5/3) loose, SLM, sand = 65% : F = 50% M = 40% C = 10% SA-SR (atq, fld, lith); gravel = 20% up to 1 1/2" (lithic); silt = 10% nonplastic; clay = 5% exist as nodules - dark yellowish brown (10 YR 3/4) soft, med. plasticity	
SW-SM			N				464	SAB @ 462-462.4 - sand = 60% VF = 30% F = 40% M = 20% C = 10% brown, gravel = 10% up to 2" silt = 2.5% nonplastic clay = 5% 7.5 YR 5/3	
SM			N				465	SAA @ 463-464 trace cobble to 4"	
SW-SM			N				466	465.5' silty sand - brown (7.5 YR 5/3) loose, SLM - sand = 65% silt = 25% SAA @ 462-462.4 gravel = 5% clay 5% SAA @ 464-465.5 trace cobble to 3 1/4"	
SW-SM		36.0	N				467		

Additional Comments:

Recovery: None

Partial

Complete

AA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

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USCS Soil Type	PHD Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type: Munsell color: density (primarily coarse) consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW-SM			N				467	SAA.	
SW-SM		26.0	N				468	GAA. But less silt	
GW-BC			N				469	well graded gravel with sand and clay - brown (7.5YR 4/2) loose, moist gravel = 50% up to 2 1/4" (Qtz + lith); sand 40%: F = 20% M = 50% C = 30% SA-SR (Qtz, Feld, Lith); clay = 10% nonplastic	
GW-BC	2398		N				470	SAA w/trace cobble to 5"	
GW-BC		22.7	N				471		
SW			N				472	well graded sand with gravel - brown (7.5YR 4/2) loose, moist sand = 80%: F = 45% M = 30% C = 25% SA-SR (Qtz, Feld, Lith) gravel = 15% up to 2" (Qtz + lith); clay = 5% nonplastic	
SW			N				473		
SW			N				474	SAA sand = 90%: F = 20% M = 50% C = 10% gravel = 5% up to 1/2" silt = 5% nonplastic	
SW			N				475	SAA @ 472-473' sand = 80%: F = 20% M = 50% C = 30% gravel = 15% up to 1" silt = 5% n.p.	
SW			N				476	SAA sand = 90%: F = 50% M = 40% C = 10% gravel = 10% up to 1"	

Additional Comments:

Recovery: None

Partial

Complete

SA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG										
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:			
Boring Well ID:					Logged By:		Page 54 of 57			
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description		Well Details
								-- soil type: Munsell color: density (primarily coarse) consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
		27.3	Y		10'		476	476-478 to freezer for sampling		
			Y				477			
			Y				478	478-480 to freezer for sampling		
			Y				479			
	2572		Y	P, V, B M			480	480-482 to freezer for sampling		
			Y				481			
		27.3	Y				482	482-484 to freezer for sampling		
			Y				483			
			Y				484	484-486 to freezer for sampling		
			X				485			

Additional Comments:

* 476 - 488 sent for sampling LNAPL

Recovery: None ☐ Partial ☒ Complete ☐

iAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring Well ID:

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse) consistency & plasticity -- % sand (include grain size %: fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
		24.3	Y				485		
							486		
							486-488 to footer track for sampling		
		25.6	Y				487		
			Y				488		
SM			N				489	silty sand with clay + gravel - brown (7.5YR 5/2) loose, moist - sand = 75% VF = 20% F = 40% M = 40% trace coarse sand SA-SR (qtz, feld, lith); silt = 15% nonplastic; clay = 5% soft, nonplastic; gravel 5% up to 1 1/4" (lithics)	
SC		38.2	N	P, V, M			490	clayey sand - brown (10YR 5/3) loose, moist - sand = 70% VF = 20% F = 20% M = 50% C = 10% SA-SR (qtz, feld, lith); clay = 20% soft nonplastic gravel = 10% up to 2 1/2" - trace cobble to 3 3/8" (qtz, lithics)	
CL	1784		N				491	clay with sand - light yellowish brown (2.5Y 6/3) stiff to very stiff medium plasticity - clay = 65% sand = 30% F = 60% M = 30% C = 10% SA-SR (qtz, feld, lith); gravel = 5% up to 5/8" (qtz, lith)	
CL			N				492	S&A - clay - white (10YR 8/1) soft, nonplastic - clay nodules grayish brown (10YR 5/2) med. stiff, low plasticity - gravel + cobble = is sand + gravel cemented by secondary calcium carbonate (calcite)	
CL			N				493	S&A @ 489-490 no trace cobble brown (7.5YR 4/2)	
			N				494	S&A @ 490-490.8 cobble is same as cobble @ 490.8-491.3	
			N					clay w/ sand - white (10YR 8/1) clay = 75% soft to stiff sand = 20% VF = 30% F = 60% M = 10% low plasticity dry gravel = 5% up to 1"	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐
 S&A = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None
 samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
 R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Boring Well ID:

Project Number: 62735DM02.1017

Logged By:

Date:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SC							494	SAA	
SC							495	clayey sand - brown (7.5YR 5/2) loose, moist - sand = 60% F = 30% M = 50% C = 20% SA-SR (qtz, feld, lith); clay = 30% soft, nonplastic; gravel = 10% up to 2 1/2" (qtz + lith)	slight odor
SW-SC	38.2		N				496	well graded sand with clay - brown (7.5YR 5/2) loose, moist sand = 80% F = 40% M = 50% C = 10% SA-SR (qtz, feld, lith); clay = 10% soft, nonplastic; gravel = 10% up to 1 1/4" (qtz + lith)	slight odor
SW-SC			N				497	SAA	
SC							498	clayey sand - brown (7.5YR 5/2) loose, moist: sand = 70% VF = 20% F = 60% M = 20% SA-SR (qtz, feld, lith); clay = 30% soft, nonplastic	no odor
SP-SC			N				499	SAA - smaller clay fraction at 495-496 JM sand = 80% gravel = 10% up to 2" clay = 10% sand = poorly graded trace coarse sand	no odor
SP-SC			N				500	SAA gravel = 5% sand = 85% clay = 10%	no odor
SW-SC	14.3		N				501	SAA @ 495-496 gravel up to 1 1/2"	no odor
SW-SC	27.8		N				502		no odor
SM			N				502.5	silty sand - brown (10YR 5/3) loose, moist: sand = 85% VF = 50% F = 50% SA-SR (qtz, feld, lith); silt = 15% nonplastic	

Additional Comments:

Recovery: None

Partial

Complete

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring Well ID:

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SM							503	SAA	
SP							503.6		
SP							504	SAA @ 498-499'	
SP							505	SAA but less clay	
SP	28.6						506	Sand = 90% F=40 M=60% gravel = 5% Clay = 5%	
SP		27.8					507		
SP							508		
SP							509		
SP							510		
	215.8							TD Sonic rig @ 510 ft bgs @ 1512 on 12-5-18	
3" PVC screen and pump 8" Blank PVC screen casing Native Soil Bentonite Grout - 20% Solids 10/20 Silica Sand Concrete - Portland Cement Type 1/1 3/8" Bentonite Chips									

Additional Comments:

Recovery: None

Partial

Complete

AA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Drilling Company: <u>Cascade</u>					Start Time/Date: <u>11/6/18</u>				
Lead Driller: <u>Roger Rodriguez</u>					Completion Time/Date:				
Drilling Method: <u>Sonic Coring</u>					Final Depth:				
Casing Diameter OD:					Bit Type and Outer Diameter				
Boring/Well ID: <u>KAFB-10652</u>					Logged By: <u>Lane Address</u> Page <u>1</u> of <u> </u>				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Soil Description	Well Details		
						-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SM					1	0-3' sand w/ gravel / 3"-5 ft - silty sand, brown (7.5 YR 5/3)			
SM					2	Loose, dry			
SM					3				
SM					4				
SM					5	@ 5 ft - saw large pebbles/cobbles up to 6"			
SM					6	below 5 ft - no cobbles seen - looks like same			
SM					7	as 3"-5 ft			
SM					8	- Harderite cuttings logged 8" - 8 ft bgs			
SM	8.6	31.7	N		9	Silty Sand - Yellowish brown (5 YR 5/6) - medium			
SM		31.7	N		10	dense to dense, slightly moist - occasional white			
SM		31.7	N		11	SAA @ 9 ft - Dense			
SM		31.7	N		12				
SM		31.7	N		13	Silty Sand - reddish brown (5 YR 4/6) dense - slightly			
SM		31.7	N		14	moist to moist - trace to minor clay (5-10%)			
SM		31.7	N		15	weakly plastic ~ 5% caliche spots & stringers			
SM		31.7	N		16	SAA @ 13 ft			
SM		31.7	N		17				
SM		31.7	N		18	SAA @ 13 ft			
SM	7.3	22.9	N		19	Silty Sand - brown (7.5 YR 4/4) medium dense,			
SM		22.9	N		20	slightly moist, ~5% caliche spots & stringers 1/4" diameter			
SM		22.9	N		21	SAA @ 19' to 20.5 ft then slightly more sand			
SM		22.9	N		22	& loose			
SM		22.9	N		23	SAA @ 19' - Dense			
SM		22.9	N		24				
SM		22.9	N		25	Silty Sand brown (7.5 YR 5/6) dense - dry to			
SM		22.9	N		26	slightly moist 5-10% caliche spots & stringers up			
SM		22.9	N		27	to 1/3 stringers up			
SM		22.9	N		28	Silty sand as above at 25' with lighter colored			
SM		22.9	N		29	Reddish areas up to 2" (in 100%) of pink (7.5 YR 7/3)			
SM		22.9	N		30	- same density & consistency			
SM		22.9	N		31	Silty Sand w/ clay - brown (7.5 YR 4/3) - dense			
SM		22.9	N		32				
SM		22.9	N		33				
SM		22.9	N		34				
SM		22.9	N		35				
SM		22.9	N		36				
SM		22.9	N		37				
SM		22.9	N		38				
SM		22.9	N		39				
SM		22.9	N		40				
SM		22.9	N		41				
SM		22.9	N		42				
SM		22.9	N		43				
SM		22.9	N		44				
SM		22.9	N		45				
SM		22.9	N		46				
SM		22.9	N		47				
SM		22.9	N		48				
SM		22.9	N		49				
SM		22.9	N		50				
SM		22.9	N		51				
SM		22.9	N		52				
SM		22.9	N		53				
SM		22.9	N		54				
SM		22.9	N		55				
SM		22.9	N		56				
SM		22.9	N		57				
SM		22.9	N		58				
SM		22.9	N		59				
SM		22.9	N		60				
SM		22.9	N		61				
SM		22.9	N		62				
SM		22.9	N		63				
SM		22.9	N		64				
SM		22.9	N		65				
SM		22.9	N		66				
SM		22.9	N		67				
SM		22.9	N		68				
SM		22.9	N		69				
SM		22.9	N		70				
SM		22.9	N		71				
SM		22.9	N		72				
SM		22.9	N		73				
SM		22.9	N		74				
SM		22.9	N		75				
SM		22.9	N		76				
SM		22.9	N		77				
SM		22.9	N		78				
SM		22.9	N		79				
SM		22.9	N		80				
SM		22.9	N		81				
SM		22.9	N		82				
SM		22.9	N		83				
SM		22.9	N		84				
SM		22.9	N		85				
SM		22.9	N		86				
SM		22.9	N		87				
SM		22.9	N		88				
SM		22.9	N		89				
SM		22.9	N		90				
SM		22.9	N		91				
SM		22.9	N		92				
SM		22.9	N		93				
SM		22.9	N		94				
SM		22.9	N		95				
SM		22.9	N		96				
SM		22.9	N		97				
SM		22.9	N		98				
SM		22.9	N		99				
SM		22.9	N		100				

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 11/7/18	
Boring/Well ID: LAFB-10652					Logged By: Lane Andres			Page 2 of 2	
USCS Soil Type	PHD Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Depth, ft bgs	Soil Description	Well Details		
SM	6.7		N		30	slightly moist, weakly to moderately plastic.			
SM			N		31	SAA @ 31.05 then silty sand as above at 19'			
SM		30.6	N		32				
SM			N		33	silty sand - brown (7.5 YR 4/4) dense to medium			
SM			N		34	Dense, slightly moist, ~5% clay - weakly plastic,			
SM			N		35	~1% white calcareous spots up to 2mm			
SM			N		36	silty sand - brown (7.5 YR 4/3) - medium dense - slightly			
SM		24.8	N		37	silty sand w/ clay pink (7.5 YR 7/3) - slightly moist,			
SM			N		38	est. 5% silty sand w/ calcareous coarse sand (15%) - brown			
SM			N		39	7.5 YR 5/3 a pink as above			
SM	1.8		N		40	silty sand brown (7.5 YR 5/4) medium dense, slightly			
SM			N		41	moist, face clay - non plastic ~5% calcareous spots up to			
SM			N		42	2mm			
SM			N		43	SAA @ 38' - slightly moist to dry			
SM		20.8	N		44	SAA @ 38'			
SM			N		45	@ 43.75' silty sand w/ clay - brown (7.5 YR 4/3) - slightly			
SM		21.8	N		46	moist - weakly plastic			
SM			N		47	SAA @ 43.75'			
SM		20.8	N		48	@ 45.75' - silty sand w/ calcareous coarse sand (10%) dry to slightly			
					49	moist - dense			
	14.0			PC50	50	silty sand - brown (7.5 YR 5/3) - slightly moist ~10% clay			
SM			N		51	slightly plastic			
SM			N		52	@ 47.5 SAA @ 47' w/ ~30% pink (5 YR 7/3) calcareous coarse sand			
SM			N		53	core bag not opened - sand for sampling			
SM			N		54	SAA @ 47'			
SM			N		55	@ 52' sand brown (7.5 YR 5/3) - slightly moist, coarse			
SM			N		56	with grade VF-80 - 5% M 10% C 5% coarse gravel up to 1/4"			
SM			N		57	@ 53' - clay w/ coarse sand (as above) same color - moist, plastic - 30% sand			
SM			N		58	to 53.25' then silty sand - reddish brown (5 YR 4/4)			
SM			N		59	moist, dense to medium dense - 8% white calcareous spots up to 2mm			
SM			N		60	SAA @ 53.25'			
SM	2.5		N		61	SAA @ 53.25'			
SM		29.2	N		62	SAA @ 53.25' silty sand w/ medium & coarse sand brown (7.5 YR 4/3)			
SM			N		63	slightly moist, medium to moderately dense			
SM			N		64	SAA @ 62.25' then sand brown (7.5 YR 4/3) coarse,			
						slightly moist, medium to moderately dense			
						with grade VF-80 - 5% M 10% C 5% coarse gravel up to 1/4"			
						F 10% M 40% C 30% (70% up to 1/2" - fine)			

Additional Comments: 14 hrs

Recovery: None ☐ Complete ☒ Partial ☐ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

EA

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/8/18

Boring/Well ID: KAFB-16652

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
SM		↑					64	SAA @ 62.25 to 24.25 then silty sand w/ trace clay - reddish brown (5 YR 4/4) dense to moderately dense - slightly moist - slightly to moderate plasticity ~5% white calcareous spots up to 2mm			
SM		29.2	N				65				
SM	1.8	↓	N				66				
SM		↑	N				67	SAA @ 64'			
SM			N				68	67 ft SAA @ 64' - loose to slightly dense			
SM			N				69	Silty sand brown (7.5 YR 5/4) - medium dense slightly moist - slightly more very fine grained sand than previously			
SM	Act taken	50.8	N				70				
SM			N				71	Sand - brown (7.5 YR 5/3) loose, slightly moist, well graded VF 20% F 10% M 40% C 30% G trace up to 1/2" S&SR at 2 fld lithes			
SM			N				72				
SM			N				73	Silty sand, reddish brown (7.5 YR 4/4) medium dense, slightly moist ~5% white calcareous spots up to 5mm			



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/8/18

Boring/Well ID: KAEB-10652

Logged By: Lane Anderson

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SM			N				73	SAA @ 72'			
SM		50.8°C	N				74	SAA @ 72' to 74.5' then SAA @ 68'			
SM			N				75				
SM			N				76				
SM			N				77	Silty Sand - yellowish red (5YR 4/6) - Dense to medium dense, slightly moist,			
SM			N				78				
SM			N				79				
SM		50.3°C	N				80	SAA @ 76'			
SM			N				81	SAA @ 76' to 81'			
SM			N				82				
SM			N				83	@ 81' - silty sand w/ clay & gravel - light brown (7.5YR 6/4) - dense to medium dense, slightly moist with areas of pink (7.5YR 8/3) ~20% VF 75% F 5% M 8% C 3% G up to 1" clay ~5% slightly plastic mostly 1/3-1/2"			
SM			N				84				

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/8/18

Boring/Well ID: KFB-10652

Logged By: Lore Andres

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
SM		33.1	N				82	Silty sand - reddish brown (5YR 5/4) - medium dense + loose - slightly moist			
SM		33.1	N				83				
SM		33.1	N				84				
SM		33.1	N				85	SAA to 85.5 ft			
SM	10.1	32.8	N				86	@ 85.5 ft - silty sand w/ medium & coarse sand - brown (7.5YR 5/3) - medium dense, slightly moist, well graded VF 20% F 10% M 60% C 10% SA/SR Qtz fld lithes			
SM		32.8	N				87	Sand - light brown (7.5YR 6/3) - loose, well graded - slightly moist VF 10% F 5% M 25% C 50% G 10% up to 1/2" SA/SR Qtz fld lithes			
SM		32.8	N				88	@ 87 - silty sand reddish brown (5YR 5/4) - dense slightly moist to dry thin 1mm horizons of white carbonate staining ~ 5% caliche?			
SM		32.8	N				89	SAA @ 87			
SM		32.8	N				90	@ 88.25 - 90 - SAA as above at 87 w/ increased white carbonate layers & caliche spots up to 2mm ~ 100%			
SM		33.2	N				91	Silty sand - strong brown (7.5YR 5/6) - dense to medium dense, slightly moist ~ 5% caliche specks & stringers up to 2mm			

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above

Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-10652

Logged By: Lane Anderson

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SM							91	SAA @ 90'	
SM							92		
SM							93	Silty Sand - strong brown (7.5YR 5/6) - dense, slightly moist calcareous spots ~ 5% up to 1/2"	
SM		37.2					94		
SM	1.1						95	SAA @ 92'	
SM							96		
SM							97	Silty Sand, light brown (7.5YR 6/4) very dense, dry w/ ~ 80% pink 7.5YR 8/3 color	
SM							98	@ 97.25 - fine sand w/ silt + brown 7.5YR 5/3) Loose, slightly moist, poorly graded	
SM							99	SAA @ 97.25'	
SM							100	Silty Sand - brown (7.5YR 5/3) - medium dense slightly moist - @ 99.5 - increased fine sand less silt	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, SA = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KATB-10652

Logged By: Lave Address

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Soil Description										Well Details				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity	-- % sand (include grain size %; fine, medium, coarse, etc.)	-- sand mineralogy	-- % gravel	-- gravel mineralogy	-- angularity/roundedness	-- % fines (silt/clay)
SP							100	SAA @ 99.5 with trace concretions up to 1/2"						
SP							101							
SP							102							
SM		55.1					103	Silty sand - brown (7.5 YR 5/3) medium dense to loose, slightly moist, poorly graded w/ occasional concretions up to 1.5" - well to sub rounded						
SM							104							
SP	15.7	58.2					105	core bag not opened - saved for sampling Sand - brown (7.5 YR 5/3) loose to slightly dense, slightly moist - poorly graded - very fine grained						
SP							106							
SW		34.2					107	Sand - brown (7.5 YR 5/3) loose, slightly moist well graded - VF 30% F 10% M 50% C 10%						
SW		34.2					108							
SP		34.2					109	Sand - brown (7.5 YR 5/2) loose, slightly moist, poorly graded - Fine grained						

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

NA - Not taken

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KAFB-52

Logged By: Lane Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SM		34.2°C	NA				109	SAA @ 108' @ 109.5 - silty sand brown (7.5YR5/4) dense to medium dense, slightly moist to dry - trace caliche/staining carbonate	0	0	0
SM							110		0	0	0
SM							111		0	0	0
SM							112		0	0	0
SM							113		0	0	0
SM							114		0	0	0
SM							115		0	0	0
SM							116		0	0	0
SM							117		0	0	0
SM							118		0	0	0

SAA @ 108'
@ 109.5 - silty sand brown (7.5YR5/4) dense to medium dense, slightly moist to dry - trace caliche/staining carbonate

silty sand - mostly silt - (brown 7.5YR5/3) dense to medium dense, slightly moist, trace caliche/carbonate staining

SAA @ 110'

SAA @ 110'

silty sand - mostly silt - brown (7.5YR5/4) - medium dense, slightly moist,
@ 116.25 a distinct wavy band of caliche (carbonate) cemented rocks from 1" to 4" SA to SR - fizzes w/ HCl

SAA @ 116' - no caliche

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above

Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

Appendix D

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SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KAFB-10G52

Logged By: Low Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description -- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	Well Details		
SM							118	SAA @ 117'			
ML							119				
ML							120	@ ~119.5 SAA w/ ~20% clay nodules up to 1-2" plastic, medium dense, moist			
CL							121	silt-brn (7.5YR 5/4) - dense to medium dense, slightly moist, trace caliche spots & stringers up to 2mm - clay as above ~5%			
ML							122				
ML							123	SAA @ 120'			
ML							124	@ 123' 6" band w/ clay nodules ~30% as above at 119.5'			
ML							125	SAA @ 120ft			
ML							126	@ 124.5 - clayey silt-clay ~40% as above at 119.5'			
ML							127	@ silty clay 125 - 125.5 - brn (7.5YR 5/3) dense, slightly moist, plastic, @ 125.5 silt as above at 120ft			
CL							128	silty clay as above at 125 - 125.5			

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

EA

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KNEB-10652

Logged By: Low Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
a			N				127	SAA @ 126'	
i			N				128		
			N				129	clay w/ minor silt - brown (7.5 YR 4/3) - dense, dry & slightly moist, plastic.	
a/m			N				130	@ 129.5' - clay w/ silt - silt ~ 30% - brown (7.5 YR 5/4) dense slightly moist - low plasticity	
M			N				131	@ 130' - silt - brown (7.5 YR 5/4) - dense, to medium dense, slightly moist	
M/ML			N				132	@ 130.5' - clay silt w/ clay brown (7.5 YR 5/4) dense, ~ 40% low plasticity - slightly moist	
ML			N				133	silt, brown (7.5 YR 4/3) dense to medium dense, slightly moist, non plastic	
ML			N				134		
a/m			N				135	silty sandy clay (vf) brown (7.5 YR 5/3), dense, slightly moist - clay 80% - plastic	
a/m	7.7		N				136	@ 134.25 - SAA @ 134 but very dense & dry to slightly moist	



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KAFB-10652

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
a		↑	N		↑		136	clay w/ silt and s.f. sand - brown (7.5YR 5/3) - medium dense to dense, slightly moist, plastic to moderately plastic	
clay							137	@137' - calcite/calcium carbonate ^{plastic} nodules - well indurated 3" & calcare staining	
a			N				137'-138'	SAA @ 136'	
			N				138		
a			N				138.5	clay w/ silt - brown (7.5YR 5/3) medium dense - slightly moist - low plasticity ~ 30% silt	
ML			N				139	@138.5 - silt w/ clay - brown (7.5YR 5/3) dense to medium dense, slightly moist - non plastic ~ 30% clay	
ML		24.8	N				140		
M			N				141	silt w/ minor clay - brown (7.5YR 4/2) - dense, slightly moist - non to low plasticity - clay ~ 10%	
M			N				141	@141' SAA @ 140' - very dense - dry to slightly moist	
ML			N				142		
ML			N				143	silt w/ clay - brown (7.5YR 5/3) dense to medium dense, slightly moist - clay ~ 30% low to medium consistency	
ML			N				144		
SP			N				144.5	SAA @ 142' to 144.5 ft - @144.5 ft - sand - fine grained - brown (7.5YR 4/2) - dense to medium dense, slightly moist - clay ~ 5% silty clay nodules - plastic, brown 7.5YR 5/3 up to 1"	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KAFB-10652

Logged By: Lane Andrews

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP		66.4°C	N				145	@145.5 - SAA @ 144.5 with ~25% clay nodules up to 1-5"	
SP			N				146		
SW	11.4		N				147	SAA @ 146.25 brown @146.25 - sand (7.5YR 5/2), loose, slightly moist, well graded VF 20% F 10% M 30% C 10% 5%	
SN			N				148	SAA @ 146.25 - Little to no pumice	
SN		84.6°C	N				149		
SN			N				150		
SW			N				151	Sand w/ gravel - brown (7.5YR 5/2) loose, moist, well graded F 10% M 20% C 25% G 45% up to 2" - SAA @ 146.25 - quartz, feldspar	
ML			N				152	@150.5 ft - silt w/ clay brown (7.5YR 5/4) very dense - dry & slightly moist - weakly plastic - clay - 20%	
ML			N				153	@151.25 ft - silt - brown (7.5YR 5/4) dense - slightly moist - non plastic	
ML			N				154	silt as above at 151.25 ft - w/ trace clay - non-plastic	
ML			N				155	@153' - silt as above at 151.25 ft - no clay	
ML		38.2°C	N				156		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KAEB-10652

Logged By: Low Address

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML							154	SAA @ 152'	
ML							155		
							156	@ 155.75' silt, w/ trace of sand brown (7.5YR 5/3) - dense, slightly moist	
No Recovery							157	No Recovery - core accidentally fell in hopper, was not captured by core bag	
SC	6.1						158	(good) Sandy clay w/ silt (60%) - brown (7.5YR 5/3) medium dense, slightly moist, plastic decreasing clay w/ depth to a sand w/ clay (~50%) sand - fine gravel	
SC SW							159	SAA to 159.5' w/ increasing sand, f, m, c trace clay ~30% 50% 20%	
SW							160	@ 159.5 - sand, brown (7.5YR 5/3) - dense to medium dense - slightly moist to moist - well graded F 60% M 25% C 10% G 5% up to 1/2" sand & sandstone lenses	
SW							161	Sand - brown (7.5YR 5/3) - loose, slightly moist well graded F 5% M 50% C 25% G 20% up to 1/2" are fld lenses	
SW							162		
SW							163	SAA @ 160' to 163'	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KAFB-10652

Logged By: Love Andress

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SW								163	@ 163 - sand - brown (7.5 YR 5/3) loose, slightly moist, well graded			
								164	F 5% M 40% C 40% G ~5% up to 1/2" sand grains			
ML								165	silt w/ minor clay (15%) - light brown (7.5 YR 6/3) medium dense, slightly moist, low plasticity			
CL								166	clay w/ silt, brown (7.5 YR 5/3) - dense - slightly moist, medium plasticity & sandy to:			
ML								167	@ 165.5' - silt w/ clay (20%) brown (7.5 YR 5/3) dense to medium dense, slightly moist, low plasticity			
SM								168	silty sand - brown (7.5 YR 5/3) dense to medium dense, slightly moist - fine grained			
SW								169	@ 166.75' - sand - brown (7.5 YR 5/3) loose, slightly moist, well graded			
SW								170	F 30% M 20% C 30% G 20% up to 1/2" sand grains, silty clay			
SW								171	@ 167.75' - silt w/ clay (40%) brown (7.5 YR 5/3) dense, slightly moist - low to medium plasticity			
SW								172	sand - light brown (7.5 YR 6/4) loose to medium dense, slightly moist - well graded			
SW								173	@ 168.5' + 169.5' - sand - light brown (7.5 YR 6/4), loose to medium dense, slightly moist - well graded			
SW								174	F 100% M 15% C 60% G 15% up to 1/2" sand grains, silty clay			
SW								175	@ 169.5' - silty sand w/ clay - strong brown (7.5 YR 5/6), dense to medium dense			
SW								176	F 40% M 20% C 30% G 10% up to 1/2" sand grains			
SW								177	sand - brown (7.5 YR 5/3) loose, slightly moist - well graded			
SW								178	F 70% M 20% C 10%			

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KAFB-10652

Logged By: Lene Andres

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				172	Sand - light brown (7.5 YR 6/3) Loose, slightly moist well graded	
SW			N				173	F 10% M 60% C 30%	
SW			N				174		
SW		58.2°C	N				175	Sand - SAA e 172' fining downwards	
SW			N				176	New % at 175.5 F 60% M 30% C 10% SAA e 175.5'	
SW			N				177		
SW	3.4		N				178	@ 177.5 - sand brown (7.5 YR 5/2) Loose, slightly moist, well graded - F 60% M 30% C 10% G trace	
SP			N				179	Sand - light brown (7.5 YR 6/3) Loose, slightly moist poorly graded - fine grained ~ 8% medium grains	
SP		74.3°C	N				180		
SP			N				181	Sand - light brown (7.5 YR 6/3) Loose slightly moist, poorly graded	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 4/13/18

Boring/Well ID: KATB-10652

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
SP		74.3	N		6'		181	SAA @ 181'	
SP			N				182		
SW			N				183		
SW		44.4	N		4'		184	@ 183.5 ft sand brown (7.5 YR 5/3) Loose, slightly moist - well graded - F 5% M 40% C 45% G 10% up to 1" SA/SR Qtz feldspar	
SW			N				185	SAA @ 183.5 - different %'s: F 20% M 70% G 10% G trace up to 1/2" SA/SR Qtz feldspar granite	
SW			N				186		
SW			N				187	sand - brown (7.5 YR 5/3) Loose, slightly moist - well graded F 40% M 40% C 15% G ~3% up to 3/4" SA/SR Qtz feldspar, granite	
SW	1.3		N				188	slight fining downward	
SW			N				189	SAA @ 186 ft	
SW		42.0	N		8'		190	@ 189 ft SAA 186 w different %'s: F 20% M 30% C 35% G 15% up to 3/4" SA/SR - Loose white Qtz, granite feldspar	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KAFB-106 S2

Logged By: Lou Andrews

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Soil Description								Well Details		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs			
— soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) — % sand (include grain size %; fine, medium, coarse, etc.) — sand mineralogy — % gravel — gravel mineralogy — angularity/roundedness — % fines (silt/clay)										
SW							190	sand - light brown (7.5 YR 6/3) Loose, slightly moist - well graded		
SW			N				191	@ 191 to 191.3 - sand (7.5 YR 5/3) loose, slightly moist - well graded - F 70% M 30% C trace		
SP			N				192	@ 191.3 - sand - light brown (7.5 YR 6/3) (Loose) slightly moist - poorly graded vfg		
SP			N				193	SAA @ 191.3 ft		
SP			N				194			
SW			N				195	sand - brown (7.5 YR 5/3) Loose, moist, well graded		
SW			N				196	F 60 M 35% C 5%		
SW			N				197	sand brown (7.5 YR 5/3) loose, slightly moist, well graded		
SW			N				198	F 70% M 40% C 40% G trace up to 1/4" SAA at 196' - different %'s:		
SW	0.3		N				199	F 20% M 25% C 55%		
SW			N				200	sand - light brown (7.5 YR 6/3) Loose, slightly moist - well graded		
Additional Comments:										

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/13/18

Boring/Well ID: KAEB-10652

Logged By: Love Address

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW		48.54	N		6		199	SAA @ 198' No gravel	
SW			N				200		
SW			N				201	Sand-brown (7.5 YR 5/3) Loose, slightly moist, well graded F 40% M 50% C 10% gravel trace up to 1/2"	
ML			N				202	@ 201.75 - silt-brown (7.5 YR 5/3) dense to medium dense, slightly moist	
ML		37.20	N				203	Silt as above @ 201.75 - trace very fine graded sand	
ML			N				204		
SW			N				205	Sand - light brown (7.5 YR 6/3), Loose, slightly moist, well graded F 80% M 10% C 10% @ 204.5 - vfg sand w/ silt & gravel - brown (7.5 YR 5/3) - medium dense, slightly moist, well graded - F 30% M 10% C 30% G up to 1"	
SW			N				206	Angular - of vfg sandstone - well indurated	
SW			N				207	SW - brown (7.5 YR 5/3) loose, slightly moist, F 85% M 15% C trace trace gravel up to 1/3" - sparse	
SW	0.7	50.96	N				208	@ 207 - Sand - brown 7.5 YR 5/3 - slightly moist, coarse, well graded F 70% M 20% C 10%	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-10657

Logged By: Wane Anderson

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)			
SW							208	Sand - light brown (7.5 YR 6/3) - loose, slightly moist, well graded			
							209	F 80% M 15% C 5%			
SW							209.5	slight coreing downwards			
							210				
SW							211	Sand - light brown (7.5 YR 6/3) - loose, slightly moist - well graded			
							211	F 70% M 20% C 10%			
SP							211.5	Sand - light brown (7.5 YR 6/3) - loose, slightly moist - poorly graded - very fine grained			
							212				
SP							213	Sand - light brown (7.5 YR 6/3) - loose, slightly moist - poorly graded - very fine grained - a few moderately cemented pieces of sand like gravel - A, up to 1/2" (~5%)			
							214				
SW							215	Sand - light brown (7.5 YR 6/3) - loose, slightly moist, well graded - F 75% M 15% C 10% + trace gravel - up to 1/2" in size			
							215.5	Sand - brown (7.5 YR 5/3) - loose, slightly moist, well graded			
SW							216	F 15% M 50% C 25% G 10% up to 1" size gravel - 1/2" in size			
							217	Silt w/ clay - light brown (7.5 YR 6/3) - dense, slightly moist - plastic - medium plasticity clay ~ 50%			

Additional Comments:

Recovery:	None
-----------	------

Partial

Complete

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

$N = No$

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/14/18

Boring/Well ID: LAFB-10652

Logged By: Lane Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
SW	1.3	N					217	@ 217 - sand, brown (7.5 YR 5/3) loose, slightly moist, well graded F 80% M 10% C 10%	
SW		N					218		
SW		N					219	SAA @ 217 - different %'s: F 20% M 30% C 35% G 20% up to 1" SA/SR lithics, Qtz, fld	
SW		N					220		
SW		N					221	SAA @ 217 - different %'s: F 15% M 25% C 40% G 20% up to 1/2" SR Qtz, pumice, lithics, fld	
SW		N					222	@ 221: SAA 217 - different %: F 10% M 30% C 60%	
SW		N					223	sand w/ gravel - brown (7.5 YR 5/3), loose, slightly moist, well graded F 10% M 20% C 40% G 30% up to 1 1/2" SA/SR - Qtz, lithics, fld	
SW		N					224		
SW		N					225	at 222' sand w/ gravel - as above, different %'s: F 25% M 20% C 25% G 30% up to 3/4" Qtz, lithics, fld SA/SR - occasional pumice	
SW		N					226	@ 225-5 SAA @ 222 w/ different %: F 30% M 20% C 35% G 15% up to 1" - Qtz, fld, lithics, SA/SR	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/14/18

Boring/Well ID: KAFB-10652

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SW			N				226	sand - brown (7.5 YR 5/3) loose, slightly moist, well graded F 70% M 20% C 10%			
SW	1.3		N				227				
SW			N				228	@ 227.5 - sand w/ gravel - brown (7.5 YR 5/3) loose, well graded F 20% M 20% C 40% G 20% up to 3/4" - SR/SA @ 227.5' - 1st hole			
SW			N				229	@ 229 SAA @ 227.5' - different %'s - F < 5% M 20% C 35% G 40% up to 1" - SA/SR @ 229.1 - 1st hole			
SW			N				230				
SW			N				231	sand w/ gravel & clay - brown (7.5 YR 5/3) loose, slightly moist - well graded - clay ~10% of clay pieces up to 1/4" big hot brown (7.5 YR 4/3) plastic, moist F 5% M 30% C 30% G 25% up to 1" - SA/SR - @ 231.1 - 1st hole			
SW			N				232	@ 231.3 sand - brown (7.5 YR 5/3) - loose, slightly moist - well graded F 10% M 30% C 15% G 5% up to 3/4" - SA/SR @ 232.1 - 1st hole			
SW			N				233	sand - brown (7.5 YR 5/3) - loose slightly moist - well graded F 10% M 70% C 15% G 5% up to 1/2" 1st hole SA/SR			
SW			N				234	@ 233.75 Sand w/ punice Gravel - light (7.5 YR 5/3) loose - slightly moist, well graded F M C G up to 1" punice @ 234 - 1st hole			
SW			N				235	@ 234 - sand w/ gravel brown (7.5 YR 5/2) - loose, slightly moist, well graded F 5% M 25% C 40% G 30% up to 1.5" - SA/SR @ 235 - 1st hole			

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/14/18

Boring/Well ID:

KAFB-10652

Logged By: Low Address

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Soil Description							Well Details		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery			
						Depth, ft bgs			
							Soil Description		
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily		
							-- % sand (include grain size %; fine, medium, coarse, etc.)		
							-- sand mineralogy		
							-- % gravel		
							-- gravel mineralogy		
							-- angularity/roundedness		
							-- % fines (silt/clay)		
SW			N			235	e 235 - SAA as at 234'		
			N			235.5	e 235.5 - Sand - light brown (7.5 YR 6/3) - Loose		
			N			236	slightly moist, well graded F 20% M 20% C 60% G trace up + 1/2" SR SA fines (4 lines)		
SW			N			236.5	SAA @ 236.5		
SP			N			236.5	e 236.5 - sand - brown (7.5 YR 5/2) Loose, slightly		
SP			N			237	moist, poorly graded - fine grained		
SP	2.1		N			238	sand - brown (7.5 YR 5/2) loose, slightly moist,		
SP			N			239	poorly graded - fine grained		
SP			N			240	sand - SAA - e 238' approx 20% ^{medium} fines		
SP			N			241	break easily w/ fingers fine grained		
SP			N			242	⊗ (core disturbed) 234 - 242' core barrel & fell out of re-retrieved		
CL			N			243	SAA @ 238'		
SP			N			244	e 243 SAA @ 238' slightly coarser fine		
			N			244	grained sand		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/14/18

Boring/Well ID: LA7B-10652

Logged By: Lane Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SP		6.2	N				244	SAA @ 243'			
SW							245	@ 244.5 - 245.25' sand pinkish gray (7.5YR 6/2) loose, slightly moist, well graded F 60% M 30% C 10% coarse feldspar is prominent			
SP			N				246	@ 245.25 - SAA @ 238'			
SW			W				247	sand w/ gravel brown (7.5YR 5/3) loose, slightly moist, well graded F 70% M 30% C 10% G 10% up to 1.5" S&SR Qtz, lotus fld			
SW	0.0		N				248				
SW		5.9	N				249	sand brown (7.5YR 5/2) loose, slightly moist, well graded F 70% M 10% C 15% G 5% up to 1" lotus - sandstone cong - Qtz, fld			
SW			N				250	at 249 - SAA at 248' w/ different %'s: F 10% M 60% C 20% G 10% small v up to 1/2" S&SR Qtz, lotus fld			
SW			N				251	SAA at 249' - sp			
SW			N				252	@ 251.25 - sand pinkish gray (7.5YR 6/2) loose, slightly moist, well graded F 80% M 10% C 10%			
CL			N				253	@ 351.75 - silty clay loam brown (7.5YR 5/3) medium dense, slightly moist plastic - silt ~ 30%			

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/14/18

Boring/Well ID:

KAFB-10652

Logged By: Lane Anderson

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
CL		↑			↑		253	SAA @ 251-7.5	0
SP			N				254	253.5 - sand - pale brown (10YR 6/3) loose, slightly moist, poorly graded - very fine grained	6
SP							255	SAA @ 253.5 to 254.5 254.5 254.5	0
CL		32.1°C	N		3'		255	@ 254.5 - 255 - clay - brown (7.5YR 5/4) dense, dry to slightly moist - medium plasticity	0
SM		↓	N				256	@ 255 ft - silty sand silty sand - brown (7.5YR 5/4) dense to dry & moist to slightly moist - non plastic	0
CL		↑	N		↑		257	clay w/ silt and very fine sand - light brown (7.5YR 6/3), medium dense, slightly moist plastic	0
CL			N				258	@ 257.5 - silty clay - light brown (7.5YR 6/3), dense dry to slightly moist & low to medium plasticity	0
MY CL	0.5		N				259	SAA @ 257.5'	0
MY CL		33.8	N		8'		260		0
SM			N				261	SAA @ 257.5' to 261' silt w/ minor clay - brown (7.5YR 5/3) dense to moderately dense - slightly moist - low plasticity	0
CL			N				262	@ 261' - clay - light yellowish brown (2.5Y 6/3) - very dense - dry to slightly moist - plastic - looks a little pale greenish	0

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/14/18

Boring/Well ID:

KATB-10652

Logged By: Lene Andres

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
CL		33.8	N				262	SAA @ 261' Less dense w/ depth to medium dense at 263.5'			
CL			N				263				
SP			N				264	Sand - white (7.5 YR 8/1) loose, slightly moist, poorly graded medium grained 90% fine grained ~10%			
SP			N				265	@ 264.75 - Sand w/ silt - brown (7.5 YR 5/3) silt ~10%			
CL		51.1	N				266	clay - brown (7.5 YR 5/3) - dense - slightly moist, Plastic ~100% of sand & silt			
SM	22		N				267	@ 267 - silty sand - brown (7.5 YR 5/3) - very fine grained ~10% clay - slightly plastic - slightly moist - medium dense with clasts of dense mixed in (~30% dense clasts of same material)			
SM			N				268	SAA @ 267'			
SP			N				269	@ 269' - sand - brown (7.5 YR 5/3) - fine grained slightly moist, loose ~10% pieces of sand & clay up to 1" mixed in - plastic -			
SP			N				270	Sand - (7.5 YR 6/3) light brown, loose, slightly moist poorly graded - fine grained			
							271				

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/14/18

Boring/Well ID: KAFB-10652

Logged By: Lav Andress

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy % gravel - gravel mineralogy - angularity/roundedness % fines (silt/clay)	
SP		51.1	N		8'		271	SAA @ 270'	
							272		
SW			N					sand - brown (7.5YR 5/3) loose, slightly moist, well graded F 80% M 20% trace gravel	
SW			N				273		
SP			N				274	@ 273.75 - Sand - light brown (7.5YR 6/3) loose, slightly moist, poorly graded	
SP			N					sand - brown (7.5YR 5/3) - loose w/ some dense areas (~1" up to 1/2" diameter) (~2-5% dense areas), slightly moist, poorly graded - fine grained	
							275	@ 275' no dense areas	
SP		77.7	N		8'		276		
SW			N				277	sand - light brown (7.5YR 6/4) - loose to medium dense, slightly moist, well graded F 80% M 10% C 10% trace gravel up to 1/3" SR Qtz, 1 blue	
SW	2.9		N	P @ 278			278	SAA @ 276"	
SW			N				279		
SL			N				280	@ 279' - Sand - light brown (7.5YR 6/1) - loose slightly moist, poorly graded - very fine grained	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG

Land BFF

Project Number: 62735DM02.1017

Date: 11/14/18

ID: KAFB-10652

Logged By: Lon Andres

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily)
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW		69.9	N				280	Sand - brown (7.5 YR 5/3) loose, slightly moist, poorly graded F 80% M 15% C 5%	
SW			N				281	Fining downwards @ 281 - sand as above w/ <5% M & C grains poorly graded	
SP			N				282	SAA @ 281' <3% M & C	
SP			N				283		
SP			N				284	SAA @ 282'	
SP			N				285		
SP			N				286	SAA @ 283'	
SP			N				287		
SP		56.2	N				288	SAA @ 283'	
SP	0.0		N				289		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐
 SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
 R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/15/18

Boring/Well ID:

KAPB-10652

Logged By: Love Andres/BB

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP		36.2			5'		289	SAA @ 282'	
SP							290	SAA @ 282'	
							291		
							292		
SP		44.9			6'		293	SAA @ 282' F 10% M 85% C 5% TRACE F. GRAVELS (4" SUBANG)	
	6.3						294		
SP							295	SAA @ 282' F 30% M 50% C 20%	
							296		
SP		35.9			5'		297	SAND - BROWN (5YR 4/3) LOOSE, SET. MOIST - MOIST P. GRADED. 20% F-C ROUNDED GRAVELS TO 1" IN SIZE. F 10% M 65% C 5%	
	0.0						298		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/15/18

Boring/Well ID:

KATB-10657

Logged By: Low Address/BS

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USCS Soil Type	PID Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
SP		35.9					298	SAA @ 298 SAND - BROWN (5YR 4/8) (5YR 4/3)	
SW							299	F 5% M 80% C 5% NO GRAVELS, SLT. MOIST	
							300		
							301	SAA @ 298	
							302		
GP		30.5					303	GRAVELS - BROWN (5YR 3/4). SLT. MOIST, FINE TO COARSE ROUNDED TO SUBROUNDED GRAVELS TO 1.5" IN SIZE. F 45% M 10% C 30% G 45%	
							304		
GP							305	SAA 303. SLT LENS 304.0-304.2' BROWN, SOFT BROWN (5YR 5/2), MOIST, LOW PLASTICITY	
							306		
							307	WELL GRADED SAND W/ F. COARSE SUBANGULAR GRAVELS, QUARTZ AND LITHICS AND FEEDSPARS SAND - 100%; F 20% M 40% C 40% SUBANG-SUBROUNDED GRAVEL - 20% QUARTZ AND LITHICS	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Boring/Well ID:

KAFB 10652

Project Number: 62735DM02.1017

Logged By: BS

Date: 11/15/18

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Logged By: <u>BS</u> Page <u>35</u> of <u>36</u>										
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Soil Description	Well Details		
							30 36			
							- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)			
SW	0.0	56.1			6'		308	WEAK GRADED SAND, BROWN (5YR 6/2), 95% FINE		
							307			5% COARSE TRACE FINE SUBANGULAR GRAVELS
							309	SAA @ 307 W/ DARK BROWN MOTTLING		
							308			(10YR 2/1)
							310			
							309			
							311	SAND W/ GRAVELS BROWN (5YR 5/3) SLT. MOIST		
							310			SAND 20% 60% F: 20% M: 40% C: 40% QTZ, LITHICS, FERRIC
							312	GRAVEL 40% UP TO 3" INSIDE SUBANG-SUBSAND, OR		
							311			LITHICS, FERRIC
	60.4				1'		312	POORLY GRADED SAND, BROWN (5YR 5/3) SLT.		
							313			MOIST, F. GRAIND, < 5% FINE ROUNDED GRAVELS
							314	SAA @ 312		
							315			
							316			

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

AA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

= Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 4/15/18

Boring/Well ID: KAFB 106S

Logged By: BR

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								31 35 -- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
GW		56.3°C					316	WEA GRADED GRAVEL WITH SAND: DARK BROWN (5YR 3/2), LOOSE, MOIST, GRAVELS: 70% F - C SUBROUNDED TO 2", LITHOLS SAND: 30% F 10%, M 20% C 70%	
							317		
	2.1						318	P. GRADED SAND, BWN, SUT. MOIST, F 90% M: 3% C: 7% LITHOLS	
							319		
							320	SAA @ 318	
							321		
							322	SAND W/ GRAVELS, BROWN (5YR 3/2), SUT. M - M GRAVELS: 40% SUBR. TO SA, TO 1" IN SIZE QZ, LITH SAND: 60% F: 15% M 20% C: 65% QZ, LITH.	
							323		
							324	SAA @ 322	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

AA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

t = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/19/18

Boring/Well ID: KAFB10652

Logged By: BJS

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description - soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	Well Details		
		56.3°C			2.1		335				
		55.4°C					336	SAA @ 332			
							337				
							338	SAA @ 332			
							339				
							340	SAA @ 332			
							341				
							342	SAND - BROWN (5YR 3/2), SLT. MOIST, FG2: 90% M: 5% C: 5% LOOSE SAA @ 332			
							343				
							344				

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB 10632

Logged By: BS

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								33 -- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP		68.92					334	SAND W/ GRAVEL, LOOSE, BWN (5YR 3/2) SLT M. TO MOIST, GRAVELS - 20% F-C TO 1.5", SZ-R, QTZ, FLD, LITH	
							335	SAND - 80% F-20%, M 10%, C 10%, QTZ, FLD, LITH	
SP							336	SAA @ 334	
SP							337	SAND, LOOSE, BWN (5YR 2.5/2), SLT. M, F: 50% M: 20% C 30%	
	7.3			C338 V/P			338	SAA @ 337	
							339		
							340	SAA @ 337 W/ INC. @ F-C GRAVELS TO 1", R-SR, LITH, TR. WEAKLY INDURATED SANDS TO 15%	
							341		
							342	SAA @ 337 W/ DEC. GRAVEL TO 5%	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/15/18

Boring/Well ID: KAFB 10652

Logged By: BS

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
							343		
SP		67.8°C					344	SAA @ 343 SAND WITH GRAVEL, LOOSE, BROWN (5YR 5/3), MOIST, GRAVEL: 25% F-L TO 1" SR-SA, QTZ, LITH SAND: 75% F: 30% M, 20% C 50% QTZ, FLD, LITH	
SP							345	SAA @ 344, DECREASING GRAVELS AT 345' TO 5-10%	
SP							346	SAA @ 345	
							347		
SP	4.7						348	SAA @ 345	
							349		
		54.7°C					350	SAA @ 345	
							351		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/15/18

Boring/Well ID: KAFB 10652

Logged By: BSB

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								3531 — soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily — % sand (include grain size %; fine, medium, coarse, etc.) — sand mineralogy — % gravel — gravel mineralogy — angularity/roundedness — % fines (silt/clay)			
SP		54.7°C					352	SAA @ 345			
SP		54.7°C					353	SAA @ 345			
SP		34.1°C					354	SAA @ 345			
							355				
							356	SAA @ 345. GRAVELS INCREASE TO 40% W/SOME COBBLES (< 3/8").			
		45.3°C					357				
	3.3						358	SAA @ 345. GRAVELS TO 1"			
							359				
		45.3°C					360	SAA @ 345. SOME FRIABLE DECOMPOSING GRANITE GRAVELS TO 1"			

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/15/18

Boring/Well ID: KAPB10652

Logged By: B. BOUTCH

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP		46.30					361		
SP					8		362	SAA @ 345	
							363		
SP					2		364	SAA @ 345	
							365		
SP							366	SAA @ 345	
							367		
SP	8.1	56.50			6		368	SAA @ 345	
							369		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/15/18

Boring/Well ID: KAFTS 10652

Logged By: B. BOCKSCH

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USCS Soil Type	PID Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
SP		45.58	N		6'		30	SAND, LOOSE, BROWN (5YR 5/3) SCT. M-M. 5% GRAVELS F-L TO 1" R-SR SAND 95% F, 7% M, 3% C	
			N				31		
SP		38.42	N		4'		32	SAA @ 320	
			N				33		
SP			N				34	SAA @ 370 TO 375! INCREASING GRAVELS TO 60% F-L TO 1.75" R-SZ, LITHICS, SAND: F: 55% M 15% C 80%	
GW			N				35		
SW		40.02	N				36	sand - Brown (7.5 YR 5/3) - Loose, well graded, slightly moist - F 20% M 30% C 40% G 10% Up to 2" S&L SR Qtz, Flt, lithics	
SW		40.02	N				37	@ 377' same w/ different %'s: F 70% M 20% C 10%	
SW			N				38	SAA @ 377'	

Additional Comments: (X) PID suspect - NO ODOR

Recovery: None ☐Complete ☒Partial ☐Complete ☐

SAA = Same as Above

Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 30/11/16

Boring/Well ID: LAEB-10657

Logged By: Low Address

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Soil Description								Well Details	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs		-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)
SW			N				378	SAA @ 377'	
SW			N				379	@ 379.25 - sand w/ gravel - Brown (7.5YR 5/3) loose, slightly moist, well graded. F 15% M 30% C 40% G 15% up to 2" S&SR lithic, fld, Qtz	
SW			N				380	SAA @ 379.25'	
SW			N				381		
SW	401		N				382		
SW			N				383	sand w/ gravel - brown (7.5YR 5/3) loose, slightly moist - well graded - F 5% M 40% C 45% G 10% up to 1.5" S&SR Qtz, fld, lithics	
SW			N				384	@ 383.5 - 383.75 - pinkish gray (7.5YR 6/2) loose, slightly moist - well graded - F 5% M 25% C 30% G 40% up to 1.5" S&SR Qtz, lithic, fld @ 383.75 - SAA @ 382' w/ G up to 1/2" only	
SW			N				385	sand - brown (7.5YR 5/3) - loose, slightly moist, well graded F 70% M 25% C 5%	
SW			N				386		
SW			N				387	SAA @ 384' @ 386.5' sand w/ gravel SAA @ 384'	

384

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, SA = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse, G = Gravel



Date: 11/16/18

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Well Details

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/16/18

Boring/Well ID: LAFB-10652

Logged By: Curtis Landers

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL							396	SAA @ 395.75 with Clay AA @ 80% Nodules	
SW							397	@ 397 - Sand ^{brown} (7.5YR 5/3) Loose, slightly moist Well graded	
SW/CL							398	VF-40% F-20% M-20% C-10% G-10% up to 1/4" SA/SR - quartz, feld, lithic	
SW/CL							399	Sand w/ Clay Nodules - Brown (7.5YR 5/3) Loose, slightly moist, Well graded. Clay Nodules: Brown (7.5YR 5/3) Dense, Low Plasticity Nodules up to 4"	
SW/CL		75.90					400	Clay ~40% VF-20% F-10% M-20% C-10% G-trace up to 1/8" SA/SR Quartz, feld, lithic	
SW/CL							401	SAA @ 398'	
SW/CL							402		
SP							403	Sand Brown (7.5YR 5/4) Loose, slightly moist, poorly sorted Fine grained 8% Medium	
SP							404		
SW	38.4	49.6					405	Sand Brown (7.5YR 5/4) Loose, slightly moist, well graded F-30% M=45% C-25% G - Trace up to 5/8" SA/SR Quartz, feld, lithic	

Additional Comments:

PID suspect - No odor

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

AA = As Above

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/16/18

Boring/Well ID: 52

Logged By: Curtis Landers

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			49.6	N				405	@ 405.5 - Sand w/ clay Nodules, Reddish Brown Slightly moist, well graded (SYR 4/4) Qtz, Fld, lithic Dense, Low plasticity Nodules up to 3" F- 35% M- 25% C- 45% G- 0%	
SW				N				406		
SW				N				407	Sand brown (7.5YR 4/3) Loose, slightly moist, well graded Qtz, Fld, lithic F- 55% M- 30% C- 15% G- 0%	
SW				N				408		
SW				N				409	Sand, light gray (7.5YR 7/1) Loose, slightly moist/dry, well graded Qtz, Fld, lithic, granite F- 60% M- 15% C- 10% G- 15%	
SW			73.3	N				410	Granite, lithic SA/SR up to 1"	
SW		19.5		N				411	SAA @ 409'	
SW				N				412		
SW				N				413	pinkish-gray Sand brown (7.5YR 5/3) Loose, slightly moist, well graded Qtz, Fld, lithic F- 50% M- 20% C- 10% G- 20%	
SW				N				414	Sand brown (7.5YR 5/2) Loose, slightly moist, well graded Qtz, Fld, lithic F- 60% M- 20% C- 5% G- 15%	

Additional Comments:

* PLO suspect - No odor

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, SA = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/16/18

Boring/Well ID: ~~Long 1st~~ KFB-10652

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		73.3	N				414	Sand - brown (7.5 YR 5/2) loose, slightly moist, well graded - F 80% M 15% C 5%	
SW			N				415	@ 415 - Sand - pinkish gray (7.5 YR 6/2) loose, slightly moist - well graded F 20% M 80% C 20% G trace up to 1/2" SR & 1/2" Qtz fld lithes	415.1
SW			N				416	Sand - brown (7.5 YR 5/3) loose, slightly moist, well graded F 60% M 25% C 10% G 5% up to 1/2" SR & 1/2" Qtz fld lithes	
SW			N				417	Sand - brown (7.5 YR 5/2) loose, slightly moist, well graded - F 5% M 30% C 60% G 5% up to 3/4" SR & 1/2" Qtz fld lithes	417
SW		51.7	N				418	Sand - brown (7.5 YR 5/3) loose, slightly moist, well graded - F 85% M 10% C 5% trace gravel up to 3/4" SR & 1/2" Qtz fld lithes	
SW			N				419	@ 418.75 - Red clay clods up to 3" - dense, plastic, slightly moist SAA @ 419.25 - clay clods in sand - 80% clay clods	
SW	0.3		N	419 V1P			420	@ 419.725 Sand - (7.5 YR 6/1) light brown, loose, slightly moist - well graded F 10% M 60% C 25% G 5% up to 1/2" SR & 1/2" Qtz fld lithes	
SW			N				421	Sand - brown (7.5 YR 5/3) loose - poorly graded, slightly moist, well graded F 85% M 10% C 5% G trace up to 2" SR clay pieces lithes	
SP		23.3	N				422	Sand - brown (7.5 YR 5/3) loose, slightly moist, poorly graded Fine grained - trace medium/coarse grained	
SP			N				423	SAA @ 421'	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, SA = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/16/18

Boring/Well ID:

KAFB-10652

Logged By: Core Address

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Soil Description							Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	
-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)							
SW		23.3	N		4'-	423	
						424	
SW			N			425	
SW			N			426	
SW			N			427	
SW			N			428	
SW			N			429	
SW			N			430	
SW	0.0		N			431	
SW			N			432	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/17/18

Boring/Well ID: KAFB-10652

Logged By: Lane Address

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Soil Description					Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	
-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)					
SW				Core Run	
SW				Recovery	
SW				Depth, ft bgs	
SW				432	Gravel w/ sand - brown (7.5 YR 5/2) loose, slightly moist, well graded F < 5% M 30% C 30% G 55% up to 1.5" SA/SR 15% Qtz fld lithes
SW				433	@ 434, sand w/ gravel
SW				434	F 10% M 50% C 25% G 15% up to 1 1/4" SA/SR Qtz, fld, lithes, ss conglomerate of mod. to indurated formator
SW		42.4	N	435	Sand - brown (7.5 YR 5/3) F 5% M 50% C 30% G 15% up to 3/4" SA/SR lithes, Qtz, fld
SP				436	@ 435' - sand brown (7.5 YR 5/3) loose, slightly moist, poorly graded Fine grained w/ trace medium grain
SP				437	SAA @ 435'
SP				438	
SW	0.2			439	Sand - brown (7.5 YR 5/2) - L, SLM, WG F 50% M 15% C 15% G 20% up to 1.5" SA/SR Qtz, fld, lithes, gravel
SP				440	@ 439' Sand (7.5 YR 5/3) - L, SLM, WG Poorly graded Fine grained - trace medium grain
SW				441	Sand w/ gravel - brown (7.5 YR 5/2) - L, SLM, WG F 30% M 25% C 25% G 20% up to 1.5" SA/SR Qtz, lithes, gravel, fld

Additional Comments:

L = Loose SLM = Slightly Moist - WG = well graded

Recovery: None ☐Partial ☒Complete ☒

SS = Sandstone

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

mod = Moderately

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 11/17/18	
Boring/Well ID: KAFB-10652					Logged By: [Signature]			Page 15 of 15	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
GW		45.5	N		6'		441	@ 441' - Gravel w/ Sand - brown (7.5 YR 5/3) L SLM, WG F 5% M 5% C 20% G 70% up to 1 3/4" - SA/SR Qtz, lithes, fld granite	442
GW			N				442	SAA @ 441'	
GW			N				443		
SW			N				444		444
SW			N				445	Sand - brown (7.5 YR 5/3) L, SLM, WG F 30% M 20% C 20% G 30% up to 2" SAA/SR Qtz, fld, lithes	
SW		40.1	N		6'		445	sand w/ gravel - pinkish gray (7.5 YR 6/2), L SLM, WG F 10% M 20% C 30% G 40% up to 2" SA/SR Qtz, fld lithes, Granite	
SW			N				446	SAA @ 445'	
SW			N				447		
SW			N				448		
SW			N				449	coarse sand and gravel - brown (7.5 YR 5/2) L SLM, WG - F 10% M 20% C 30% G 40% SA/SR up to 1/2" Qtz, lithes, fld	448.8
SW			N				450	Sand - brown (7.5 YR 5/3) - L, SLM, WG F 70% M 15% C 10% G 5% up to 1/2" SA/SR Qtz, fld, lithes Slight petroleum odor	
SW	0.7	31.6	N		2'		450		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/17/18

Boring/Well ID:

KATB-10652

Logged By: Low Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				450	SAA @ 449'	
SW			N				451	@ 451' - sand (brown 7.5 YR 5/2) L, SLM, WG F 50% M 40% C 10%	
SW			N				452	slight H-C odor	
SW		42.2	N				453	SAA @ 451'	
SW			N				454	@ 453.5 SAA @ 451' w/ large gravel up to 1 1/2" of rounded fine-med g sand SS conglomerate F 10% M 20% C 40% G 30% up to 1.5" SA/SP (gate flt. litho)	
SW		42.2	N				455	Sand - brown (7.5 YR 5/3) L, SLM, WG F 85% M 10% C 5%	
SW			N				456		
SW			N				457	Sand - brown (7.5 YR 5/3) L, SLM, WG F 60% M 30% C 10% G ~5% up to 1" lithes &	
SW		25.8	N				458	Low non plastic clay nodules up to 1" SA/R	
SW			N				459	Petroleum H-C odor	
SW		61.3	N				460	Sand - brown (7.5 YR 5/3) L, SLM, WG F 70% M 20% C 10% some medium dense areas ~20% - odor	

Additional Comments:

H-C = petroleum hydrocarbon

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/17/18

Boring/Well ID:

KAPB-10652

Logged By: Lane Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP	22.9		N				459	sand - brown (7.5YR 5/3) L, SLM, w poorly graded - Fine grained + trace gravel up to 1/2" SR	
SP			N				460	SAA @ 459'	
SP			N				461		
SP			N				462		
SP	61.3		N				463	SAA @ 459'	
SP			N				464		
SP			N				465	SAA @ 459'	
SP			N				466		
SP			N				467	SAA @ 459'	
SP			N				468		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/17/18

Boring/Well ID: KATB-10652

Logged By: Lane Address

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Soil Description							Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	
-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)							
SW		26.0	N			468	Sand - brown (7.5 YR 5/3) L, SLM, WG F M C G up to 2" silt/cl odor Lithic Qtz fld
SW	31.7	26.0	N			469	SAA @ 468 w/ clay nodules up to 2" - dry BNS - low plasticity ~ 5% clay nodules in gravel fraction odor
						470	
						471	Sand - brown (7.5 YR 5/3) L, SLM, WG - F 90% M 3% C 2% G up to 1" 95% silt/cl lithic
						472	odor
				B, M V, P @ 474		473	Sand - brown (7.5 YR 5/2) L, SLM, WG F 90% M 5% C 5% odor
						474	Sand - brown (7.5 YR 5/2) L, SLM, WG, very fine grained
						475	@ 474' SAA @ 473' fine grained odor
						476	Sand w/ gravel (7.5 YR 4/2) L, SLM, WG - F 10% M 10% C 10% G up to 1.5" silt/cl 40% Lithic Qtz fld granitic
						477	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, SA = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse, G = Gravel

BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/17/18

Drilling Company: CACADE

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method:

Final Depth:

Casing Diameter OD:

Bit Type and Outer Diameter

Boring/Well ID: KAFB-70652

Logged By: LAW ANDRESS

Page 1 of 1

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		22.4	N				477	SAA at 475' - o.d.	
SW		22.4	N				478	@ 478' - sand - brown (7.5YR 5/3) - L, SLM, WG -	
SW		22.4	N				479	F 70% M 15% C 10% G 5% up to 1/2" SA/SR Qtz, fld, lth	
GW	362	23.2	N				480	stand gravel - brown (7.5YR 5/2) L, SLM, WG, F trace M 10% C 10% G 80% up to 2 1/4" Qtz, fld	
GW		23.2	N				481	SAA @ 480' different %'s: 11th	
SW		23.6	N				482	F trace M 10% C 20% G 70%	
SW		23.6	N				483	sand (7.5YR 5/2) L, SLM, WG - F 80% M 15% C 5% G trace more minor clay pieces up to 1" non plastic Qtz, fld, lth up to 1"	
SW		23.6	N				484	@ 482' SAA @ 481' different %'s: F 10% M 75% C 15% G up to 1" SA/SR Qtz, fld, lth	
SW	1802	24.2	N				485	sand (7.5YR 4/1) dark gray - L, SLM, WG F 10% M 30% C 50% G 10% up to 1" SA/SR Qtz, fld	
SW		24.2	N				486	@ 484' SAA @ 483' different %'s: F 70% M 10% C 10% G 10% up to 1" F trace 2 1/2" SA/SR Qtz, fld, lth	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel

BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Drilling Company:					Start Time/Date: Date 11/17/18				
Lead Driller:					Completion Time/Date:				
Drilling Method:					Final Depth:				
Casing Diameter OD:					Bit Type and Outer Diameter				
Boring/Well ID: KATB-10652					Logged By: Lane Address Page 1 of 1				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		↑ 25.0	N				485	sand brown (7.5 YR 5/3) L, wet, well graded F M C	
QU		↓ 25.0	N				486		
							487	486 - sand Gravel (7.5 YR 5/3) wet, L, WG F 5% M 15% C 20% G 60% up to 1" silt/sr Qtz fld lathes	
SW		↑ 25.4	N				488	sand - brown (7.5 YR 4/2) - L, wet, WG + minor clay F 5% M 25% C 40% G 30% up to 1 1/2" silt/sr Qtz fld lathes	
SW		↓ 25.4	N				489		
SW	1476	↑ 26.9	N	489 - 491 sent to PFS lab for UV			490		
SW		↓ 26.9	N				491		
SW		↑ 29.0	N	491 - 493 sent to PFS for UV			492		
SW		↓ 29.0	N				493		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel									

BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company:

Start Time/Date:

Lead Driller:

Completion Time/Date:

Drilling Method:

Final Depth:

Casing Diameter OD:

Bit Type and Outer Diameter

Boring/Well ID: KAEB-10652

Logged By: Lane Address

Page 1 of 1

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW	3026	25.1	N	493-495 Core to P/S for UV			493	sand w/ gravel - brown (7.5YR 4/3) L wet, well graded F 10% M 20% C 40% G 20% up to 2" SA SR	
SW			N				494	Qtz, lithic, fld	
SW			N				495	SAA @ 493' w/ minor clay coating grain	
SW			N				496	@ 496 SAA different %'s:	
SW			N				497	F 10% M 20% C 60% G 10% up to 1" clay silt, lithic, fld, SA/SR Qtz	
SW			N				498	@ 497 - Sand - brown (7.5YR 3/1) L wet, well graded F 5% M 15% C 60% G 20% up to 3/4" SA/SR Qtz, lithic, fld	
SW			N	VIP @ 499			499	@ 498' sand - brown (7.5YR 5/3) wet, L, Wg F 10% M 80% C 10% trace gravel up to 1/2" SR - lithic	
SW			N				500	sand - dark gray (7.5YR 4/1) L wet, well graded loose to medium dense 1/1 F 5% M 90% C 5%	
SW			N				501		

Additional Comments:

489-491 + 491-493 sampled NOT 493-495

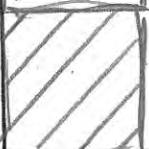
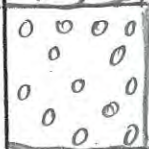
Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel

BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Drilling Company:					Start Time/Date: Date: 11/17/18				
Lead Driller:					Completion Time/Date:				
Drilling Method:					Final Depth:				
Casing Diameter OD:					Bit Type and Outer Diameter				
Boring/Well ID: KAPB-10652					Logged By: Lane Andrews Page 1 of 1				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW		24.4	N				501	SAA @ 499' - medium dense	
SW		24.4	N				502	sand w/ clay (30%) brown (7.5YR 5/2), dense to medium dense, moist, well graded - slight + medium plasticity	
SW		24.8	N				503	F 20% M 50% C 30% trace gravel up to 1/4" @ 2 fld lumps	
SW		24.8	N				504	@ 503' No clay F 20% M 50% C 20% G 10% up to 1/4" @ 2 fld lumps, fld granules	
SW	130.1	24.0	N				505	Sand - dark gray (7.5YR 4/1) - medium dense, wet well graded F 5% M 40% C 45% G 10% up to 1" R to SR @ 2 fld lumps	
SW		24.0	N				506	SAA @ 504' different %s: F 10% M 30% C 50% G 5% up to 1/2" as above	
SW		24.4	N				507	Sand - dark gray (7.5YR 4/1) medium dense wet, well graded F 40% M 10% C 30% G 20% up to 2/3" SA/SR @ 2 fld lumps	
SW		24.8	N				508	Sand - dark gray (7.5YR 4/1) medium dense wet, well graded - silty sand clumps w/ 20% clay	
SW	346	24.8	N				509	F 10% M 40% C 25% G 25% dispersed @ 2 fld lumps SA/SA	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel									

BORING/WELL CONSTRUCTION LOG										
Project: Kirtland BFF					Project Number: 62735DM02.1017					
Drilling Company:					Start Time/Date:					
Lead Driller:					Completion Time/Date:					
Drilling Method:					Final Depth:					
Casing Diameter OD:					Bit Type and Outer Diameter					
Boring/Well ID: KAFB-10652					Logged By: Low Address Page 1 of 1					
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description		Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SN		24.8	N	V.P. 510	11"		509	SAA @ 508' conc. cobble - SR - 1' above up to 3"		
							510	TD = 510 ft bgs.		
KEY:										
								3" diameter blank Sch. 80 PVC		
								3" diameter well screen Sch. 80 0.010" slot		
								3" diameter well sump 2 ft with 3" solid flat endcap		
								 Filter Pack: 10/20 Pioneer Silica Sand		
								 Bentonite Seal: Halliburton 3/8" HOLE PLUG		
								 Bentonite Grout: Halliburton 20% solids QUIK-GROUT		
								 Cement:		
								 Native Soil/Slough		
Additional Comments:										
Recovery: None ☐ Partial ☒ Complete ☐										
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No										
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity										
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel										

BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Drilling Company: Cascade					Start Time/Date: 10-18-18				
Lead Driller: Mark Green / Forest Chaffin					Completion Time/Date: 1679 11-29-18				
Drilling Method: ARCH					Final Depth:				
Casing Diameter OD: 1 3/4" + 2 5/8"					Bit Type and Outer Diameter 10 1/2" Ken Claw 8 1/2" mill tooth tri-cone				
Boring/Well ID: KAFB-10653					Logged By: Joshua Messenger Page 1 of				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SP	↑				1		0' - 8' Poorly graded sand - brown, trace fine gravel slightly moist		
	↓ HYDROKNIFE				5				
					8				
ML	5.5				10		silt with sand - strong brown (7.5 YR 5/6) soft, dry silt 90% nonplastic; sand 10%: VF = 20% F = 60% M = 20% SA-SR (Qtz, feld, lithics)		
ML					15		SAA @ 10' yellowish red (5YR 4/6)		
ML	8.0		P		20		SAA @ 15'		
SM					25		silty sand with trace gravel - strong brown (7.5 YR 5/6) loose, moist - sand 80%: F = 30% M = 40% C = 30% SA-SR (Qtz, feld, lithics) - trace gravel up to 3/8" (Qtz, lithics) silt 20% nonplastic		
					30				
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10653					Logged By: Joshua Messenger			Page 2 of	
USCS Soil Type	PID Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
ML	4.0				30		silt with sand - light yellowish brown (10YR 6/4) soft, dry silt 90% nonplastic; sand 10%; VF = 50% F = 50% SA-SR (Qtz, feld, lithics)		
ML					35		SAA @ 30' light brown (7.5YR 6/4) sand 20% VF = 40% F = 50% M = 10% trace coarse grained sand note: contains nodules of pedogenic carbonate		
ML	2.1				40		SAA @ 35' reddish brown (5YR 5/4) no carbonate		
ML					45		SAA @ 40' light yellowish brown (10YR 6/4) sand 20% VF = 40% F = 50% M = 10% trace coarse sand		
ML	1.4				50		SAA @ 45'		
SM					55		silty sand with gravel - light yellowish brown (10YR 6/4) loose, dry - sand 60% F = 30% M = 40% C = 30% SA-SR (Qtz, feld, lithics); silt 25% nonplastic; gravel 15% up to 1/2" (Qtz + lithics) @ 58' gravel observed in hopper up to 1.5"		
SW	2.8				60		well graded sand with gravel - brown (7.5YR 5/4) loose, moist - sand 85% F = 15% M = 50% C = 35% SA-SR (Qtz, feld, lithics) - gravel 15% up to 3/8" (Qtz + lithics)		
					65				
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: 53					Logged By: J. Messenger			Page 3 of 3	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		Well Details
ML					65		- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)		
							silt with sand - reddish yellow (7.5YR 6/6) soft, moist		
							silt 85% nonplastic; sand 15%: VF=40% F=50%		
							M=10% SA-SR (Qtz, feld, lithics)		
							@69' drill chatter		
SM	4.5				70		silty sand with gravel - reddish brown (5YR 5/4) loose, moist		
SW							sand 80%: F=40% M=40% C=20% SA-SR (Qtz, feld, lithics); silt 10% nonplastic; gravel 10% up to 3/8"		
SW					75		well graded sand w/ gravel - reddish brown (5YR 5/4) loose, moist		
							sand 60%: F=10% M=50% C=40% SA-SR (Qtz, feld, lithics); gravel 40% up to 1/2" (Qtz+ lithics)		
SP	5.9				80		poorly graded sand w/ trace gravel - light yellowish brown (10YR 6/4) loose, dry		
							sand 100%: F=15% M=85% SA-SR (Qtz, feld, lithics) - trace gravel to 3/8" (Qtz+ lithics)		
							sand has trace coarse grained in it		
SM					85		silty sand - light brown (7.5YR 6/4) loose, dry - sand 60%		
							VF=30% F=60% M=10% SA-SR (Qtz, feld, lithics); silt 40% nonplastic		
ML	1.4				90		silt with clay, sand, and trace gravel - reddish brown (5YR 5/4)		
							soft, moist - silt 75% nonplastic; clay 15% slightly plastic; exist as nodules; sand 10%: VF=30% F=50%		
							M=10% C=10% SA-SR (Qtz, feld, lithics); gravel up to 1/2" (lithics)		
ML					95		silt with sand and trace gravel - light yellowish brown (10YR 6/4) soft, moist		
							silt 65% nonplastic; sand 35% VF=15% F=30% M=40% C=15% SA-SR (Qtz, feld, lithics); gravel up to 1/2" (lithics)		
Additional Comments: 120									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: 53					Logged By: J. Messenger			Page 4 of	
USCS Soil Type	PID Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SP-SM	5.9				100		poorly graded sand with silt - light yellowish brown (10YR 6/4) loose, moist - sand 90% - F=60% M=40% SA-SR (Qtz, feld, lithics); silt 10% nonplastic		
SP					105		SAA @ 100' sand 95% silt 5%		
ML	5.0				110		silt with ^{minor} sand - brown (7.5YR 5/4) soft, moist silt 95% nonplastic; sand 5% - VF=65% F=20% M=15% SA-SR (Qtz, feld, lithics)		
ML					115		SAA @ 110'		
ML	5.6				120		SAA @ 115'		
ML					125		SAA @ 120' strong brown (7.5YR 5/6)		
ML	4.5				130		SAA @ 125' silt 90% sand 10% trace gravel up to 1" (lithics)		
					135				
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: 53					Logged By: J. Messenger			Page 5 of	
USCS Soil Type	PID Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SP					135		poorly graded sand with trace silt and gravel - pale brown (10YR 6/3) loose, dry - sand $\approx 100\%$; F = 25% M = 75% trace coarse grain SA-SR (Qtz, feld, lithics); silt trace, nonplastic gravel trace up to 3/8" (lithics)		
ML	6.0				140		silt with trace sand and gravel - strong brown (7.5YR 4/6) soft, moist - silt $\approx 100\%$ nonplastic; sand F = 95% M = 5% (Qtz, feld, lithics) SA-SR; gravel up to 3/8" (lithics)		
ML					145		SAA @ 140' strong brown (7.5YR 5/6); no trace gravel		
ML	5.6				150		SAA @ 145'		
ML					155		SAA @ 150'		
SW	10.2			P	160		well graded sand with gravel - yellowish brown (10YR 5/4) loose, moist - sand 90%: F = 50% M = 30% C = 20% SA-SR (Qtz, feld, lithics); gravel 10% up to 1/2" (Qtz, lithics)		
SW					165		SAA @ 160' sand 100%; no gravel		
					170				
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: 53					Logged By: J. Messenger			Page 6 of	
USCS Soil Type	PID Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SW SM	8.3				170		well graded sand with silt and trace gravel - light sm yellowish brown (10YR 5/4); sand 90%: F=50% M=35% C=15% SA-SR (Qtz, feld, lithics, caliche); silt 10% nonplastic		
SP					175		poorly graded sand with silt - yellowish brown (10YR 5/4) loose, moist - sand 95%: F=40% M=60% SA-SR (Qtz, feld, lithics, caliche); silt 5% nonplastic		
SW	8.0				180		well graded sand - light yellowish brown (10YR 6/4) loose moist - sand 100%: F=15% M=60% C=25% SA-SR (Qtz, feld, lithics, caliche)		
SM SP SM					185		poorly graded sand w/trace sm silt - yellowish brown (10YR 5/4) loose, moist - sand ~90%: F=70% M=30% SA-SR (Qtz, feld, lithics, caliche); silt 10% nonplastic		
SP	8.2				190		SAA@ 185' sand 100%; no silt		
SP					195		poorly graded sand with silt - brown (7.5YR 5/4) loose, moist - sand 95%: VF=15% F=70% M=15% SA-SR (Qtz, feld, lithics); silt 5% nonplastic		
SP SM	5.6				200		SAA@ 195' sand 90%, silt 10%		
Additional Comments: 205									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 11-4-18	
Boring/Well ID: KAFB-10653					Logged By: J. Messenger			Page 107 of 107	
PSCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SP					205		poorly graded sand - yellowish brown (10YR 5/4) loose, moist, SAND 100%: F = 70% M = 30% SA-SR (Qrz, feld, lithics, mica)		
SP	6.0				210		SAA @ 205' sand with trace silt: sand: F = 80% M = 20%		
SW					215		well graded sand w/ trace silt - yellowish brown (10YR 5/4) loose, moist - SAND ~100%: F = 20% M = 65% C = 15% SA-SR (Qrz, feld, lithics)		
SW	7.9				220		SAA @ 215' - dark yellowish brown (10YR 4/4) - trace silt		
SW SM					225		well graded sand with gravel and silt - dark yellowish brown (10YR 3/4) loose, moist - sand 60%: F = 25% M = 60% C = 15% SA-SR (Qrz, feld, lithics); gravel 30% up to 1 1/4" (Qrz, lithics); silt 10% nonplastic		
SW	8.3				230		well graded sand with trace gravel and silt - dark yellowish brown (10YR 4/4) loose, moist - sand >95%: F = 15% M = 70% C = 15% SA-SR (Qrz, feld, lithics); gravel up to 3/8" (lithics); silt nonplastic		
SW SM					235		well graded sand with silt - dark yellowish brown (10YR 3/4) loose, moist - sand 90%: F = 20% M = 60% C = 20% SA-SR (Qrz, feld, lithics); silt 10% nonplastic		
					240		@ 237 drill chatter - gravel observed up to 1 1/4"		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: 33					Logged By: J. Messenger			Page 8 of	
USCS Soil Type	PIR Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SM	8.4			P	240		silty sand - yellowish brown (10YR 5/4) loose, moist Sand 85%: F = 30% M = 45% C = 25% SA-SR (Qtz, feld, lithics, caliche); silt 15% nonplastic		
					245		NO CUTTINGS RETURNED		
SM	4.8				250		silty sand with trace gravel - yellowish brown (10YR 5/4) loose, moist - Sand 80%: VF = 10% F = 50% M = 25% C = 15% SA-SR (Qtz, feld, lithics); silt 20% nonplastic - trace gravel up to 3/4" (lithics + Qtz)		
SP					255		poorly graded sand with trace silt - yellowish brown (10YR 5/4) loose, moist - Sand >95%: VF = 10% F = 10% M = 80% trace coarse grained sand - SA-SR (Qtz, feld, lithics);		
SC	3.8				260		clayey sand with trace gravel - brown (7.5YR 4/3) loose, soft, moist - Sand 65%: VF = 30% F = 30% M = 30% C = 10% SA-SR (Qtz, feld, lithics); clay 35% soft, slightly plastic; trace gravel up to 1" (lithics)		
SW SC					265		sand with clay and trace gravel - yellowish brown (10YR 5/4) loose, moist - Sand 90% F = 15% M = 60% C = 25% SA-SR (Qtz, feld, caliche); clay 10% nonplastic - trace gravel up to 1/2" (lithics)		
SC	4.0				270		SAA @ 260'		
					275				
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID:					Logged By:			Page 9 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		
							Well Details		
CL					275		-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
CL	3.5				280		Clay with trace sand - brown (7.5YR 5/4) medium dense, medium stiff, slightly plastic trace sand VF = 80% F = 20% (Qtz, feld)		
ML					285		silt with trace sand - brown (7.5YR 4/4) soft, moist, nonplastic - trace sand; VF = 60% F = 30% M = 10% SA-SR (Qtz, feld)		
ML	3.4				290		SAA @ 285' silt with clay and trace sand silt 60% clay 30% sand 10%		
ML					295		SAA @ 290' @ 297' drill chatter		
SW-SC	5.5				300		well graded sand with clay - brown (10YR 5/3) loose, dry - sand 90% F = 25% M = 60% C = 15% SA-SR (Qtz, feld, lithics); clay 10% slightly plastic soft - exists as nodules		
SP-SPA					305		sand with silt and trace clay - yellowish brown (10YR 5/4) loose, moist - sand 90% F = 60% M = 40% SA-SR (Qtz, feld, lithics); silt 10% nonplastic - trace clay exists as nodules - slightly plastic, soft		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: 53					Logged By: J. Messenger			Page 19 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							Well Details		
SW	5.7				310		Well graded sand with gravel - yellowish brown (10YR 5/4) - sand 90%: F=10% M=60% C=30% SA-SR (Qtz, feld, lithics); gravel 10% up to 3/8" (Qtz + lithics)		
SW					315		SAA @ 310' sand with gravel sand: F=25% M=60% C=15% gravel 10% up to 1/2"		
SW	5.0				320		Well graded sand with gravel - yellowish brown (10YR 5/4) loose, moist - sand 90%: F=30% M=40% C=30% SA-SR (Qtz, feld, lithics); gravel 10% up to 1/2" (Qtz + lithics)		
GW					325		@ 323 drill chatter Well graded gravel with sand - yellowish brown (10YR 5/4) loose, moist - gravel 65% up to 1" (Qtz + lithics); sand 35%: F=15% M=60% C=25% SA-SR (Qtz, feld, lithics)		
SW	4.7				330		@ 328 drill chatter SAA @ 320' sand 75% gravel 25% pale brown (10YR 6/3) - dry		
SW					335		@ 333 drill chatter SAA @ 330'		
GW	3.6				340		Well graded gravel with sand - brown (10YR 4/3) loose, moist - gravel 70% up to 1" (Qtz + lithics) sand 30%: F=10% M=60% C=30% SA-SR (Qtz, feld, lithics)		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: 53					Logged By: J. Messenger			Page 11 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SW					343		Well graded sand with gravel - yellowish brown (10YR 5/4) loose, moist - sand 90% F=15% M=70% C=15% SA-SR (Qtz, feld, lithics); gravel 10% up to 1/2" (Qtz + lithics)		
SW	5.8				350		SAA @ 345' sand 65% gravel 35% up to 1 1/4"		
SW					355		Well graded sand with trace gravel - yellowish brown (10YR 5/4) loose, moist - sand >95% F=40% M=50% C=10% SA-SR (Qtz, feld, lithics); gravel <5% up to 1.5" (lithics)		
SP-SM	6.9			P	360		poorly graded sand with silt and trace gravel - light yellowish brown (10YR 6/4) - loose, moist - sand 90% VF=40% F=55% M=5% SA-SR (Qtz, feld, lithics) silt 10% nonplastic - trace gravel to 1" (lithics)		
SW-SM					365		Well graded sand with silt and gravel - dark yellowish brown (10YR 4/4) loose, moist - sand 80% F=35% M=50% C=15% SA-SR (Qtz, feld, lithics); silt 10% nonplastic; gravel 10% up to 1 1/4" (lithics + Qtz)		
SP-SM	6.5				370		SAA @ 360'		
GW-GM					375		Well graded gravel with sand and silt - dark yellowish brown (10YR 4/4) loose, moist - gravel 60% up to 1" (Qtz + lithics); sand 30% F=20% M=20% C=10% SA-SR (Qtz, feld, lithics); silt 10% nonplastic		
					380				
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: 53					Logged By: J. Messenger			Page 12 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							Well Details		
SW	6.0				380		Well graded sand with gravel - yellowish brown (10YR 5/4) loose, moist - sand 75%: F=30% M=30% C=40% SA-SR (Qtz, feld, lithics); gravel 25% up to 1" (Qtz + lithics)		
SP					385		poorly graded sand - pale brown (10YR 6/3) loose, dry sand 100%: F=15% M=85% trace coarse grained sand - SA-SR (Qtz, feld, lithics)		
SW	6.4				390		Well graded sand with gravel - yellowish brown (10YR 5/4) loose, moist - sand 90%: F=25% M=60% C=15% SA-SR (Qtz, feld, lithics); gravel 10% up to 1/2" (Qtz + lithics)		
SW					395		SAA @ 390'		
SP	2.3				400		poorly graded sand with gravel - yellowish brown (10YR 5/4) loose, moist - sand 90%: F=65% M=35% trace coarse grained sand SA-SR (Qtz, feld, lithics); gravel 10% up to 1.5" (Qtz + lithics)		
					405		- ARCH rig TD = 400' bgs		
					410				
					415				
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF Project Number: 62735DM02.1017 Date: 11-18-18
Boring/Well ID: KAFB-10653 Logged By: Lane Address Page 13 of 25

USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
SW	SW	17		N				400	sand - brown (7.5YR 5/3), L, SLM, WG - F 75% M 15% C 5% G 5% up to 1 1/2" SA/SR - Qtz, fld, lithes, fld Limestone	
SW	SW			N				401	@ 401.5 - sand, brown (7.5YR 5/3), L, SLM, WG F 65% M 15% C 20% No gravel	
SW	SP			N				402	sand (light brown 7.5YR 6/3), L, SLM, WG F 90% M 10% C trace Qtz, fld	
SW	SW			N				403	@ 403' - sand (light brown 7.5YR 6/3), L, SLM F 55% M 25% C 20% G trace up to 1/2" SA/SR Qtz, fld, lithes	
SW	SW		68.2	N				404	sand - (light brown 7.5YR 6/3), L, SLM, WG F 20% M 10% C 10% G trace - SR up to 1/2" Qtz	
SW	SW			N				405	VF 60%	
				N				406		
				N				407	sand - light brown (7.5YR 6/3), L, SLM to dry, WG - F 70% M 20% C 10%	
a				N				407.75	@ 407.75 - Lense of clay w sand - light brown (7.5YR 5/3) Dense, SLM to dry, well graded - low to medium plasticity - clay - 60% F 5% M 5% C 20% G 10% up to 1/2" SR Qtz, fld, lithes	
				N				408	sand - light gray (7.5YR 6/3) - L, DRY to SLM well graded - F 80% M 10% C 10% - w/ carbonate cement - fizzes w/ HCl	
				N				408.5	@ 408.5 - SAA w/ NO cementation	

Additional Comments:

Recovery: None ☐ complete ☒ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

L = Loose
SLM = slightly moist
WG = well graded

EA SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF					Project Number: 62735DM02.1017					Date: 11-19-18				
Boring/Well ID: LAFB-16653					Logged By: Law Address					Page 14 of 25				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Soil Description					Well Details				
					-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)									
SW	6.4		N		Core Run	409	sand - brown (7.5 YR 5/2) - L, Dry to SLM, WG F 60% M 30% C 10% Gr up to 1/4" No gravel @ 409							
					Recovery	410	increasing density to L to medium dense w/ cementation - breaks apart w/ fingers - does not fizz w/ HCl @ up to 100%							
SW			N			411	sand w/ gravel, brown (7.5 YR 5/2), L - Dry to SLM WG F 20% M 30% C 40% Gr up to 3/4" - SA/SR Qtz fld lithes							
SW			N			412	e 411 - sand - brown (7.5 YR 5/3) - L, Dry to SLM - well graded - F 10% M 30% C 50% G 10% up to ~ 5% is weakly to moderately dense clay nodules up to 2"							
SW	60.7 OC		N			413	sand - brown (7.5 YR 5/3) - L, Dry to SLM, WG F 10% M 20% C 50% Gr up to 1/2" SA/SR Qtz fld lithes							
SC			N			413.5	sandy clay (7.5 YR 4/3) - Dense to medium dense - SLM, WG - clay ~ 80% - 20% is sand + gravel as above @ 412' - dense,							
CL			N			414	CLAY (brown 7.5 YR 5/3) - very dense, moist, high plasticity							
CL			N			415								
SW			N			415.5'	sand - brown (7.5 YR 5/3) - L, SLM, WG F 30% M 10% C 60% 60% trace gravel up to 1/2" SA lithes							
NR			N			416	No Recovery - not caught in bag - fell in hopper							
NR			N			417								
						418								

Additional Comments:

NR = No Recovery

L = loose
SLM = slightly moist
WG = well graded

Recovery:
None
Partial
Complete

SAA = Same as Above
Qtz = quartz
Fld = feldspar
Y = Yes
N = No

Samples:
V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-19-18

Boring/Well ID: KAFB-10653

Logged By: Lane Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				418	sand - brown (7.5YR 5/2) - L, SLM, WG F 5% M 40% C 30% G 10% up to 1" SA/SR Qtz fld lithes	
SW	5.7		N				419	@419 - sand - pinkish gray (7.5YR 6/2) L, SLM, WG ~20% silt - F 65% M 40% C 30% G 15% up to 1" Qtz M - 15% C + trace fld lithes	
SW		78.1°C	N		7'		420	SAA @ 419'	
SP			N				421	@421 - 421.5 - sand w/ silt - pinkish gray (7.5YR 6/2) L, SLM poorly graded - very fine grained	
SW			N				422	@421.5 - sand - pinkish gray (7.5YR 6/2) - L, SLM WG - F 60% M 25% C 10% G 5% up to 2" Qtz fld lithes	
SM			N				423	silty sand - pinkish gray (7.5YR 6/2) - L, SLM poorly graded - VFC	
SP		29.1°C	N	@424 V.P			424	core bag are opened saved for sampling Sand - pinkish gray (7.5YR 6/2) - L, SLM, poorly graded very fine grained - trace C & M grains	
SP	0.4		N				425		
SP/SW		32.8°C	N				426	sand - light brown (7.5YR 6/3) - L, SLM poorly graded VF - 90% F - 5% M - 5% C - trace	
SP/SW			N				427		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

EA

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-19-18

Boring/Well ID: KAFB-10653

Logged By: Lane Andres

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		↑	N		6'		427	Sand - light brown (7.5 YR 6/3) L, SLM, WG VF 40% F 10% M 5% C 30% G 15% up to 1" ^{SA-SR} @ 427.75 - SAA Sand - light brown (7.5 YR 6/3) L, SLM poorly graded - VF - F gravel _{at 2, fld 14 in}	
SP		40.6 °C	N				428		
SP			N				429		
SP/		↓	N				430	Sand - brown (7.5 YR 5/3) - L, SLM, poorly graded F ~ 90% M 10% C + trace	
SW	0.0	42.9 °C	N				430.5		
SP/			N				431	@ 430.5 - no coarse fraction & M only ~ 8%	
SW		↑	N				431	Sand - brown (7.5 YR 5/2) L, dry, poorly graded - F - 90% M ~ 10%	
SP/			N				432		
SW		↓	N				433	Sand - brown (7.5 YR 5/2) L, dry - F 85% M 10% C 5% + trace gravel up to 1/2" _{SA/SR Lithic, at 2 fld}	
SP		82.8 °C	N				433'	@ 433' - sand - pinkish gray (7.5 YR 6/2), L, dry - poorly graded VFG	
SP	1.2		N				434		
SP			N				435	Sand - gray (7.5 YR 6/1) - L, dry, poorly graded - minor silt VFG	
			N				436		

Additional Comments:

L = Loose SLM = slightly moist WG = well graded

Recovery: ☐ None ☒ Partial ☐ Complete

SAA = Same as Above Qtz = quartz fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 11-18-18	
Boring/Well ID: KAFB-10653					Logged By: Low Address			Page 17 of 25	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								Well Details	
SW			N				436	sand - light brown (7.5 YR 6/3) L, SLM, WG F 15% M 40% C 40% G 5% up to 1/2" SR Qtz fld Lithes	
SW		46.6	N				437	C 137 ft - sand - brown (7.5 YR 5/2) L, SLM - WG F 40% M 30% C 30% G trace up to 1" SR Lithes	
SW			N				438	Sand w/ gravel - pinkish gray (7.5 YR 4/2) - L, SLM partly graded - F 40% M 30% C 30% G trace up to 1" SR Lithes	
SW	2.7		N				439	F 10% M 10% C 45% G 35% up to 2 1/2" SR, SA, Qtz, Lithes, fld, granite	
SW			N				440	sand - brown (7.5 YR 5/3) L, SLM, WG F 65% M 15% C 10% G 10% up to 3/4" SA/SR Qtz fld Lithes	
SW			N				441		
SW			N				442		
SW		52.3	N				443	sand w/ gravel - brown (7.5 YR 4/2) L, SLM to dry - WG F 10% M 25% C 40% G 25% up to 1 3/4" SA/SR Qtz fld Lithes	
SW	1.6		N				444		
SW			N				445	sand w/ Gravel & silt (45%) brown (7.5 YR 5/2) L dry to SLM - WG F 20% M 15% C 35% G 30% up to 2 1/2" SA/SR Qtz fld Lithes	
Additional Comments:									
L = loose SLM = slightly moist WG = well graded									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Boring/Well ID: KAFB-10653

Project Number: 62735DM02.1017

Date: 11-18-18
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Logged By: Lane Andrews

Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW		42.32	N		64		444	SAA @ 444'	
SW		45.62	N		72		446	sand w/ gravel - brown (7.5 YR 4/2) L, SLM, WG	
SW			N				447	F + trace M 20% C 30% G 50% up to 2 3/4"	
			N				448	SA/SR Qtz, fld, lith	
CL			N				449	CLAY - Gray (7.5 YR 6/1) VERY DENSE, DRY to SLM, w/ Black mottling (~30%) plastic when wetted & worked	
CL	1.2		N				450	@ 449' SAA - No mottling - specks of black, orange & occasionally white up to 3 mm thick lenses (discontinuous) & 2-5 cm long x 3-4" wide	
CL			N				451	SAA @ 449' orange & black specks up to 1 cm x 2-3 mm	
CL			N				452	@ 451.75 - Sand (7.5 YR 5/2) - Loose, SLM WG - F 20% M 20% C 30% G 30% up to 3" SA/SR Qtz fld lith	
SP/ SW			N				453	FA to 453'	
SP/ SW			N				454	@ 453' - sand - brown (7.5 YR 5/3) - L, SLM, F 90% M 10% C - trace	
CL			N				455	@ 453.75 - CLAY - Light yellowish brown (2.5 Y 6/3) VERY DENSE, SLM, plastic when wetted.	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-19-18

Boring/Well ID: KAFB-16653

Logged By: Low Andress

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL	15.6	82.4	N				454	SAA @ 453.75'	
CL			N				455	CLAY as above at 453.75' w/ ~10% black speck mottling - specks up to 2mm - DENSE (not very dense)	
CL			N				456	@ 456 - clay w/ silt - Brown (7.5 YR 5/3) - dense to medium dense - SLM - plastic	
CL			N				457	@ 456.75 - silty clay - brown (10 YR 5/3) - medium dense, medium plasticity	
SM			N				458	silty sand - brown (10 YR 5/3) - medium dense to loose, SLM - ~10% clay - non plastic VF 70% M trace C trace	
SM			N				459	core log upended for sampling off	
SN			N				460	Sand - brown (7.5 YR 5/3) - L, SLM, wG -	
SW	6.7		N				461	Sand - brown (7.5 YR 5/3) - L, SLM, wG F 60% M 20% C 15% G 5% up to 2.3" JAISR atz, fld lithics	
SW	15.2	22.0	N				462	Faint petroleum H-C odor	
SW			N				463	Sand - brown pinkish gray (7.5 YR 6/2) - L, SLM wG - F 80% M 10% C 5% G 5% JAISR atz fld lithics	

H-C = hydrocarbon

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

Date: 11-20-18

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USCS Soil Type				PID Reading (ppm)				Temperature (°C)				UV fluorescence				Samples collected				Core Run				Recovery				Depth, ft bgs				Soil Description				Well Details			
																												-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)											
SW				9.4				26.5				N								5.1				463				SAA @ 462'											
SW																								464				sand - brn (7.5 YR 5/3) L, SLM, WG - H-C faint odor F 75% M 20% C 5%											
SW																								465															
SW																								466															
SW																								467				SAA @ 464' @ 466.5 - Gravel w/ sand - brn (7.5 YR 5/2) L, SLM, WG F 5% M 20% C 20% G 60% up to 3" - SA/ SR 55% or 2 fld Lithics											
GW				69.9				N																468															
GW																								469				SAA @ 464'											
SW																								470				@ 469 SAA @ 466.5'											
GW																								471				sand - brn (7.5 YR 5/2) - L, moist, WG - slight H-C odor F 70% M 20% C 5% G 5% up to 1" SA/ SR or 2 lithics, fld											
SW				7.3																				472				sand - brn (7.5 YR 5/2) L, moist - poorly graded F 92% M 5% C 3%											
SP				50.4				N																473															
																								474															
																								475															

470-474" disturbed - fell out of core barrel
5' was rechecked twice

Recovery:	None
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Partial

Complete

N = No/None

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

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Additional Comments: 470-474 Disturbed - fell out of core barrel twice
480-483 - disturbed - fell out of core barrel
x Re-retrieved w/ Next Run

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-20-18

Boring/Well ID: KAFB-10653

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		27.3	N				481	SAA @ 480'	
SW		27.3	N				482		
SW		27.3	N				483	sand w/ gravel - Brown (7.5 YR 4/2) L, wet F trace M 20% C 40% gravel 20% up to 1/2" clay in matrix ~ 20% trace up to 1/2" Non plastic SA/SR Qtz fld lotus	
SW		21.7	N				484		
SW	335	21.7	N				485	Sand - brown (7.5 YR 4/2) - medium dense wet, WG - ~10% clay in fines/matrix - non Plastic - F 70% M 15% C 10% G 5% up to 1/2" SA/SR - Qtz fld lotus	
SP		22.0	N				486	sand - brown 7.5 YR 5/2 - medium dense, wet poorly graded - fine grained - trace med coarse grains	
SP		24.1	N				487		
SP		24.1	N				488	SAA @ 485 to 487.25 @ 487.25' - sand brown (7.5 YR 5/3) medium dense, wet, well graded F 50% M 15% C 20% G 15% up to 1" SA/SR - Lotus, Qtz, fld	
SW	NS	24.1	N				489		
SW	85.9	15.4	N				490	sand - brown (7.5 YR 6/2) - medium dense wet well graded - H-c odor F 25% M 40% C 20% G 15% up to 1.5" SA/SR with Qtz fld	

Additional Comments:

NS = Not sampled 480-483' Disturbed

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 11-21-18	
Boring/Well ID: KAFB-10653					Logged By: Lane Address			Page 23 of 25	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW	468	18.5	N				490	sand - SAA @ 489' - gravel up #3"	
SW			N				491		
CL		21.0	Y	V.P. BM UV on core			492	core bag not opened - UV shows NAPL smearing & spots can feel dense clay through core bag	
CL			Y	492-494 core			493		
CL		21.1	Y	W on 494-496 core			494	core bag not opened - UV shows NAPL spots can feel dense clay through core bag	
CL			Y				495		
SW	2569	24.0	N				496	sand - gray (7.5 YR 5/1) dense to medium dense wet - H-C odor F 75% M 15% C 5% G 5% up to 1" Qtz fld liths SA/SR	
SW			N				497		
SW		23.4	N				498	sand - dark gray (7.5 YR 4/1) dense to medium dense, wet - well graded - H-C odor F 30% M 45% C 20% G 5% up to 2" SA/SR Qtz fld liths	
							499		
Additional Comments:									
Recovery: ☐ None ☐ Partial ☒ Complete									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11-21-18

Boring/Well ID: KFB-10653

Logged By: Lou Andress

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		23.4	N				499	SAA @ 498'	
SW	260	21.5	N				500		
SW		21.5	N				501	SAA @ 498' different %'s: - also faint organic/sewage odor w/ H-C odor F 80% M 15% C 5% G trace up to 1/2" SA/SR Qtz, fld lithes	
SW		24.8	N				502		
SW/cl		24.8	N				503	Sand w/ clay - brown (7.5 YR 4/2) dense - wet well graded - H-C odor - clay - dispersed in matrix & as small orange & yellow streaks specks up to 1/4" x 3' long low plasticity ~30%	
SW/cl		24.4	N				504	F < 5% M 50% C 10% G 5% up to 1" SA/SR - Qtz, fld, lithes	
SW/cl	175	24.4	N				505	SAA @ 502' to 504.25' @ 504.25' - sand brown (7.5 YR 5/2) - Dense wet - WG - trace clay in matrix	
SW		23.8	N				506	F 5% M 40% C 40% G 15% up to 3" trace cobbles up to 3.5" - SA/SR lithes Qtz, fld	
SW			N				507	SAA @ 504.25'	
SW			N						
SW/cl			N					@ 507.75 - sand brown (7.5 YR 5/2) dense, wet, WG clay in matrix AS above at 502 ft	
Additional Comments:								F 10% M 30% C 25% G up to 1" SA/SR Lithes, fld, Qtz clay ~20%	

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 5/11/2018	
Boring/Well ID: KAEB-10653					Logged By: Lori Anderson			Page 25 of 25	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW		↑	N				508	Sand - brown (7.5 YR 5/2) dense, wet, WG	
CL			N				509	~ 10% clay in matrix - Non plastic	
SW		22.4	N				510	F 10% M 40% C 30% G 10% up to 1" SR/SA - Qtz	
CL			N				511	occasional G up to 2.5" SR	
SW	35.1	↑	N				512	Sand (7.5 YR 4/2) - Dense, wet, well graded	
SW		33.2	N	V.P			513	F 70% M 30%	
SW	42.0	↓	N	C 5R			514	@ 511.25 - sand w/ gravel (7.5 YR 4/2) Dense, wet	
							515	F trace M 35% C 50% G 15% up to 1" SA/SR	
							516	Qtz Fld Lithic	
							517	TD = 512 ft bgs	
							518	key	
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Additional Comments:

Recovery: None ☐ Partial ☐ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

EA Project: Kirtland BFF Drilling Company: <u>Cascade</u> Lead Driller: <u>Mark Green</u> Drilling Method: <u>ARCH</u> Casing Diameter OD: <u>11 3/4"</u> Boring/Well ID: <u>KAFB-106 S4</u> BORING/WELL CONSTRUCTION LOG Project Number: 62735DM02.1017 Start Time/Date: <u>10-</u> Completion Time/Date: Final Depth: Bit Type and Outer Diameter <u>Ken Claw 10 1/2" Milt tooth tri-cone 8 1/2"</u> Logged By: <u>Joshua Messenger</u>										
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details		
(CL)	Hydro-knife			NONE TAKEN			0-4" coarse sand and gravel 4"-8" silty clay with sand - brown (7.5YR 4/3), dense, moderately plastic - sand M to C			
(CL)					5		@ 6' 1/2" tree roots visible			
					8		@ 7' 1/4" tree roots visible			
(ML)	3.6				10		silt with sand - reddish brown (5YR 5/4) loose, dry silt 80% non plastic - sand 20% : VF = 70% F = 20% M = 50% C = 5% SA-SR (Qtz, feld, lithics)			
(ML)					15		SAA @ 10' with 5% gravel up to 1" (lithics) silt 80% sand 15% SAA			
(SM)	2.3				20		silty sand with gravel - brown (7.5YR 5/4), loose, dry - silty sand 60% : F = 20% M = 40% C = 40% SA-SR (Qtz, feld, lithics); silt 30% non plastic; gravel 10% up to 1/2" (Qtz, lithics)			
(ML)					25		silt with sand - brown (7.5YR 5/4), loose, dry, non plastic silt 90%; sand 10% VF = 80% F = 15% C = 5% SA-SR (Qtz, feld, lithics)			
Additional Comments:										
Recovery: None ☐ Partial ☒ Complete ☐										
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No										
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity										
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse										

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 10-16-18	
Boring/Well ID: KAFB-10654					Logged By: Joshua W. Leary			Page 2 of 2	
USCS Soil Type	PTD Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
ML	2.5				30		-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							silt with sand and gravel - brown (7.5 YR 5/4) loose, dry silt 70% nonplastic - sand 20% F=30% M=40% C=30% SA-SR (Qtz, feld, lithics) - gravel 10% up to 3/8" (Qtz, lithics)		
ML					35		silt w/sand and gravel - reddish brown (5YR 4/4) loose, dry - silt 65% nonplastic - sand 20% F=30% M=40% C=30% SA-SR (Qtz, feld, lithics) gravel 15% up to 3/8" (Qtz, lithics)		
SM	5.0			P	40		silty sand with gravel - light brown (7.5 YR 6/4) loose, dry - sand 70% F=30% M=40% C=30% SA-SR (Qtz, feld, lithics) silt 20% nonplastic - gravel 10% up to 1/2" (Qtz, lithics)		
SM					45		SAA @ 40' - brown (7.5 YR 5/4) sand 70% silt 30% gravel 10%		
SM	1.8				50		SAA @ 45' - light brown (7.5 YR 6/4) sand 60% silt 30% gravel 10%		
ML					55		silt with sand and gravel - reddish brown (5YR 4/4) loose, dry silt 80% nonplastic; sand 15% F=40% M=40% C=20% (Qtz, feld, lithics) SA-SR; gravel 5% up to 1" (lithics)		
ML	0.6				60		SAA @ 55' - brown (7.5 YR 5/4)		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐ SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10654					Logged By: Joshua Messenger			Page 3 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
ML					65		-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							SAA @ 60' silt 70% sand 20% gravel 10%		
ML	3.1				70		SAA @ 65' silt 85% sand 15% trace gravel up to 5/8"		
ML					75		SAA @ 70'		
ML	3.8				80		SAA @ 75' silt 80% sand 15% gravel 5% up to 3/8" 1"		
SP					85		poorly graded sand - yellowish brown (10YR 5/4) loose dry - sand 100% F = 60% M = 40% SA-SR (Qtz, feld, lithics)		
SP	0.2				90		SAA @ 85' with trace gravel up to 3/8" (lithics)		
SW					95		well graded sand w/gravel - yellowish brown (10YR 5/4) loose, dry - sand 90% F = 40% M = 40% C = 20% SA-SR (Qtz, feld, lithics) - gravel 10% up to 1/2" (lithics)		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10654					Logged By: Joshua Messenger			Page 4 of	
USCS Soil Type	PID Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
ML	0.3				100		- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)		
							silt with sand - strong brown (7.5YR 4/6) loose, dry silt - 85% nonplastic - sand 15% F=60% M=40% SA-SR (Qtz, feld, lithics)		
ML					105		SAA @ 100' brown (7.5YR 5/4) silt 80% sand 15% gravel 5% up to 1/2" (lithics)		
ML	2.6			P	110		SAA @ 105' - strong brown (7.5YR 5/6)		
SM					115		poorly graded sand with silt - strong brown (7.5YR 5/6) loose, dry - sand 70% F=80% M=20% SA-SR (Qtz, feld, lithics); silt 30% nonplastic		
ML	0.0				120		silt with sand and clay - strong brown (7.5YR 4/6) loose, dry - silt 70% nonplastic - sand 20% F=80% M=20% SA-SR (Qtz, feld, lithics); clay 20% slightly plastic - exist as nodules		
CL					125		Clay - brown (7.5YR 4/4) slightly plastic, exists as nodules soft		
					130		NO CUTTINGS RETURNED		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10654					Logged By: Joshua Messenger			Page 5 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SP					135		-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							poorly graded sand with clay - brown (10YR 5/3) loose dry - sand 95% F = 70% M = 30% SA-SR (Qtz, feld, lithics) - clay 5% slightly plastic, soft exists as nodules		
SW	0.0				140		well graded sand - brown (10YR 5/3) loose, dry sand 100%: F = 20% M = 60% C = 20% SA-SR (Qtz, feld, lithics)		
SW-SM					145		well graded sand with silt - light yellowish brown (10YR 6/4) loose, dry - sand 90%: F = 30% M = 55% C = 15% SA-SR (Qtz, feld, lithics); silt 10% nonplastic		
SP	0.1				150		poorly graded sand - yellowish brown (10YR 5/4) loose, dry - sand 100%: F = 50% M = 50% SA-SR (Qtz, feld, lithics)		
SW					155		well graded sand with gravel - light yellowish brown (10YR 6/4) loose, dry - sand 90%: F = 20% M = 60% C = 20% SA-SR (Qtz, feld, lithics); gravel 10% up to 3/8" (Qtz + lithics)		
SW	0.0				160		SAA @ 155' gravel up to 5/8"		
SW					165		SAA @ 160 gravel up to 1 1/4" sand (Qtz, feld, lithics, caliche)		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐ SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KATFB-106S4					Logged By: Joshua Messenger			Page 6 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SW-SM	0.0				170		- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)		
							well graded sand with silt and gravel - light yellowish brown (10YR 6/4) loose, dry - sand 85%: F=25% M=50% C=25% SA-SR (Qtz, feld, lithics); silt 10% nonplastic; gravel 5% up to 3/8" (Qtz, lithics)		
SW					175		well graded sand with gravel - light yellowish brown (10YR 5/4) loose, dry - sand 90%: F=30% M=50% C=20% SA-SR (Qtz, feld, lithics) + caliche) gravel 10% up to 3/8" (Qtz + lithics) + caliche)		
SW	0.0				180		well sm SAA @ 175' sand - F=35% M=40% C=35% gravel 15% up to 1/2" (Qtz + lithics)		
SW					185		SAA @ 180'		
SW	0.0				190		SAA @ 185' sand 80%: F=30% M=50% C=20% gravel 20% up to 1" (Qtz + lithics) no caliche in sand		
SP					195		poorly graded sand with gravel - light yellowish brown (10YR 6/4) loose, dry - sand 80%: F=80% M=20% SA-SR (Qtz, feld, lithics) sm gravel 20% up to 1/2" (Qtz + lithics)		
SP-SM	0.0				200		poorly graded sand with silt - brown (10YR 5/3) loose, dry, moist - sand 90%: VF=15% F=60% M=25% SA-SR (Qtz, feld, lithics); silt 10% nonplastic		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106 S4					Logged By: Joshua Messenger		Page 7 of		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SW					205		-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SW	1.8				210		well graded sand w/ gravel - light yellowish brown (10.1R 6/4) loose dry - sand 85% : F=35% M=45% C=80% SA-SR (Qtz, feld, lithics); gravel 15% up to 1/2" (Qtz, lithics)		
SW					215		SAA @ 205' sand 45% F=15% M=70% C=15% gravel 5% up to 1/2"		
SW					220		SAA @ 210' sand 90% F=10% M=60% C=30% gravel 10% up to 3/8" yellowish brown (10.1R 5/4)		
SW	0.7				225		SAA @ 215' gravel up to 1/2"		
SW					230		SAA @ 220' sand 85% F=30% M=40% C=30% gravel 10% silt 5% nonplastic		
SP	0.8				235		poorly graded sand with gravel - yellowish brown (10.1R 5/4) loose, moist - sand 95% F=30% M=80% SA-SR (Qtz, feld, lithics, caliche); gravel 5% up to 5/8" (Qtz, lithics caliche) - sand has trace coarse grained.		
SP					237.5		SAA @ 230' brown (7.5YR 5/4) - no gravel sand 100%		
GN							@ 237' drill chatter @ 238' well graded gravel with sand - gravel 75% up to 1" sand 25% well graded		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10654					Logged By: Joshua Messenger			Page 8 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SP	0.7				240		poorly graded sand w/gravel - pale brown (10YR 6/3) loose, dry - sand 80% : F = 90% M = 10% trace coarse grain - SA-SR (qtz, feld, lithics) gravel 20% up to 1/2" (qtz + lithics)		
SW					245		@ 243' - well graded gravel up to 1.5" silty sand - brown (10YR 5/3) loose, moist sand 65% : VF = 20% F = 25% M = 55% SA-SR (qtz, feld, lithics); silt 35% non plastic		
SM					250		silt with sand and trace gravel - dark yellowish brown (10YR 4/6) soft, moist - silt 85% non plastic sand 15% : VF = 70% F = 30% SA-SR (qtz, feld, lithics) trace gravel up to 1/4" (lithics)		
SP-SM	0.7				255		SAA @ 250' sand w/silt - sm silty sand with gravel - yellowish brown (10YR 5/4) loose, moist - sand 85% : VF = 20% F = 50% M = 25% C = 5% SA-SR (qtz, feld, lithics, caliche); silt 10% non plastic; gravel 5% up to 1/2" (lithics + caliche)		
MO	0.5				260		silt with sand and trace gravel - dark yellowish brown (10YR 4/6) soft, moist - silt 90% non plastic sand 10% : F = 95% M = 5% SA-SR (qtz + lithics) trace gravel to 3/8" (lithics)		
SP					265		well graded poorly graded sand - yellowish brown (10YR 5/4) loose, dry - sand 100% : 100% fine - trace medium - SA-SR (qtz, feld, lithics)		
SP	0.6				270		@ 269' drill chatter SAA @ 265'		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

Logged By:

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USCS Soil Type		PID Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details			
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)				
SC						275		clayey sand - dark yellowish brown (10YR 3/6) soft, moist - sand 65% : F = 70% M = 30% SA-SR (Qtz, feld, lithics) - clay 35% slightly plastic - clay coats sand grains				
SC	1.1					280		SHA @ 275' sand 70% clay 30%				
SP-SM						285		poorly sorted @ 284' drill chatter well graded sand with silt - brown (10YR 4/3) loose, moist - sand 90% : F = 95% M = 5% SA-SR (Qtz, feld, lithics) - silt 10% non plastic				
SW	0.8					290		well graded sand w/gravel - yellowish brown (10YR 5/4) loose, moist - sand 85% : F = 40% M = 40% C = 20% SA-SR (Qtz, feld, lithics) - gravel 15% up to 3/4" (Qtz + lithics)				
SW						295		SAA @ 290' sand 35% F = 20% M = 40% C = 40% gravel 15% up to 1"				
SW	2.1			P		300		well graded sand w/gravel and clay - light yellowish brown (10YR 6/4) loose, dry - sand 60% : F = 10% M = 40% C = 50% SA-SR (Qtz, feld, lithics); gravel 35% up to 1" (Qtz + lithics) - clay 5% nonplastic @ 304' drill chatter				
GW						305		well graded gravel w/sand - light yellowish brown (10YR 6/4) loose, dry - gravel 80% up to 1.5" (Qtz + lithics) - sand 20% : F = 30% M = 35% C = 35% SA-SR (Qtz, feld, lithics)				

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID:					Logged By:			Page 10 of	
USCS Soil Type	PTD Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
GW	0.7				310		SAA @ 305' gravel up to 2"		
GW					315		SAA @ 310' gravel 70% sand 30%		
GW	0.3				320		well graded sand w/ gravel - dark yellowish brown (10YR 4/4) loose, moist - sand 90% F = 60% M = 25% C = 15% SA-SA (Qtz, feld, lithics) gravel 10% up to 2" (lithics + Qtz)		
SP					325		poorly graded sand with gravel - yellowish brown (10YR 5/4) loose, moist - sand 95% F = 80% M = 20% fine coarse sand - SA-SA (Qtz, feld, lithics) gravel 5% up to 1" (Qtz + lithics)		
GW	0.7				330		well graded gravel w/ sand - yellowish brown (10YR 5/4) loose, moist - gravel 60% up to 5/8" (Qtz + lithics) sand 40% F = 25% M = 35% C = 40% SA-SA (Qtz, feld, lithics) @ 334 drill chatter		
GW					335		SAA @ 330'		
GW	0.7				340		SAA @ 335' gravel 55% sand 45% ARCH TD = 340'		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 11/1/18	
Boring/Well ID: SONIC Portion of KAFB10654					Logged By: LAW ANDRESS			Page 1 of 1	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW	3.1		N				340	Sand w/ gravel, brown (7.5 YR 5/3), loose, slightly moist, well graded - F 10% M 60% C 20% G 10% up to 1 3/4", occasional cobbles up to 4" - SA/SR Qtz, fld, lith, g, granitic	
SW		25.9°C	N				341		
							342	coarseening downwards SAA @ 340' w/ trace silt F 10% M 30% C 40% G 20% up to 2" - SA/SR Qtz, fld, lith - coarse sandstone conglomerate	
SW		27.8°C	N				343	@ 343 SAA @ 340' gravel smaller up to 1 1/2", no cobbles F 10% M 40% C 30% G 20% up to 1/2" SA/SR Qtz fld lith	
SW			N				344		
							345	SAA @ 340' - trace silt F 10% M 40% C 25% G 25% up to 2.5" SA/SR Qtz, fld, lith	
SW		41.6°C	N				346		
SP			N				347	Sand, brown (7.5 YR 6/3), loose very slightly moist, poorly graded - fine grained	
SW		33.6°C	N				348	@ 347 - sand, yellowish brown (10 YR 5/4) - loose, very slightly moist, well graded F 20% M 20% C 40% G 20% up to 2" - SA/SR Qtz, fld, lith	
SW		38.1°C	N				349	sand - pale brown (10 YR 6/3) very slightly moist, loose, well graded F 10% M 20% C 40% G 30% up to 3" SA/SR Qtz, lith, fld	
Additional Comments:									
Recovery: None ☐ ☒ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz lith = lithic fld = feldspar Y = Yes N = No Mod = moderate									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse G = gravel									



Project: Kirtland BFF

SONIC CORING BORING/WELL CONSTRUCTION LOG

Boring/Well ID: SONIC - KAFB - 10654

Project Number: 62735DM02.1017

Date: 11/1/18

Logged By: Lane Andrews

Page 2 of 2

Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily)
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW	3.8	38.1°C	N				348	SAA @ 348'	
SW							351	SAA @ 348' - 351'	
SW		34.4°C	N				351		
SW							352	@ 351 - 351.5 - Gravel w/ silty sand light brown (7.5YR 6/3) loose, well graded, slightly moist - silt ~ 10% F 10% M 5% C 15% G 60% up to 3" at 2, 1 thickness, fld	
SW							352	@ 351.5 - silty sand (fine grained) & minor clay - brown (7.5YR 4/3) dense, slightly moist - silt ~ 10% clay ~ 5% F 15% M 20% C 15% G 60% up to 3" SALS at 2, 1 thickness, fld	
SW		34.8°C	N				353	352 - 353.5 - gravel w/ sand - brown (7.5YR 5/3), loose, slightly moist, well graded F 5% M 20% C 15% G 60% up to 3" SALS at 2, 1 thickness, fld	
SW							354	@ 353.5 - sand w/ gravel - brown (7.5YR 5/3) loose, slightly moist, well graded - trace M 20% C 50% G 30% up to 2" - SALS at 2, 1 thickness, clay nodules	
SW							355	sand w/ gravel - light brown (7.5YR 6/3), loose, slightly moist, well graded F 20% M 25% C 40% G 15% up to 1" SALS at 2, 1 thickness, fld	
SW		39.7°C	N				356		
SW							357		
SW		20.1°C	N				358		
								core bag not opened - saved for potential sampling	

Additional Comments:

Recovery: None ☐ Complete ☒ Partial ☒ Complete ☒
SAA = Same as Above Qtz = quartz Fld = feldspar H = 1/4" Y = Yes N = No Mod = moderate
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
R = Rounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/1/18

Boring/Well ID: KAFB-10654

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
GW							358	gravel w/ sand - brown (10YR 5/3) loose, slightly moist well graded	
GW	2.1	22.4°C	N				359	F5% M10% C25% G60% up to 2" SA/SE lotus, Qtz, fld	
GW							360		
GW							361	SAA - different %s:	
GW		24.8°C	N				361	F0% M5% C15% G80% up to 2.5" SA/SE lotus, Qtz, fld	
GW			N				362	one 6" clayey nodules w/ organics (black red) & lotus gravel up to 1/2" coal? 650120? up to 3mm	
GW							362	less fines w/ depth	
GW		36.0°C	N				363	SAA @ 360'	
SP							363	@ 363 abrupt change to sand - light brown (7.5YR 6/3) loose, slightly moist, poorly graded - fine G(3)	
SW			N				364	@ 364.5 sand as above well graded w/ gravel	
SW							364	F20% M70% C10% G trace up to 1" - SA/SE Qtz lotus	
SW							364	gravel w/ sand - brown (7.5YR 5/3) - loose, slightly moist - well graded	
SW			N				365	F10% M20% C10% G60% up to 2" - SA/SE Qtz fld lotus	
SW		31.8°C					365	@ 364.5 sand brown (7.5YR 5/2) loose, slightly moist, well graded	
SW			N	Pe.			366	F10% M20% C10% G60% up to 1" SA/SE 10% Qtz fld lotus	
SW							366		
SW		50.9°C	N				367	sand w/ gravel - brown (7.5YR 5/3) - loose, slightly moist, well graded	
SW							367	F5% M45% C40% G10% up to 1" - Qtz red clay nodules up to 1" fld	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/1/18

Boring/Well ID: KAFB-10654

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
SW	6.8	50.5	N				367	@ 367 - sand w/ gravel - brown (7.5YR 5/3) - loose, slightly moist, well graded F 20% M 20% C 30% G 30% up to 2.75" SA/SE Qtz, lithics, fld	
SP		56.6	N				368	Sand, brown (7.5YR 5/3), loose to moderately dense, slightly moist, poorly graded - fine grained	
SP	5.7	56.6	N				369		
SW		55.5	N				370	Sand - light brown (7.5YR 4/3) - loose, slightly moist, well graded F 5% M 40% C 60% G 15% up to 1" SA/SE @ 371 SAA - diff %'s: Qtz, fld, lithics	
SW		54.3	N				372	F 20% M 80% C 20% G trace as above Sand light brown (7.5YR 6/3) loose, slightly moist, poorly graded - fine grained - trace silt	
SP		54.3	N				373	@ 373 - 272.75 ft - sand, light brown (7.5YR 6/3) loose, slightly moist - well graded - trace silt F 40% M 40% C 20%	
SW		50.0	N				374	Sand - brown (7.5YR 5/3) loose, slightly moist, well graded - F 60% M 20% C 20% G trace up to 1/2" A/SA lithics	
SW		50.0	N				375	@ 375 SAA - different %'s: F 15% M 25% C 30% G 70% up to 1" SA/SE Qtz, fld, lithics	
							376		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
 R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG

Date: 11/1/18

Project Number: 62735DM02.1017

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Project: Kirtland BFF

Boring/Well ID: CAFB-10654

Logged By: Lane Andress

Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily)
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description
SW							376	Sand, brown (7.5 YR 5/3) - loose, slightly moist, well graded
SW		21.6°C	N				377	F 20% M 20% C 40% G 20% up to 1.5" SA/SR Qtz, feldspar, feldspar Some gravel are reddish yellow sandy clay Nodules up to 1"
SW			N				378	Sand, brown (7.5 YR 5/3) - loose, slightly moist, well graded - very coarse
SW		21.4°C	N				379	F 10% M 20% C 50% G 20% up to 1.5" SA/SR Qtz, feldspar, feldspar - reddish brown sandy clay pieces up to 1"
SW	6.7	21.4°C	N				380	@ 379.5 - sand brown (7.5 YR 5/3) - loose, slightly moist, well graded F 20% M 40% C 20% G 20% up to 1.25" as above
SW		23.9°C	N				381	Sand as above different %s: F 40% M 25% C 20% G 15% up to 1.5" - SA/SR Qtz, feldspar, feldspar
SW			N				382	Core log not opened - send for potential sampling
SW		23.6°C	N				383	
SW			N				384	
SW/GW		28.0°C	N				385	Gravelly sand - brown (7.5 YR 5/3) loose, slightly moist - well graded F 5% M 15% C 30% G 50% up to 1.75" SA/SR Qtz, feldspar, feldspar, granite

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above

Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Mod = Moderate

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subangular, A = Angular, VF = Very Fine, M = Medium, C = Coarse

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G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/1/18

Boring/Well ID: KAFB-10654

Logged By: Lane Andress

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
GW/SW		26.0°C	N		10'		385	SAA @ 384'	
SW							385.5	@ 385.5 - sand w/ gravel - brown (7.5 YR 5/3) loose, slightly moist, well graded - F 30% M 15% C 45% G 10% up to 1" S&A/SE are feldspar	
SW		24.7°C	N				386	sand w/ gravel - brown (7.5 YR 5/2) loose, slightly moist, well graded	
SW							387	F 15% M 25% C 40% G 30% up to 2" S&A/SE are feldspar, feldspar, granite	
SW							388		
SP		27.1°C	N				388.5	SAA @ 388' to 388.5 then sand grayish brown (10 YR 5/2) loose, slightly moist, poorly graded - fine grained to 389.5	
SW	613				10'		389		
SW		27.1°C	N				389.5	@ 389.5 ft sand w/ gravel - (brown 7.5 YR 4/3) loose, slightly moist, well graded - F 5% M 20% C 55% G 20% up to 1.5" S&A/SE are feldspar, feldspar, granite	
SW		35.2°C	N				390	SAA to 390.5 then a lens of med to well indurated carbonate cemented conglomerate sand & gravel	
SW							391	light brown (7.5 YR 4/3) - F 20% w/ HCl F to C graded w/ gravel S&A/SE up to 1" - broken up by drilling	
SW							392	@ 391.75 - sand - brown (7.5 YR 5/3) - loose, slightly moist, poorly graded - fine grained	
SP							393	SAA AS 391.75' - 393'	
SW		39.0°C	N				393	@ 393' - sand, coarse - brown (10 YR 5/3), loose, slightly moist - well graded -	
SW							394	F 20% M 10% C 40% G 30% up to 1" S&A/SE are feldspar, feldspar, granite	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/2/18

Boring/Well ID: KAFB-10654

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
SW							394	SAA @ 393' slightly more c grains, less fines	
SW							395		
SW							396	@ 395.25 - SAA (~20%) w/ clay clods up to 1/4" - 1/2" clay reddish brown (5YR 5/4) - loose slightly moist medium plasticity - clods have dark brown organics (wood?) up to 1" inside - light gray carbonate cement visible on sand & gravel surrounding clay clods	
No Recovery							397	396-397.5 - No Recovery 10 ft Run from 396-406 fell out of core barrel was re-retrieved & there fore disturbed & over temperature due to re-retrieval down hole loose sediment fell out of core barrel trying to load core bags	
SM							398	@ 397.5 - silty sand w/ gravel - brown (7.5YR 4/2) - loose slightly moist, well graded	
SM							399	Silt 20% F15% M40% C15% G10% up to 3/4" SA/SR Qtz fll lithes	
SW							400	SAA to 398.25 then sand brown (7.5YR 5/2) - loose, slightly moist - well graded	
SP							401	Silt 10% F20% M25% C25% G20% up to 1" - SA/SR Qtz fll lithes	
No Recovery							402	@ 399 - sand brown (7.5YR 5/2) - loose, slightly moist - poorly graded - medium grained trace silt, trace coarse grains	
SW							403	No Recovery 400'-401' - fell out of core bag while trying to fill	
SW							404	Sand - brown (7.5YR 5/3) - loose slightly moist, well graded -	
SW							405	F10% M40% C40% G10% up to 1.5" SA/SR Qtz fll lithes granite - gneiss	

Additional Comments:

Recovery: None ☐

Complete Partial ☒

Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No / None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse G = gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG										Date: 11/2/18
Project: Kirtland BFF					Project Number: 62735DM02.1017					Page 18 of
Boring/Well ID: LAFB-10654					Logged By: Lane Andress					
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details	
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
no recovery							403	No Recovery 403-404 - fell out of core bag while trying to fill.		
SP	8.7		N				404	sand brown (7.5 YR 5/3) - loose, slightly moist, poorly graded 95% fine 5% medium trace coarse gravel		
SP		48.3°C	N				405	@ 405.25 clay clods as above at 395-25 - (No sandstone/conglomerate) w/ carbonate staining on sand/gravel -		
SW		50.0°C	N				406	sand-brown (7.5 YR 5/3) loose, slightly moist, well graded		
SW		50.0°C	N				407	F 55% M 30% C 15% trace gravel up to 1/8"		
SW		50.0°C	N				408	SA/SR - Qtz lithic, feldspar & reddish sandy clay pieces - dense non-plastic		
SW		50.0°C	N				409	@ 407.75 sandy clay - light moist, dense - weak plastic		
SW		56.7°C	N				410	sand & gravel - (brown 7.5 YR 5/3) loose, slight moist well graded - F 70% M 10% C 30% G 60% up to 1" SA/SR		
SW	6.8	56.7°C	N				411	@ 409.75 sandy clay - reddish brown to YR 5/4 - medium grained - light moist, dense - weak plastic	409.9	
SW		31.0°C	N				412	sand 7.5 YR 5/3 brown loose, slightly moist, well graded - mostly fine to very fine grained		
SW	6.9	31.0°C	N					VF 40% F 50% M 5% C 25%		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/2/18

Boring/Well ID: KAFB-10654

Logged By: Lou Andress

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP							412	sand, brown (7.5 YR 5/2) slight moist poorly graded fine grained trace coarse sand @ 412.5 - sand, brown (7.5 YR 5/2) loose slight moist well graded -	
SW		28.4°C	N				413	F 30% M 20% C 20% G 30% up to 2.5" S4/SR at 2.1 inches, fld	
SW	7.8	28.4°C	N				414		
SW		29.4°C	N				415	sand - brown (7.5 YR 5/2) loose, slightly moist, well graded - F 10% M 40% C 40% G 15% up to 1" Qtz lith, feldspar SA	
SW		24.2°C	N	V, P			416	sand w/ gravel, brown (7.5 YR 5/3) loose, slightly moist, well graded F 15% M 30% C 40% G 15% up to 1.5" S4/SR at 1.5 inches fld spw	
SW		26.0°C	N				417		
SW		26.0°C	N				418	sand - brown (7.5 YR 5/3) loose, slightly moist well graded F 70% M 60% C 20%	
SW		26.0°C	N				419		
SW	7.7	35.2°C	N				420	sand - brown (7.5 YR 5/2) loose, slightly moist, well graded - F 30% M 40% C 30%	
		49.6°C					421		

Additional Comments: Disturbed core - fell out of core barrel on retrieval from bore hole & was re-retrieved from through core that fell off of core barrel

Recovery: None ☐ Partial ☒ Complete ☒
 SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None flds - feldspar
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
 R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/3/18

Boring/Well ID: KAFB-10654

Logged By: Lore Andres

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW		49.6°C	N				421	@ 421-421.25 - clay like - brown (7.5 YR 5/3) Plastic	
SW							422	@ 421.25-422 - sand, brown (7.5 YR 5/2) Loose, slightly moist - well graded, pinkish gray, VF 20% F 10% M 30% C 45% G 5% trace fld	
SW							423	Sand brown (7.5 YR 6/2) slightly moist, Loose, well graded - Loose, slightly moist, SAA @ 421.25 to 422.25	
SW		53.6°C	N				424	@ 422.25 - sand brown (7.5 YR 5/2) - Loose, slightly moist, well graded F 10% M 40% C 45% G 5% trace fld	
SW							425	Sand - brown (7.5 YR 5/2), Loose, slightly moist, well graded VF 10% F 5% M 25% C 50% G 10% up to 1.5" SA/SR are fld	
SW		60.2°C	N				426	Sand grayish brown (10 YR 5/2) - Loose, slightly moist, well graded VF 50% F 20% M 20% C 20%	
SW		66.6°C	N				427	@ 427.25 - sand w/ gravel (brown 7.5 YR 5/2) - Loose, slightly moist, well graded	
SW							428	Trace M 20% C 50% G 30% up to 2.5" SA/SR are fld	
SW		55.6°C	N				429	Sand w/ gravel - brown (7.5 YR 5/2) - Loose, slightly moist - well graded	
SW	4.8		N				430	F 5% M 20% C 50% G 25% up to 2" SA/SR are fld, lithic g Rn it	

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

SA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 11/3/18	
Boring/Well ID: KAFB-10654					Logged By: Lane Address			Page 21 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							430	soil type: Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		31.2°C	N				431	Sand w/ gravel & cobbles - brown (7.5YR 5/2) - loose Slightly moist well graded VF 10% F 20% M 20% C 15% G 30%	
SW		31.2°C	N				432	cobbles 5% - SA/SR Qtz fld 1 thick 5 reddish brown silty clay pries up to 1"	
SW		38.2°C	N				433	SAA @ 433 core gravel at weathered sand converted coarse grains up to 1/4"	
GW		38.2°C	N				434	@ 433 - Gravel w/ sand brown (7.5YR 5/3) - loose Slightly moist well graded w/ sandy clay clumps up to 1/4" F 5% M 10% C 25% G 60% up to 2" SA/SR clumps are 1/2" to 1" plastic	
GW		46.7°C	N				435	SAA @ 433 @ 433.5 - gravel w/ sand - pinkish gray (7.5YR 6/1) - loose Slightly moist well graded F 5% M 10% C 25% G 60% up to 2" SA/SR SA/SR Qtz fld in thin granular does not freeze w/ HCl	
CL		65.2°C	N				436	CLAY, pale brown (10YR 6/2) w/ some red clay spots - dense plastic slightly moist w/ moist lenses - coarse when wetted	
CL		65.2°C	N				437	Sand mixed w/ clay 436-436.25	437
CL		Yost	N				438	SAA @ 436.25	
							439		438.9 439

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/3/18

Boring/Well ID: KAFB-10654

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL		46.5°C	N				439	Clay as above at 436.25 to 439.5 then trace very fine sand in the clay	
CL		47.9°C	N				440	SAA @ 439.5 to 441.25 - tan clay tight w/ minor fine sand brown (7.5YR 6/3) - dense w/ soft lenses, slightly moist - slightly plastic lenses; dense clay mod plastic	
CL		47.9°C	N				441		
CL		47.9°C	N				442		
SN		53.3°C	N				443	sand - brown (7.5YR 5/3), loose, slightly moist, well graded - F15% M50% C30% G5% up to 1/2" S&SR qtz fls, lithes	
SM		53.3°C	N				444	@ 443.5 - silt w/ fine sand & trace clay - light brown (7.5YR 6/3) very dense, moist, weakly plastic -	443.3
SM		39.7°C	N				445	SAA @ 443.5 ft - w/ lenses of increased clay (<5%)	
SM		39.7°C	N				446		
SW		53.1°C	N				447	sand w/ gravel & cobbles (brown 7.5YR 5/2) - loose, slightly moist, well graded gravel up to 3" cobbles up to 3.5" S&SR qtz, lithes, fld some dense lenses of sand - moist, cemented %'s grading from M10% to VF60% F70% C30% G trace to VP20% F40% M20% C10% G10% cobbles trace	446
SW		53.1°C	N				448		
Additional Comments: 7 ft core run from 446-453 was very disturbed - difficulty retrieving core - it fell out of core barrel several times before it was successfully retrieved.									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/3/18

Boring/Well ID: KAEB-10654

Logged By: Lane Anderson

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP							448	fine-bran (10YR 5/2) loose, slightly moist, poorly graded	
SP							449	SAA @ 449.5 occasional trace silt in clumps < 5% up to 2"	
SP							450	SAA at 449.5 ft - silty clumps up to 4" - mod dense to dense occasional gravel up to 1" SR lumps	
SP							451		
SP							452		
SP							453	SAA @ 450' w/ greater density/undulation can still break apart w/ fingers w/ moderate pressure	
SW							454	@ 453 - sand dark grayish brown (10YR 4/2) wet, dense, well graded VF 10% M 20% C 10%	
SW							455	Sand - dark grayish brown (10YR 4/2) - dense to very dense, well graded VF F M C	
SW							456	@ 455.5 silty clay nodules up to 4" ~ 40% clay brown (10YR 4/3) & 1" stringers of dark clay	
SW							457	SAA @ 455.5 - clay nodules have black specks of organic material up to 1/4"	

Additional Comments: 7 ft core run from 446-453 was very disturbed - see p. 22 note

7 ft core run was disturbed core from 453 to 457 - core from 457-460 is undisturbed

Recovery: None ☐Partial ☒Complete ☒

N = No/None

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 11/4/18

Boring/Well ID: KAFB-10654

Logged By: Lm Andress

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL		24.4°C	22.4°C				457	457 - Sandy clay brown (10YR 5/3) - dense, moist, non plastic	
CL		22.4°C	22.4°C				458	458 - 458.5 - Dense clay brown (7.5YR 5/3) moist - very dense, plastic	
CL		22.4°C	22.4°C				459	458.5 - Sandy clay as above at 457'	
CL		22.4°C	22.4°C				460		
SP		31.4°C	N				461	Sand brown (7.5YR 5/2) slightly dense, moist, poorly graded - ~20% dense silty/clayey (Noches up to 2")	
SP		31.4°C	N				462	461 - sand as above	
SW		35.7°C	N				463	VF 70% F 20% M 5% C 5% G trace up to 1" SF loams	
SW		35.7°C	N				464	SAA @ 461'	
GW		23.1°C	N				465	463.5 - gravelly sand, brown (7.5YR 5/3), moist loose to slightly dense, well graded medium	
GW		23.1°C	N				466	F 5% M 10% C 25% G 60% up to 2" 10% SF 5% SP 2% at 2' loams fld	
GW		23.1°C	N					SAA @ 463.5 No odor	

Additional Comments:

Recovery: None ☐

Partial ☐

Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date: 11/9/18		
Boring Well ID: CAPB-106-54					Logged By: Lane Andres		Page 25 of		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								Well Details	
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW	15.6						466	Sand - brown (7.5YR 5/2), loose, slightly moist, well graded	
SW		28.5°C		V.P.			467	F 40% M 30% C 30% G trace up to 1" SA/SR Luthus	
SW							468	H-C odor 466-468' @ 467.5 SAA w/ diff % F 20% M 25% C 25% G up to 2.75" SA/SR Qtz, Luthus, fld, gran.	
SW	34.7	32.5°C					469	Sand w/ gravel - brown (7.5YR 5/3) - loose, moist, well graded F 10% M 30% C 40% G up to 3" trace cobbles up to 1" SA/SR Qtz, Luthus, fld, gran.	
SW							470	465 SAA @ 468' - no cobbles, coarser %'s - H-C odor F 10% M 30% C 40% G up to 2"	
SW	52.8	23.9°C					471	Sand w/ gravel - brown (7.5YR 4/3) - loose, wet, well graded H-C odor F 5% M 25% C 40% G up to 1.5" SA/SR Qtz, Luthus, fld - clay pieces - light to med dense	
SP							472	Sand - brown (7.5YR 4/2) - loose to med dense, wet, poorly graded - fine grained - trace M/C H-C odor	
SW		23.9°C					473	@ 471 - Sand, brown (7.5YR 4/2) - loose to med dense, wet, well graded - H-C odor F 20% M 70% C 10% trace clay pieces up to 1/3" soft weakly plastic	
SW							474	Gravel w/ sand - brown (7.5YR 5/2) - loose to medium dense - wet - well graded - H-C odor F 30% M 40% C 20% G up to 2" SA/SR Qtz fld Luthus, granite	
SW		22.8°C					475	gravel w/ sand - brown (7.5YR 5/2) - loose - wet, well graded H-C odor F 5% M 5% C 30% G up to 2" one cobble SA/SR - Qtz, fld, Luthus 4" x 3"	
SW		26.5°C					475		

Additional Comments: Disturbed, bag broke getting sample from core barrel

H-C = Petroleum hydrocarbons

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Drilling Company: Cascade					Start Time/Date: 11/9/18 @ 145/18				
Lead Driller: Roger Rodriguez					Completion Time/Date:				
Drilling Method: Sonic					Final Depth:				
Casing Diameter OD:					Bit Type and Outer Diameter				
Boring/Well ID: KAEB-10654					Logged By: Lane Andress Page 26 of				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW		20.5°C	N		7		476	-- soil type: Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
		21.2°C	Y	GVV			477	sand w/ gravel - brown (7.5YR 5/2) - wet, loose, well graded - H-C odor F 10% M 15% C 35% G 40% up to 1.5" SA/SR atz fld, lithics, clay pebbles	
		21.2°C	Y				478	core bag not opened - UV fluorescence on screen in water in bag - sent to PTS for CNARL transmissivity	
GW	1432	21.1°C	N				479	Gravel w/ sand brown (7.5YR 5/2) medium dense wet well graded H-C odor F 5% M 10% C 20% G 65% up to 2" SA/SR atz fld, lithics, gravel	
SW	74.4	21.9°C	N				480	Gravel sand w/ gravel brown (7.5YR 5/2) wet well graded - mod dense - H-C odor F 5% M 25% C 30% G 40% up to 2.5" SA/SR atz fld lithics	
SW		21.9°C	N				481	@ 480.5 - SAA - different %'s: H-C odor F 10% M 40% C 30% G up to 1" SA/SR	
SW		22.7°C	N				482	Sand w/ gravel - brown (7.5YR 4/2) medium dense to loose - well graded - H-C odor F 30% M 20% C 30% G 20% up to 1" R/SR atz lithics, fld	
SW		22.7°C	N				483	@ 482 - large rubble of sandstone conglomerate w/ gravel up to 5" in it - Fizzes w/ HCl's carbonate cement will disintegrate - gravel falls out easily @ 482 - SAA @ 481 - minor silt in matrix - different %'s: F 15% M 10% C 45% G 30% up to 2" as above	
Additional Comments:									
H-C = petroleum hydrocarbon									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No mod = moderately									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel									

EA BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Drilling Company:					Start Time/Date: 11/5/16				
Lead Driller:					Completion Time/Date:				
Drilling Method:					Final Depth:				
Casing Diameter OD:					Bit Type and Outer Diameter				
Boring/Well ID: VAFB-10654					Logged By: Lane Address Page 27 of				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run Recovery	Depth, ft bgs	Soil Description	Well Details	
SW	3271	22.0°C	N			483	Sand w/ gravel - dark gray (7.5 YR 4/1) - medium dense wet well graded - strong H-C odor -		
						484	F 20% M 70% C 10% Gravel - trace silt & are lithic fld		
SW		22.4°C	N			485	Sand brown (7.5 YR 5/2) dense, wet, well graded strong H-C odor		
						486	F 30% M 20% C 70% G 30% up to 1" silt & SR are lithic, fld		
SW	3028	22.5°C	Y			487	core not opened - sent to PTS for LNAPL + transmissivity & W analysis		486
		22.5°C	Y			488			488
SW		24.0°C	N			489	Sand w/ gravel - brown (7.5 YR 5/2) wet, dense, well graded strong H-C odor -		
						490	F 5% M 15% C 80% G 30% up to 1" SR/silt are fld lithic		
SW	1608	24.0°C	N			491	@ 489.5 - sand as above - different %'s: F 10% M 40% C 20% G 30% up to 1" as above		
		24.7°C	N			491	Sand - brown (7.5 YR 5/2) - wet, dense, well graded - strong H-C odor		
							F 20% M 30% C 30% G 20% up to 1/2" silt & SR are fld lithic		
Additional Comments: Fell out of core barrel run from 476-486' & re-retrieved w/ core barrel run from 483-493.									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel									

BORING/WELL CONSTRUCTION LOG										
Project: Kirtland BFF					Project Number: 62735DM02.1017					
Drilling Company:					Start Time/Date: 11/5/18					
Lead Driller:					Completion Time/Date:					
Drilling Method:					Final Depth:					
Casing Diameter OD:					Bit Type and Outer Diameter					
Boring/Well ID: CAFB-101.54					Logged By: Lou Andreas					
Page 128 of 29										
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description		Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SW	214	24.2	N				491	SAA @ 491 - slightly fine grained		
		25.3	Y				492	492-493' core not opened sent to PST for LNAPL transmissivity & UV		
SW	1322	21.1	N				493	Sand, dark gray (7.5 YR 4/1) - dense, wet, H-C odor w/ a hint of an organic (sewage?) odor		
							494	F 60% M 30% C 30%		
SW		23.4	N				495	SAA @ 493' - some odors		
SW		23.4	N				496			
SW		23.1	N				497			SAA @ 493'
SW		23.1	N				498			
SW		23.4	N				499			SAA @ 493' - No organic odor
Additional Comments:										
Recovery: None ☐ Partial ☒ Complete ☐										
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No										
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity										
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel										

BORING/WELL CONSTRUCTION LOG										
Project: Kirtland BFF					Project Number: 62735DM02.1017					
Drilling Company: <u>Carcade</u>					Start Time/Date: <u>4/5/18</u>					
Lead Driller: <u>Roger Rodriguez</u>					Completion Time/Date:					
Drilling Method: <u>SCNLC</u>					Final Depth: <u>504 ft bgs</u>					
Casing Diameter OD:					Bit Type and Outer Diameter					
Boring/Well ID: <u>KATB-106.54</u>					Logged By: <u>Larry Andrews</u> Page <u>129</u> of <u>29</u>					
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description		Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SW	174.2	23.4°C	N				499	sand, brown (7.5 YR 4/2) dense, wet, well graded - H-C odor		
							500	F 80% M 15% C 10%		
SW							501	Sand w/ large gravel/cobbles - brown (7.5 YR 4/2) dense, wet well graded H-C odor		
SW	73.2	24.1°C	N				502	F 70% M 60% C 10% G 10% 2" up to 3" cobbles up to 4" SA/SR Qtz, lithics fld		
SW							503	Core art opened for sampling		
SW	71.4	25.8°C	N				504			
TD = 504.0 ft bgs										
KEY: Concrete - QUIKRETE Portland TYPE 1/11 Bentonite Grout - Halliburton 20% Solid QUIK-Grout Filter Pack 10/20 Pioneer Silica Sand Bentonite Seal - Halliburton 3/8" HOLEPLUG Native Soil/Slough 3" diameter blank PVC Sch. 80 3" diameter well screen Sch. 80 PVC 0.010 slot 3" diameter sump 24" long w/ 3" solid flat cap										
Additional Comments:										
Recovery: None ☐ Partial ☒ Complete ☐ Y = Yes N = No SAA = Same as Above Qtz = quartz Fld = feldspar Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel										

BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Drilling Company: <u>Cascade</u>					Start Time/Date: <u>10-5-18</u>				
Lead Driller: <u>Mark Green</u>					Completion Time/Date:				
Drilling Method: <u>ARCH</u>					Final Depth:				
Casing Diameter OD: <u>11 3/4" 9 5/8"</u>					Bit Type and Outer Diameter <u>Ken Claw 10 1/2" 8 1/2" miltooth + cone</u>				
Boring/Well ID: <u>KAFB-10655</u>					Logged By: <u>Joshua Messenger</u> Page 1 of 1				
USCS Soil Type	PID Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		Well Details
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
(SW)					1	HYDROKNUIFE	0-6" asphalt		
					2		6" - 8" sand with gravel - brown (7.5YR 5/4)		
					3		sand fine to coarse, well graded ~80%		
					4		gravel up to 2" - caliche & lithics ~20%		
					5				
(SM)					8	↓			
					10		silty sand - reddish brown (5YR 5/4) loose, moist sand 70% VF to C (feld, Qtz, Lithics) VF = 40% silt 30% nonplastic F = 40% sand is SA to SR M = 10% C = 10%		
(ML)					15		silt with sand - reddish brown (5YR 5/4) loose, moist silt 70% nonplastic sand 30% VF to M - VF = 60% F = 30% M = 10% (feld, Qtz, lithics) SA to SR		
	8.1				20		SAA @ 15' silt 80% sand 20% brown (7.5YR 5/4)		
(ML)					25		SAA @ 20' brown (7.5YR 5/4)		
					30				
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐ SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106S5					Logged By: Joshua Messenger			Page 2 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
(ML)	15.5				30		SAA @ 25' reddish brown (f. 5YR 5/4) - Jm (5YR 5/4)		
(MA)					35		silt with sand, clay and gravel - reddish brown (5YR 5/4) loose moist silt 80% slightly plastic; sand 10% VF = 75%; F = 20%; M = 5% (qtz, feld, lithics) SA to SR gravel in clay 5% slightly plastic; gravel 5% up to 1/2" (qtz & lithics) SA to SR - clay exists in nodules		
(ML)	9.5				40		SAA @ 35' gravel to 3/8" clay nodules		
(ML)					45		SAA @ 40' clay nodules		
(ML)	1.4				50		SAA @ 40' no clay - silt 85% sand 10% gravel 5% up to 3/8"		
(ML)					55		SAA @ 50' gravel up to 5/8" SA to SR silt 75% slightly plastic sand 20% F = 60% M = 30% C = 10% SA to SR		
(SW)					60		Sand with gravel - brown (7.5YR 5/4) loose moist sand 85% F = 10% M = 40% C = 50% SA to SR (qtz, feld, lithics); gravel 15% up to 3/8" SA to SR (qtz, lithics) sand well graded		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106 S5					Logged By: Joshua Messenger			Page 3 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
ML					65		silt with sand - reddish brown (5YR 5/4) loose, moist silt 90% slightly plastic sand 10% VF = 40% F = 30% M = 30% SA to SR (Qtz, feld, lithics)		
ML	31.9				70		SAA @ 65' reddish brown (5YR 5/3) silt 85%, sand 10%, clay 5% exists as nodules		
					75		NO CUTTINGS RETURNED		
ML	2.0				80		SAA @ 70' reddish brown (5YR 5/4) clay nodules		
ML					85		SAA @ 80' clay nodules		
ML	3.0				90		SAA @ 85' silt 80%, sand 15%, clay 5%		
ML					95		SAA @ 90' silt with sand and gravel - NO CLAY silt 80% sand 15% gravel 5% up to 3/8" gravel SA to SR (Qtz + lithics)		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐ SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

65



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SS

Logged By: Joshua Messenger

Page 4 of

Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details
ML	5.0				100	100% SM	silt with sand - reddish brown (5YR 5/4) loose, moist silt 90% slightly plastic - sand 10% VF = 60% F = 30% M = 10% SA to SR (Qtz, feld, lithics)	
ML					105	105% SM	SAA @ 100' - VF = 60% F = 40% sand	
ML	2.9				110	110% SM	SAA @ 105'	
ML					115	115% SM	SAA @ 110'	
ML	1.0				120	120% SM	SAA @ 115'	
ML					125	125% SM	SAA @ 120 with 5% clay 85% silt 10% sand	
SM	1.0				130	130% SM	silty sand with gravel - reddish brown (5YR 5/4) loose, moist sand 80% VF = 15% F = 25% M = 35% C = 65% SA to SR (Qtz, feld, lithics); silt 15% slightly plastic; gravel 5% up to 1/2" (Qtz + lithics)	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biological; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10655					Logged By: Joshua Messenger			Page 5 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
CL					135	735 sm	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							clay with sand and trace gravel — brown (7.5 YR 5/4) slightly plastic — clay 90%; sand 7% VF=60% F=30% M=10% SA to SR (Qtz, feld, lithics), gravel 3% up to 1/2" (lithics) clay nodules up to 1"		
ML	0.9				140	740 sm	silt with clay — brown (7.5 YR 5/4) slightly plastic silt 90%; clay 10% no clay nodules		
ML					145	745 sm	SAA @ 140 — silt 80%; clay 20% clay nodules up to 1"		
ML	0.8				150	750 sm	SAA @ 140' silt 90%; clay 10% silt & clay nodules to 1"		
SP-SM					155	755 sm	sand with silt — reddish brown (5 YR 5/4) loose, moist sand 90% F=60% M=40% (Qtz, feld, lithics) SA to SR silt 10%, nonplastic poorly graded sand		
SP	1.6				160	760 sm	sand — brown (10 YR 5/3), loose — sand 100% F=60% M=40% poorly graded (Qtz, feld, lithics) SA to SR moist		
SW-SM					165	765 sm	sand with silt — brown (7.5 YR 5/4), loose, moist sand 90% — F=10% M=50% C=40% SA-SR (Qtz, feld, lithics, sm promice) — silt 10% nonplastic caliche		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10655					Logged By: Joshua Messenger			Page 6 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
(SW)	2.6				170		-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							sand - yellowish brown (10% SL), loose sand 100% - F = 40% M = 40% C = 20% SA-SR (qtz, feld, lithics (caliche)) well graded sand ~ moist		
(SW)					175		SAA @ 170'		
(SW)	1.5				180		SAA @ 175' with trace gravel up to 3/8" (lithics)		
(SW)					185		SAA @ 180' gravel 5% up to 1" (qtz + lithics)		
(SW)	1.3				190		SAA @ 185' gravel 5% up to 3/8" (qtz + lithics)		
(SW)					195		SAA @ 190'		
(SW)	0.9				200		SAA @ 195' trace gravel to 3/8" sand is well graded F = 30% M = 40% C = 30%		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 9 OCT 18	
Boring/Well ID: KAFB-10655					Logged By: Joshua Messenger			Page 7 of 7	
USCS Soil Type	PTD Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SW SM					205		Well graded sand with silt - brown (7.5 YR 4/4), loose sand 90%: F=30% M=40% C=30% SA-SR (Qtz, feld, lithics); silt 10% non plastic fine sand caliche moist		
SW	10.7				210		Well graded sand with trace gravel - brown (7.5 YR 4/4) loose - sand 97%: F=10% M=50% C=40% SA-SR (Qtz, feld, lithics); gravel 3% up to 3/8" (lithics) moist		
SW					215		SAA @ 210' No trace gravel sand is brown - (7.5 YR 4/4)		
SW SM	4.6				220		Well graded sand with silt and trace gravel - yellowish brown (10 YR 5/4) loose, dry - sand 90%: F=15% M=40% C=15% (Qtz, feld, lithics) SA-SR silt 10% non plastic; gravel trace up to 3/8" (lithics)		
GW					225		Well graded gravel with sand - yellowish brown (10 YR 5/4) - gravel 60% up to 5/8" (Qtz, lithics) sand 40%: F=20% M=30% C=50% SA-SR (Qtz, feld, lithics) dry		
SW	1.9				230		229' drill chatter Well graded sand with gravel - brown (7.5 YR 5/3) loose, moist - Sand 85%: F=10% M=50% C=40% (Qtz, feld, lithics, fine sand caliche) SA-SR; gravel 15% up to 1/2" (lithics)		
SP					235		poorly graded sand - light yellowish brown (10 YR 6/4) loose, moist - sand 100%: F=80% M=20% SA-SR (Qtz, feld, lithics, fine sand caliche)		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10655					Logged By: Jishua Messenger			Page 8 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
							- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)		
SP	4.1				240		SAA @ 235' sand is yellowish brown (10YR 5/4)		
GW					245		well graded gravel with sand - brown (10YR 5/3) loose, moist - gravel 85% up to 7/8" (Qtz + lithics) Sand 15%: F=10% M=40% C=50% SA-SR (Qtz, feld, lithics) - 248' drill chatter		
SW	6.2				250		well graded sand with gravel - brown (10YR 5/4) loose, moist - sand 95%: F=20% M=50% C=30% SA-SR (Qtz, feld, lithics) - gravel 5% up to 5/8" (lithics)		
SP-SM					255		poorly graded sand with silt - light yellowish brown (10YR 6/4) loose, moist - sand 90%: F=90% M=10% SA-SR (Qtz, feld, lithics) - silt 10% nonplastic		
SW	2.2				260		well graded sand with gravel - light yellowish brown (10YR 6/4) loose, moist - sand 80%: F=10% M=50% C=40% SA-SR (Qtz, feld, lithics, caliche fragments) - gravel 20% up to 3/8" (lithics + pumice)		
SW					265		SAA @ 260' gravel trace up to 3/8" sand: F=20% M=50% C=30%		
SW	4.9				270		SAA @ 265' no gravel		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-10655					Logged By: Joshua Messenger		Page 9 of		
USCS Soil Type	PTD Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SC					275		poorly graded sand with clay - yellowish brown (10YR 5/4) soft, slightly plastic - sand 70%: VF=20% F=40% M=30% SA-SR (Qtz, feld, lithics) - clay 30% slightly plastic		
SC	7.0				280		SAA @ 275' sand 80% clay 20%		
SP-SM					285		NO CUTTINGS RETURNED SM poorly graded sand with silt - yellowish brown (10YR 5/4) loose, moist - sand 90%: VF=20% F=50% M=30% SA-SR (Qtz, feld, lithics) - silt 10% non plastic		
SC					290		SAA @ 280' SM NO CUTTINGS RETURNED		
GW					295		well graded gravel with sand - brown (10YR 4/3) loose, moist - gravel 70% up to 3/4" (Qtz + lithics) sand 30%: F=20% M=50% C=30% SA-SR (Qtz, feld, lithics)		
SP	2.2				300		poorly graded sand with trace gravel - yellowish brown (10YR 5/4) loose, moist - sand 95%: F=85% M=15% SA-SR (Qtz, feld, lithics) - gravel 5% up to 1/2" (lithics)		
SP-SM					305		poorly graded sand with silt and trace gravel - yellowish brown (10YR 5/4) loose, moist - sand 90%: F=70% M=30% SA-SR (Qtz, feld, lithics) - silt 10% non plastic gravel trace - up to 3/8" (lithics)		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SS					Logged By: Joshua Messinger			Page 10 of	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
(SW)	2.3				310		Well graded sand with gravel - yellowish brown (10YR 5/4) loose, moist - sand 95%: F=40% M=40% C=20% SA-SR (qtz, feld, lithics) - gravel 5% up to 1/2" (lithics)		
(SW)					315		SAA @ 310' - sand 85%: F=10% M=50% C=40% - gravel 15% up to 3/8"		
(SW)	2.5				320		SAA @ 315' - sand 60%: F=20% M=65% C=15% gravel 40% up to 1"		
(SW)					325		324' drill chatter SAA @ 320'		
(SW)	2.4				330		329' drill chatter SAA @ 325' sand 90% F=30% M=45% C=25% gravel 10% up to 1"		
(SW)					335		SAA @ 330' sand 80% gravel 20%		
(SW)	2.6				340		SAA @ 335'		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106.55					Logged By: Joshua Messenger			Page 11 of	
USCS Soil Type	PTD Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SW					345		well graded sand - yellowish brown (10YR 5/4) loose, moist - sand 100%: F=20% M=70% C=10% SA-SR (Qtz, feld, lithics)		
SW	1.7				350		well graded sand with gravel - yellowish brown (10YR 5/4) loose, moist - sand 85%: F=50% M=30% C=20% SA-SR (Qtz, feld, lithics) - gravel 15% up to 3/4" (lithics)		
SW					355		SAA @ 350' sand 90%: F=45% M=40% C=15% gravel 10% up to 1"		
SW	4.0				360		SAA @ 355' sand 85% gravel 15%		
SW					365		SAA @ 360' sand 95%: F=35% M=55% C=10% gravel 5% up to 5/8"		
SW	3.3				370		SAA @ 360'		
SW					375		well graded sand - yellowish brown (10YR 5/4) loose, moist sand 100%: F=20% M=60% C=20% SA-SR (Qtz, feld, lithics)		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

375.7

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KATB-106SS					Logged By: J. Messinger		Page 12 of		
USCS Soil Type	PTD Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
							- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)		
(SW)	2.9				380		well graded sand - brown (10YR 5/3) loose, moist sand 100% - F=20% M=55% C=25% SA-SR (qtz, feld, lithics)		
(SW)					385		well graded sand with gravel - brown (10YR 5/3) loose, moist - sand 95% F=20% M=50% C=30% SA-SR (qtz, feld, lithics) - gravel 5% up to 1" (lithics)		
(SW)	2.1				390		well graded sand with trace gravel - brown (10YR 5/3) loose, moist - sand: F=30% M=60% C=10% SA-SR (qtz, feld, lithics) - gravel up to 3/8" (lithics)		
(Su)					395		SAA @ 390'		
(SW)	1.1				400		SAA @ 395' sand 90% F=20% M=50% C=30% ARCH TD = 400' gravel 10% up to 1/2" (lithics)		
					405				
					410				

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 10/21/18	
Boring/Well ID: KAFB-10655					Logged By:			Page 13 of	
USCS Soil Type	PID Reading (ppm)	Temperature (C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
								See page 12 of ARCH Log	
SW	3.5						400	Sand, brown (7.5 YR 5/2), loose, slightly moist, well graded	
SW		3.5					401	F 40% M 30% C 30% G - trace up to 1/2" SA/SR	
							402	SAA @ 400ft different %'s	
SW							403	F 50% M 30% C 20% G	
SW							404	SAA @ 400ft 402 feet - same %'s	
							405	SAA @ 400 ft different %'s	
							406	VF 20% F 30% M 30% C 20% no gravel	
							407	SAA @ 403 ft	
							408	Clay - brown (7.5 YR 5/3) very dense, plastic, slightly moist	
							409	clay - reddish brown (5 YR 5/4) - very dense, slightly dense, non plastic	
							410	clay - brown to 407.5 - reddish brown (5 YR 5/4) clay, moderately dense, weakly plastic	

Additional Comments:

Recovery: None ☐ ☒ Partial ☐ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

VF = very fine
G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/24/18

Boring/Well ID: LAFB-10655

Logged By: Lane J. Dress

Page 14 of

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL								408 clay w/ fine sand - reddish gray (5YR 5/2) - mod dense, non plastic	
CL		22.0°C						408.25 - clay w/ trace sand - reddish brown (5YR 5/4) - mod dense - non plastic	
SW	4.7	22.4°C					409	408.5 - very fine grained sandstone - effervesces w/ HCl - brittle	
							410	408.75 - sand (7.5 YR 5/3) - loose, moist, well graded	
								VF 80% F 10% M 5% C 5% trace gravel of sandstone above, A up to 1/2"	
NR		22.4°C					410	409.5 - No coarse or fine grained fractur - minor clay pieces up to 1/4"	409.5
								No Recovery 410 - 411 ft	
SP		20.0°C					411	sand (7.5 YR 6/3) brown - fine grained - loose, slightly moist - poorly graded	
SP	3.7	45.8°C					412	SAA @ 411 ft	412
SW		22.0°C					413	sand - light brown (7.5 YR 6/3) - loose, slightly moist, well graded	
SW	2.4	62.8°C					414	VF 10% F 20% M 50% C 20%	
							415	414.25 - sand as above increasing fines	
								VF 25% F 50% M 20% C 5% - occasional fine grained sandstone concretions up to 1.5"	
SP	3.2	71.7°C					416	sand - brown (7.5 YR 6/3) - loose, slight moist, poorly graded very fine to fine grained - one 1/2" concretion of fine grained sandstone up to 1.5"	
SP		21.4°C					417	core bag not opened - saved for potential sampling	
								SAA @ 415 ft - no concretions	

Additional Comments:

Recovery: None ☐Complete ☒ Partial ☐Complete ☒

NR = No Recovery

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No / None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/21/18

Boring/Well ID: XAFB-10655

Logged By: Laci Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP		21.9°C	N	V, P @ 417'			418	Saved for potential sampling - core bag not opened SAA @ 415 ft - no concretions	
SP			N				419	SAA @ 415 ft - no concretions	
SP		22.7°C	N				420	SAA @ 415 ft - no concretions	
SP	3.8	27.2°C	N				421	SAA @ 415 ft - no concretions	
SP			N				422	SAA @ 415 ft - no concretions	
SP/SW		30.0°C	N				423	@ 422 ft - sand light brown (7.5 YR 6/3) loose, slightly moist - poorly graded sand as above w/ ~3% gravel up to 3/4" SR/SA & dark lathes	
SW			N				424	Sand w/ gravel brown (7.5 YR 5/3), loose, slightly moist, well graded	
SW		32.2°C	N				425	F 20% M 30% C 40% G 20% - P to 1/5" Qtz, fld, fathies SA/SR	
SW			N				426	SAA @ 423 ft	
SW		39.2°C	N				427	@ 425.5 - sand light brown (7.5 YR 6/3) loose, slightly moist - poorly graded	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

(Note SAA = Same as Above)

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF Project Number: 62735DM02.1017 Date: 10/23/18
 Boring/Well ID: KAEB-10685 Logged By: Low Address Page 14 of 14

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		23.80C	N				426	set up for port ext. test sample - core bag not opened Sand (7.5 YR 5/3) loose, slightly moist, well graded -	
SW			N				427	F 5% M 15% C 50% G 30% up to 1" SASSR @ 428 sample w/ different %	
SW			N				428	F 10% M 40% C 40% G 20% up to 1" SASSR Sand w/ gravel - brown 7.5 YR (5/3) loose, slightly moist, well graded	
SW		24.00C	N				429	F 5% M 40% C 40% G 15% up to 1" SASSR @ 429 Sand w/ gravel / gravel w/ sand - brown 7.5 YR (5/3) loose, slightly moist, well graded	
SW	2.9		N				430	F < 5% M 5% C 40% G 50% up to 1.5" SASSR @ 429 Fld Litho SAA @ 429' to 431'	
SW		28.90C	N				431	@ 431' - Sand, yellowish red (5 YR 4/4) coarse grained w/ clay nodules up to 3" of mod dense (mod plastic) clay - brown (7.5 YR 5/3) - Sand coarse grained - Loose, well graded, slightly moist - clay ~ 30%	
SW			N				432	F 5% M 20% C 55% G 20% up to 1" @ 432 Fld Litho SAA @ 431' to 432.5' then sand - light brown (7.5 YR 6/3) loose, slightly moist, well graded - F 20% M 30% C 40% G 10% up to 1" - SASSR @ 432 Fld Litho	
SW		32.60C	N				433	Fining downwards	
SW			N				434	@ 433.25 - sand as above F 20% M 20% C 10% No gravel	
SW		48.60C	N				435	Sand, brown (10 YR 5/3), loose, slightly moist, well graded F 60% VF 20% M 15% C 5%	

Additional Comments:

Recovery: None ☐ Complete Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No / None Mod = Moderately

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/22/18

Boring/Well ID: KFB-10059

Logged By: Jane Anderson

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundness -- % fines (silt/clay)	
SW	SW		48.6°C	N				435.5	Sand w/ gravel - brown (10YR 5/3) loose, slightly moist, well graded F 50% M 15% C 15% G 20% up to 1" - SA/ SR at 2 fld lithes	
SW	SW		49.5°C	N				437	Sand - brown (7.5YR 5/3) loose, slightly moist, well graded F M C G up to 1.5" R - SA at 2 fld lithes	437
SW	SW		49.5°C	N				438	F M C G 0% 1 broken 1 1/4" cobble SR/ST up to 2"	
SW	SW		49.5°C	N				439	Sand brown (7.5YR 5/2) - Loose, slightly moist, poorly graded Fine grained, trace medium grains	438.8
SW	SW	35	49.7°C	N				440	Sand - brown (7.5YR 5/3), loose, slightly moist, well graded - F < 5% M 30% C 50% G 15% up to 1/2" SA SR at 2 fld lithes	439
SW	SW		49.8°C	N				441	core bag not opened - saved for potential sampling SA/ SR at 2 fld lithes SAND w/ gravel & cobbles - brown (7.5YR 4/3), loose, slightly moist, well graded F 5% M 20% C 25% G 50% up to 3" 45% SA/ SR cobbles < 5% up to 3.5" 45% lithes, are 3.5"	
SW	SW		49.8°C	N				442	SAND Gravel w/ sand - brown 7.5YR 4/2, loose, slightly moist, well graded - F 5% M 5% C 20% G 70% up to 2.5" - SA/ SR at 2 fld lithes & clay pieces up to 1"	
SW	SW		49.8°C	N				443	@ 442.5 - 443 - Sand w/ gravel - brown 7.5YR 5/3) loose, slightly moist - well graded - F 20% M 30% C 20% G 30% up to 1" - SA/ SR at 2 fld lithes	
SW	SW		49.8°C	N				444	@ 443 - 444 - Sand - brown (7.5YR 5/2) - loose, slightly moist, well graded - F 50% M 10% C 20% G 20% as above	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No / None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/22/18

Boring/Well ID: KAFB-10655

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW							444.3	Sandy gravel - light brown (7.5YR 6/3), loose, slightly moist, well graded	
SW		60.9°C	N				445	F 10% M 40% C 20% G 30% up to 1.5" SA/SR Lithics	
SW			N				446	SW - sandy gravel - brown (7.5YR 5/2) loose, slightly moist, well graded	
SW			N				447	F 40% M 20% C 10% G 30% up to 2" SA/SR Lithics, Qtz, fld	
SW		73.1°C	N				448	Early mix of sand - surf for potential sampling SW: light brown (7.5YR 5/3) loose, slightly moist, well graded - trace medium grain gravel F 5% M 35% C 40% G 20% up to 1.5" SA/SR at 447 - sand - brown (7.5YR 5/3) loose, slightly moist, well graded - F 15% M 40% C 45%	
SW		25.9°C	N				449	sand light brown (7.5YR 6/3) loose, slightly moist, well graded - F 30% M 40% C 20% G 10% up to 3/4" SA/SR Qtz, Lithics, fld	
SW	1.7		N				450	@ 448.5 - SW as above different %'s F 65% M 20% C 20% G trace up to 1/4-1/2"	
SW		20.8°C	N				451	Sand + brown (7.5YR 5/3) loose, slightly moist, well graded F 35% M 45% C 15% G 10% up to 1" - SA/SR Qtz, Lithics, fld	
SW		41.3°C	N				452	Sand brown (7.5YR 5/2) - loose, slightly moist, well graded VF - W% F 40% M 45% C ~5%	
SW			N				453		

Additional Comments:

Recovery: None ☐Complete ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 10/22/18	
Boring/Well ID: KAFB-101-S5					Logged By: Love Address			Page 17 of 17	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW							854	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.)	
SW							855	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.)	
SW							856	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.)	
SW	4.9						857	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.)	
SW		21.2°C					858	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.)	
SW							859	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.)	
SW	3.2	21.9°C					860	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.)	
SW							861	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.)	
SW	8.7	24.9°C					862	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.)	
SW		44.7°C					863	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.)	
Additional Comments:									
Recovery: None ☐ ☒ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/22/18

Boring/Well ID: KAFB-106.55

Logged By: Levi Lindress

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		44.2°C	N					SAT	
SW		44.2°C	N				463	@ 463 - 2" well indurated white Biorbasite sand w/ gravel - pinkish gray (7.5YR 6/2) loose, moist - well graded slight odor as above F 10% M 15% C 5% G 30% up to 1.5" of carbonates cemented 11 times	
SP		44.2°C	N				465	Sand - light brown (7.5YR 6/3) loose, moist, slight odor as above, poorly graded Fine grained trace medium grain	
SW CL		36.6°C	N				466	Sand w/ sandy clay gravel/cobbles - brown (7.5YR 5/3), loose moist, well graded, slight odor as above - F 10% M 40% C 20% G 30% up to 3" of this as clay pieces clay greenish SAT SR	
SW		20.7°C	N	V, P			467	case log not used - saved for potential sampling Sand brown (7.5YR 5/2) - loose, slightly moist, well graded VF 5% F 35% M 30% C 20% CL 10% up to 1.5" SAT SR QZ fill 11 times	
SP	27.8	20.7°C	N	C 467			468	@ 467 - sand brown (7.5YR 5/2) loose - slightly moist poorly graded VF to F grained - trace medium grain	
SW		22.2°C	N				469	Sand brown (7.5YR 5/3) - medium dense, moist well graded - slight odor as above - VF 75% F 15% M 5% C 5%	
SW CL	20.3	22.2°C	N				470	@ 469 - sand as above at 468 but w/ large gravel/small cobbles of 11 times (sandstone) clay - brown (7.5YR 5/3) mod. dense, plastic	
SW CL	44.2	23.0°C	N				471	@ 470 - sand - dark grayish brown (10YR 4/2), medium dense well graded - VF 40% F 45% M 10% C 5% trace ss gravel up to 1/2" constant Sand & clay & silt - medium, dense to dense - wet inter fingered - Sand as above at 470 ft - clay & silt in sand - weakly to non plastic - slight odor as above - no gravel, less M & C	

Additional Comments:

Recovery: None

Complete	Partial	
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Complete

$$N = N_0$$

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

$$N = N_0$$

med - med 1704

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

$$k = 90, x$$



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/23/18

Boring/Well ID: KAFB-10655

Logged By: Lou Anderson

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW							472	Sand, brown (10YR 4/3), medium dense, wet, well graded - slight to med. coarse VF 60% F 20% M 15% C 5% trace gravel up to 1/3" SA lithics, gravel	
SW	91.0	19.9°C	N				473	@ 472 - sand, dark grayish brown (10YR 4/2) med. dense wet VF 50% F 15% M 20% C 5% no gravel @ 473 - ~5% M & C grains slight to med. coarse	
SW							474	SAA @ 472 -	
SW							475		
SW	77.3	19.5°C	N				476	sand as above as 472 w/ ~30% red clay pieces up to 3" - soft, slight to non-plastic - and 20% sandstone cobbles up to 4 1/2" medium-coarse grained SS w/ 1/2" flint & feld lithic grains - well indurated - slight to med. coarse	
SW							477	coarse sand (10YR 4/3) (brown 10YR 4/3) - loose, wet, well graded - slight to med. coarse F 10% M 60% C 10% G 20% up to 1" SA SR Qtz, feld lithics	
SW		20.5°C	N				478	coarse sand w/ gravel dark grayish brown (10YR 4/2) med. dense, wet, well graded - slight to med. coarse F 20% M 30% C 40% G 10% up to 1.5" SA SR lithics, Qtz feld	
SW							479	coarse sand w/ gravel - same as above as 477 slightly coarser - slight to med. coarse F 5% M 20% C 45% G 30% up to 2" clay & lithics & feld pieces SA SR	
SW	27.7	20.7°C	N				480	@ 480 - gravel smaller up to 1.25" & minor clay pieces in gravel	

Additional Comments:

Recovery: None ☐Complete ☒ Partial ☐Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: **Kirtland BFF**Project Number: **62735DM02.1017**Date: **10/23/18**Boring/Well ID: **KAFB-10655**Logged By: **Lau Andress**Page **22** of **18**

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		21.30C	N				481	core bag opened - saved for potential sampling sand w/ gravel - (brown 7.5YR 5/2) - Loose to med dense, wet, well graded - F 20% M 20% C 10% G 60% up to 2.5" - lotus SAA	
SW			N				482	@ 481 - Gravel w/ sand - brown 7.5YR 5/2 (wet med dense, well graded - wet - F trace M 20% C 15% G 60% up to 9/16" etc. fl. lith.	
SW			N				483	sand w/ gravel grayish brown (10YR 4/2) - SAA at 477 ft gravel up to 3/4" 2.5" with minor clay pieces - gravel - slight odor - less than previously	
SW	21.8	22.4C	N				483.5	@ 483.5 - gravel smaller - up to 1.5" - SAA at 477 ft w/ minor clay pieces in gravel - slight odor	
SW			N				484		
SW			N				485	sand w/ gravel - dark grayish brown (10YR 4/2) - med dense, wet, well graded - slight petroleum H-C odor F 10% M 15% C 50% G 25% up to 2" SAA/SR lotus, Qtz, fld	
SW	14.7	25.7C	N				486		
SW			N				487	SAA @ 477 - increased odor sand w/ gravel	486
SW	14.42	21.30C	N				488		
S		21.60C	N	G, UV			488-490	core bag not opened - saved for potential sampling - shipped to PTS Lab for analysis 488-490 core	488

Additional Comments:

Recovery: None ☐Complete ☒ Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/25/18

Boring/Well ID: KAFB-10655

Logged By: Lane Andres

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USCS Soil Type	PID Reading (ppm)	Temperature (C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
		21.6	N	GUV 488-490			490	cutting was done for potential sampling - 488-490 core shipped to PLS Lab for analysis	
SW			N				491	Coarse sand & gravel - dark grayish brown (10YR 4/2) - med dense wet, well graded F 10% M 20% C 40% G 30% up to 2" fine grtz flsper	
SW	1857	22.0	N	VIP 491			492		
SP/			N				493	Sand w/ clay dark gray (10YR 4/1) - dense, wet, poorly graded Non plastic - fine grained - clay ~ 20% evenly dispersed silt ~ 10%	
SP/	557	25.0	N				494	SAA @ 492 w/ minor clay silt	
SP/			N				495	SAA @ 493 ft - very fine grained	
SP/	627	26.3	N				496	SAA @ 493 ft - fine grained	
SW			N				497	Sand dark gray (10YR 4/1) med dense - very wet, well graded F 10% M 65% C 20% G 5% - p 10% fines (sandstone grtz flsper)	
SW	21.0	20.8	N				498		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/23/18

Boring/Well ID: KAFB-10659

Logged By: Love Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				499	core bag unopened sand - dark gray (7.5 YR 4/1) med. dense, wet, well graded - pieces of clay 1/2" to 2" - sandy clay - dense - weakly plastic F 10% M 30% C 50% G 10% up to 1.5" atz fld, lithes SA/SR	
SW			N				500		
SW			N				501	sandy gravel & cobbles - gray (7.5 YR 5/1) med. dense - well graded - wet - gravel & cobbles in R to A lithes & carbonate cemented sandstone w/ SR to SA gravel up to 1" in it - sand: 45% F 10% M 40% C 45% G 10% up to cobbles up to 55% atz, lithes, sandstone	
SW	75		N				502		
SW			N				503	↑ SAA 502.25 - 504'	
SW	12		N				504	502 ft. @ 502 ft. a 2" thick slab of carbonate cemented conglomerate sandstone (fizzes w/ HCL)	
SW			N				505	core bag unopened sand - dark grayish brown (10 YR 4/2) medium dense, wet, well graded F 30% M 25% C 25% G 20% up to 3/4" 2, 3 lithes, atz fld incl. SS as above	
SW	16.9		N	VIP			506	@ 505.75 - sandstone Fizzes - carbonate cement - F - coarse med. 5% gravel as above TD = 506 ft & well indicated	

Additional Comments:

Recovery: None ☐Complete ☒ Partial ☒Complete ☒

N = No

Med = medium

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10655					Logged By: J. Messenger / L. Andress			Page 75 of 25	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							Well Details		
							KEY: ← 3" diameter blank PVC Schedule 80 ← 3" diameter well screen Schedule 80 PVC 0.010 slot ← 3" diameter well sump (2 ft) with 3" solid flat end cap Filter Pack: 10/20 silica sand (Premier Silica) Bentonite Seal: Halliburton 3/8" HOLEPUG Bentonite Grout: ≥20% Bentonite Solids - Halliburton GUK-GROUT 20% solids pumpable bentonite grout Concrete: Portland Cement Native Soil/Slough		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Carroll

Start Time/Date: 1350 1/16/19

Lead Driller: Forest Chackton

Completion Time/Date:

Drilling Method: Arch

Final Depth:

Casing Diameter OD: 11 7/8 / 12.5

Bit Type and Outer Diameter

Boring/Well ID: LAER-1065A

Logged By: *C. McIntyre*

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Additional Comments:

Recovery: None	Partial	Complete
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SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/16/19	
Boring/Well ID: KAEB-10657					Logged By:			Page 2 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
ML	68				30		Silt, yellowish Brown (5YR 4/6), 40% F, 60% VF trace clay		
					35				
ML					40		SAA 50% F, 50% VF		
					45				
CL	4.9				45		finely clay, light reddish Brown (5YR 6/4), dry soft, slightly plastic, 60% VF, 30% F, 10% M lithic, Qtz, Feldspar, SR		
					50				
CL					50		Silty clay, yellowish Brown (5YR 5/6), loose very soft, non plastic, lithic, Qtz, Feldspar, SR, dry 50% F, 50% VF, 20% VF		
					55				
		4.0			55		SAA 90% VF, 10% F		
					60				
SC					60		clayey sand, yellowish Brown (5YR 5/6), very loose 10% medium, 40% F, 30% VF, 2% coarse		
					65				
SC	5.5				65		SAA w/ trace gravel SR, lithic, Feldspar, Qtz, 25% coarse, 15% medium, 60% fine		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/16/17	
Boring/Well ID: KAFB-10657					Logged By: C. Montoya			Page 3 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							Well Details		
SC					65		SAA 10% 40%F 60%VF, Trace Gravels, SR Lithiz, Feldspar, Qtz		
					70		↓ ↓		
SM 4.0					75		Silty Sand, yellowish red (5YR 5/6) very loose, non plastic, 40% medium, 40%F, 10%VF, 10% coarse, SAA, Lithiz, Qtz, Feldspar		
					80		↓ ↓		
SM 3.8					85		SAA		
					90		↓ ↓		
SM					95		SAA yellowish red (5YR 5/6), 40% medium, 60%F		
					95		↓ ↓		
SC 3.5					95		Clayey Sand, yellowish red (5YR 5/6), sand is 50%VF, 50%F, 10% clay, Lithiz, Feldspar, Qtz, Rounded Grains		
							SAA - 50%VF, 40%F, 10% clay		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/16/19	
Boring/Well ID: KAER-12657					Logged By: C. Montoya			Page 5 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		Well Details
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SP	1.6				100		Fine Grained Sand, Light Brown (7.5YR 6/4), very loose, dry, Qtz, Lithics, Feldspar, SR, 90% F, 10% VF		
SP					105		SAA - Coarsest part of sandstone concretions		
SM	3.2				110		Silty Sand, Yellowish Red (5YR 5/6), very loose, dry, Lithics, Feldspar, Qtz, R-SR, 10% F, 10% VF		
SM					115		SAA - 60% F, 30% VF		
SM	2.3				120		SAA - 50% F, 50% VF		
CL					125		Sandy (clay), Strong Brown (7.5YR 5/6), very soft, moist, slightly plastic, Feldspar, Qtz, Lithics, 70% VF, 30% F		
CL	3.5				130		SAA 40% F, 60% VF		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/16/19	
Boring/Well ID: KAFB-10657					Logged By: C. McIntosh			Page 5 of 24	
USCS Soil Type	PIR Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							Well Details		
SP					135		Sand, Strong Brown (7.5YR 5/6), loose, 10% medium, 60% F, 30% VF, Lithics, Qtz, Feldspar SR		
SC	3.0				140		Clayey Sand, Strong Brown (7.5YR 5/6), loose, plastic, moist, 50% F, 10% C, 40% VF, Lithics, Feldspar, Qtz, SR-R		
SC					145		SAA F-30% VF-70%		
SC					150		SAA		
SC	3.8						SAA - F-50%, VF-50%		
SM					155		Silty Sand, Strong Brown (7.5YR 5/6), loose 10% M, 20% F, 70% VF, Rounded Grains, Qtz, Feldspar, Lithics		
SM	4.1				160		Silty Sand, reddish yellow (7.5YR 6/8), loose, dry, 50% F, 50% VF, R, Lithics, Qtz, Feldspar, Trace Silt concretions		
SM					165		SAA - 40% F, 50% VF, 10% Gravel, Gravel is SR, ~4.75mm, Lithics, Qtz, Feldspar		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/17/19	
Boring/Well ID: 148FB-10652					Logged By:			Page 6 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
							Well Details		
SM	14.8				170		SAA - 10% C, 30% A, 60% VF, no gravel 3% m, 60% F		
SM					175		Silty Sand, Reddish yellow (7.5YR 6/6), loose Dry, 15% C, 65% M, 60% VF, Lithic, Qtz, Feldspar R-SR 25% M, 60% F		
SM	11.0				180		SAA - 25% C, 70% M, 55% F		
SP					185		Sand, pink (7.5YR 7/4), loose Dry, 10% C 60% M, 30% F, Feldspar, Qtz, Lithic, R-SR		
SP	13.8				190		SAA		
SP					195		SAA - 15% C, 60% M, 25% F		
SP	13.3				200		Sand, Light Brown (7.5YR 6/4), 10% M, 40% F, 5% C, 45% VF, Lithic, Feldspar, Qtz, R-SR		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/17/19	
Boring/Well ID: KAFB-13052					Logged By: C. L. L. L. L. L.			Page 4 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		Well Details
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SM					205		Silty Sand, Reddish Yellow (7.5YR 6/6), Loose, Dry, Lithics, Qtz, Feldspar, M-60% F-20 V-15, R Gravel-5%, Lithics, Qtz, Feldspar, SR-R		
SM	1.7				210		SAA - C-15%, M-50%, F-10%, VF-20, 10% Gravel-15%		
SM					215		SAA - C-20%, M-60%, F-10%, VF-10%		
SM	2.1				220		Silty Sand, Light Brown (7.5YR 6/4), Loose, Dry, C-25% M-50%, 2% F, 5% VF, LSK, Lithics, Qtz, Feldspar		
SM					225		Silty Sand w/Gravel, Reddish Yellow (7.5YR 6/6) loose, Dry, C-30, M-40, F-20, VF-5% Gravel up to 1.5" in size, 15% Gravel Sand - Qtz, Lithics, Feldspar Gravel - Limestone, Qtz, Lithics, Feldspar		
SM	2.4				230		SAA - C-20%, M-20%, 10% F, VF-10%, Gravel-40%		
SM					235		SAA - Gravel 50%, C-20%, M-55%, F-15%, VF-5%		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/17/19	
Boring/Well ID: KAFB-1057					Logged By: CM Antonio			Page 8 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SA	2.4				240		SAA - No gravel, 100% C, 70% M, F-10%, 60-10%		
SA					245		SAA		
GP	2.5				250		Partly Graded Gravel & Sand, Light Brown (7.5YR 6/4), Loose, Dry, C-10%, M-10%, Gravel up to 0.75" in size, Gravel-50%, Sand-lithics, Qtz, Feldspar, R-SR		
SA					255		Gravel-Lithics, Limestone, Qtz, Feldspar		
					260		Silty Sand/Gravel, Light Brown (7.5YR 6/4), Loose, Dry, 10% C, 60% M, 25% F, 5% Gravel R		
					265		Lithics, Feldspar, Qtz, Gravel up to 0.75", R-SR		
CL	1.7				270		Sandy Clay, Pink (7.5YR 7/4), Soft, Plastic,		
CL					275		SAA		
CL	1.6				280		Clay, Brown (7.5YR 4/3), Silt, Plastic		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

EA SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/17/13	
Boring/Well ID: KAFB-12057					Logged By: C. Montoya			Page 1 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
CL					500		SAA		
					290				
CL	1.2				310		Gravelly Clay, light Brown (7.5YR 6/4), Silty, slightly plastic, Gravel up to 1/4" in size, Limestone Angular, Gravel - 35%		
					285				
SM					325		Silty Sand, Brown (7.5YR 5/4), loose, Dry, M-60%, F-35%, VF-5%, Qtz, Lithics, Feldspar		
					210				
SM	1.7				670		Silty Sand, Brown (7.5YR 4/3), loose, 5% C, 45% M, F-45%, VF-30%, 20% M, R-SR, Qtz, Lithics, Feldspar		
					245				
SM					310		SAA - C-10%, M-25, 45% F, 20% VF		
					300				
SM	1.2				370		SAA - C-15, M-30, 40% F, 15% VF		
					335				
SP-SM					360		Gravelly Sand w/ Silty, light Brown (7.5YR 6/3), loose, Dry, C-45%, M-25%, Gravel - 30%, Sand-Qtz, Feldspar, Lithics, SR-R, Gravel - LS, Qtz, Feldspar, Lithics, R-SR up to 25% in size		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/17/19	
Boring/Well ID: KAF-10657					Logged By: J. Montoya			Page 10 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		Well Details
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SP-1.4 SM					31.5		SA		
SP					32.0		SAA - M 60%, 30% S, 30% Gravel		
SP 0.9					32.5		SAA		
SP					33.0		Poorly Graded Sand, Brown (7.5YR 5/3), Loose, Dry, 5% M, 45% F, Qtz, Lithics, Feldspar		
SP 1.3					33.5		SAA		
SW					34.0		Well graded Sand, Light Brown (7.5YR 6/4), Loose Dry, 10% C, 90% M, 5% F, 5% VF		
SM 1.0							Silty Sand w/ Gravel, light Brown (7.5YR 6/4), Loose, Dry, 10% C, 20% M, 20% VF, 50% F, Qtz, Lithics, Feldspar R-SR		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/17/19	
Boring/Well ID: KAFB-12652					Logged By: C. McIntosh			Page 11 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
SW					345		-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
					350		Well Graded Sand w/Trace Gravel, light Brown (7.5YR 6/3), Loose, Dry, C-20%, M-40%, F-10% Gravel 30% upto 1/4" in size A-SA Sand - Qtz, Lithics, Feldspar Gravel - Qtz, LS, Feldspar		
SAA 69.3 SP					355		Poorly Graded Sand, Brown (7.5YR 4/4) Loose, Dry, 60% F, 10% VF, 15% C, 10% M, Trace Gravel ~5% Sand - Feldspar, Qtz, Lithics Gravel up to 1/4" in size, Lithics, Feldspar		
SP					360		SAA		
SP 2-4					365		SAA - 50% F, 10% VF, 15% C, 10% M, Gravel - 15%		
SP SW					370		SAA - 45% Gravel, 10% C, 5% VF, 40% Sand. Well Graded 45% Gravel, 40% C, 10% M, 5% F, 5% VF Gravel Brown (7.5YR 4/4), Feldspar, Qtz, Lithics, SR-R Gravel upto 1/2" in size, Lithics, Feldspar, Qtz, R-SK		
SW 5.1					375		SAA		
					375		SAA		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 1/15/11	
Boring/Well ID: 162815-1057					Logged By: C. Montoya			Page 12 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		Well Details
						-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SP	3.8				380		Poorly Sorted Poorly Graded Sand, Bl ^h light Brown (7.5YR 6/4) 85% F, 15% VF, 5% M, 8% L, 1% CL, 1% F. - 5% Rounded		
					385		SAA		
					390		SAA		
	9.4				395		SAA - 80% F, 10% VF, 10% M		
					400				
SC-S.1 SMCM							Gravelly Sand w/ clay, reddish yellow (7.5YR 6/6) Gravel - 20%, C-40%, M-20%, F-20% Sand - Qtz, Feldspar, Lithos, R-SR Gravel - Qtz, Lithos, Feldspar, SA-SR		

384.8

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

Sonic Driller: Roger Rodriguez

7-inch Bit

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106ST

Logged By: J. Messenger

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type

PID Reading (ppm)

Temperature (°C)

UV fluorescence

Samples collected

Core Run

Recovery

Depth, ft bgs

400-401' NO RECOVERY.

401

well graded sand w/ gravel - strong brown (7.5YR 5/6) loose
SLM - sand = 70% F = 20% M = 65% C = 15% SA-SR
(Qtz, feld, lith); gravel = 30% up to 2 5/8" (lith + Qtz)

402

SAA
to 402.75'

403

poorly graded sand - brown (7.5YR 5/2) loose, SLM
sand = 100% F = 40% M = 60% (fine sand - SAA)
(Qtz, feld, lith); trace gravel up to 1 1/2" (lith); trace clay
as nodules - brown (7.5YR 5/4)

404

SAA @ 401-402 - sand = 85% F = 25% M = 65% C = 10%
gravel = 15% up to 1 1/4" (Qtz + lith); trace clay
as nodules - brown (7.5YR 5/4)

405

406

SAA with clay lense @ 406.5 - 406.7'
SAA nodules above.

407

clay with sand - reddish brown (2.5YR 4/4) and brown
(7.5YR 5/4); clay = 80% SAA - very stiff; med. plasticity
weakly mottled to white (7.5YR 8/1) - fix w/ acid; sec. calc. carbonate
sand = 15% F = 20% M = 70% C = 10% (Qtz, feld, lith) SA-SR
gravel = 5% up to 5/8" (Qtz + lith)

408

409

SAA @ 404-405' pale brown (10YR 6/3)
gravel = 10%

Additional Comments:

~~401-406'~~ disturbed

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF				Project Number: 62735DM02.1017			Date:		
Boring/Well ID: KAFB-106S7				Logged By: J. Messenger			Page 14 of 24		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
								Well Details	
GN			N				4/9		
SW	0.3	39.0	N				4/10		
SW			N				4/11		
CL			N				4/12	SAA w/clay lense @ 411.4 - 411.6'	
SW			N				4/12	clay = SAA @ 407-408 brown (7.5YR 5/4)	
SW			N				4/13	SAA w/more clay	
SC			N				4/13	sand = 65%	
SW			N				4/13	gravel = 25%	
SC			N				4/13	clay = 10% silt low-med plasticity	
SW			N				4/13	brown (7.5YR 5/4)	
SC	26.4		N				4/14	trace silt - nonplastic	
SA			N				4/15	SAA @ 403 - 404'	
SA			N				4/15	sand = 90%	
SA			N				4/15	gravel = 10% up to 1"	
SA			N				4/15	trace coarse sand	
SA			N				4/15	trace clay	
SA			N				4/16		
SA			N				4/17	SAA	
SA			N				4/17	sand = 95%	
SA			N				4/17	gravel = 5% up to 1"	
SA			N				4/17	trace coarse sand + clay	
SA			N				4/18		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SF					Logged By: J. Messenger			Page 15 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SM			N				118	well graded sand - brown (7.5YR 5/2) loose, SLM sand = 90%; F = 25% M = 65% C = 10% (Qtz, feld, lith) SAA-SR gravel = 10% up to 1 1/8" (lith + Qtz) trace silt = nonplastic	
SW	1.3		N				419	SAA: sand = F = 20% M = 65% C = 15% (No odor)	
SP		23.0	P, V				420		
SP			N				421	sand = F = 60% M = 65% C = 15% - Jmm 421-422' should be up here @ 420-421'	
SP			N				422	poorly graded sand w/ silt - pale brown (10YR 6/3) loose, SLM sand = 90%; F = 45% M = 55% (Qtz, feld, lith) SAA-SR silt = 10% nonplastic trace coarse sand (No odor)	
SP			N				423	421-423' SAA @ 420-421' 421-423' trace coarse sand trace gravel up to 1/2" (lith) trace clay as nodules - light olive brown (2.5Y 5/4)	
SP			N				424	SAA w/ less silt trace clay as nodules (brown - 7.5YR 5/3) Sand = 90% silt = 5% gravel = 5% up to 1/2" (lith)	
SP			N				425	SAA sand = 90% silt = 5% clay = 5% as nodules SAA trace gravel to 1/2" (lith)	
SP			N				426		
SP			N				427	SAA - light brownish gray (10YR 6/2) loose, SLM sand = 95% silt = 5% trace gravel to 5/8" trace clay SAA	
Additional Comments: 423-424' disturbed									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG										
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:		
Boring/Well ID: KAFB-106S7					Logged By: T. Messenger			Page 16 of 24		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details	
SP							427	SAA - Haze coarse sand Sand = 85% silt = 5% gravel = 10% up to 1"		
							428			
SW	30.4						429		SAA @ 418-419' sand = 85% gravel = 10% silt = 5% nonplastic	
SP-SM			N				430		SAA @ 421-422' light gray (10YR 7/2) w/trace gravel to 3/8" (1th)	
SW	2.1						430.25			
SW			N				431	well graded sand, w/gravel - pale brown (10YR 6/3) base, SCAM Sand = 70% : F=30% M=55% C=15% (Qtz, feld, lith) SA-SR gravel = 25% up to 1 1/4" (lith + Qtz)	no odor	
SW	68.9						432	silt = 5% nonplastic		
SW			N				433	SAA - light gray (10YR 7/2) Sand = 75% JM gravel = 20% silt = 5%		
SP			N				434			
SP	58.6						435	SAA - light brownish gray (10YR 6/2) Sand = 80% silt = 5% gravel = 5%		
SP			N				436			

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF				Project Number: 62735DM02.1017			Date:		
Boring/Well ID: KAFB-106 S7				Logged By: J. Messenger			Page 17 of 24		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								Well Details	
SW			N				436	SAA @ 430.25 - 432' no odor	
SW			N				437	poorly graded sand w/ silt - gray (2.59 6/1) loose, SLM Sand = 85% : F = 35% M = 55% C = 10% (qtz, fld, lith) SAA SR silt = 10% nonplast = ; gravel = 5% up to 1" (qtz + lith) no odor	
SW			N				438		
SW			N				439	SAA @ 436 - 437' sand = 80% gravel = 15% trace clay silt = 5%	
SW	1.6	67.5	N				440		
SW			N				441		
SW			N				442		
SP			N				443	SAA @ 429 - 430' w/ trace coarse sand gravel = 5% silt = 10% sand = 85%	
SP			N				444		
SP			N				445	poorly graded sand - pale brown (10YR 6/5) loose, SLM Sand = 100% : F = 40% M = 60% trace coarse sand (qtz, fld, lith) SAA SR, trace gravel up to 5/8" (qtz + lith) no odor	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SF					Logged By: J. Messenger			Page 18 of 24	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
		67.5	N				443		
							446		
SW			N				447	well graded sand w/ gravel - light brownish gray (7.5YR 6/5) loose, SLM - sand = 80%: F=30% M=60% C=10% (qtz, feld, lith); gravel = 20% up to 2 1/4" (lith) NO odor	
CL			N				448	@ 447.4-447.6' - clay - strong brown (7.5YR 4/6) around outside and brown (7.5YR 6/4) on inside - very stiff low plasticity, SLM NO odor SW below	
SP			N				449	SAA @ 447-448 brown (7.5YR 5/3) to 448.75' NO odor	
CL		34.3	N				450	clay - highly altered + mottled to olive (5Y 5/4) white (2.5Y 8/1), and black (2.5Y 2.5/1) - white alteration rxn w/ acid = sec. cal-carbonate - very stiff low-med plasticity dry NO odor	449
CL	0.1		N				451	SAA - no white mottling - altered to the olive black - strong brown (7.5YR 5/6) SLM very stiff - low-med plasticity NO odor	
CL			N				452		
CL			N				453	clay - brown (7.5YR 5/3) unaltered, very stiff med. plasticity very weakly mottled to white (7.5YR 8/1) WEAK odor	
CL			N				454		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106S7

Logged By: J. Messenger

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run Recovery	Depth, ft bgs	Soil Description	Well Details
CL		34.3				454	SAA	
CL						455		
SL						456	SAA @ 446-447'	
ML			N			457	silt with clay - pale brown (10YR 6/3) silt = 80% clay = 20% silt is soft, nonplastic clay is stiff	odor present
ML		45.4	N			458		
ML			N			459	SAA but less clay clay is trace	100% silt nonplastic soft
ML			N			460		
SM	6.8		N			461	silty sand - pale brown (10YR 6/3) loose, SLM Sand = 85% : VF = 30% F = 40% M = 30% (Qtz, feld, lith) SA-SR silt = 15% soft, nonplastic	
SM		46.9	N			462	SAA w/ trace gravel up to 1" (lith) and trace coarse sand	
SP SM						463	SAA w/ less silt sand = 90% silt = 10% trace gravel + coarse sand	

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106S7

Logged By: J. Messenger

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run Recovery	Depth, ft bgs	Soil Description	Well Details
SP- SM			N			463		
						464		
SP- SM		46.9	N			465		
SP- SM			N			466		
SP- SM			N			467		
SW		31.1	N			468	well graded sand - light brownish gray (10YR 6/2) loose, SLM sand = 90% : F=25% M=65% C=10% (qtz, feld, lith) SA-SR gravel = 10% up to 1 1/4" (qtz + lith) trace silt	color present
SW			N			469	SAA sand = 80% gravel = 20%	
SP- SM			N	P, V, M, B		470	SAA @ 462 - 463 sand = 90% silt = 10%	
SP	6.3	23.0	N			471	poorly graded sand - brown (10YR 5/3) loose, SLM sand = 95% : V=25% F=65% M=10% (qtz, feld, lith) SA-SR silt = 5% nonplastic trace gravel up to 2" (lith)	
SP			N			472		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106S7

Logged By: J. Messenger

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP		23.6	N		✓	✓	472		
SW			N		✓	✓	473		
SP			N		✓	✓	474	well graded sand with gravel - brown (10YR 5/3) loose moist sand = 70% F=25% M=65% C=10% SA-SF (Qtz, feld, lith); gravel = 30% up to 2" (lith & Qtz); trace clay as nodules	
SP			N		✓	✓	475	poorly graded sand - brown (10YR 5/3) loose moist sand = 100% VF=15% F=60% M=25% trace coarse sand (Qtz, feld, lith) SA-SF; trace silt - non plastic trace gravel up to 1/2" (lith)	weak odor
SP			N		✓	✓	476		
SP	24.7		N		✓	✓	477	SAA - no trace gravel Sand = 100% VF=30% F=65% M=5% trace silt	
SP			N		✓	✓	478		
SP			N		✓	✓	479		
SP			N		✓	✓	480		
SW	46.3		N		✓	✓	480.5'	SAA @ 473-474 sand = 85% gravel = 15% up to 1 5/8"	color present
SC	30.6		N		✓	✓	481	SAA but w/clay - sand = 65%; gravel = 20%; clay = 15% clay is soft, low plasticity	

Additional Comments:

clay nodules - pale olive (5Y 6/3) and brown (7.5YR 5/3)

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106S7

Logged By: J. Messenger

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Soil Description

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP			N				481	poorly graded sand w/ gravel - brown (7.5YR 4/2) loose moist - sand = 85% F = 40% M = 60% trace coarse sand (Qtz, feld, lith) SA-SR; gravel = 15% up to 1 3/4" (Qtz, lith) trace silt	
SP			N				482		
SP			N				483		
SW		37.9	N				484	SAB @ 484-486'	
SW			N				485	well graded gravel w/ sand - brown (7.5YR 4/2) loose moist gravel = 65% up to 3" (Qtz, lith); sand = 35% F = 15% M = 60% C = 25% (Qtz, feld, lith) SA-SR; trace silt - nonplastic	
SW			N	P, V, M, B			486		
SW			N				487	well graded sand w/ gravel - brown (7.5YR 4/2) loose, moist sand = 65% F = 20% M = 70% C = 10% (Qtz, feld, lith) SA-SR gravel = 35% up to 3" (lith) - trace cobble up to 3 1/2" (lith) trace silt	
SW			N				488	SAA w/ less gravel + trace silt sand = 40% gravel = 10% up to 1 1/2"	
SP		31.1	N				489	SAA @ 481-482 w/ less gravel sand = 95% gravel = 5% up to 1 1/4" trace silt	
SP			N				490		

Additional Comments:

SAB = Same As Below

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-10657

Logged By: J. Messenger

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Soil Description ¹								Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run Recovery	Depth, ft bgs	- soil type; Munsell color; density (primarily coarse)/consistency & plasticity - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
SL	1499		N			490	SAA @ 486-487 w/o cobbles Sand = 70% trace coarse sand gravel = 30% trace silt	
SP			N			491		
						492	SAA @ 488-489' trace coarse sand silt	
			N			493	BENT FOR SAMPLING	
			N			494		
SP	34.1		N		20	495	SAA @ 490-491' JM SAA @ 491-492' w/ trace clay as nodules (light brownish gray 10YR 6/2)	
SW			N	P, V, B, I		496	SAA @ 490-491' w/o cobbles	
SP			N			497	SAA @ 491-492'	
SP			N			498		
SP			N			499		

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF				Project Number: 62735DM02.1017			Date:		
Boring/Well ID: KAFB-106S7				Logged By: J. Messenger			Page 24 of 24		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)	
								Well Details	
SP			N				499		
SP	418.3		N				500	SAA - sand = 100% trace gravel to 1/4" trace silt	color present
SP			N				501		
SP			N				502		
SP	31.1		N				503	SAA sand = 95% gravel = 5% trace silt	
SP			N				504		
SW			N				505	SAA @ 490-491 sand = 85% gravel = 15% trace silt	weak odor
SW			N				506		
	8.6		N				TD = 506' Key		
Northland Cement 1 1/2" 50/100 Sand 3/8" Bentonite Chips Hole Plug Grout Native Soil 3" PVC SCH80 Casing 3" PVC SCH80 Screen w/ sand									
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐ SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: CASCADE

Start Time/Date: 1-4-19

Lead Driller:

Completion Time/Date:

Drilling Method: SONIC

Final Depth:

Casing Diameter OD:

Bit Type and Outer Diameter 7-inch bit

Boring/Well ID: KAFB-106SB

Logged By: J. Messenger

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Soil Description

-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily
-- % sand (include grain size %; fine, medium, coarse, etc.)
-- sand mineralogy
-- % gravel
-- gravel mineralogy
-- angularity/roundedness
-- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP							1	0-8' Poorly graded sand w/ silt - brown, SLM trace to some fine gravels (feld, Qtz, lith)	
SP							2		
SP							3		
SP							4		
SP							5		
SP							6		
SP							7		
SP							8		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description -- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	Well Details
							8	NO CUTTINGS RETURNED	
							9		
							10		
ML	3.4		N				10	silt - reddish brown (5YR 5/4) soft, SL M - silt = 80%; clay = 10%; soft - nonplastic - sand = 10% F = 60% M = 30% C = 10% SA-SR (Qtz, feld, lith, caliche) nonplastic	
ML			N				11		
ML			N				12		
ML	19.2		N				13	SAA - silt is mottled by secondary calcium carbonate - (5YR 7/2) pinkish gray (fizzes)	
ML			N				14		
ML			N				15	SAA - silt = 70% clay = 25% sand = 5%	
ML			N				16		
ML	19.7		N				17	SAA - (7.5YR 4/3) brown trace gravel to 1/2" (lith + caliche)	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				17		
ML		19.7	N		5'		18	SAA - silt = 60% clay = 30% sand = 10% yellowish red (5YR 5/6) still mottled to pinkish gray 5YR 7/2	
ML			N				19		
ML	2.4		N				20		no odor
ML			N				21	SAA - strong brown (7.5YR 5/6) silt = 80% clay = 10% sand = 10% no mottling	no odor
ML			N				22		
ML			N				23		
ML		19.3	N		5'		24	SAA - brown - 7.5YR 5/4	
ML			N				25		
ML			N				26		

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				26	clay - reddish brown (5YR 3/3) med. stiff; med. plasticity no mottling visible	
CL			N				27		
CL			N				28		
CL			N				29		
ML		33.0	N				30	SAA @ 21-22'	
ML	1.9		N				31		
ML			N				32	SAA @ 26-27'	
CL			N				33		
CL			N				34		
ML			N				35	SAA @ 21-22' mottled as in 18-19'	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
(ML)		33.0	N		10'		35	SAA - highly mottled	
(ML)			N				36		
(ML)			N				37		
(ML)		31.3	N		4'		38		
(ML)			N				39		
(ML)			N				40		
(ML)	0.4		N				41	SAA - lightly mottled reddish brown (5YR 5/4) silt = 85% clay = 10% sand = 5%	
(ML)			N				42		
(ML)		19.4	N		6'		43	@ 42.5-43' - SAA silt = 75% clay = 10% sand = 15% F = 50% M = 30% C = 20% (qtz, feld, lith, caliche) SA-SP trace gravel to 1/2" (lith+caliche) SAA @ 40-41'	
(ML)			N				44		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				44	SAA silt = 70% clay = 20% sand = 10% reddish brown 5YR 4/4 no odor	
ML		19.4	N				45		
ML			N				46		
ML			N				47	to 471	
ML		26.6	N				48	SAA @ 44-45 - highly mottled and secondary calcium carbonate alteration throughout to (5YR 8/2) - pinkish white	
ML			N				49	SAA	
ML			N				50	SAA - less calcium carbonate alteration - still mottled	
ML	1.6		N				51	SAA brown (7.5YR 5/4)	
ML			N				52		
ML			N				53		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				53	clay - brown (7.5YR 5/3) med. plasticity, med. stiff light mottling to pinkish gray (7.5YR 7/2)	
CL			N				54		
ML	26.4 43.2		N		6'		55	SAA @ 49-50'	
ML			N				56		
ML			N				57		
ML			N				58	silt w/ sand - reddish brown (5YR 5/4) soft - silt = 80% nonplastic - clay = 5% - sand = 15% F = 40% M = 60% trace coarse sand - SA-SR (Qtz, feld, lith, caliche) (SLM)	
SM			N				59	silty sand - brown (7.5YR 5/4) loose, SLM - sand = 60% F = 40% M = 50% C = 10% SA-SR (Qtz, feld, lith, caliche) silt = 40% nonplastic - trace gravel to 1/2" (lith + caliche) (no odor)	
SM		28.6	N		10'		60	SAA @ 49-50'	
ML	5.3		N				61		
ML			N				62		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				62		
ML		28.6	N				63		
ML			N				64		
ML			N				65		
ML			N				66		
ML			N				67	SAA - light brown (7.5YR 6/4)	
ML			N				68	SAA to 69'	
SW		29.2	N				69	well graded sand - light yellowish brown (10YR 6/4) loose, SLM Sand = 90% ± F = 15% M = 70% C = 15% SA-SR (Qtz, feld, lith); gravel = 10% up to 5/8" (Qtz + lith)	
SW			N				70	SW @ 69'	
SW	2.5		N				71	no odor	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW							71	SAA	
ML			N				72	SAA @ 66-67'	
ML			N				73	SAA - amount of mottling increasing from 72' to 74' - highly mottled to light gray (10% 7 1/2)	
ML	29.2		N		10'		74		no odor
ML			N				75		
ML			N				76	SAA - med. stiff to very stiff	
ML			N				77		no odor
ML	48.6		N		10'		78	SAA - silt w/ sand	
ML			N				79	silt = 70% sand = 20% clay = 5% nonplastic	
ML			N				80		

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

SAA = Same as Above

Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

EA Project: Kirtland BFF Boring/Well ID: <u>KAFB-106SB</u> SONIC CORING BORING/WELL CONSTRUCTION LOG Project Number: 62735DM02.1017 Logged By: <u>J. Messenger</u> Date: Page <u>10</u> of <u>58</u>													
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details				
ML ML ML ML ML ML ML ML ML ML	3.9		N		10	80	SAA @ 76-77' ↓	no odor ↓					
	81			N		82	83	84	85	86	87	88	89
		48.6		N		7'		SAA - very stiff, low plasticity dense ↓	silt = 80% sand = 10% clay = 10% no odor ↓				
		77.9		N				SAA - highly mottled to light gray (10% 7/2) ↓	↓				

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-10658

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML							89	light reddish brown (5YR 6/4)	
ML	1.7						90		
ML							91		
ML		77.9					92		
ML							93		
ML							94		
ML							95		
ML		33.7					96		
ML							97		
ML							98		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML		33.7	N		7'		98		
ML			N				99		
	2.1		N				100	poorly graded sand w/silt - light brown (7.5YR 6/3) loose	
SP- SM			N				101	SLM - sand = 90% F = 60% M = 40% trace coarse sand + trace gravel to 3/8" (Qtz + lith) - sand = (Qtz, lith, feld) silt = 10% non plastic	
SP- SM			N				102		
SP- SM			N				103		
ML			N		6'		103	103-103.4' - silt SAA @ 91-92'	
SP- SM			N				104	SAA @ 100-101'	
SP- SM			N				105	trace gravel to 3/8"	
SP- SM			N				106	@ 104.8 - 105 trace gravel up to 1 1/4"	
SP- SM		33.9	N				107	Partly graded sand - pale brown (10YR 6/3) loose, SLM - sand = 100% VF = 20% F = 70% M = 10% SA-SR (Qtz, feld, lith, caliche)	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW SM			N				107	Well graded sand w/silt and gravel - pale brown (10YR 6/3) loose, SLM - sand = 80% F = 35% M = 45% C = 20% SA-SR (Qtz, feld, lith, caliche); silt = 10% nonplastic; gravel = 10% up to 1 1/2" (Qtz, lith, caliche)	
SP- SM			N				108	SAA @ 100-101' pale brown (10YR 6/3) <u>no odor</u>	
SW- SM			N				109	SAA @ 107-108'	
SP- SM	2.6	33.9	N				110	SAA @ 108-109'	
SW- SM			N				111	SAA @ 107-108' to 111.5'	
CL			N				112	clay - brown (7.5YR 5/3) SLM, very stiff, med. plasticity slightly mottled to pinkish gray (7.5YR 7/2) reacts w/ acid	
CL			N				113	clayey silt - light brown (7.5YR 6/3) soft, SLM silt = 80% nonplastic clay = 20% med. stiff, low plasticity trace sand + gravel (to 3/8")	
ML			N				114	SAA @ 111.5-113' <u>no odor</u>	
CL			N				115	SAA @ 113-114'	
ML			N				116		

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML							116	SAA to 116.5'	
SW							117	well graded sand SAA @ 107-108' sand = 90% silt = 5% gravel = 5%	no odor
ML							118	SAA @ 116-116.5'	SLM
ML		42.6	N				119		no odor
ML			N				120		
ML	2.0		N				121		
SW			N				122	SAA @ 116.5-117' sand = 90% : F = 20% M = 60% C = 20% pale brown (10R 6/3) silt = 5% nonplastic clay = 5% - med/stiff - low plasticity Trace gravel to 3/8"	SLM
ML		51.1	N				123	SAA @ 113-114'	
CL			N				124	SAA @ 111.5-113' no mottling	SLM
CL			N				125		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL		51.1	N		6'		125	SAA - 5% F-M sand SLM	
CL			N				126	SLM	
CL			N				127	trace F-M sand SAA to 127.4' slightly mottled to 10YR 7 1/2 light gray rxn w/acid	
ML			N				128	SAA @ 113 - 114' SLM no odor	
CL			N				129	SAA @ 111.5 - 113 brown 7.5YR 5/3 highly mottled to pinkish gray (7.5YR 7/2) sec. cal. carbonate - rxn w/acid DRY slight odor	
CL		37.9	N		10'		130	silty clay - yellowish brown (10YR 5/6) silt = 25% nonplastic clay = 75% - very stiff - low plasticity SLM	
CL	0.2		N				131	SAA @ 126 - 127.4 - no trace sand very stiff med. plasticity DRY no odor	
CL			N				132	SLM slight mottling to pinkish gray 7.5YR 7/2	
CL			N				133		
CL			N				134	SAA less mottling	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10658					Logged By: J. Messenger			Page 16 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							134	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL		37.9	N				135	brown (7.5YR 5/3) (DRY) nothing increasing	
CL			N				136	FSM w/ acid sec. cal. carb. moderately mottled (DRY)	
SM			N				137	silty sand w/ clay - light yellowish brown (10YR 6/4) loose, SLM sand = 60% VF = 15% F = 70% M = 15% trace coarse sand - SA-SR (Qtz, feld, lith, calcite); silt = 30% nonplastic; clay = 10% no nodules + clumps - brown (7.5YR 4/4), silt - very silt, med. plast	
CL			N				138	137-138.8' - clay SAA @ 131-132' no odor	
SM			N				139	SAA @ 136-137'	
SM		40.5	N				140	SAA to 140.2'	
SP		3.9	N				141	SAA w/o clay - silty sand - no trace coarse sand sand = 90% silt = 10% poorly graded sand (no odor)	
SP			N				142	SAA - less silt sand = 95% silt = 5%	
SP			N				143		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 17 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP			N				143		
SW		40.5	N				144	well graded sand w/ gravel - light yellowish brown (10YR 6/4) loose, SLM - sand = 75%: F=10% M=60% C=30% SA-SR (Qtz, feld, lith); gravel = 20% up to 1 1/2" (Qtz + lith); silt = 5% non plastic	
SW		X	N				145	SAA - less gravel + more silt sand = 85%: F=30% M=60% C=10% silt = 10% gravel = 5% (no odor)	
SW			N				146	SAA @ 145-146' - sand = (Qtz, feld, lith, caliche) trace gravel to 3/8" sand = 90% silt = 10%	
SP		51.8	N				147	SAA @ 141-142' trace coarse sand trace gravel to 1/2" (lith)	
SP			N				148	SAA w/clay Sand = 85% clay = 10% silt = 5% } soft, nonplastic	
CL			N				149	clay - yellowish brown (10YR 5/4) stiff - very stiff low-med. plasticity trace F-M sand SLM (no odor)	
CL	2.3	X	N				150	6 brown 7.5 IR 5/3 mottled to pinkish gray 9.5 IR 7 1/2 sec. cal. sand w/ acid (no odor)	
ML		40.0	N				151	silt - strong brown (7.5YR 5/6) soft, nonplastic trace F-M sand SLM	
							152		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 18 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML			N				152	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				153	Sandy silt - SAA w/more sand silt = 60% sand = 35% VF = 31% F = 50% M = 20% (Qtz, feld, lith) clay = 5% SA-SR	
SM		40.5	N		6'		154	no odor	
SM			N				155	silty sand - brown (7.5YR 5/4) loose, SLM sand = 60% VF = 20% F = 70% C = 10% SA-SR (Qtz, feld, lith) silt = 40% nonplastic no odor	
SP-SM			N				156	↓ to 155.5'	
ML			N				157	Poorly graded sand w/silt - pale brown (10YR 6/3) loose, SLM sand = 90% F = 60% M = 40% trace coarse sand SA-SR (Qtz, feld, lith) silt = 10% nonplastic	
SP-SM			N				158	Sandy silt w/clay - yellowish brown (10YR 5/4), soft, SLM silt = 75% nonplastic sand = 20% VF = 20% F = 70% M = 10% SA-SR (Qtz, feld, lith) clay = 5% as nodules - soft, low plasticity no odor	
SW-SM		41.4	N		10'		159	SAA @ 155.5-156' trace coarse sand trace gravel up to 1/2" (lith)	
SP-SM			N				160	SAA @ 145-146' caliche in sand sand = 90% gravel = 5% (lith + caliche) silt = 5%	
SP-SM	1.6		N				161	SAA @ 157-158' grayish brown (10YR 5/2)	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 19 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							161	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SW)			N				162	SAA @ 158-159 no odor	
(SW)			N				163	sand = 80% 80% gravel = 10% 15% silt = 5% 5%	
(SW)	41.4		N				163.5	to 163.5	
(SC)			N				164	clayey sand w/ gravel - brown (7.5YR 5/4) SLM - sand = 50% VF = 20% F = 70% M = 10% SA-SR (Qtz, feld, lith, caliche); clay = 30% stiff, low plasticity gravel = 20% up to 1" (lith + caliche)	
(SW-SC)			N				164.2	to 164.2' no odor	
(CL)			N				165	well graded sand w/ gravel + clay - brown (7.5YR 5/4) loose, SLM sand = 60% F = 30% M = 50% C = 20% SA-SR (Qtz, feld, lith) gravel = 30% up to 1 1/2" (lithics); clay = 10% coats gravel + as nodules med. stiff - low plasticity	
(SW)			N				166	clay - brown (7.5YR 5/4) med. stiff, med. plasticity	
(SW)			N				167	SAA @ 162-163' sand = 75%; gravel = 15%; silt = 5% clay = 5% as nodules	
(SP)			N				168	poorly graded sand - light brownish gray (10YR 6/2) loose, SLM sand = 100% VF = 20% F = 60% M = 20% SA-SR (Qtz, feld, lith, caliche) trace coarse sand; trace gravel up to 3/8" (lithics) trace silt	
(SP)	29.1		N				169	no odor	
(SP)			N				170		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 20 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP-5M	0.9		N				170	SAA w/ more silt - sand = 90% silt = 10% nonplastic	
SP-5M			N				171		
SP-5M			N				172	clay - light brown (7.5 YR 6/4) very stiff - low plasticity	
SP-5M		29.1	N				173	SAA @ 170-171	
SW			N				174	well graded sand - light brownish gray (10 YR 4/2) loose, 5 LM sand = 90% : F = 30% M = 50% C = 20% SA → R (Qtz, feld, lith, caliche) gravel = 10% up to 1/8" (Qtz + lith); trace silt	
SW			N				175	SAA - sand = 90% gravel = 5% silt = 5%	
SW			N				176		
SW			N				177	176.5 - 176.8 - dark gray (7.5 YR 4/1) 176.8 - 177 - gray (7.5 YR 5/1) @ 177 SAA @ 174 - 176.5	
SP		33.2	N				178	SAA @ 167 - 168	
SW			N				179	SAA @ 173 - 174 sand = 95% gravel = 5% (lith + caliche) trace silt	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10658					Logged By: J. Messenger			Page 21 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW			N				179		
SW	3.7		N				180		
SW			N				181		
SM			N				182	poorly graded sand silty — light brownish gray (10YR 6/2) loose, SLM sand = 80% : VF = 20% F = 70% M = 10% SA-SR (qtz, feld, lith, caliche); silt = 20% nonplastic	
SM		33.2	N				183		
SP-SM			N				184	SAA @ 170-171 trace clay as nodules — brown (7.5YR 5A)	
SW-SM			N				185	NO RECOVERY SM Very pale brown (10YR 7/3) well graded sand with silt — loose, SM — sand = 80% : F = 30% M = 55% C = 15% SA-SR (qtz, feld, lith, caliche); silt = 10% nonplastic gravel = 10% up to 1 1/2" (lith)	
SW-SM		35.5	N				186	SAA @ 181.8 — 183' sand = 75% silt = 20% gravel = 5% up to 1 1/4" (lith.)	no odor
SW-SM			N				187	SAA @ 184-185 gravel is lith + caliche	
SW		30.3	N				188	SAA — sand = 85% gravel = 10% silt = 5%	
Additional Comments:									
★ 184-186 disturbed									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10658					Logged By: J. Messenger			Page 22 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							188		
SW			N				189		
SW			N				190	pale brown (10YR 6/3)	
SW	2.6		N				191		no odor
SW			N				192		
SP-SM		30.3	N				193	SAA @ 170-171 trace coarse sand no trace gravel	
SP			N				194	poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 100% - F = 40% M = 60% trace coarse sand SA-SR (qtz, feld, lith, caliche); trace clay as nodules trace gravel up to 3/8" (lith)	
SP		33.4	N				195		
SP-SM			N				196	SAA w/silt - Sand = 80% silt = 20% non plastic light brownish gray (10YR 6/2)	
SP-SM		23.1	N				197		
Additional Comments: * 193-196' disturbed									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106S8

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP			N				197	SAA @ 193-194' brown (10YR 5/3) no trace clay trace gravel up to 1"	
SP			N				198	↓ to 198.5'	
SW			N				199	SAA @ 187-188'	
								SAA @ 197-198'	
SP			N				200		
SP			N				201		
SW	23.1		N				202	SAA @ 198.5-199' @ 201.5-202 gravel = 15%; trace silt; sand = 85%	
SW			N				203		
SP			N				204	SAA @ 199-200'	
SW			N				205	SAA @ 201-202' sand = 90% gravel = 10% trace silt	
SW			N				206		

Additional Comments:

Recovery:	None	
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Partial	
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Complete

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 24 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW			N				206	SAA. SW. with gravel gravel to 1" (lith + Qtz) brown 10YR 5/3 sand = 90% F = 30% M = 55% C = 15% gravel = 10% trace silt no odor	
SW			N				207		
SW			N				208	SAA w/ more gravel — sand = 80% gravel = 20% trace silt	
SW		25.6	N				209		
SW	0.7		N				210	SAA @ 206-207' w/ less gravel F = 35% M = 55% C = 10% sand = 90% gravel = 5% silt = 5% to 210.5'	
SP			N				211	poorly graded sand — light brownish gray (10YR 6/2) loose, silty sand = 95% F = 40% M = 60% trace coarse sand — SA-SR (Qtz, feld, lith); silt = 5% nonplastic no odor	
SP			N				212	@ 211.5 = 211.75' - 212' SAA w/ gravel — sand = 98% gravel = 10% silt = 5% NO silt	
SW			N				213	SAA @ 209-209' sand = 65% brown (10YR 5/3) gravel = 35% up to 21' trace silt (Qtz + lith) NO odor	
SW			N				214	SAA light gray (10YR 7/2) sand = 70% gravel = 25% silt = 5% nonplastic to 214.2'	
SW			N				215	SAA — pale brown (10YR 6/3) sand = 85% F = 30% M = 60% C = 10% gravel = 15% up to 1 3/4" NO odor	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		25.6	N		10'		215		
SW			N				216	Brown (10YR 5/3) SW w/ gravel sand = 95% F = 35% M = 55% C = 10% gravel = 5% trace silt	no odor
SW			N				217	Pale brown (10YR 6/3) sand = SAA but increasing gravels down - sand = 85% gravel = 15% - sand = 75% gravel = 25%	no odor
SW			N				218		
SW			N				219	well graded gravel - pale brown (10YR 6/3) loose, SLM - gravel = 60% up to 2" (Qtz + lith); sand = 40% F = 30% M = 50% C = 20% (Qtz, feld, lith) SAA	
SW		24.0	N		10'		220	SAA @ 216-217 SW w/ gravel sand = 90% gravel = 10%	no odor
SW	0.0		N				221	SAA: sand = 80% gravel = 20%	
SW			N				222	SAA @ 216-217 sand = 90% gravel = 5% silt = 5%	
SP			M				223	Poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 85% F = 40% M = 60% trace coarse sand SA-SR (Qtz, feld, lith) gravel = 10% up to 1 1/8" (Qtz + lith); silt = 5% nonplastic	no odor
SP			N				224	SAA w/ trace gravel sand = 90% silt = 10%	

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 26 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							224	SAA @ 222-223'	
SP		24.0	N				225	SAA @ 216-217'	
SW			N				226	sand = 80% gravel = 20% up to 1 3/4" (qtz + lith)	
SW			N				227	SAA @ 225-226 sand is qtz, feld, lith, caliche sand = 80% gravel = 15% silt = 5%	
SW		27.4	N				228	227.5-228 sand = 95% gravel = 5%	
SW			N				229	@ 228 sand = 85% gravel = 15%	
SW-SR			N				230	well graded sand with silt - light gray (10YR 7/2) loose, 5LM sand = 85% : F = 25% M = 65% C = 10% SA-SR (qtz, feld, lith, caliche) silt = 10% soft; nonplastic gravel = 5% up to 1" (qtz + lith)	
SW	2.5		N				231	SAA @ 225-226' no odor	
SW			N				232	230.8-231.2' sand = 95% gravel = 5% up to 3/4"	
SW		41.1	N				233	231.2-232' SAA @ 230-230.8'	
SW			N				234	no odor	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10658					Logged By: J. Messenger			Page 27 of 59	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP			N				233	poorly graded sand — pale brown (10YR 6/3) loose, SLM Sand = 95%: F=40% M=60% trace coarse sand SA-SR (Qtz, feld, lith, caliche); gravel = 5% up to 1" (Qtz + lith) no odor	
SP		41.1	N				234	↓ to 234.5'	
SW			N				235	well graded sand w/ gravel — light yellowish brown (10YR 6/4) loose SLM — Sand = 80%: F=20% M=70% C=10% SA-SR (Qtz, feld, lith); gravel = 15% up to 1 1/8" (Qtz + lith); silt = 5% nonplastic	
SW			N				236	↓	
SP-SM		31.0	N				237	poorly graded sand w/ silt — light brownish gray (10YR 6/2) loose, SLM — sand = 90%: VF=30% F=60% M=20% SA-SR (Qtz, feld, lith); silt = 10% nonplastic — trace coarse sand trace gravel up to 3/8" (lith)	
SP-SM			N				238	↓ to 237.5'	
SP			N				239	SAA w/ less silt — sand = 95%: VF=80% F=70% M=70% silt = 5%	
SW			N				240	well graded sand — brown (10YR 5/3) loose, SLM sand = 85%: F=30% M=55% C=15% SA-SR (Qtz, feld, lith, caliche) gravel = 10% up to 1 1/2" (lith + Qtz); silt = 5% nonplastic no odor	
SP		34.5	N				241	SAA @ 233-234.5' trace coarse sand + trace gravel to 3/8"	
SW	2.4		N				242	SAA @ 238-239' sand = 85% (Qtz, feld, lith, caliche) gravel = 10% (lith + caliche) silt = 5%	
SW		26.4	N				243	SAA sand = 75% gravel = 25% trace silt	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10658					Logged By: J. Messenger			Page 28 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW			N				242	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				243	SAA: sand = 70% gravel = 30% fine silt	no odor
SW		26.4	N		5'		244	↓ to 244.5'	
SW			N				245	SAA light brownish gray (10YR 6/2) sand = 85% F = 30% M = 55% C = 15% gravel = 10% up to 1 1/4" silt = 5% nonplastic	
SW			N				246	@ 245.5 - sand with silt - very pale brown (10YR 7 1/2) sand = 90% F = 40% M = 60% trace coarse sand silt = 10% nonplastic trace gravel to 3/8"	
SP			N				247	poorly graded sand - pale brown (10YR 6 1/2), loose, SLM sand = 100% F = 30% M = 70% trace coarse sand SA-SR (Qtz, feld, lith) - trace gravel to 1" (lith)	no odor
SP			N				248	SAA sand = 100% F = 45% M = 55% no trace coarse sand no trace gravel	
SP		31.5	N		10'		249	SAA - grayish brown (10YR 5 1/2) ↓ to 248.8'	
GW			N				250	well graded gravel w/ sand - pale brown (10YR 6 1/2) loose, SLM gravel = 70% up to 1 3/4" (Qtz + lith) sand = 30% F = 35% M = 55% C = 10% SA-SR (Qtz, feld, lith)	no odor
GW			N				251	SAA @ 248-248.5m 246-247 sand = 95% gravel = 5%	
AR			N						

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP			N				251	SAA @ 244.5 - 245.5' SAA @ 250 - 251'	
SP			N				252		
CL		31.5	N		10		253	clay - light brown (7.5YR 6/3) hard, SLM low-med plasticity SAA @ 253 - 253.5'	
CL			N				254	SAA @ 244.5 - 245.5' sand = 75% gravel = 25% 254 - 254.25' silt - pale brown (10YR 6/3) soft, nonplastic clay - SAA @ 253 - 253.5'	trace silt = 2% no odor
CL			N				255		
CL			N				256	SAA brown - 7.5YR 5/3	
CL			N				257	clayey silt - pale brown (10YR 6/3) soft, nonplastic, SLM silt = 100% sm silt = 80% clay = 20% - clay is SAA @ 256 - 257	
CL		41.2	N		10		258	clay SAA @ 256 - 257 clay is altered/stained to gray (10YR 5/1) at 258.5 - 258.8'	
CL			N				259	light gray (10YR 7/2) @ 258.8 - 260'	
CL			N				260		

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10658					Logged By: J. Messenger			Page 30 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							260	soil type; Munsell color; density (primarily coarse)/consistency & plasticity	
							261	% sand (include grain size %; fine, medium, coarse, etc.)	
							262	sand mineralogy	
							263	% gravel	
							264	gravel mineralogy	
							265	angularity/roundedness	
							266	% fines (silt/clay)	
CL	5.2		N				260	light gray to 261	
CL			N				261	light gray and light brown (7.5YR 6/3)	
CL			N				262	to 262.75'	
ML		41.2	N				263	262.75-263.25 - silt - light brown (7.5YR 6/3) soft, nonplastic trace F sand	
SW			N				264	well graded sand - light brown (7.5YR 6/3) loose, SLM Sand = 90% : VF = 20% F = 50% M = 20% C = 10% SA-SR (Qtz, feld, lith, caliche); silt = 5% nonplastic; clay = 5% SRA @ 265-262	
SP			N				265	SRA @ 263.25 - 264 but trace coarse VF = 20% F = 60% M = 20% no clay sand = 95% silt = 5% (no odor)	
CL			N				266	to 265.25'	
SP			N				267	SRA @ 253 - 253.5'	
ML			N				268	poorly graded sand - dark yellowish brown (10YR 4/4) loose, SLM Sand = 95% : F = 50% M = 50% trace coarse sand SA-SR (Qtz, feld, lith); silt = 5% nonplastic	
ML			N				269	clayey silt - brown (7.5YR 5/2) soft, SLM silt = 85% soft; nonplastic clay = 15% low plasticity	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 31 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML			N				269		
ML	3.1		N				270		
ML			N				271		
ML		58.2	N				272		
ML			N				273		
CL			N				273.25	273-273.25' - clay - brown (7.5YR 5/2) hard, dry, low plasticity - altered to very dark gray (7.5YR 3/1) and pinkish gray (7.5YR 7/2) which turn w/ acid	
SM			N				274	silty sand - light yellowish brown (10YR 6/4) loose, silty sand = 85% : VF = 20% F = 70% M = 10% (qtz, feld, lith) SA-SR silt = 15% nonplastic	
SP			N				275	SAA w/ trace silt sand = 100% trace gravel up to 1/2" (1.7h)	
SP			N				276	SAA - pale brown (10YR 6/3) sand = 90% silt = 5% clay = 5% as nodules	
SP			N				277	SAA - sand = 100% trace silt no clay	
SP	31.2		N				278	SAA - larger med. fraction sand = 100% : F = VF = 15% F = 65% M = 20% trace coarse sand + silt	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP			N				278	SAA	
SP			N				279		
SW	1.0		N				280		
SW		31.2	N				281	SAA @ 278-280' to 282.25' clay - brown (7.5YR 5/3) hard, SLM low-med. plasticity	
SP			N				282		
CC			N				283		no odor
CU			N				284		
CL			N				285		
CU			N				286		
SP			N				287	SAA @ 277-278 no trace coarse sand or silt	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 33 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							287	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				288	well graded sand - grayish brown (10YR 5/2) loose, moist sand = 90% - F = 60% M = 20% C = 20% SA-SR (qtz, feld, lith) gravel = 10% up to 1" (qtz + lith)	
SW			N				288.6	SAA w/ two clay stringers - 1/2" stringers @ 288.6'	
SW			N				288.8	and 288.8' - clay SAA @ 282.25-283'	
SW			N				289	SAA @ 288-289 - clay 1/2" stringer @ 289.2'	
SW			N				290	clay - brown (7.5YR 5/4) hard, dry, low med plasticity	
CL			N				291	lightly mottled to pinkish white (7.5YR 8/2) rxn with acid - sec. cal. carb.	
CL			N				292	mottling increase - mod. mottled	
CL			N				293	SAA @ 286-287' moist	
SP			N				294	SAA sand = 95% (SLM) trace gravel up to 3/4" (lith) silt = 5% nonplastic	
SP	55.0		N				295		
SP			N				296		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106S8

Logged By: J. Messenger

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						Soil Description		Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	
							296	
							297	
					4'		298	
							299	
							300	
	NO PID						301	
							302	
					4'		303	
							304	
							305	

NO CUTTINGS RETURNED - highly disturbed and a poor representation of subsurface. Cuttings were discarded. Was observed that all 4 ft was of sand; no clay observed. Appeared as a poorly-graded sand.

SAA

SAA @ 293-294' wet

no odor

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 35 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SM)			N				305	silty sand w/gravel - light gray (10YR 7/1) loose, dry sand = 45% VF = 20% F = 30% M = 10% trace coarse sand SA-SR (qtz, feld, lith); gravel = 40% up to 2 1/4" (lith)	
							306	silt = 15% soft, non plastic SAA @ 293-294' sand = 90% silt = 5% gravel = 5% up to 1/2" (lith)	
(SP)			N				307	↓ to 307.25'	
(SP)							308	well graded sand w/gravel - yellowish brown (10YR 5/4) loose, SLM - sand = 75% F = 30% M = 50% C = 20% SA-SR (qtz, feld, lith); gravel = 25% up to 1 1/4" (Qtz + lith)	
(SW)		41.6	N				309	↓	
(SM)			N				310	SAA @ 305-306 pale brown (10YR 6/3) SLM - sand = 85% silt = 15% trace gravel up to 3/8" (lith)	
(SP) 0.7			N				311	SAA w/less silt sand = 90% silt = 10% trace gravel to 1/2"	
(SP)			N				312	SAA @ 306-307' trace coarse sand gravel = 5%	
(SP)							313	↓	
(SW)			N				314	well graded sand w/gravel SAA @ 307.25-309' sand = 65% gravel = 35% trace silt	
Additional Comments:									
★ 304-306' disturbed ★									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106S8

Logged By: J. Messenger

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Soil Description							Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	
						Depth, ft bgs	
						-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity	
						-- % sand (include grain size %; fine, medium, coarse, etc.)	
						-- sand mineralogy	
						-- % gravel	
						-- gravel mineralogy	
						-- angularity/roundedness	
						-- % fines (silt/clay)	
SW			N			314	
						SAA — sand = 75% F = 35% M = 55% C = 10% gravel = 20% silt = 5% nonplastic	
SW			N			315	
						315.8 - 316.25 SAA @ 313 - 314' pale brown (10YR 6/3)	
SW		42.3	N	SM	6'	316	
						317	
SW			N			318	
						SAA @ 314 - 315' sand F = 25% M = 55% C = 20%	
SW			N			319	
						320	
SW	0.4		N			321	
		34.7	N		7'	322	
SW			N			323	
						SAA — sand = 60% gravel = 35% up to 2" silt = 5% secondary calcium carbonate throughout pale brown (10YR 6/3) SAA — brown (10YR 5/3)	
						SAA — light gray (10YR 7/2)	
					</		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
Sw			N				323	SAA to 323.75'	
SP		34.7	N				324	Poorly-graded sand - light yellowish brown - (10YR 6/4) loose, SLM - sand = 95% VF = 20% F = 70% M = 10% (Qtz, fld, lith) SA-SR - silt = 5% nonplastic	
Sw			N				325	@ 324.25' - well graded sand - pale brown (10YR 6/3) loose SLM - sand = 90% F = 20% M = 70% C = 10% (Qtz, fld, lith) SA-SR - gravel = 10% up to 1 1/2" (Qtz + lith) no odor	
Sw			N				326		
Sw			N				327	SAA to 326.5'	
SP			N				328	Poorly graded sand - light brownish gray (10YR 6/2) loose, SLM sand = 95% F = 45% M = 55% trace coarse sand SA-SR (Qtz, fld, lith); silt = 5% nonplastic - trace gravel to 3/8" (lith) no odor	
SP			N				329		
SP		58.1	N				330	SAA to 329.5'	
Sw	0.2		N				331	SAA @ 324.25 - 325 sand = 90% gravel = 5% silt = 5%	
Sw			N				332	SAA w/ trace silt sand = 95% gravel = 5%	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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Soil Description							Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery Depth, ft bgs	
-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)							
(SW)			N			332	
(SW)			N			333	
(SW)		58.1	N			334	
(SW)			N			335	
(SW)			N			336	
(SW)			N			337	
(SP)			N			338	
(SW)		36.5	N			339	
(SP)	0.6		N			340	
(SP)			N			341	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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Soil Description								Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP							SAA to 341.1'	10 odor
SN			N				SAA @ 338 - 338.75'	
							↓ to 342.5'	
CL			N				clay - reddish brown (5YR 5/3) hard, SLM med. plasticity	no odor
CL		36.5	N					
CL			N				SAA w/ moderate mottling to white (5YR 8/1) rxn w/ acid sec. cal. carbonate	no odor
CL			N				SAA @ 338 - 338.75'	
CL			N				@ 345.9' ↑	sand = 95% gravel = 5% trace silt
SN			N				SM light brownish gray (10YR 6/2) @ 346 - brown (10YR 5/3)	
SN			N				@ 346.5' light brownish gray (SLM)	
SN			N				SAA @ 346.5' sand = 90% gravel = 5% clay = 5% nodules brown (7.5YR 4/4)	
SN		84.5	N				@ 348 SAA @ 347 but SM	
CL			N				clay - brown (7.5YR 5/3) very stiff - low-med plasticity	
CL			N				SAA - clay highly mottled throughout to white (7.5YR 8/1) rxn w/ acid sec. cal. carbonate	weak odor

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 40 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL	10.6						350	silty clay - brown (7.5YR 5/4) med. stiff to stiff - low plasticity clay = 60% - no mottling silt = 40%	
CL							351		
ML		84.5					352	clayey silt - light brown (7.5YR 6/4) soft, SLM silt = 80% soft, nonplastic clay = 20%	
ML							353		
SP							354	poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 95%: F=50% M=50% trace coarse sand (qtz, feld, lith) silt = 5% nonplastic trace gravel up to 3/4" (lith)	
							355	highly disturbed + discarded: contents appeared as sand	
SW							356	well graded sand w/ gravel - pale brown (10YR 6/3) loose, SLM sand = 80%: F=30% M=55% C=15% (qtz, feld, lith) SA-SR gravel = 20% up to 1 3/4" (qtz + lith)	
SP							357	poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 95%: F=60% M=40% (qtz, feld, lith) SA-SR silt = 5% nonplastic	
SP							358	SAA w/ trace gravel up to 1/2" (lithics)	
SP							359	358.6 - 358.8' SAA w/ gravel - sand = 85% gravel = 10% up to 1 1/2" (lith) silt = 5% SAA @ 358 - 358.4'	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒ SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106S8					Logged By: J. Messenger			Page 41 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							359	soil type; Munsell color; density (primarily coarse)/consistency & plasticity % sand (include grain size %; fine, medium, coarse, etc.) sand mineralogy % gravel gravel mineralogy angularity/roundedness % fines (silt/clay)	
SP	0.4		N				360	trace coarse sand	
SP			N				361	SAA @ 359-360'	
SP			N				362		
SP			N				362.5	to 362.5'	
GW		35.3	N				363	well graded gravel w/ sand - pale brown (10YR 6/3) loose, SLM gravel = 65% up to 1 3/4" (Qtz + lith) - sand = 35% F = 30% M = 60% C = 10% SA-SR (Qtz, feld, lith)	
GW			N				364		
SW			N				365	well graded sand w/ gravel - pale brown (10YR 6/3) loose, SLM sand = 65% F = 25% M = 55% C = 20% (Qtz, feld, lith) SA-SR gravel = 35% up to 1 5/8" (Qtz + lith)	no odor
SW			N				366		
SW			N				367	SAA - brown (7.5YR 5/2) sand = 75% F = 35% M = 55% C = 10% gravel = 25%	
GW		36.4	N				368	well graded gravel w/ sand - light brownish gray (10YR 6/2) loose, SLM gravel = 75% up to 2" (Qtz + lith); sand = 25% F = 80% M = 65% C = 15% (Qtz, feld, lith) SA-SR	
SW			N					SAA @ 366-366.8 light brownish gray (10YR 6/2)	no odor

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG										
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:		
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 42 of 58		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description		Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity	-- % sand (include grain size %; fine, medium, coarse, etc.)	
							368			
(SW)			N				369			
(SP)			N				370	poorly graded sand - pale brown (10YR 6/3) loose, SLAI sand = 100% : F = 40% M = 60% trace coarse sand SA-SR (Qtz, feld, lith); trace gravel to 1/4" (lith)	no odor	
(SP)	0.1		N				371			
(SW)		36.4	N				372	SAA @ 364-365		
(SW)			N				373			
(SW)			N				374			
(SW)			N				375			
(SW)			N				376	grayish brown (10YR 5/2)		
(SW)			N				377	SAA brown (10YR 5/3) moist	no odor	
Additional Comments:										
Recovery: None ☐ Partial ☒ Complete ☒										
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None										
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity										
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel										



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				377	SAA @ 364-365 Sand = 80% F = 30% M = 60% C = 10% gravel = 15% up to 1" silt = 5% nonplastic NO odor	
SW			N				378		
SW			N				379		
SP-SM	0.6		N				380	poorly graded sand w/silt - brown (7.5 YR 5/3) loose, SLM - Sand = 90% F = 40% M = 60% trace coarse sand + trace gravel to 3/4" (1.5%); silt = 10% nonplastic (NO odor)	
SW-SM		38.6	N				380.25	SAA to 380.25' SAA w/coarse sand + gravel Sand = 75% F = 25% M = 60% C = 15% gravel = 15% up to 1 1/4" (at + 1.5%) silt = 10% NO odor	
SW-SM			N				381		
SW			N				382		
SW			N				383	loos silt Sand = 80% gravel = 15% silt = 5%	
SW			N				384		
SW			N				385	sand = 70% gravel = 25% silt = 5%	
SW			N				386		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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Soil Description										Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SP			N				386	poorly graded sand - light gray (10YR 7/2) loose, SLM sand = 100% : F = 35% M = 65% ^{fine} SA-SL gravel = 10% up to 3/8" coarse (Qtz, feld, lith)	no odor	
SP			N				387	trace silt + trace gravel up to 5/8" (lith)		
SP			N				388			
SP			N				389			
SP		54.0	N				390			
SW	0.5		N				391	7' @ 389.75' : well graded sand w/ gravel - grayish brown (10YR 5/2) loose, SLM - sand = 85% : F = 30% M = 60% C = 10% SA-SR (Qtz, feld, lith); gravel = 15% up to 1 1/2" (lith) trace silt	no odor	
SW			N				392	sand = 75% : F = 25% M = 50% C = 25% gravel = 25% up to 1 3/4" trace silt		
SW			N				393			
SW			N				394			
SW			N				395			

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 45 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		54.0	N				395	to 395.75'	
CL							396	Clay - brown (7.5YR 5/4) very stiff, low plasticity, SLM w/gravel = 10% up to 1/2" trace FLM sand	
								to 396.25'	
SW			N				397	SAA @ 390-391' Sand = 85% gravel = 10% silt = 5%	
SW			N				398		
SW			N				399	poorly graded sand w/silt - pale brown (10YR 6/3) loose, SLM Sand = 90% F = 45% M = 55% SA-SR (qtz, feld, lith) silt = 10% nonplastic	no odor
SP-SM			N				400	to 399.5' Clay - brown (7.5YR 5/3) very stiff, low plasticity SLM	
CL	0.4	60.4	N				401	to 400.5' poorly graded sand w/clay - gray (10YR 6/1) loose, SLM Sand = 90% F = 50% M = 50% (qtz, feld, lith) SR clay = 10% nonplastic	
SP-SG			N				402	SAA @ 396.25 to 398.75'	
SW			N				403		
SW			N				404	to 403.8' SAA Sand = 70% gravel = 25% silt = 5%	
SP			N				404	poorly graded sand - brown (7.5YR 5/3) loose, SLM Sand = 45% F = 45% M = 60% trace coarse sand (qtz, feld, lith) gravel up to 1/2" is trace (lith); silt = 5% nonplastic SA-SR	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 46 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP-SC			N				404	SAA @ 400.5 - 401'	
CL		60.4	N				405	clay - SAA @ 399.5 - 400.5' to 404.75'	
SP			N				406	SAA @ 403.8' - 404'	
SP-SC			N				407	SAA @ 404 - 404.75' trace coarse sand trace gravel to 3/8" (1.7h)	
SP-SC			N				408		
SP-SC			N				409	SAA trace gravel up to 3/8"	
SP-SC			N				410		
SP-SC	0.1	64.0	N				411		
SW			N				412	well graded sand - gray (10YR 6/1) loose, SLM Sand = 85%; F = 30% M = 55% C = 15% SA-SIL (qty, feld, lith) gravel = 10% up to 1/4" (qty & lith); silt = 5% nonplastic	
SW			N				413	SAA = Sand = 80% gravel = 15% silt = 5%	
Additional Comments: 406-416' disturbed									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SW)			N				413		
(SW)		64.0	N				414		
(SW)			N				415		
(SW)			N				416		
(AL)			N				416.25	Clay - dark gray (4.5YR 4/1) sm olive (5Y 5/3) hard, med. plasticity - contains clumps of secondary calc carbonate (w/acid)	
(SP-SC)			N				417	SAA @ 400.5 - 401' - trace coarse sand	
(CL)			N				417.25	SAA @ 400.5 - 401' - trace coarse sand sm (to 417.25')	
(SP)			N				418	Poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 75% : F = 46% M = 55% trace coarse sand (Qtz, feld, lith) SA-SR silt = 5% nonplastic trace gravel to 3/8" (lith) no odor	
(CL)			N				418.8	Clay - center = brown (4.5YR 5/4); outer = strong brown (4/6) med. plasticity very stiff - 417.8 - 418.8	
(SP)		41.3	N				419	418.8 - 419' = SAA @ 417.25 - 417.8' trace clay as nodules sand = 80% brown (4.5YR 5/3) no odor gravel = 5% up to 1 1/2" (lith)	
(SW)	1.5		N	P, V			420	well graded sand w/ gravel - pale brown (10YR 6/3) loose, SLM sand = 85% : F = 20% M = 70% C = 10% (Qtz, feld, lith) SA-SR gravel = 15% up to 2 3/4" (Qtz + lith) no odor	
(SW)	1.1	50.4 40.5	N				421		
(SW)			N				422	@ 421.8 - Poorly graded sand - see next page	

Additional Comments:

* 406-416' disturbed

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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Soil Description										Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SP	2.1		N				422	poorly graded sand - pale brown (10YR 6/3) loose, SCLM sand = 95%: VF = 15% F = 40% M = 45% (Qtz, feld, lith) SA-SR silt = 5% nonplastic trace gravel to 3/8" (lith)		
SP		50.4 40.5	N				423	trace clay as nodules - brown (7.5YR 5/4)	no odor	
SP			N				424			
SP			N				425	SAA sand = 95% trace coarse sand gravel = 5% up to 2 1/2" (lith) trace silt		
SW			N				426	well graded sand w/ gravel - brown (10YR 5/3) loose, SCLM sand = 65%: F = 20% M = 60% C = 20% (Qtz, feld, lith) SA-SR gravel = 35% up to 1 1/2" (Qtz + lith)		
SW		26.2	N				427	SAA - sand = 70% gravel = 30%	weak, sweet odor	
SW			N				428	SAA - sand = 75% gravel = 25%		
SW			N				429	sand = 85% gravel = 15% up to 1"		
CL			N				430	clay - strong brown (7.5YR 4/6) stiff to very stiff low to med. plasticity		
SW	1.2	7.2	N				431	SAA @ 428-429'	slight odor	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 49 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
								Well Details	
SW			N				431	SAA w/loss gravel sand = 95% gravel = 5%	
SW			N				432		
SW		37.8	N		6'		433	light brown (10YR 6/3) sand = 95% gravel = 5%	
SW			N				434		
SW			N				435	sand = 90% gravel = 10%	
SW			N				436	SAA - sand = 95% F = 40% M = 58% C = 10% gravel = 5% up to 1 1/8" (at 2-1.7h)	slight odor
SW			N				437		
SW		28.3	N		4'		438	SAA sand = 90% gravel = 10% up to 1 1/2"	
SW			N				439		
SW			N				440		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106SB					Logged By: J. Messenger			Page 50 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SO	1.4	↑	N		↑		440	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				441	SAA: Sand = 85% F = 25% M = 60% C = 15% gravel = 15% up to 1 1/2" (Qtz + lith)	
SP			N				442	poorly graded sand - pale brown (10YR 6/3) loose, SLM - sand = 95% F = 45% M = 55% (Qtz, feld, lith) S.A. - SR = silt = 5% non-plastic trace gravel to 3/8" (lith) + (Qtz)	
SW			N				443	442.2' SAA @ 436-437'	
SP	26.6		N				444	SAA @ 441.75 - 442.2'	
SW			N				445	SAA @ 427-428'	
SP			N				446	SAA @ 441.75 - 442.2' trace coarse sand Sand = 95% silt = 5% gravel = 5% up to 1" (Qtz + lith)	
SW			N				447	SAA @ 440-441' sand = 90% F = 30% M = 60% C = 10% gravel = 10%	
SW			N				448	SAA @ 440-441' sand = 55% gravel = 45% up to 2 1/2" clay - brown (7.5YR 5/3) stiff to very stiff, med. plasticity	
CW	27.2		N				449	SAA @ 445-446'	
SP			N						

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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Soil Description										Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SW		27.2	N		4'		449	SAA @ 440-441'	slight sweet odor	
CL	70.4		N				450	clay - reddish brown (5YR 5/4) very stiff, SLM low-med. plasticity	odor present	
CL			N				451	clay is brown (7.5YR 5/3) to 451.25'		
SM			N				452	451.25' - silty sand - pale brown (10YR 6/3) loose, SLM sand = 75% : VF = 15% F = 60% M = 35% SA-SR (at 2, lith) silt = 25% nonplastic		
SP-SM		27.2	N				453	SAA w/less silt : sand = 90% silt = 10%		
SW			N		6'		454	SAA w/ coarse sand fraction and gravel sand = 80% : F = 40% M = 50% C = 10% gravel = 10% up to 1/4" (at 2, lith) silt = 5% clay = 5% as nodules (brown 7.5YR 5/3) low-med. plasticity		
SP			N				455	SAA @ 451.25' w/less silt sand = 95% silt = 5% trace clay and gravel up to 1" (lith)		
SP			N				456			
SP		30.6	N		4'		457			
SP			N				458	trace coarse sand		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-10658					Logged By: J. Messenger			Page 52 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								Well Details	
SP		36.6	N		H		458	sand = 90% silt = 5% gravel = 5% up to 1/8" (i.th)	
							459		
SP		124.6	N		X		460	SAA trace coarse sand	
SP			N				461		
SP			N				462		
SP		51.8	N				463	SAA trace clay as nodules brown (7.5 PR 5/3)	
SP			N				464		
SP			N				465		
SP			N				466		
SP		40.6	N				467	SAA trace coarse sand no clay	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106SB

Logged By: J. Messenger

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Soil Description								Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		40.6	N		2'		467	well graded sand w/ gravel — light brownish gray (10PR 6/2) 100% SLM — sand = 70% F: 30% M = 60% C = 100% (qtz feld, lith) SAA — gravel = 30% up to 2" (Qz + lith)
SP							468	SAA @ 462 - 463'
SP							469	
SP							470	
SP	54.1						471	
SP		31.9			6'		472	
SP							473	
SP							474	
SP							475	moist
SP		21.8		P, V, M, B	4'		476	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-10658

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SP)			N				476	SAA No trace clay nodules trace gravel up to 3/8" (lith) moist	
(SP)		21.0	N				477		
(SP)		X	N				478		
(SP)			N				479	SAA - trace coarse sand moist sand = 95% gravel = 5% up to 2 1/2" (lith)	
(SP)			N				480		
(SP)	844		N				481	moist trace silt sand = 100% trace gravel up to 2" (lith) trace silt	
(SP)		27.3	N				482		
(SP)			N				483	no trace gravel no trace coarse sand	
(SP)			N				484		
(SP)			N				485		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-10658

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP			N				485		
SP		27.3	N				486		
SP			N				487		
SP			N				488		
SW			N				489	well graded gravel w/sand - brown (7.5YR 4/3) loose, wet gravel = 65% up to 2" (qtz + lith) sand = 35%: F=25% M=55% C=20% SA-SR (qtz feld, lith)	
SW			N				490	SAA w/less gravel sand = 90% gravel = 10% up to 3/4" sand: F=20% M=70% C=10%	odor present
SW	1498		N				491	SAA @ 488-489 sand = 45% gravel = 55%	
SW		25.9	N				492		
SW			N				493		
SP			N				494	SAA @ 480-481 brown (7.5YR 4/3) wet	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description			Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity	-- % sand (include grain size %; fine, medium, coarse; etc.)	-- sand mineralogy	
(SP)			N				494	SAA w/ trace gravel to 1 1/2" (lith) and trace silt - non plastic (odor present)			
(SP)			N				495				
(SP)		25.9	N		10'		496				
(SP)			N				497				
(SP)			N				498	SAA 489-490			
(SW)			N				499				
(SW)			N	P, V, M, B			500	Wet		weak odor	
(SW)	8.1		N		8'		501				
(SW)		22.1	N				502				
(SW)			A				503				

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106SB

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(Sw)			N				503	sand = 95% gravel = 5% trace gravel SAA @ 503-504'	
(Sw)		22.1	N		8'		504		
(Sw)			N				505		
(Sw)			N				506	sand = 90% gravel = 10%	
(Sp)			N				507	SAA @ 478-479' sand = 100% trace gravel + coarse sand	
(Sp)			N				508	SAA @ 503-504'	
(Sw)		20.4	N		8'		509		
(Sw)			N				510	SAA sand = 90% gravel = 10%	
(Sw)	3.7		N				511		
(Sw)			N				512		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



Project Number: 62735DM02.1017 Date:

Logged By:

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[illegible]

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Drilling Company: Cascade					Start Time/Date: 10/6/18				
Lead Driller: Roger Rodriguez					Completion Time/Date:				
Drilling Method: Sonic					Final Depth:				
Casing Diameter OD:					Bit Type and Outer Diameter				
Boring/Well ID: KATB-10659					Logged By: Lane Andress				
					Page 2 of 25				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details	
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily)		
							-- % sand (include grain size %; fine, medium, coarse, etc.)		
							-- sand mineralogy		
							-- % gravel		
							-- gravel mineralogy		
							-- angularity/roundedness		
							-- % fines (silt/clay)		
SM	NA			None - Knife	1		0-3" sand w/ gravel		
					2		3"-5 ft silty sand, brown (7.5 YR 5/3)		
					3				
					4				
					5		a few large pebbles/cobbles up to 6"		
					6		below 5 ft None seen - silty sand as above		
					7		to 8 ft 4 inches		
SM	NA				8				
SW	74.3				9		Silty sand, trace clay - strong brown (7.5 YR 4/6), moderately		
CL	74.5				10		dense, weakly plastic, silt & sand fine to coarse, trace gravel - sand/gravel etc. feldspar, calcite, lithus - 1/2"		
SW	74.5				11		clay or sand - strong brown (7.5 YR 4/6), moderately plastic, mod dense - sand 20%, trace gravel up to 1" of calcite		
CL	74.5				12		damp		
SW	74.5				13		sand, brown (7.5 YR 4/4), loose, silt to coarse grained, gravel up to 10% of gravel, limestone, calcite up to 1/2"		
CL	74.5				14		linch - damp		
SW	74.5				15		clay - brown (7.5 YR 4/4) mod dense, plastic, damp, trace		
CL	74.5				16		coarse sand of calcite - Recovery 15.3 - 16 ft		
SW	74.5				17		same as above - increased silt 16 - 16.5 ft		
CL	74.5				18				
SW	74.5				19		Silty sand - brown (7.5 YR 4/4), mod dense to dense, damp, fine grained to very fine		
SW	74.5				20				
SW	74.5				21		Silty sand (brown - 7.5 YR 4/4) - loose, dry to damp, fine to coarse grained - sand 50% mod - coarse of calcite & lithus SA		
SW	74.5				22				
SW	74.5				23		SAA		
SW	74.5				24				
SW	74.5				25		Silty sand as above to 24.9 ft - thin lenses of clay brown (7.5 YR 5/4) - 25.2 - clayey silt w/ nodules of clay up to 1" (5% nodules) dense, damp		
SW	74.5				26				
SW	74.5				27		Silty sand, fine grained, strong brown (7.5 YR 5/6) damp, loose		
SW	74.5				28				
SW	74.5				29		Silty sand - brown (7.5 YR 5/4), loose, damp - very fine to fine grained		
SW	74.5				30				
SW	74.5				31				
SW	74.5				32				
SW	74.5				33				
SW	74.5				34				
SW	74.5				35				
SW	74.5				36				
SW	74.5				37				
SW	74.5				38				
SW	74.5				39				
SW	74.5				40				
SW	74.5				41				
SW	74.5				42				
SW	74.5				43				
SW	74.5				44				
SW	74.5				45				
SW	74.5				46				
SW	74.5				47				
SW	74.5				48				
SW	74.5				49				
SW	74.5				50				
SW	74.5				51				
SW	74.5				52				
SW	74.5				53				
SW	74.5				54				
SW	74.5				55				
SW	74.5				56				
SW	74.5				57				
SW	74.5				58				
SW	74.5				59				
SW	74.5				60				
SW	74.5				61				
SW	74.5				62				
SW	74.5				63				
SW	74.5				64				
SW	74.5				65				
SW	74.5				66				
SW	74.5				67				
SW	74.5				68				
SW	74.5				69				
SW	74.5				70				
SW	74.5				71				
SW	74.5				72				
SW	74.5				73				
SW	74.5				74				
SW	74.5				75				
SW	74.5				76				
SW	74.5				77				
SW	74.5				78				
SW	74.5				79				
SW	74.5				80				
SW	74.5				81				
SW	74.5				82				
SW	74.5				83				
SW	74.5				84				
SW	74.5				85				
SW	74.5				86				
SW	74.5				87				
SW	74.5				88				
SW	74.5				89				
SW	74.5				90				
SW	74.5				91				
SW	74.5				92				
SW	74.5				93				
SW	74.5				94				
SW	74.5				95				
SW	74.5				96				
SW	74.5				97				
SW	74.5				98				
SW	74.5				99				
SW	74.5				100				



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/6/18

Boring/Well ID: LAFB-10659

Logged By: Low Andres

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Soil Description							Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	
						-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL		↑	N		31	SAA to 31.5 then grading to clay strong brown (7.5YR 4/6)	
					32	grading from weakly plastic to dense plastic	
					33	trace coarse grains of caliche, damp	
CL		85	N		34	clay - light brown (7.5YR 6/4), dense, plastic, slightly	
					35	moist, trace coarse caliche sand & gravel - SR up to 1/2"	
SM		↓	N		36	clay as above mottled w/ silty sand, strong brown (7.5YR 4/6)	
					37	mod dense, non plastic, trace caliche sand, mod gravel	
SM		↑	N		38	silty sand - very fine grained - strong brown (7.5YR 4/6)	
					39	slightly moist, mod dense, trace mod - coarse sand & trace	
SM		68.1			40	gravel up to 1/2" - gravel of limestone	
					41	clay w/ silty sand - strong brown (7.5YR 4/6) - dense,	
CL		↑			42	non plastic, non moist slightly moist	
					43	clay strong brown (7.5YR 5/6) - dense, slightly moist,	
CL		66.9			44	caliche sand & gravel up to 1/2" SA	
					45	SAA	
CL		↑	N		46	SAA	
					47	SAA to 47.5 then - sand brown (7.5YR 4/6), loose, slightly	
SW		69.4			48	moist - w/ gravel	
					49	some more cohesive nodules w/ silty sand up to 2 1/2"	
SW		0.0			50	SAA	
SM		↑	N		51	silty sand to 50.5 @ 50.5 silty sand w/ trace clay	
					52	strong brown (7.5YR 4/6) - loose to mod dense, moist	
SM		74.6			53	slightly moist - trace caliche coarse sand	
					54	silty sand w/ trace clay as above - trace	
SM		↓	N		55	gravel up to 1/2" of caliche - SA - SR	
					56	SP - 59.5 - SAA to 55 - @ 55 - sand fine to medium	
SW		0.0			57	gravel brown (7.5YR 5/4), loose, damp	
SM		↑	N		58	SAA to 56.5 @ 56.5 then 56.5 @ 57.5 - sand	
SM		69.1			59	brown (7.5YR 5/3) - fine to coarse grained - 5% gravel	
SM		↓	N		60	up to 1/2", lithics @ 57.5 - 58" SAA @ 54 ft	
SM		88.8			61	SAA @ 54 ft to 58.5 ft - @ 58.5 ft to 59 ft - sand, strong brown	
SM		0.0			62	(7.5YR 4/6) loose, w/ trace coarse gravel, loose, slightly	
					63	moist @ 59 ft silty sand - SAA @ 54 ft	
SM		↑	N		64	silty sand (7.5YR 5/6) loose, VF, slightly damp to 61.5	
SM		69.3			65	61.5 - 62.5 - silt w/ sand fine to coarse grained sand	
					66	same color @ 61.5 - 62 - same as 61 - 61.5 ft	
SM		↓	N		67	silty sand brown (7.5YR 5/4) to 63 ft - @ 63 ft - 63.5 ft	
SM		↑	N		68	sand, coarse grained trace gravel brown (7.5YR 5/3) loose,	
SM		↓	N		69	gravel up to 1/2" SR, lithics @ 63.5 - 64 silty sand - VF to C	
SM		84.6			70	clay w/ silty sand - strong brown (7.5YR 4/6) - dense,	
SM		65.0			71	non plastic, non moist slightly moist	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes

N = No / None Mod = mod. velocity

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/6/18

Boring/Well ID: KAFB-106.39

Logged By: Lane Andrews

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Soil Description							Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	
-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)							
SM	0.0	68.3	N		66		60-66
SM	0.0	68.8	N		67		
SM	0.0	68.6	N		68		
SM	0.0	68.6	N		69		
SM	0.0	68.6	N		70		70
SM	0.0	68.6	N		71		
SM	0.0	68.6	N		72		
SM	0.0	68.6	N		73		
SM	0.0	68.6	N		74		
SM	0.0	68.6	N		75		
SM	0.0	68.6	N		76		76
SM	0.0	68.6	N		77		
SM	0.0	68.6	N		78		
SM	0.0	68.6	N		79		
SM	0.0	68.6	N		80		80
SM	0.0	68.6	N		81		
SM	0.0	68.6	N		82		
SM	0.0	68.6	N		83		
SM	0.0	68.6	N		84		
SM	0.0	68.6	N		85		
SM	0.0	68.6	N		86		86
SM	0.0	68.6	N		87		
SM	0.0	68.6	N		88		
SM	0.0	68.6	N		89		90
SM	0.0	68.6	N		90		
SM	0.0	68.6	N		91		
SM	0.0	68.6	N		92		
SM	0.0	68.6	N		93		
SM	0.0	68.6	N		94		
SM	0.0	68.6	N		95		96
SM	0.0	68.6	N		96		
SM	0.0	68.6	N		97		
SM	0.0	68.6	N		98		
SM	0.0	68.6	N		99		100

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/6/18

Boring/Well ID: KAPB-10639

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Soil Description		Well Details
					Depth, ft bgs	Recovery	
SP		↑	N		101	SAA - very fine grained sand, poorly sorted	
SP		↑	N		102	Loose, slightly moist	
SP	49.6	102.3			103	did not open core bag - it looks like SAA sand	
SW		103.3			104	brown (7.5 YR 5/3), loose, silty, brown 2-3" - loose	
SW		103.3			105	fine sand - @ 103 ft - 7.5 YR SAND - well sorted - 10% fines	
SP		↓	N		106	SAA - light brown (7.5 YR 5/3)	
SW		↑	N		107	sand w/ gravel, brown (7.5 YR 5/3), F to C, gravel up to 1"	
SW		↑	N		108	1", well graded gravel of lithics, at 2, 10% per	
SW	2.0	108.3			109	SAA - gravel up to 2" of pebble conglomerate	
SW		108.3			110	sandstone, lithics, etc, 10% per	
CL		↑	N		111	clayey silt - moderately dense to dense, slightly moist	
ML		↑	N		112	plastic	
CL		↑	N		113	SAA - occasional gravel up to 1" of conglomerate	
ML	0.0	113.3			114	silt lenses at ~113.5 ft	
ML		↑	N		115	silt - loose - brown (7.5 YR 5/4) - caliche / ash lens	
ML		↑	N		116	at 114.5 ft - 1/2" - below lens, silt - moderate	
ML		↑	N		117	dense - slightly moist	
ML		↑	N		118	silt as above at ~114.8 ft	
ML		↑	N		119	silt - as above @ 114.8 ft to 119 ft - caliche indicator	
ML	0.0	↑	N		120	silt lens - 1/2" pink (5 YR 5/3) - 1/2" thick -	
ML		↑	N		121	from 119.20 - clayey silt w/ clay brown (7.5 YR 5/4)	
ML		↑	N		122	very dense - not plastic, silt w/ clay brown (7.5 YR 5/4)	
ML		↑	N		123	SAA @ 119 ft - some caliche staining at 121.5 change	
ML		↑	N		124	to clay brown (7.5 YR 5/4) mod dense, mod plastic	
CL		↑	N		125	slightly moist	
CL		↑	N		126	clay as above - dense & plastic	
CL		↑	N		127	clay as above - to 124.5, increased silt to	
CL		↑	N		128	125.5	
CL		↑	N		129	clayey silt brown (7.5 YR 5/3), mod dense, slightly moist	
CL		↑	N		130	fine coarse sand & gravel up to 1" to 128 ft thin clay -	
CL	0.0	↑	N		131	brown (7.5 YR 5/3) dense, slightly moist plastic	
CL		↑	N		132	clay - brown (7.5 YR 5/3) dense, slightly moist, plastic	
CL		↑	N		133	130.5	
CL		↑	N		134	SAA at 130.5 ft - a 2-3" band of indurated caliche - at 130.75	
CL		↑	N		135	clay as above w/ indurated caliche staining (5%) at 131.75	
CL		↑	N		136	at 1" caliche lens - well indurated	
CL		↑	N		137	silty clay, brown (7.5 YR 5/3) dense, moderately plastic to	
CL		↑	N		138	plastic - staining of caliche staining (5%) occasional	
CL		↑	N		139	coarse grains of caliche up to 2 mm	
ML		↑	N		140	134 - 134.5 - silty sand (7.5 YR 5/3) - loose, slightly moist	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No / None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/7/18

Boring/Well ID: KAFB-106.S9

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details		
SP		78.3	N		136		@ 136.25 - sand, light brown (7.5 YR 6/3) fine grained, loose poorly graded, slightly moist	0	0	0
SP		↑	N		137		SAA @ 136.25' occasional medium grains of lithics & calcite (< 1%)	0	0	0
SP		76.8	N		138			0	0	0
SP		↓	N		139		SAA to 138.5 - from 138.5 to 139' sand, fine to coarse grained light brown (7.5 YR 6/3), well graded, slightly moist	0	0	0
SP	0.0	↓	N		140		coarse grains Qtz, feld, lithics. At 139' sand, SAA @ 136.25'	0	0	0
SP		↓	N		141		SAA to 140.25 then sand, (7.5 YR 6/3) light brown - fine to coarse grained, well graded, loose, dry	0	0	0
SW		74.1	N		142		occasional gravel up to 1" - SR - lithics	0	0	0
SW		↓	N		143		SAA to 142.5 then gravel w/ sand (pink 7.5 YR 7/2) - well graded - gravel ~ 60% up to 1" - sand coarse to med	0	0	0
GN		↓	N		144		Loose, dry	0	0	0
CL		↑	N		145		silty clay to 144.75' brown (7.5 YR 4/4) dense, plastic @ 144.75' clayey silt - brown (7.5 YR 5/4) med dense - new plastic - 144-146 slightly moist	0	0	0
ML		↑	N		146			0	0	0
ML		78.6	N		147		SAA to 147.25' decreasing clay to 147.25' then silt, same color, loose	0	0	0
ML		↓	N		148			0	0	0
ML	NAP	↓	N		149		Silt as above to 149.5 ft, then ~2-3" band of well indurated silt, then SAA, med indurated, slightly moist	0	0	0
SW	165 @ 150	↑	N		150			0	0	0
SW		153.7	N		151		Sand, fine to coarse grained w/ gravel, brown (7.5 YR 5/3), loose slightly moist, - gravel 5% up to 1", SR - SAA	0	0	0
SW		154.0	N		152		@ 151.25 - SAA - no gravel - Qtz feld, lithics	0	0	0
SW		154.8	N		153		SAA - at 153 increased coarse fraction & gravel	0	0	0
SW		155.5	N		154		5% up to 1" Qtz feld, lithics	0	0	0
SW		157.1	N		155		SAA to 155 then sand w/ silt & gravel pinkish gray (7.5 YR 7/2)	0	0	0
SW		157.3	N		156		sub VF to C, gravel up to 1" well graded of coarse sand conglomerate	0	0	0
SW		157.4	N		157		Sand w/ gravel, pinkish gray (7.5 YR 6/2) w/ - C grained gravel ~ 5-10% up to 1.25" of lithics	0	0	0
SW		157.6	N		158		graded, slightly moist, gravel Qtz feld, lithics - SAA SR	0	0	0
SW		158.4	N		159		SAA to 158.5 then increased gravel to 30% to 159' @ 159 ft	0	0	0
SW	0.0	158.8	N		160			0	0	0
SW		160.7	N		161		SAA to 160.25, then fining downwards, to mostly fine sand w/ ~20% M + C sand & no gravel well graded	0	0	0
SW		160.9	N		162		Dry to very slightly moist	0	0	0
SW		72.1	N		163		SAA @ 162.5 then sand, light brown (7.5 YR 6/3), fine grained, poorly graded, slightly moist	0	0	0
SP		↓	N		164			0	0	0
SP		↑	N		165		SAA @ 164.5 then sand w/ gravel light brown (7.5 YR 6/3) w/ - C gravel ~ 10% up to 1.25" well graded, dry to slightly moist - gravel of med grained sandstone lithics - SAA SR	0	0	0
SW		↑	N		166			0	0	0
SW		77.6	N		167		SAA - gravel also of Qtz & limestone	0	0	0
SW		↓	N		168			0	0	0
SP		↓	N		169		Sand, fine grained, pinkish gray (7.5 YR 6/2), poorly graded, dry	0	0	0
SW	0.0	↓	N		170		@ 169.5 sand, fine to med grained, light brown (7.5 YR 6/3), loose	0	0	0

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above

Qtz = quartz

Fld = feldspar

Y = Yes

N = No

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/7/18

Boring/Well ID: KAFB-106S9

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description		Well Details
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily % sand (include grain size %; fine, medium, coarse, etc.) -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SW		↑	N		171		Sand - F-C grained w/ gravel - light brown (7.5 YR 6/3) - gravel up to 1/2" - 1/4" lithes - sand atz feldspar, lithes		176
SW		↓	N		172		well graded, slightly moist		
SW		↓	N		173		SAA to 174.4 then SAA with pieces of clay as below at 173.5		180
SW		↓	N		174		at 173.5 - clay - light brown (7.5 YR 6/3) - dense plastic orange		
SW	1.8	↓	N	V.P. @ 174	175		clay as above to 175.5 ft - 1/4" lithes - sand atz feldspar, lithes		184
SW		↓	N		176		light brown (7.5 YR 6/3) - F-C grained gravel - 100% up to 1/2"		
SW		↑	N		177		SAA to 176.5 then SAA - sand fine grained - light brown (7.5 YR 6/3)		190
SW		↑	N		178		poorly graded, loose, dry to slightly moist		
SW		↑	N		179		SAA to 179.5 then sand - F-C w/ gravel, light		196
SW	0.0	↑	N		180		brown (7.5 YR 6/3) loose, well graded, slightly moist,		
SW		↑	N		181		gravel up to 1/2" atz, feld, lithes, well graded - slightly moist		200
SW		↑	N		182		Sand - F-C grained - light brown (7.5 YR 6/3) occasional gravel up to 1/2" atz, feld, lithes, well graded - slightly moist		
SW		↑	N		183		Sand - F-C grained light brown (7.5 YR 6/3) w/ gravel up to 1/2" SA - SE - gravel & coarse sand of atz feld, lithes,		204
SW		↑	N		184		well graded - slightly moist		
SW		↑	N		185		184-190 - poor recovery - ~1 ft recovered, depth uncertain, may be slough - interval drilled w/ auger		208
SW		↑	N		186		Material disturbed - general lithology		
SW		↑	N		187		Sand - light brown (7.5 YR 6/3) F-C w/ gravel		212
SW		↑	N		188		gravel up to 10% up to 3/4" SA - SE atz feld, lithes		
SW		↑	N		189		Sand - light brown (7.5 YR 6/3) F-C w/ gravel		216
SW		↑	N		190		gravel up to 10% up to 3/4" SA - SE atz feld, lithes		
SW	0.0	↑	N		191		Sand - light brown (7.5 YR 6/3) F-C w/ gravel - coarse		220
SW		↑	N		192		well graded, moist, coarse feldspar, lithes		
SW		↑	N		193		@ 192 - clayey silt - brown (7.5 YR 6/3), dense, non plastic		224
SW		↑	N		194		Sand - VF-C - gray (7.5 YR 6/1) atz gravel - coarse		
SW		↑	N		195		downwards - well graded, slightly moist - F-30% M-40% C-15%		228
SW		↑	N		196		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		197		SAA - F-45% M-40% C-15% atz feld, lithes		232
SW		↑	N		198		SAA - F-45% M-40% C-15% atz feld, lithes		
SW	0.0	↑	N		199		SAA - F-45% M-40% C-15% atz feld, lithes		236
SW		↑	N		200		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		201		SAA - F-45% M-40% C-15% atz feld, lithes		240
SW		↑	N		202		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		203		SAA - F-45% M-40% C-15% atz feld, lithes		244
SW		↑	N		204		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		205		SAA - F-45% M-40% C-15% atz feld, lithes		248
SW		↑	N		206		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		207		SAA - F-45% M-40% C-15% atz feld, lithes		252
SW		↑	N		208		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		209		SAA - F-45% M-40% C-15% atz feld, lithes		256
SW		↑	N		210		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		211		SAA - F-45% M-40% C-15% atz feld, lithes		260
SW		↑	N		212		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		213		SAA - F-45% M-40% C-15% atz feld, lithes		264
SW		↑	N		214		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		215		SAA - F-45% M-40% C-15% atz feld, lithes		268
SW		↑	N		216		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		217		SAA - F-45% M-40% C-15% atz feld, lithes		272
SW		↑	N		218		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		219		SAA - F-45% M-40% C-15% atz feld, lithes		276
SW		↑	N		220		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		221		SAA - F-45% M-40% C-15% atz feld, lithes		280
SW		↑	N		222		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		223		SAA - F-45% M-40% C-15% atz feld, lithes		284
SW		↑	N		224		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		225		SAA - F-45% M-40% C-15% atz feld, lithes		288
SW		↑	N		226		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		227		SAA - F-45% M-40% C-15% atz feld, lithes		292
SW		↑	N		228		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		229		SAA - F-45% M-40% C-15% atz feld, lithes		296
SW		↑	N		230		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		231		SAA - F-45% M-40% C-15% atz feld, lithes		300
SW		↑	N		232		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		233		SAA - F-45% M-40% C-15% atz feld, lithes		304
SW		↑	N		234		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		235		SAA - F-45% M-40% C-15% atz feld, lithes		308
SW		↑	N		236		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		237		SAA - F-45% M-40% C-15% atz feld, lithes		312
SW		↑	N		238		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		239		SAA - F-45% M-40% C-15% atz feld, lithes		316
SW		↑	N		240		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		241		SAA - F-45% M-40% C-15% atz feld, lithes		320
SW		↑	N		242		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		243		SAA - F-45% M-40% C-15% atz feld, lithes		324
SW		↑	N		244		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		245		SAA - F-45% M-40% C-15% atz feld, lithes		328
SW		↑	N		246		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		247		SAA - F-45% M-40% C-15% atz feld, lithes		332
SW		↑	N		248		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		249		SAA - F-45% M-40% C-15% atz feld, lithes		336
SW		↑	N		250		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		251		SAA - F-45% M-40% C-15% atz feld, lithes		340
SW		↑	N		252		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		253		SAA - F-45% M-40% C-15% atz feld, lithes		344
SW		↑	N		254		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		255		SAA - F-45% M-40% C-15% atz feld, lithes		348
SW		↑	N		256		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		257		SAA - F-45% M-40% C-15% atz feld, lithes		352
SW		↑	N		258		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		259		SAA - F-45% M-40% C-15% atz feld, lithes		356
SW		↑	N		260		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		261		SAA - F-45% M-40% C-15% atz feld, lithes		360
SW		↑	N		262		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		263		SAA - F-45% M-40% C-15% atz feld, lithes		364
SW		↑	N		264		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		265		SAA - F-45% M-40% C-15% atz feld, lithes		368
SW		↑	N		266		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		267		SAA - F-45% M-40% C-15% atz feld, lithes		372
SW		↑	N		268		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		269		SAA - F-45% M-40% C-15% atz feld, lithes		376
SW		↑	N		270		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		271		SAA - F-45% M-40% C-15% atz feld, lithes		380
SW		↑	N		272		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		273		SAA - F-45% M-40% C-15% atz feld, lithes		384
SW		↑	N		274		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		275		SAA - F-45% M-40% C-15% atz feld, lithes		388
SW		↑	N		276		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		277		SAA - F-45% M-40% C-15% atz feld, lithes		392
SW		↑	N		278		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		279		SAA - F-45% M-40% C-15% atz feld, lithes		396
SW		↑	N		280		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		281		SAA - F-45% M-40% C-15% atz feld, lithes		400
SW		↑	N		282		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		283		SAA - F-45% M-40% C-15% atz feld, lithes		404
SW		↑	N		284		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		285		SAA - F-45% M-40% C-15% atz feld, lithes		408
SW		↑	N		286		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		287		SAA - F-45% M-40% C-15% atz feld, lithes		412
SW		↑	N		288		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		289		SAA - F-45% M-40% C-15% atz feld, lithes		416
SW		↑	N		290		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		291		SAA - F-45% M-40% C-15% atz feld, lithes		420
SW		↑	N		292		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		293		SAA - F-45% M-40% C-15% atz feld, lithes		424
SW		↑	N		294		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		295		SAA - F-45% M-40% C-15% atz feld, lithes		428
SW		↑	N		296		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		297		SAA - F-45% M-40% C-15% atz feld, lithes		432
SW		↑	N		298		SAA - F-45% M-40% C-15% atz feld, lithes		
SW		↑	N		299		SAA - F-45% M-40% C-15% atz feld, lithes		436
SW		↑	N		300		SAA - F-45% M-40% C-15% atz feld, lithes		

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/8/18

Boring/Well ID: VNEB-10659

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Depth, ft bgs	Recovery	Soil Description	Well Details
SW		98	N		206		SAA - F-60% M-25% - C-5%	206
SW		↑	N		207		SAA - F-20% M-15% C-35% Gravel 30% - up to 2.5" - Qtz, Fld, Lithes	207
GW		90.4	N		208		207.25 - gravel w/ sand - pinkish gray (7.5YR 6/2) - Loose, dry to slightly damp - well graded - F-10% M-15% C-25% Gravel - 55% up to 1" - A-SR - Qtz, Lithes	208
SW	0.0	↓	N		209		Sand w/ Gravel - pinkish gray (7.5YR 6/2) - F-15% M-30% C-25%	209
SW		↑	N		210		Gravel - 35% up to 2.5" - SA-SR Qtz, Fld, Lithes	210
SW		↑	N		211		SAA @ 209 - F-15% M-10% C-40% gravel up to 3/4" - 50%	211
SW		↑	N		212		Loose, well graded dry to slightly moist, Qtz, Fld Lithes, Lithes - A-SR	212
SW		78.6	N		213		SAA - F-10% M-20% C-40% G-30%	213
SW		↓	N		214		C213.5 - brown (7.5YR 5/5) - SAA b4 w/ clay infills - soft plastic	214
SW		↓	N		215		213.5 - 214.5 (SAA) @ 214.5 - 9" dry sand w/ gravel - pinkish gray (7.5YR 6/2) - Loose, well graded - slightly moist - F-10% M-10% C-5%	215
SW		↓	N		216		gravel 5% - up to 1/2" - SA-SR F=80%	216
SW		↑	N		217		Sand - brown (7.5YR 4/2) Loose, well graded - slightly moist	217
SW		↑	N		218		F-60% M-20% C-20% occasional gravel up to 1/2" - Qtz, Fld, Lithes color change to pinkish gray (7.5YR 6/2) at 217 ft	218
SW		↑	N		219		SAA to 214.4 ft - thin Gravel (w/ sand) - pinkish gray (7.5YR 6/2) Loose, dry - well graded - F-5% M-25% C-70% Gravel up to 60%	219
GW	NA	*	N		220		13 1/4" SA-SR	220
SW	0.5	↑	N		221		Sand w/ gravel, pinkish gray (7.5YR 6/2), Loose well graded, dry	221
SW		↑	N		222		F-5% M-25% C-60% G-10% up to 1.5" SA-SR - Qtz Fld Lithes	222
SW		↑	N		223		Sand, pinkish gray (7.5YR 6/2), Loose, dry - VF-60% F-30% M-10% C-5%	223
SW		↑	N		224		P224 - Sand, light brown (7.5YR 6/3), Loose, dry, fine Gravel - VF-30% M-20% C-20% G-10% up to 1" SA-SR	224
SW		↑	N		225		Sand, pinkish gray (7.5YR 6/2) Loose, dry - well graded	225
SW		↑	N		226		VF 50% F 30% M 5% C 15% Gravel - thin up to 1/4" SA-SR	226
SW		↑	N		227		Sand - pinkish gray (7.5YR 6/2) Loose dry - well graded	227
SW		↑	N		228		VF 30% F 40% M 10% C 20% - Qtz Fld Lithes SA-SR	228
SW		↑	N		229		Sand - pinkish gray (7.5YR 6/2) Loose dry - well graded	229
SW		↑	N		230		VF 20% F 20% M 50% C 10% - SR white Qtz & pinkish med/coarse to 220.5 then increasing to 230.25 - Sand w/ pinkish pieces up to 1" SR - @ 230.5 - 232 - Sand - loose dry - well graded - as above w/ occasional gravel up to 1" - A-SR	230
SW		↑	N		231		Sand brown (7.5YR 5/2) F-C gravel, occasional gravel, Loose, dry to slightly moist, well graded	231
SW		↑	N		232		VF 10% F 30% M 50% C 10% gravel occasional up to 3/4" SR-R	232
SW		↑	N		233		SAA firing down wires to 235.5 to a	233
SW		↑	N		234		Sand, light brown 7.5YR 6/3, Loose, DRY, poorly graded - Fine	234
SW		↑	N		235		core wet from 236.8 to 236.5 - Sand, light brown (7.5YR 6/3) to 236.5 then Sand (7.5YR 6/3) light brown - Loose, slightly moist	235
SW		↑	N		236		well graded VF 20% F 20% M 40% C 20% - occasional up to 1" - SR Lithes	236
SW		↑	N		237		Sand - light brown (7.5YR 6/3), Loose, slightly moist, well graded	237
SW		↑	N		238		graded - VF 20% F 10% M 60% C 10% - Qtz, Fld, Lithes	238

Additional Comments: *added 16" to core barrel to keep temps down

Comments: *added ice to core barrel to keep temps down
 *P10 sample compromised - bag lost air - sample recelled from refrigerated core

Recovery: None ☐ Partial ☒ Disturbed ☐ Complete

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No NA = Not Applicable

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

EA

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/9/18

Boring/Well ID: KAFB-10659

Logged By: Lane Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°F)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL		↑	N				241	clay w/ silt - brown (7.5YR 5/3) - moderately dense to dense non plastic, grading to dense & weakly plastic at 241.5 with plastic pinkish gray (7.5YR 7/2) clay nodules ~ 241.75 - 242 - slightly moist	
CL	1.6	78.6	N		6'		243	clay as above to 243.5 then dense clay light brown (7.5YR 7/4) w/ calciche staining & dark greenish/brown spots up to 1/2" - petroleum odor & PID of core here is 5.1 ppm	
CL	8.9		N				244	clay dense dry to slightly moist, broken pieces w/ 1-3" x 1/4-1/2"	
CL			N				245	244 - 244.75 - SAA PID of core 2.3 ppm @ 244.75 sand w/ silt light brown (7.5YR 6/3) - loose, dry to slightly moist - silt ~ 20% VF 75 F 45% M 0% C 0%	
CL	1.4	70.4	N		3'		247	clay - grayish brown (10YR 5/2) dense, dry non plastic unweathered - at ~ 246.5 - silty clay (10YR 5/2) non plastic - largest dry breaking in small pieces	
SM			N				248	silt w/ clay - brownish yellowish brown (10YR 5/4) moderately dense, weakly plastic - PID on core up to 25 ppm - slight petroleum odor	
SM	1.5		N				250	silty sand - light brown (7.5YR 6/3) - moderately dense, petroleum odor - slightly moist	
CL			N				251	250 - 251.5 - clay - brown (10YR 5/3) moderately dense slightly w/ silt, weakly plastic to moderately plastic up to 251.5 - silty clay brown (10YR 5/3)	
CL			N				252	silt, moderately cohesive, non plastic to weakly plastic, slightly moist - petroleum odor	
CL	6.0	72.9	N				253	CLAY - did not open core sleeve - save for sampling 252 - 254 ft Sampled 10/9/18 - silty clay pale brown	
CL			N				254	10YR 6/3 - occasional thin calciche stringers - slightly plastic, dense - petroleum/naphtha odor	
CL			N				255	clay - 254 - 254.5 - brown (7.5YR 5/2) - dry, dense - slight odor - petroleum/naphtha - PID on core ~ 15 ppm	
SP			N				259	@ 259.5 SAND - light brown (7.5YR 6/3) - loose, dry, poorly graded fine grained	

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

SAA = Same as Above

Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/9/18

Boring/Well ID: KAFB-106S9

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°F)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SC		↑	N		↑		257	256-257' Sand w/ clay - Brown (7.5 YR 5/3) - mod to weakly dense vfg to coarse grained, non plastic			
SW			N				258	257-258' Sand w/ trace gravel (7.5 YR 6/3) light brown (7.5 YR 6/3) Loose, slightly moist well graded - Qtz, lithics, mica			
SW		84.2	N		↓		259	VF 30% F 10% M 40% C 20% trace gravel up to 3/4"			
ML	4.6		N				260	SAA p 258'			
NR		↓	-		↓		261	Silt w/ Sand & clay - brown (7.5 YR 5/3) - Loose to weakly consolidated, silt + 60% Sand vfg 30% clay 10% - non plastic			
SW		↑	N		↑		262	260-261' - No Recovery			
SW		↑	N		↑		263	Sand w/ gravel - brown (7.5 YR 5/3), loose, slightly moist well graded - fine down wards - gravel ~ 5% up to 1" Qtz, fld, lithics - no odor			
SW		↑	N		↑		264	Sand - SAA F 30% M 70% C 10% No gravel, Loose No odor - 263-264			
SW		8.1	N		↑		265	Sand w/ gravel light brown (7.5 YR 6/3) Loose, dry to slightly moist, slight petroleum odor - Sand F - C			
SW		↑	N		↑		266	F 50% M 30% C 20% Gravel up to 2" SA - SR - Qtz feldspar - lithics, mica			
SW		↑	N		↑		267				
SW		↑	N		↑		268	sand - brown (7.5 YR 5/3), Loose, slightly moist well graded - No odor			
SW		↑	N		↑		269	F - 15% M - 65% C - 20% gravel trace			
SW		↑	N		↑		270	SA - SR Qtz fld, lithics			
SW		76.6	N		↑		271	Sand SAA			
SW		↑	N		↑		272	less coarse - No odor			
CL		↓	N		↓		273				
CL		↓	N		↓		274	Clay w/ silt - brown (7.5 YR 5/3), moderately dense to dense, slightly moist to moist, occasional calcareous nodules up to 1" petroleum odor - slight			
CL		↓	N		↓		275				

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No mod = moderately

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/9/18

Boring/Well ID: CABB-10659

Logged By: L. Anne Andres

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USCS Soil Type	PID Reading (ppm)	Temperature (°F)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description -- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	Well Details		
a		36.5	N				273	SAA @ 270'			
a		61.8	N				274				
CL		↑	N				275	clay w/ silt - brown (7.5YR 4/3) - silt ~ 30%, dense slightly moderately plastic			
CL		46.5	N				276				
a		↑	N				277	clay - dark yellowish brown (10YR 3/4), dense, plastic slightly moist to moist - caliche spots, up to 1/2" of soft sandy caliche - lighter in color			
CL		95.8	N				278	~ 8%			
a		↑	N				279	SAA caliche spots ~ 15%			
CL		100.3	N				280				
	3.4	↑	N				281	SAA caliche specs / spots 20% & thin stringers ~ 1-3mm thick - more dense, slight silt			
		84.4	N				282	@ 282 ~ 2" thick caliche dense & well indurated pinkish (gray 7.5Y 7/2) sand w/ caliche gravel lighter brown (7.5YR 6/3) coarse, slightly moist - well graded, small pieces of non-plastic clay			
SW		↑	N				283	@ 282.5 a 2" thick caliche lens as above at 282			
SW		93.9	N				284	@ 282.5 - 283.5 - Sand - brown (7.5YR 5/3) w/ to F mung silt			
SW		↑	N				285	@ 283.5 - 284.5 - Sand - brown (7.5YR 5/3) w/ - M - Qtz, feldspar			
SM		↑	N				286	Silty sand - yellowish brown (10YR 5/4) w/ - F - trace silt - Loose, slightly moist - at 285 ft;			
SM		110.4	N				287	Silty sand minor clay - brown (10YR 5/4), mod dense weak P @ 285.5 - Sand - pale brown (10YR 6/3) - F graded - poorly sorted, loose, slightly moist			
SW		↑	N				288	Sand - light brown (7.5YR 6/3) - well graded, loose, dry to slightly moist - F - 30 M - 60 C - 10 Qtz			
SW		83.4	N				289	partially cemented sand up to 1/2" with ves			
SW		↓	N				290	@ 287.5 increased coarse fraction - F 30 M 30 C 20% G 30% up to 1/2"			

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/10/18

Boring/Well ID: KAFB-10659

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (F)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SP		↑			↑		289	289-289.5 - sand - brown (7.5 YR 5/3) F - grained - loose, dry, well graded - at 289.5, sand w/ gravel (7.5 YR 5/3) - loose, dry, well graded	0	0	0
SW		↓	N				290	→ Qtz, gonville, lithics F20 M30 C-30 G-20 up to 1 1/2" SA-SR	0	0	0
SW	1.1	↓	N				291	core not logged - core log left unopened for sampling	0	0	0
SW		↑	N				292	SAA @ 290, firing downwards	0	0	0
SW		↓	N				293	SAA @ 289 ft - gravel up to 1/2" - firing downwards	0	0	0
SW		↓	N				294	SAA @ 289' - F40% M-10% C-50% G up to 3/4" Qtz, gonville, lithics trace	0	0	0
SW		↑	N				295	SAA @ 290' - sand brown (7.5 YR 5/3) - loose, dry, well graded F20 M30 C-10% trace gravel up to 3/4" lithics SA/SR	0	0	0
SW		↓	N				296	@ 295' - sand brown (7.5 YR 5/3) - loose, dry, well graded F30% M-15% C-5% no gravel	0	0	0
GW		↑	N				297	sand w/ gravel - brown (7.5 YR 5/3) loose, dry to slightly moist - well graded F45% M-40% C-35% G-20% up to 1.75"	0	0	0
GW		↓	N				298	Qtz, feldspar lithics	0	0	0
GW		↑	N				299	core not logged - core log left unopened for sampling	0	0	0
SP	0.8	↑	N				300	SAA to 299' @ 299 ft sand as below @ 300 ft	0	0	0
SP		↑	N				301	300-300.5 - sand - light brown (7.5 YR 6/3) fine grained, loose dry to slightly moist - poorly graded	0	0	0
SW		↑	N				302	@ 300.5 - 301.5 - sand w/ gravel brown (7.5 YR 5/3) loose, dry, well graded - F30% M-20% C-20% G-30% up to 1 1/2"	0	0	0
GW		↓	N				303	@ 301.5 - gravel w/ sand brown (7.5 YR 4/3) F5% M5% C30% G up to 1 1/2" Qtz, lithics	0	0	0
SW		↑	N				304	SAA - 302.3 @ 302.3 - 304 - sand purplish gray 7.5 YR 6/2 - slightly moist, well graded - F30% M-20% C-20% G-30% up to 1.5" Qtz Fld Lithics SA-R	0	0	0
SW		↓	N				305		0	0	0

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/10/18

Boring/Well ID: KAFB-10659

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (F)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)			
SW		↑	N				305	Sand - light gray (7.5YR 7/1), Loose or weak cementation around larger grains, dry, well graded - F 5% M 20% C 75% occasional gravel up to 1/2" - Qtz, fld, lithics - SR	0	0	0
SW		106.3	N				306	@ 305.5 - Sand (pinkish gray (7.5YR 6/2) - F - C gravel, dry trace loose, well graded - F 5% M 20% C 50% G 20% up to 1/2" - Qtz, fld, lithics - SR	0	0	0
SW		84.5	N				307	Sand - brown (10YR 4/3), Loose, dry well graded, slightly musty w/ gravel - F 20% M 20% C 20% G 40% up to 1 1/2" SA-SR - Qtz, fld, lithics	0	0	0
SW		↓	N				308	@ 307 - Sand - brown (10YR 5/3) - Loose, dry, well graded w/ gravel	0	0	0
GW		↑	N				309	Gravel w/ Sand - Pale brown (10YR 6/3) - Loose, dry well graded - F 10% M 20% C 30% G 40% up to 2 1/2" - SR SA Qtz, fld, lithics	0	0	0
GW	0.6	↓	N				310	@ 308.5 - Gravel w/ Sand - brown (10YR 5/3) - Loose, dry, well graded - F 0% M 10% C 25% G gravel - 65% up to 1" - Qtz, fld, lithics	0	0	0
GW		↑	N				311	SAA @ 308.5	0	0	0
GW		↑	N				312		0	0	0
GW		↑	N				313	SAA @ 308.5	0	0	0
GW		↓	N				314		0	0	0
SW		↑	N				315	Sand w/ Gravel - brown (10YR 5/3) - Loose, slightly musty well graded - F 50% M 20% C 35% Gravel 45% up to 2" Qtz, fld, lithics, gravel	0	0	0
SW		↓	N				316		0	0	0
SW		↑	N				317	SAA to 317.5 then Sand brown (7.5YR 5/3), Loose, slightly musty - well graded	0	0	0
SW		↓	N				318	F 20% M 75% C 5% Gr trace up to 1/4" SA/SR - Qtz fld lithics	0	0	0
		↑	N				319	SAA @ 317.5 finer Sand	0	0	0
	0.7	↓	N				320	F 60% M 20% C 20% - Gravel trace up to 1/2" SA/SR, Qtz FLD lithics	0	0	0

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No / none

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/10/18

Boring/Well ID: KATB-106 S9

Logged By: Love Andress

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Soil Description								Well Details	
USCS Soil Type	PID Reading (ppm)	Temperature (°F)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs		
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SW		24.7	N				321	core not logged - core bag was opened for potential sampling	
SW		109.5	N				322	Sand w/ gravel - brown (7.5 YR 5/3) - Loose, slightly moist well graded - F 20% M 40% C 20% G 20% up to 1.5" SA-SR Qtz fld lithol	
SW		109.5	N				323	Sand w/ gravel - brown (10YR 5/3) - Loose, slightly moist, well graded - F 20% M 40% C 20% G 20% up to 1.5" - 1st hole Qtz fld lithol	
CL		109.5	N				324	@ 321 - Clay w/ iron staining/inclusions - brown (10YR 5/3) dense, slightly moist, plastic - orange spots/nodules - 2mm diameter by w/ long - some black organic specks, streaks	
SP		103.7	N				325	Sand - brown (10YR 5/3), fine grain, Loose, slightly moist - poorly graded	
SP		103.7	N				326		
								SAA	
SP		77.9	N				327		
SW		77.9	N				328	@ 327.5 sand w/ gravel - brown (10YR 5/3) - Loose Dry, well graded F - 90% M - 0% C - 0% G 10% up to 2 1/4" Lithol SAA/SR	
SW		77.9	N				329	Silty sand - brown (10YR 5/3) w/ gravel - Loose, slightly moist well graded - VF - 90% F - 0% M - 0% G 10% up to 1 1/2" SAA/SR Qtz fld lithol	
SW		77.2	N				330	@ 328.5 - sand brown (10YR 5/3) - Loose, dry, well graded F - 20% M - 35% C - 40% G 5% up to 3/4" - Qtz, lithol fld	
SW		77.2	N				331	@ 329.75 - sand - SAA @ 325	
SW		77.2	N				332	Sand w/ gravel - brown (10YR 5/3) - Loose, slightly moist, well graded - F 20% M 20% C 30% G 30% up to 1.5" SAA/SR Qtz fld lithol	
NR							333	Lost 1 ft core - No recovery	
SW							334	Clay - brown (7.5YR 5/3) - dry to slightly moist Mud-silt - moderately dense to dense - plastic to moderately plastic	
SW							335	Sand - brown (10YR 5/3) - Loose, dry to slightly moist, well graded	
SW		83.2	N				336	F 40% M 10% C 20% G 30% up to 1" SAA/SR Qtz, fld lithol	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/11/18

Boring/Well ID: KA-FB-106.S9

Logged By: Lave Andress

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								Soil Description			
USCS Soil Type	PID Reading (ppm)	Temperature (°F)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity		Well Details	
								-- % sand (include grain size %; fine, medium, coarse, etc.)			
								-- sand mineralogy			
								-- % gravel			
								-- gravel mineralogy			
								-- angularity/roundedness			
								-- % fines (silt/clay)			
SW		↑	N		↑		337	Sand, brown (7.5 YR 5/3), Loose, slightly moist, well graded		0	0
SW		79.8	N		↑		338	F70% M30% C0% Qtz fld lithics		0	0
SW		↑	N		↑		339	Sand w/ gravel brown (7.5 YR 5/3) Loose, slightly moist		0	0
SW		81.4	N		↑		340	well graded F-20% M-65 C-10% G-5% up to 1/2" Qtz lithics SA/SS		0	0
SW		↑	N		↑		341	SAA		0	0
SW		↑	N		↑		342	SAA		0	0
SW		↑	N		↑		343	SAA w/ trace silt		0	0
SP	NA	↑	N		↑		344	Sand-brown (7.5 YR 5/3) Loose, slightly moist, poorly graded		0	0
GM	NA	70.8	N		↑		345	Silt, sandy gravel & clay - brown (7.5 YR 4/3) -		0	0
GM	31.0	↓	N	VIP	↑		346	gravel up to 2" silt & clay - Qtz lithics - 30% clay - slight moist		0	0
GM	31.0	↓	N	VIP	↑		347	slight plastic ~ 30%		0	0
GM	31.0	↓	N	VIP	↑		348	Silt, clay - occasional gravel - strong brown (7.5 YR 4/6) dry		0	0
SW		↑	N		↑		349	to slight moist - dense, slight plastic		0	0
SW		75.7	N		↑		350	SAA to 342.25 @ 342.25		0	0
SW		↑	N		↑		351	Silt, sandy gravel - brown (7.5 YR 5/3) - loose, slight moist		0	0
SW		↑	N		↑		352	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		353	Silt, clay - yellowish brown (10 YR 5/4), dry to slight moist, dense		0	0
SW		↑	N		↑		354	slightly plastic, breaks in 2" laminar planes		0	0
SW		↑	N		↑		355	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		356	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		357	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		358	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		359	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		360	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		361	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		362	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		363	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		364	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		365	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		366	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		367	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		368	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		369	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		370	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		371	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		372	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		373	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		374	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		375	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		376	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		377	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		378	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		379	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		380	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		381	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		382	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		383	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		384	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		385	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		386	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		387	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		388	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		389	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		390	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		391	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		392	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		393	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		394	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		395	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		396	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		397	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		398	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		399	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		400	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		401	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		402	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		403	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		404	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		405	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		406	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		407	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		408	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		409	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		410	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		411	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		412	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		413	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		414	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		415	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		416	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		417	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		418	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		419	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		420	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		421	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		422	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		423	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		424	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		425	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		426	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		427	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		428	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		429	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		430	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		431	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		432	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		433	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		434	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		435	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		436	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		437	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		438	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		439	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		440	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		441	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		442	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		443	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		444	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		445	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		446	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		447	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		448	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		449	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		450	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		451	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		452	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		453	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		454	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		455	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		456	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		457	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		458	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW		↑	N		↑		459	Loose, well graded F-30% M 20% C 20% G 30% up to 2" Qtz fld lithics		0	0
SW		↑	N		↑		460	Silt, clay - pale brown (10 YR 6/3), loose		0	0
SW		↑	N		↑		461	slight moist - well graded - cobbles up to 3.25" Qtz fld		0	0
SW		↑	N		↑		462	F 30% M 20% C 10% G 40% up to 3" lithics		0	0
SW		↑	N		↑		463	Silt, clay - light brown (7.5 YR 6/3) loose, slightly moist		0	0
SW		↑	N		↑		464	well graded - F 80% M 15% C 5% Qtz fld lithics		0	0
SW		↑	N		↑		465	Silt, clay - light brown (7.5 YR 6/3) dry to		0	0
SW		↑	N		↑		466	slightly moist, loose, poorly graded - fine gravel		0	0
SW		↑	N		↑		467	Sand w/ gravel - pinkish gray (7.5 YR 6/2), slightly moist		0	0
SW											



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-10659

Logged By: Lane Address

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USCS Soil Type	PID Reading (ppm)	Temperature (F)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
SW		↑	N				352	soil type; Munsell color; density (primarily coarse)/consistency & plasticity - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay) SAA increased gravel sand w/ gravel - light brown 7.5 YR 6/3 Loose, dry to slight moist, well graded, loose F 10% M 20% C 30% G 40% up to 2.5" Qtz fld 1 lthrs SAA SR	0	0	0
GW		86.0 ↓	N				354	graded gravel w/ sand, brown (10 YR 5/3) loose, slightly moist well F 15% M 15% C 30% G 50% up to 3" Qtz fld 1 lthrs SAA SR	0	0	0
SW		↑	N				355	sand w/ gravel - brown (10 YR 5/3) loose, slightly moist well graded F 10% M 30% C 30% G 30% up to 2" Qtz fld 1 lthrs	0	0	0
SW		98.5 ↓	N				356	SAA @ 354	0	0	0
SW		↑	N				357	SAA @ 354	0	0	0
SW		74.7 ↓	N				358		0	0	0
SW		↑	N				359	SAA @ 356	0	0	0
SW	1.3	84.8 ↓	N				360		0	0	0
SW		↑	N				361	SAA @ 360.75	0	0	0
SP		70.5 ↓	N				362	@ 360.75 - sand brown (7.5 YR 5/3), loose, slightly moist well graded - fine grained	0	0	0
SP		↑	N				363	SAA @ 360.75	0	0	0
SP		72.7 ↓	N				364	From a bare interval @ @ 368.75 occasional small gravel up to 1/2" SR lithness → NO fine med or coarse fraction	0	0	0
SW		↑	N				365	Don't log core bag not logged (sand/sand/gravel) for preferred sample spot sand - light brown (7.5 YR 6/3) - loose, moist well graded - F 10% M 30% C 50% G 10% up to 1" SAA SR	0	0	0
SW		83.1 ↓	N				366	increased gravel w/ both to 30% well graded @ fld lithness	0	0	0
SW		↑	N				367	sand w/ gravel brown (7.5 YR 5/3) - loose, dry to slight moist F 30% M 10% C 20% G 50% up to 1 1/2" SAA SR - lithness, Qtz @ 366.75 - sand - light brown (7.5 YR 6/3) loose, slightly moist	0	0	0
SP		82.9 ↓	N				368	well graded @ 367 ft - sand (10 YR 6/3) pale brown - fine grained - loose, poorly graded - slightly moist	0	0	0

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/11/18

Boring/Well ID: YAFB-10659

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°F)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details		
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity - % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy - % gravel - gravel mineralogy - angularity/roundedness - % fines (silt/clay)			
SP		↑	N		4		369	SAA - poorly sorted fine grained sand			
SP	2.1	88.7	N		↓		370	SAA			
SP		↓	N		↑		371	SAA			
SP	2.2	76.9	N		↓		372	SAA			
SW	#	91.3	N		↓		373	Sand w/ large gravel - (10 YR 5/3) brown, loose, slightly moist, well graded F 20% M 40% C 0% G 45% up to 2" S&SR Qtz, Fld, lithics			
SW		↓	N		↓		374	SAA			
SW		91.3	N		↓		375	Did not open core - looks like Spalane saved for potential sampling SAA			
SW		↓	N		↓		376				
SW		↑	N		↑		377	Sand w/ gravel - brown (10 YR 5/3), loose, slight moist well graded			
SW		90.2	N		↓		378	F 20% M 40% C 25% G 15% up to 2" S&SR Qtz, Fld, lithics			
SW		↑	N		↓		379	Sand w/ gravel to brown (10 YR 5/3) loose, slight moist well graded			
SW	1.2	89.1	N		↓		380	F 30% M 40% C 20% G 10% up to 1/2" S&SR Qtz, Fld, lithics			
SW		↑	N		↓		381	SAA - different percentages			
SW		80.3	N		↓		382	F 20% M 40% C 20% G 20% up to 1"			
SW		↑	N		↓		383	Sand w/ gravel - SAA - different percentages			
SW		85.3	N		↓		384	F 15% M 70% C 10% G 5% up to 1/2"			

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Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/16/18

Boring/Well ID: KAPB-106 S9

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		21.9°C	N		1		385	Sand w/ gravel - same as above - different percentages	
SW		21.9°C	N		1		386	F 10% M 20% C 30% G 40% up to	
SW		21.9°C	N		1		387	Sand - Light brown (7.5 YR 6/3) well graded, slight moist loose - 40% M 40% C 20% - trace gravel up to 1/3"	
SW		21.9°C	N		1		388	qtz, fld, lithics, SA-SR granite	
SW		21.9°C	N		1		389	Sand - Light brown (7.5 YR 6/3), well graded, slight moist - loose -	
SW	1.5	21.5°C	N		1		390	F 20% M 60% C 20% G gravel up to 1", ~5% SA-SR qtz fld, lithics, granite	
SP		21.5°C	N		1		391	Sand - Light brown (7.5 YR 6/3) poorly graded fine grained, loose	
SP		21.5°C	N		1		392	@ 392 a 4" band of well graded sand F 20% M 40% C 10% trace qtz fld lithics up to 1" mica	
SP		21.5°C	N		1		393	SAA @ 391	
SP		21.5°C	N		1		394	SAA @ 391	
SW		21.5°C	N		1		395	Not logged - held for potential sampling - Sand, brown (7.5 YR 5/3) - loose, slight moist, well graded -	
SW		21.5°C	N		1		396	F 10% M 40% C 30% G 20% up to 1 1/2" SA/SR coarse grained qtz, fld, lithics	
SP		21.5°C	N		1		397	sand as above @ 391 coarse grained - changed to med grained sand brown (7.5 YR 5/3) poorly graded to 397 ft then well graded, loose, slight moist to moist	
SW		21.5°C	N		1		398	F 5% M 85% C 10% Gravel, trace up to 1/2" - qtz, fld lithics SA-SR	
SW		21.5°C	N		1		399	Sand as above at 397 ft, but dry	
SP		21.5°C	N		1		400	@ 398.5 - Sand - Light brown (7.5 YR 6/3), loose, fine to slight moist - poorly graded - very fine grained	

Additional Comments: temperature taken in °C as of 9am 10/16/18

Recovery: None ☐ Complete ☒ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/16/18

Boring/Well ID: KAFB 10659

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								- soil type; Munsell color; density (primarily coarse)/consistency & plasticity % sand (include grain size %; fine, medium, coarse, etc.) - sand mineralogy % gravel - gravel mineralogy - angularity/roundedness % fines (silt/clay)	
SW		23.5°C	N		↑		401	Sand - brown (7.5 YR 5/3) Loose, slightly moist - well graded F 4% M 20% C 35% G 5% up to 1" S&SR Qtz fld lithus	
SW		23.5°C	N		↑		402	e 400.5 SAA - gravel up to 1/2" e 400.5	
SW		22.9°C	N		↑		403	Sand as above e 400 - gravel up to 1/2"	
SW		22.9°C	N		↑		404		
SW		26.5°C	N		↑		405	Not logged - sand (f. silt/clay) - loose, slightly moist, well graded - VF 10% M 30% C 45 G 15% up to 1/2" S&SR Qtz, fld, lithus	
SW		26.5°C	N		↑		406		
SP		33.2°C	N		↑		407	Sand - brown (7.5 YR 5/3) Loose, slight moist, poorly graded - VF - trace silt	
SW	2.8	33.2°C	N		↑		408	e 400.5 Sand brown (7.5 YR 5/3) Loose, slight moist, well graded F 60% M 30% C 10%	
SW		33.4°C	N		↑		409	Sand - SAA @ 406.5	
SW	1.9	33.4°C	N		↑		410		
SW		22.9°C	N		↑		411	Sand - brown (7.5 YR 4/3) - Loose, slight moist to moist VF 20% F 30% M 40% C 10% - Qtz fld lithus S&SR	
SW		22.9°C	N		↑		412	e 411 Sand brown (7.5 YR 5/3) - VF 40% F 10% M 50% C 0% Loose, slight moist, Qtz fld lithus S&SR	
SW		28.8°C	N		↑		413	Sand - brown (7.5 YR light brown 7.5 YR 6/3), Loose, slight moist, well graded	
SW		28.8°C	N		↑		414	VF 10% F 30% M 30% C 30% Gravel 10% up to 3/4" Qtz, fld lithus, S&SR	
CL		27.2°C	N	V, P	↑		415	Not logged - sand (f. silt/clay) - weakly dark, slightly moist, well graded - F 30% M 40% C 30% + trace Gravel up to 1/2" Qtz fld lithus	
SW		27.2°C	N		↑		416		
CL		27.2°C	N		↑		417		

Additional Comments:

Recovery: None

Complete Partial

Complete

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Boring/Well ID: LAEB-106.59

Project Number: 62735DM02.1017

Logged By: Lane Anderson

Date: 10/16/18

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						Date:	
						Page	of
						Soil Description	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run Recovery	Depth, ft bgs	Well Details
SP							
SW		40.2°C	N		↑	417	
SW		40.2°C	N		↓	418	
SW		7°C	N		↑	419	
SW	45	28°C	N			420	
SW		25.2°C	N			421	
SW		25.2°C	N			422	
SW		27.9°C	N			423	
SW		27.9°C	N			424	
SW		49.0°C	N			425	
SW		49.0°C	N			426	
SP		29.3°C	N		↑	427	
SP		29.3°C	N			428	
SW		7°C	N			429	
SP	1.8	37.7°C	N			430	
SW		36.1°C	N			431	
SW		36.1°C	N			432	

Additional Comments:

Recovery: None

Conflict Partial

Complete

N = No *None*

AA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

Examples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/16/18 9:10/17/18

Boring/Well ID: KAEB-106.59

Logged By: Lane Address

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USCS Soil Type	PID Reading (ppm)	Temperature (°F)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		N					433	Sand w/ gravel, brown (10YR 4/3) - loose, slight moist, well graded - F 10% M 20% C 40% G 30% up to 2" Qtz, lithics, fld - SAKR	
SW	1.7	N					434	433.75 - Clay brown (7.5YR 5/3) - weakly mod. plastic, med. silt	
SW		N					435	Sand w/ gravel - fine to coarse grained - core bag not opened Moisture analysis sent to DBS for w/ gravel	
SW		N					436	Sand, brown (7.5YR 4/3) - loose, slight moist, well graded - F 10% M 20% C 40% G 30% up to 1.5" SA/SR - Qtz, fld, lithics	
SW		N					437	436.5 - 437.5 - gravel w/ sand - brown (7.5YR 5/3) - loose, slight moist - F 10% M 20% C 10% G 60% up to 2" - SA/SR - Qtz, fld, lithics, clay	
SW		N					438	437.5 - Sand light brown (7.5YR 6/3) - loose, slight moist - F 60% M 25% C 10% G 5%	
SP		N					439	Sand - light brown (7.5YR 6/3) - loose, slight moist - poorly graded - fine sand	438
SW		N					440	439 - Sand w/ gravel (brown 7.5YR 5/3) - loose, slight moist, well graded - F 15% M 65% C 20% trace gravel up to 1/2" lithics SR	
CL		N					441	439.75 - Clay w/ calcite - reddish brown (5YR 5/4) - dense to mod. dense, med. plastic	
SP		N					442	not logged - sand for potential sampling - moderately dense - SAA	440.1
SP		N					443	SAA	
SP		N					444	Sand - light brown (7.5YR 6/3) - loose to slightly dense, slightly moist, poorly graded - very fine grained	
SP	1.2	N					445	"	
SP		N					446	Sand, brown (7.5YR 5/3), loose, slight moist - poorly graded - very fine grained	444.9
SP		N					447	445.75 - SAA - 444 (moist), med dense / mod coarse - trace silt	
CL		N					448	not logged - sand for potential sampling - clay - higher yellow brown (2.5YR 6/3) - dense, moist, slightly plastic	
CL		N					449	447 - clay brown (7.5YR 5/3) - dense, moist, plastic to weakly plastic	447

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No / none

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/17/18

Boring/Well ID: KAFB -10659

Logged By: Lane Anderson

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SM		26.2°C	N				444	Silty sand - brown (7.5 YR 5/3) - medium dense, moist, poorly graded - very fine grained	
SM	0.5	26.2°C	N				448	@ 444.5 - SAA @ 448' but fine grained	
SM		26.2°C	N				451	SAA @ 449.5'	
SW		26.2°C	N				452	Sand - brown (7.5 YR 5/3) loose, moist to slightly moist with graded	
SW		26.2°C	N				453	VE 2% F 40% M 40% C 5% G 0% - trace - one piece of Red basalt 1.5" SR	
SW		26.2°C	N				454	Sand as above @ 452' increasing in moisture w/ depth to moist at 455 f	
SW		26.2°C	N				455	SAA @ 455' Sand - brown (7.5 YR 5/3) loose to slightly dense, moist, poorly graded fine grained	
SW		26.2°C	N				456	SAA @ 452' - dark grayish brown (10 YR 4/2) moist dense	
SW		26.2°C	N				457	Sand dark grayish brown (10 YR 4/2) moist dense, moist, well graded F 40% M 30% C 30%	
SM		24.3°C	N				458	@ 456.5' - silty sand brown (10 YR 5/3), dense, moist	
CL		25.1°C	N				459	@ 457.5' clay - brown (7.5 YR 5/3) mod dense - slight odor	
CL	0.5	25.1°C	N	TW 458-460			460	not logged saved for potential sampling clay - dense, moist - slight odor	
CL		25.1°C	N				461	logged through core bag - core bag not opened sent to DBS for thermal conductivity & moisture analysis	
CL	0.5	25.1°C	N				462	@ 460' clay - brown (10 YR 5/3) mod dense to dense, slight to mod plastic, strong weathered organic vapor	
SM	0.5	25.1°C	N				463	@ 460.5' - silty sand - same color, strong organic odor weathered small	
SM		25.1°C	N				464	Silty sand - brown (10 YR 5/3) mod dense moist - silt ~30% fine sand 70% - strong odor as above	
SW		25.1°C	N	TW 463-465			465	463-465 not logged for potential sampling Sand w/ gravel - F to C gravel up to 1"	

Additional Comments:

Recovery: None ☐Complete ☒ Partial ☐Complete ☒

N = No

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/17/18

Boring/Well ID: KAEB-10659

Logged By: Lane Address

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Soil Description										Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SW		25.4	N		5'		465	Not logged - saved for potential sampling - sand w/ gravel logged through core bar - silt to DBS for thermal conductivity & moisture analysis		
SW	379.8	26.5	N				466	sand w/ gravel - brown 10YR 4/3, loose, moist, well graded strong weathered organic odor F10% M20% C30% G50% - SA/SR - up to 1.5"		
SW	379.8	26.5	N				467	sand w/ gravel - brown (7.5YR 5/3) loose, moist, well graded F5% M10% C40% G45% up to 1" SA/SR etc. feldspar - strong odor as above		
SW		23.2	N				468	e 467.5 - 1-2" white indurated calcite lenses e 467.8 - sand as above @ 467' - w/ odor as above		
SW		22.3	N	P, V	5'		469	Not logged - saved for potential sampling - sand - brown (10YR 5/3) Loose - slight moist to moist - well graded		
SW	519.4	22.3	N	P, V			470	F5% M10% C50% G20% up to 1" - SA/SR etc. feldspar, fld.		
SW	1440.0	23.7	N				471	e 469 Less gravel F20% M40% C40% G10% Sand brown (7.5YR 4/3) loose - well graded, moist - F20% M35% C40% G5% up to 2" - Qtz/lithics fld SA/SR		
SW	253	21.3	N				472	Sand - very dark brown (10YR 4/2) - loose, wet, well graded F40% M100% C50% G10% up to 1" SA/SR		
SW		21.3	N				473	e 472 - sand as above w/ ad clay gravel pieces up to 2" & gray clay pieces up to 1/2"		
SP		21.2	N	G, W			474	Sand - dark grayish brown (10YR 4/2) fine grained wet, poorly graded medium dense		
SP		21.2	N	B, W			475			
SP	2557	22.0	N	B, M, V			476	wet visible black sediment - sand - dark brown (10YR 3/3) loose medium dense, wet, poorly graded - some darker areas		
SW		22.7	N				477	Sand - brown (10YR 4/3) - loose to medium dense - well graded strong odor F20% M100% C10% G5% up to 1/2" Qtz, fld		
SW		22.7	N				478	e 477 Sand w/ clay & gravel - brown 7.5YR 5/2, mod plastic C 477.25 Large calcite cobble - (SA/SR) gravel up to 1/2" e 477.5 - Sand w/ clay & gravel F40% M100% C10% G5% up to 1/2" clay zone		
SW		27.1	N				479	Not logged - saved for potential sampling - sand brown (7.5YR 5/3) moderately dense, wet - well graded - F85% M-10% C-5% trace gravel up to 1/2" SR - lithics, Qtz - Petrohu		
SW	557		N				480	e 479.75 w/ 2 Lenses of indurated sand w/ carbonate cement as above		

Additional Comments:

Recovery: None

Complete

Partial

Complete

SAA = Same as Above

Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse

SONIC CORING BORING/WELL CONSTRUCTION LOG										
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date: 10/18/18 & 10/30/18		
Boring/Well ID: KAFB-16659					Logged By: <i>Lawrence</i>			Page 23 of 25		
USCS Soil Type	PID Reading (ppm)	Temperature (°F/°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description		Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
SW								sand - brown (10YR 4/3) - mod dense, wet - well graded - F 60% M 20% C 20% trace clay pieces up to 1/2"		
CL	1679	34.4°C					480	e 480.5 sand clay - brown (10YR 4/3) - dense - wet, - well graded		
							482	F 30% M 10% C 20% clay - 20% G 20% up to 3/4" at +2 ft		
SC							483	e 483.75 - caliche - sand - brown (10YR 6/3) - mod dense - well graded - mod dense - white (10YR 8/1) clay - plastic - 48% dense		
SW		40.6°C					484	e 483.75 - caliche - sand - light brownish gray (10YR 6/2) - loose, moist - not logged - whole unopened core sent to PTS for LNA PL TRANSMISSIVITY		
		25.8°C					485			
							486			
SW		25.8°C					487	sand & pieces of indurated sandstone (same comp as then as sand) - calcareous - brown (10YR 4/2) - mod dense - well graded - medium grained		487
SW		25.8°C					488	e 487.5 - sand w/ clay - same color as above - medium grained - wet mod dense, non - to weakly plastic		
SW							489	e 487.75 - caliche - well indurated - white - massive - fissures with HCl		
SW		33.6°C					490	489 - 489.75 - sand - brown (10YR 5/3) - loose, wet - well graded - petroleum - medium to coarse grained - fissures		489
SW		25.2°C					491	e 489.75 - well indurated caliche - white, massive - with HCl - not logged - whole unopened core sent to PTS Lab for UV analysis		
SW		20.1°C					492	491 - 493 - whole core sent to PTS Lab for UV analysis		
		20.1°C					493			
		20.2°C					494	493 - 495 - whole core sent to PTS Lab for UV analysis		
							495			
SW	4880	20.1°C					496	sand w/ gravel - dark gray (7.5YR 4/1) - mod dense - wet, well graded - F 10% M 65% C 15% G 10%		496

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐ *mod = moderately*
 SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No
 Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
 R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse G = gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/30/18

Boring/Well ID: KAFB-10659

Logged By: Lane Andrews

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		20.4°C	N				497	e 496 gravel ~ 30% e 496.5 SAA @ 495 ft G up to 2" SA/SR Qtz Fld lithics	
SW			N				498	Same as above no gravel to 498.5 ft thin gravel ~ 5% up to 1" of Qtz, lithics thin clay nodules up to 2"	
SW	1496 ppm	20.4°C	N				499		
SW			N				500	Same as above - No gravel ~ 10% silt @ 500.75 ft bgs	
SW	230.8	20.5°C	N				501		
SW	419.9	20.7°C	N				502	Sand - 60% (10% 4/3), medium dark-wet, well graded - petroleum odor F 10% M 50% C 35% Gravel ~ 5% up to 1.3" SAA - lithics Qtz, fld	
							503	NO Recovery 503-510 ft full of core barrel & would not stay in core barrel	
							504		
							505		

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

~~Disturbed~~ CORE

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date: 10/30/18

Boring/Well ID: KAFB-106S9

Logged By: Lane Anderson

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
							506	No Recovery 503 - 510 ft core fell out of core barrel & was disturbed & not retrieved.	
							507		
							508		
							509		
							510		
								TD Drilled to: 510 ft	
								KEY: ← 3" diameter blank PVC schedule 80 ← 3" diameter well screen Sch. 80 PVC 0.010 slot ← 3" diameter well wrap Sch. 80 PVC with 3" solid flat end cap	
								Filter pack 10/20 - Colorado Silica Sand	
								Bentonite Seal Halliburton 3/8" Holeplug	
								Native Soil/ Slough	
								Bentonite Grout ≥ 20% solids Halliburton QUIK-GROUT	

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

BORING/WELL CONSTRUCTION LOG										
Project: Kirtland BFF					Project Number: 62735DM02.1017					
Drilling Company: <u>Cascade</u>					Start Time/Date:					
Lead Driller: <u>Roger Rodriguez</u>					Completion Time/Date:					
Drilling Method: <u>SONIC</u>					Final Depth:					
Casing Diameter OD: <u>7-inch</u>					Bit Type and Outer Diameter <u>7-inch 6.1</u>					
Boring/Well ID: <u>KAFB-106V1</u>					Logged By: <u>Page 1 of 52</u>					
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description		Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
(SW)				HYDRO KNIFE - NO SAMPLES NO RECOVERY - NO MEASUREMENTS			0	0-8' : Well graded sand w/ gravel and cobbles F-C gravels to 1.5" SR brown, SLM cobbles to 4" SR		
(SW)							1			
(SW)							2			
(SW)							3			
(SW)							4			
(SW)							5			
(SW)							6			
(SW)							7			
(SW)							8			
Additional Comments:										
Recovery: None ☐ Partial ☐ Complete ☒										
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No										
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity										
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel										

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KARB - 106V1					Logged By: J. Messenger Page 2 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW-SM			N				8	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW-SM			N				9	silty sand w/ gravel - yellowish red (5YR 4/6) loose, SLM Sand = 75%; F = 20% M = 60% C = 20% SA-SR (Qtz, lith, lith) gravel = 15% up to 1/4" (Qtz + lith); silt = 10% nonplastic	
SW-SM			N				10	SAA ^{wet graded} silty sand with gravel and clay - reddish brown (5YR 4/4); sand = 70%; gravel = 15%; silt = 10% clay = 5% soft, nonplastic	
SW-SM	36.1		N				11		
CL		24.5	N				12	clay w/ sand + gravel - reddish brown (5YR 5/4) medium stiff, med. dens - low plasticity: clay = 60% - mottled to pinkish gray (5YR 7/2) - freezes: secondary calcium carbonate sand = 25% F = 30% M = 40% C = 30% SA-SR (Qtz, lith, lith); gravel = 10% up to 5/8" (Qtz + lith); silt = 5% nonplastic	
CL			N				13	clayey silt - yellowish red (5YR 5/6) soft, SLM silt = 80% nonplastic; clay = 20% nonplastic	
ML			N				14	SAA - dense stiff - stringers of secondary calcium carbonate exist (Qtz) - pinkish gray (5YR 7/2)	
ML			N				15	@ 14.5' SAA w/o stringers w/ trace sand (Qtz, lith) F-M S	
ML			N				16	@ 15.5' SAA w/ trace sand + gravel (Qtz, lith)	
ML		24.9	N				17		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106VI					Logged By: J. Messenger		Page 3 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SC			N				17	clayey sand w/gravel - yellish red (5YR 5/6) loose	
SC			N				18	52M; sand = 70%; VF=10% F=20% M=40% C=30% SA-SR (qtz, feld, lith); clay=15% soft, nonplastic; gravel=10% up to 1 1/8" (qtz+lith); silt=5% nonplastic	S. odor
ML		24.9	N		6'		19	SAA @ 13-14' soft-med stiff w/trace sand (F-M) (qtz, feld, lith.)	S. odor
ML	2547		N				20	SAA @ 19-20' w/trace sand (F-M) and trace gravel to 1/2" (lith. ss)	
ML			N				21		
ML			N				22		
ML			N				23	SAA - silt=75% sand=25% clay=10% sand=VF=80% F=30% M=40% SA-SR (qtz, feld, lith) trace gravel up to 1/2" (lithics)	S. odor
ML			N				24	SAA @ 13-14' w/trace sand (F-C) (qtz, feld, lith.)	
ML		24.9	N		4'		25	SAA @ 23-24 w/trace sand (F-C) (qtz, lith) and trace gravel up to 1/2" (lithics)	S. odor
ML			N				26		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106V1					Logged By: J. Messenger		Page 4 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				26	SAA @ 13-14' reddish brown (5YR 5/4)	
ML			N				27		
ML			N				28		
ML		22.1	N		6'		29		
ML	2330		N				30		
ML			N				31		
ML			N				32	SAA - light reddish brown (5YR 6/4) trace sand (F-C) trace gravel up to 5/8" (lith) (Qtz + lith)	s.odor
ML			N				33	SAA @ 22-23' sand has trace coarse grain	s.odor
ML		22.7	N		4'		34	SAA @ 32-33 sand (Qtz, lith, caliche) trace gravel up to 5/8" (lith + caliche)	s.odor
ML			N				35		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106 VI					Logged By: J. Messenger Page 5 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML		22.7	N		4'		35		
ML			N				36	SAA @ 13-14' w/ trace F-M sand (dtr + 1.7th caliche)	
ML			N				37	yellowish red (5YR 4/6)	
ML			N				38		
ML			N				39	to 39'	
ML		21.6	N		6'		40	SAA @ 36-37 (5YR 5/4)	
ML	24.34		N				41		
ML			N				42	SAA @ 39-40	s. odor
ML			N				43		
ML		22.7	N		4'		44		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAEB-106VI					Logged By: J. Messenger Page 6 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								Well Details	
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(ML)		22.7	N		44		44	SAA - 54R 5/6 trace sand	S. odor
(ML)			N		45		45		
(ML)			N		46		46		S. odor
(ML)			N		47		47	SAA @ 22-23' sand - lithics + caliche; trace gravel to 3/8"	
(ML)			N		48		48	@ 47.2' clayey silt - reddish brown (54R 4/4) soft - med. stiff / med. dense - low plasticity trace sand (F-M) - lith + caliche	S. odor
(ML)		21.9	N		49		49		
(ML)			N		50		50	SAA @ 47-48' brown (7.54R 5/4)	
(ML)	2991		N		51		51		
(ML)			N		52		52		
(ML)		22.6	N		53		53	SAA @ 49-50' - trace sand (lith + caliche) F-M trace gravel to 3/8" (lith + caliche) 7.54R 5/4	S. odor

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106VI					Logged By: J. Messenger Page 7 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							53	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				54		
ML		22.6	N		4'		55	SAA - silt = 70% clay = 20% sand = 10% F = 40% M = 50% C = 10% SA-SR (Qtz, lith, caliche) trace gravel to 3/8" (lith+caliche)	
ML			N				56		s. odor
ML			N				57	clayey silt - brown (7.5 YR 5/4) soft, non plastic, SLR silt = 80% clay = 20% trace F-M sand (lith+caliche) trace gravel to 1/2" (lith)	s. odor
ML			N				58		
ML		22.1	N		6'		59	SAA @ 56-57 silt = 75% ; clay = 20% sand = 5% F = 40% M = 50% C = 10% SA-SR (lith+caliche) trace gravel to 3/8" (lith)	s. odor
ML			N				60	SAA - strong brown (7.5 YR 5/6)	
ML	3131		N				61		
ML			N	P, Y			62		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106 v1					Logged By: J. Messenger Page 8 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SM			N				62	silty sand - reddish brown (5YR 5/4) loose, SLM sand = 80%: F=40% M=40% C=20% SA-SR (Qtz, feld, lith) silt = 15% nonplastic; gravel = 5% up to 1" (Qtz + lith)	
SM			N				63		
ML		21.4	N				64	silt w/sand - yellowish red (5YR 5/6) soft, SLM silt = 90% - nonplastic sand = 10%: VF=40% F=40% M=20% SA-SR (Qtz, lith)	
ML			N				65	trace gravel to 5/8" (lith)	
ML			N				66		
SW SM			N				67	SAA to 67.25'	
ML		22.5	N				68	well graded sand w/ silt - brown (7.5YR 5/3) loose, SLM sand = 85%: VF=15% F=35% M=30% C=20% SA-SR (Qtz, feld, lith, calcite); silt = 10% nonplastic; gravel = 5% up to 1/4" (lith + Qtz)	
ML			N				69	68-70' clayey silt - brown (7.5YR 5/4) soft, nonplastic silt = 80% clay = 20% as nodules	
SW SM	2834		N				70	SAA @ 67.25-68' F=45% M=45% C=10%	
			N				71		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAF-B-106V1					Logged By: J. Messenger Page 9 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							71	SAA @ 68-70'	
(ML)			N				72		
(ML)			N				73	SAA - strong brown (7.5YR 5/6) silt = 80% ; clay = 10% ; sand = 10% VF = 40% F = 40% M = 20% trace coarse sand SA-SR (lithocaliche) clay nodules - brown (7.5YR 5/3)	
(ML)		24.3	N				74	trace gravel to 5/8" (lith) soft - med. stiff	
(ML)			N				75	SAA silt = 80% ; sand = 10% ; clay = 5% gravel = 5% up to 5/8" (lith)	
(ML)			N				76		
(ML)			N				77	SAA - silt = 90% sand = 5% clay = 5% trace gravel to 3/8" soft - med. stiff	
(ML)		22.5	N				78		
(ML)			N				79		
(ML)			N				80		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017 Date:

Boring/Well ID:

KAFB-106V1

Logged By: J. Messenger Page 10 of 32

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML	22.71	22.5	N		6'		80	SAA - silt = 80%, clay = 15%, sand = 5% no trace gravel minor secondary calcium carbonate coating/staining throughout soft-med. stiff s. odor	
ML			N				81		
ML			N				82		
ML			N				83	SAA - silt = 80% clay = 20% minor staining/coating present throughout soft to hard s. odor	
ML			N				84		
ML	23.1		N		4'		85	SAA	
ML			N				86		
ML			N				87		
ML	22.2		N		6'		88	clayey silt w/ sand - strong brown (7.5YR 5/6) soft SLM - silt = 50% soft, non plastic; clay = 10% med. stiff/dense nodules; sand = 40% VF = 30% F = 30% M = 40% SA-SR (qtz, feld, lith) s. odor	
SM			N				89	to 88.25' silty sand - brown (7.5YR 5/3) loose, SLM; sand = 60% VF = 20% F = 65% M = 15% SA-SR (qtz, feld, lith); silt = 30% non plastic, soft; clay = 10% exists as cobbles cemented by secondary calcium carbonate (fizzes) up to 5'	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106V1					Logged By: J. Messenger		Page 11 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SM			N				89	SAA - sand = 80%; silt = 15%, clay = 5% exists as smaller nodules that are hard/dense	
SM	2546	22.2	N				90	s. odor	
SM			N				91		
SM			N				92		
SP-SM			N				93	poorly graded sand w/ silt - yellowish brown (10R 5/4) loose, SLM; sand = 90% : VF = 30% F = 40% M = 30% SA-SR (qtz, feld, lith) trace coarse sand; silt = 10% nonplastic; gravel trace to 1/2" (qtz + lith)	
SP-SM			N				94		
SP		22.4	N				95	poorly graded sand - yellowish brown (10R 5/4) loose SLM; sand = 95% : VF = 30% F = 55% M = 15% SP (qtz, feld, lith); silt = 5% nonplastic - trace gravel caliche trace coarse to 7/8" (lith + caliche) sand	
SP			N				96		
SP-SM			N				97	SAA @ 92-93' fine sm	
SP-SM		23.2	N				98		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAPB-106V1					Logged By: J. Messenger Page 12 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							98	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP			N				99	SAA @ 94-95 sand = dtz, feld, lith trace gravel = lith	
SP			N				100		
SP	3097	23.2	N				101	SAMPLED	
SP			N	P, V			102		
SP			N				103	SAA @ 98-99' - trace clay as nodules	
SP			N				104		
SP	2600	30.8	N				105		
SP			N				106		
SP			N				107	SAA - no trace clay nodules	
SP		35.5	N						

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017 Date:

Boring/Well ID:

KAFB-106V1

Logged By: J. Messinger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP			N				107	SAA - 102-103' clay nodules trace coarse sand - sand = Qtz, feld, lith + caliche	
SP			N				108	S. odor	
CL			N				109	@ 108.8' SAA - brown (4.5YR 5/3) med. stiff med. dense, med. plasticity	
SP			N				110	SAA @ 107-108'	S. odor
CL	35.5		N		9'		111	@ 110.8' SAA @ 108.8' stiff - very stiff to 111.4'	
SW SC			N				112	well graded sand w/ clay - brown (10YR 5/3) loose, SLM sand = 80% F = 50% M = 35% C = 15% silt (Qtz, lith, feld + caliche) clay = 10% as nodules - brown (7.5YR 5/4) med. stiff/med. dense silt = 5% nonplastic to 12.5' gravel = 5% up to 5/8" (lith. caliche)	
CL			N				113	Clay - brown (7.5YR 5/4) med. stiff/med. dense/med. plasticity SAA - strong brown (7.5YR 4/6) stiff, dense, med. plasticity secondary calcium carbonate coating throughout	S. odor
CL			N				114		
W	38.25	30.7	N	P, V			115	SAMPLED	114.6
			N				116		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106V1					Logged By: J. Messenger		Page 14 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
CL	3402						116	SAA @ 113' - very stiff, dense, med. plasticity	
ML		31.1	N				117	Q116.4' - clayey silt - yellowish brown (10YR 5/4) soft, nonplastic; silt = 90% clay = 10%	
ML			N					to 117.8'	
CL			N				118	SAA @ 113'	
ML	2981		N					SAA @ 116.4 silt = 80% clay = 20%	
ML		28.7	N				119	secondary calcium carbonate (caliche) gravel up to 1.5" exists - trace	
			N				120		
	2179							removed for possible sampling	
							121		
							122	Removed for sampling	
		29.3	Y				123		
			Y	B, M			124		
CL			N				125	clay - brown (7.5YR 5/4) very stiff, very dense med. plasticity slightly mottled to a pinkish gray (7.5YR 7/2) by secondary calcium carbonate (fizzes)	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB - 106V1					Logged By: J. Messenger		Page 15 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
CL	29.3	N			6'		125	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL							126	SAA @ 124-125 not mottled	s. odor
ML							127	clayey silt - brown (7.5YR 5/4) soft to med. stiff nonplastic - silt = 70% clay = 30% med. plasti.	
CL	28.8	N			4'		128	silt - brown (7.5YR 5/6) soft, nonplastic silt = 90% - clay = 10% as nodules	s. odor
ML							129	poorly graded sand w/silt - brown (10YR 5/3) loose, SM sand = 85% VF = 20% F = 60% M = 20% SA-SR (Qtz, fld, lith, calcite) silt = 10% nonplastic clay = 5% as nodules	s. odor
SP-SM							130	SAA @ 129-130' sand = 95% silt = 5% no trace coarse sand; no clay	s. odor
SP	32.78	N					131		
SP							132		
SP	25.1	N			6'		133	SAA - Sand = 95% F = 45% M = 55% trace coarse sand; gravel = 5% up to 1/4" (lith + Qtz)	s. odor
SP							134	SAA @ 130-131'	s. odor

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106V1					Logged By: J. Messenger		Page 16 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
(SP) SM		25.1	N				134	SAA @ 129-130' 90% sand; 10% silt no clay trace coarse sand trace gravel to 3/8" (lith + Qtz)	
(SW)			N				135	well graded sand - brown (10YR 5/3) loose, SM sand = 90%: F=20% M=65% C=15% SA-SR (Qtz, feld, lith + calcite); silt = 5% nonplastic; gravel = 5% up to 1/4" (Qtz + lith)	S. odor
(SW)			N				136	SAA @ 135-136' sand = 80%: F=20% M=60% C=20% gravel = 15% up to 1" (Qtz + lith) silt = 5%	S. odor
(SP)		26.5	N				137	SAA @ 130-131'	
(SP)	3246		N				138	(SAA) w/trace gravel up to 3/8" (Qtz + lith)	
(SP)			N				139	SAA but with trace coarse sand: sand = 90% silt = 5%; gravel = 5% up to 2" (Qtz + lith)	
(ML)			N				140	SAA @ 132-138'	S. odor
(ML)			N				141	clayey silt - brown (7.5 5/6) soft to med. stiff non plastic silt - low plasticity clay nodules silt = 80% clay = 20% mildly mottled to a very pale brown (10YR 7/3) - calcium carb. (fizzes)	
(ML)		31.1	N				142	silty clayey silt light yellowish brown (10YR 6/4) to very pale brown (10YR 7/3) soft to very stiff, low to med. SM plasticity - silt = 70% clay = 30%	S. odor
(ML)			N				143		S. odor

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106V1

Logged By: J. Messenger

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(CL)				N				143	silty clay - very pale brown (10YR 7/3) stiff, dense medium plasticity - readily effervescent w/acid friction on	
(CL)				N				144		
(CL)		31.1		N				145	to 144.75' silty yellowish brown (10YR 5/4) med. stiff to stiff med. dense, low plasticity	
(SP-SM)				N				146	SP-SM @ 129-130' no clay; trace coarse sand; trace gravel to 3/8"	
(SW)				N	P-SM			147	removed for sampling well graded sand - pale brown (10YR 6/5) loose, SLM sand = 85%: F=30% M=60% C=10% SA-SR (Qtz, feld, lith, caliche); silt = 5% nonplastic clay = 5% as nodules - trace clay gravel = 5% up to 1 3/4" (lith + Qtz)	
(SW)		29.2		N	P, V			148		
(SW)				N				149	well graded sand - pale brown (10YR 6/3) loose, SLM - sand = 85%: F=20% M=65% C=15% SA-SR (Qtz, feld, lith, caliche); gravel = 10% up to 1 1/8" (lith, Qtz); silt = 5% nonplastic	
(SW)				N				150		
(SW)		3163		N				151	sand: F=20% M=70% C=10% gravel up to 2"	
(SW)		24.9		N				152	@ 151.8 - 152 = clay - brown (7.5YR 5/3) stiff, dense, med. plasticity	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAB-106V1

Logged By: J. Messenger

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USCS Soil Type	PTD Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
(SW)			N				152	SAA @ 148-149 - sand = 70% gravel = 25% up to 2 3/8" silt = 5%	
(SW)			N				153		
(SW)		24.9	N				154		
(SW)			N				155	Sand = 80% gravel = 15% silt = 5%	
(SW)			N				156	Sand = 90% gravel = 5% silt = 5%	
(SP-5M)			N				157	Poorly graded sand w/silt - pale brown (10YR 6/3) loose, SLM - sand = 90% : F = 40% M = 60% trace coarse sand SA-SR (qtz, fld, lith, caliche); silt = 10% non plastic trace gravel to 1/2" (lith) trace clay no nodules brown (7.5YR 5/4)	
(SP-5M)			N				158	157-158 SAA Sand = 95% silt = 5% 158-160 removed for sampling - no trace gravel - no trace clay	
	4229	29.6	Y				159		
			Y				160		
(CL)	5743	32.3	Y				161	clay - yellowish brown (10YR 5/4) med. stiff, med. dense med. plasticity - mottled throughout to light gray (10YR 7/2) mottled areas fizz with acid - secondary calcium carb. present also contains staining - brownish yellow (10YR 6/3) and black staining - in some places this brownish yellow staining coats/surrounds calcium carbonate mottling	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAR3-106V1

Logged By: S. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(CL)	4270	32.3	Y	P, V, B, M	6'		161	SAA	
			Y				162	162-166 removed for sampling	s. odor
			Y				163		
			Y				164		
			Y				165		
			Y				166		
(SP)			N				167	poorly graded sand - pale brown (10YR 6/3) loose SLM - sand: 95%; F=60% M=40% trace coarse sand SA-SR (qtz, fld, lith, caliche); silt=5% nonplastic - trace gravel to 3/8" (lith)	s. odor
(SP)		29.4	N				168	SAA to 168.6 - 168.8 = clay - brown 7.5YR 5/6 - med. stiff/med. dense/med. plasticity interbedded w/sec. calcium carbonate stringers throughout	s. odor
(CL)			N				169	168.8-169 SAA @ 166-167 - trace gravel to 5/8"	s. odor
(SP)			N				170		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017 Date:

Boring/Well ID:

KAFB-106V1

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SP)	1338		N				170	SAA	
(SP)			N				171		
(SW)			N				171.5	to 171.5'	
(SW)			N				172	171.5-171.8 - well graded sand w/gravel - pale brown (10YR 6/3) loose, SLM - sand = 90% F = 30% M = 50% C = 20% (qtz, feld, lith, caliche), gravel = 10% up to 1" (qtz, lith, caliche)	
(SW)			N				173	171.8-172 = clay - brown (7.5YR 5/4) outside - altered center - pinkish white (7.5YR 8/2) stiff/dense/med. plasticity - altered center reacts w/acid - sec. cal. carb.	
(SW)		28.6	N				174	172-174 - SAA @ 171.5-171.8 Sand = 85% gravel = 10% clay = 5% as nodules	
(SW)			N				175	SAA - trace clay - silt = 5% nonplastic	S. odor
(SW)			N				176		S. odor
(SW)			N				177		
(SP-SM)			N				178	poorly graded sand w/silt - yellowish brown (10YR 5/4) loose, SLM - sand = 90% F = 30% M = 50% trace coarse sand SA-SR (qtz, feld, lith, caliche); silt = 10% nonplastic - trace gravel to 1/2" (lith)	S. odor
(SP-SM)		36.1	N				179		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB - 106V1

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP-SM		36.1	N		4'		179		
SW	3578		N				180		
SW			N				181	SAA @ 171.5-171.8 sand = 90% F = 30% M = 60% C = 10% gravel = 5% up to 1 1/2" (Qtz + lith) silt = 5% nonplastic S. odor	
SW			N				182		
SW			N		6'		183		
SW	334		N				184		
SW			N				185	SAA @ 180-181 sand = 95% silt = 5% trace gravel to 1 1/8" (Qtz + lith) S. odor	
SW			N				186		
SW	37.6		N				187		
SP			N		10'		188	Poorly graded sand - pale brown (10YR 6/3) loose SLM - sand = 100% F = 0% M = 60% SA SR (Qtz, feld, lith, caliche) trace coarse sand S. odor	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF				Project Number: 62735DM02.1017		Date:			
Boring/Well ID: KAFB-106V1				Logged By: J. Messenger		Page 22		of 32	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							188	SAA @ 184-185	
(SW)			N				189		
(SP)			N				189.5	189-189.5 — SAA @ 187-188 Sand=95% Silt=5% nonplastic	
(SW)			N				190	189.5-190 — SAA @ 184-185 Sand=65% Silt=5% gravel=30% up to 1 7/8" Qtz+lith	
(SP)	3463		N				190.5	190-190.5 — SAA @ 187-188 — sand=85% gravel=15% up to 2" (Qtz+lith)	
(SW)			N				191	190.5-191.5 — SAA @ 189.5-190 sand=65% silt=5% gravel=30% up to 1" (Qtz,lith, caliche)	
(SP)		37.6	N				192	SAA @ 190-190.5 ↓ to 192.4'	
(SW)			N				193	SAA @ 190.5-191.5	
(SW)			N				194	@ 193.8' SAA but w/ clay nodules - brown (7.5YR 5/3) sand=60% gravel=30% clay=10% Clay - brown (7.5YR 5/3) med. stiff - stiff med. dense - dense, med. plasticity	
(CL)			N				195	SAA @ 187-188 trace coarse sand trace gravel to 1 1/4" (Qtz+lith)	
(SP)			N				196		
(SW)			N				197	well graded sand w/ gravel - pale brown (10YR 6/5) loose, SL-M - sand=85% F=30% M=50% C=10% gravel=10% up to 2" (Qtz+lith) silt=5% nonplastic - trace clay as nodules	
Additional Comments: also contains staining - brownish yellow (10YR 6/5) in some places this stain surrounds calcium carbonate grain material - JM									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106V1					Logged By: J. Messenger		Page 23 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SW)			N				197	SAA but more gravel	
							198	Sand = 75% gravel = 20% silt = 5%	S. odor
(SW)	33.4		N		4'		199	SAA - sand = 80% F = 30% M = 50% C = 20% gravel = 15% up to 1 1/4" silt = 5%	S. odor
(SW)			N				200	to 199.8' poorly graded sand w/silt - light brownish gray (10YR 6/2) loose, SLM - sand = 90% F = 50% M = 50% trace coarse sand - SA - 5% (aka, feld, lith) silt = 10% nonplastic - trace gravel to 1/2" (1.7%)	
(SP-SM)	32.01						201	SAA @ 198-199	S. odor
(SW)			N				202	removed for sampling	
(SW)	27.2		N		4'		203		
			Y				204		
			Y				205		
(SW)			N				206	SAA @ 197-198 to 204.9' 204.9-205.25 - clay - brown (7.5YR 5/6) med. stiff/med. dense/med. plasticity - black staining on outside clayey silt - brown (7.5YR 5/2) soft, nonplastic silt = 85% 90% clay = 15% 10%	S. odor
(CL)	30.4		N		6'				S. odor
(ML)									

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106V1					Logged By: J. Messenger		Page 24 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML							206	SAA ↓ to 206.75'	(S. odor)
SP							207	poorly graded sand - pale brown (10YR 6/3) loose, SLR sand = 95%: VF = 20% F = 70% M = 10% SA-SR (Qtz, feld, lith, caliche); silt = 5% nonplastic - trace gravel up to 3/16" (lith) ↓ to 207.8'	(S. odor)
SW		30.4					208	207.8 - 210 well graded sand w/ gravel - pale brown (10YR 6/3) loose, SLR - sand = 65%: F = 20% M = 60% C = 20% SA-SR (Qtz, feld, lith, caliche); gravel = 30% up to 2" (lith, Qtz); silt = 5%	(S. odor)
SW							209	@ 208.6' gravel = 40% sand = 55% silt = 5% black staining on gravel 208.6 - 209' only than SAA @ 207.8'	(S. odor)
SW		28.12					210	SAA sand = 75% gravel = 20% silt = 5%	(S. odor)
SW							211		
SW							212		
SP		28.4					213	SAA @ 206.75 - 207.8 trace coarse sand trace gravel to 1" (lith + caliche) 100% sand - no silt	(S. odor)
SP							214		
SP							215		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106V1					Logged By: J. Messenger		Page 25 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP	2647						215	SAA to 215.5'	
SW			N				216	SAA @ 210-211 sand = 70% gravel = 30% up to 2"	S.oder
SW	2965		N	P, V			217		
SW		27.3	N				218	Sand = 75% F=30% M=60% C=10% gravel = 20% silt = 5%	
SW	1459		N				219	Sand = 85% gravel = 10% silt = 5% trace clay nodules - brown (7.5YR 4/4) hard/very dense/low plasticity	
SW			N				220		
SP	3491		N				221	Sand = 90% F=25% M=75% C=10% gravel = 5% up to 1" (lith + caliche) silt = 5% trace coarse sand	
SP		26.1	N				222		
SP			N				223	to 222.8'	
SW			N				224	well graded sand - light gray (10YR 7/2) loose, silty Sand = 90% F=10% M=70% C=20% SAA (caliche + lith + Qtz) gravel = 10% up to 1" (caliche) SAA @ 220-221	S.oder
SP		30.5	N						

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KATB-106V1

Logged By: J. Messenger

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP								224	SAA @ 224.25	
SW								225	well graded sand w/ gravel - pale brown (10YR 6/3) loose SLM - sand = 80%: F=10% M=70% C=20% SA-SR (Qtz, feld, lith, caliche) - gravel = 15% up to 1" (Qtz, lith); silt = 5% nonplastic	
CE								225.4	SAA @ 224.25 - 225.4	
SW								226	clay = brown (7.5YR 5/3) med. silt/dense plasticity sand = 90% gravel = 5% silt = 5%	
SW								227		
SW								228	SAA @ 220 - 221 trace coarse sand no gravel 95% sand 5% silt	
SP								229		
SW								230	SAA @ 224.25 - 225.4 trace clay as nodules	
SP-SM								231	poorly graded sand w/ silt - brown (10YR 5/3) loose SLM - sand = 90%: VF=20% F=30% M=50% SA-SR (Qtz, feld, lith, caliche); silt = 10% nonplastic	
ML								232	clayey silt - brown (10YR 5/3) soft, SLM silt = 80% clay = 15%	
SP-SM								233	SAA @ 230 - 231 trace coarse sand	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KARB-106V1					Logged By: J. Messenger		Page 27 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
(SW)		34.4	N		4'		233	SAA @ 224.25 - 225.4 sand = 85% gravel = 10% to 1 1/8" silt = 5% trace clay - clay coats gravel S. odor	
(SW)			N				234		
(SW)			N				235	sand = 75% gravel = 20% up to 1 1/2" silt = 5%	
(SW)			N				236	✓ 235.8 JM	
(SP)			N				237	SAA @ 227.5 - 230 JM 229	
(SW)		25.7	N		6'		238	SAA @ 234 - 235.8 sand = 60% silt = 5% gravel = 35% up to 1 1/8" S. odor	
(SW)			N				239		
(SW)			N				240		
(SW)	6831		N				241	sand = 80% gravel = 15% silt = 5%	
(SW)		32.7	N		5'		242	SAA @ 232 - 233	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KARB-106V1					Logged By: J. Messenger		Page 28 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP-SM							242	SAA	
SP		32.7	N				243	SAA @ 227.5 - 229	
SP			N				244		
SP			N				245	SAA trace clay as nodules	
SP			N				246		
SP			N				247		
SW		30.4	N				248	well graded sand - light brownish gray (10% 6/8) loose, SLM - sand = 95%: F=25% M=60% C=15% SA-SR (Qtz, feld, lith, calcite); gravel = 5% up to 1/2" Qtz + lith	
SW			N				249	SAA @ 245-246	
SP			N				250		
SP	4450	24.0	N				251	trace coarse sand	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106VI

Logged By: J. Messenger

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs
SP			N				251
SP	7263		N				252
SP		24.0	N				253
SW	8563		N	P, V			254
SP			N				255
SP			N				256
SP			N				257
SP-SM		24.3	N				258
SP			N				259
SP			N				260

SAA

10YR 5/3

S. odor

Removed for sampling

SAA @ 247-248 Pale brown (10YR 6/3)

SAA @ 251-252

SAA @ 245-246 trace coarse sand

S. odor

SAA @ 230-231

SAA @ 255-256

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KFB-106V1					Logged By: J. Messenger		Page 30 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SP)	4049		N				260	SAA @ 255-256 grayish brown trace coarse sand 10YR 5/2	
(SP)			N				261	trace gravel to 3/8" (lithics)	
SP			N				262		
SP			N				263	SAA @ 230-231 grayish brown 10YR 5/2	
SP			N				264		
SP			N				265		
SP			N				266		
(CL)		28.1	N				267	clay - brown (7.5YR 4/4) hard, dense, dry med. plasticity - black staining around clay on outside - secondary calcium carbonate throughout that fizzes w/ acid	
(CL)			N				267.5	267-267.5 clay is olivegray (5Y 5/2)	
(CL)		26.7	N				268	267.5-268 SAA @ 266-267 brown (7.5YR 5/2)	
(CL)			N				269	SAA - highly mottled to pinkish gray (7.5YR 6/2) secondary calcium carbonate (fizzes)	
(CL)			N				270		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML		26.7	N		4'		269	clayey silt - brown (7.5YR 5/3) soft, nonplastic silt = 85% clay = 15%	s. color
CL	1788		N				270	clay - brown (7.5YR 5/3) hard, dense, dry low to med. plasticity	
CL			N	P, V			271	secondary calcium carbonate staining throughout - to white (7.5YR 8/1)	s. color
CL			N				272	gravel to cobble size calciche present	
CL		35.4	N		5'		273		
CL			N				274		
CL			N				275	silty clay - brown (7.5YR 5/3) soft to hard silt = 10% nonplastic, soft clay = 90%, soft to hard - sec. calcium carbonate staining cobble size calciche present	
CL			N				276	SAA	
CO		28.3	N		6'		277	clay - brown (7.5YR 5/3) very stiff, very dense dry to SLR - secondary calcium carbonate staining - med. plasticity	s. color
CL							278		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID:					Logged By:		Page 32 of 32		
USCS Soil Type	PTD Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL		28.3					279	SAA	
ML							279	clay silt - brown (10YR 5/3) soft, nonplastic SLM	
CL	3681						280	silt = 70% clay = 30% as nodules (yellowish brown 10YR 5/4) med. stiff / med dense / med plasticity	
SM	1439						281	SAA @ 281 clay - yellowish brown (10YR 5/4) very stiff / very dense / med. plasticity dry to SLM	
SL							282	silty sand w/ clay - brown (10YR 5/3) loose, SLM sand = 75% VF = 30% F = 60% M = 10% SA-SR (Qtz, feld, lith); silt = 15% nonplastic; clay = 10% as nodules - strong brown (7.5YR 4/6)	
SW							282.5	well graded sand w/ gravel - pale brown (10YR 6/3) loose, SLM sand = 70% F = 10% M = 50% C = 40% SA-SR (Qtz, feld, lith + calcite) gravel = 30% up to 2" (Qtz + lith)	
SW	1363						283	282.5 - 283' SAA - Sand = 60% F = 10% M = 75% C = 15% gravel = 40% up to 2" (Qtz + lith)	
SW							284	283.8 - 284.2 SAA @ 281-281.5m 282.5-283 sand = 85% gravel = 15%	
SP-SM	1160						285	poorly graded sand w/ silt - brown (10YR 6/3) loose, SLM sand = 90% VF = 30% F = 50% M = 30% SA-SR (Qtz, feld, lith); silt = 10% nonplastic	
TD of sonic coring @ 285 f bgs on 12-19-18									
Native Soil Bentonite chips 3/8" Heliplus Sand 10/20 Pioneer Sand									
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

EA BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Drilling Company: Cascade					Start Time/Date:				
Lead Driller: Roger Rodriguez					Completion Time/Date:				
Drilling Method: SONIC					Final Depth:				
Casing Diameter OD: 7-inch					Bit Type and Outer Diameter 7-inch 6.7				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 1 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								Well Details	
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SW)				↑			1	0-8' Well graded sand w/ gravel and cobbles	
(SW)							2	F-C gravel to 1.5" SR	
(SW)							3	Grown, SLM	
(SW)							4	cobbles to 4" SR	
(SW)							5		
(SW)							6		
(SW)							7		
(SW)							8		

Additional Comments:

Recovery: None ☐ Partial ☐ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 2 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							8	NO RECOVERY 8-10'	
							9		
							10		
ML	1730		N				11	Clayey silt - yellowish red (5YR 5/6) soft, SLAM silt: 90% nonplastic; clay: 10% nonplastic	NO odor
SC			N				12	Clayey sand - yellowish red (5YR 5/6) loose, SLAM sand: 70%; VF = 20% FF = 20% M = 50% C = 20% SA-SR (Qtz, feld, lith); clay: 15% soft, nonplastic; silt: 10% nonplastic gravel: 5% up to 3/8" (Qtz + lith)	
SC			N				13	SAA to 12.5' clay - reddish brown (5YR 5/4) soft to med. stiff trace sand med. plasticity	NO odor
CL	230		N				14	@ 13.5' silty clay w/trace sand clay: 80% silt: 20%	
CL			N				15		
CL			N				16	clay: 70% silt: 10% sand: 20% SA-SR (Qtz, feld, lith) F: 20% M: 40% C: 40%	NO odor
ML	245		N				17	SAA @ 10-11' med plasticity silt: 70% clay: 20% sand: 10% SA-SR (Qtz, feld, lith) F: 30% M: 30% C: 40%	NO odor
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106 Y2					Logged By: J. Messenger Page 3 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML			N				17	SAA.	
SC		24.5	N				18	SAA @ 11-12.5'	
SM			N		5'		19	sand: 60% clay: 20% silt: 20%	SLM
ML	284.0		N				20	SAA sand: 50% silt: 30% clay: 20%	SLM
ML			N				21	SAA @ 16-17'	
ML			N				22	SAA silt: 70% clay: 25% sand: 5%	(5YR 5/4) reddish brown med. plasticity SLM
ML			N				23		
ML		24.1	N		5'		24		
CL			N				25	Clay - reddish brown (5YR 4/4) soft, med. plasticity clay = 75% silt: 25%	no odor SLM
ML			N				26	silt - reddish brown (5YR 5/3) soft, low plasticity silt: 80% clay: 20%	no odor SLM

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

EA Project: Kirtland BFF Boring/Well ID: <u>KAFB-106V2</u> SONIC CORING BORING/WELL CONSTRUCTION LOG Project Number: 62735DM02.1017 Date: _____ Logged By: <u>J. Messenger</u> Page <u>4</u> of <u>32</u>									
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
(ML)							26	SAA - silt: 60% clay: 40% low plasticity soft to very stiff	
(ML)							27	no odor (SLM)	
(ML)		24.4	N		5'		28	SAA w/trace sand yellowish red (5YR 4/6) soft to stiff	
(ML)			N				29	no odor (SLM)	
(ML)			N				30	SAA w/trace gravel up to 1/4"	
(ML)	221.9		N				31	SAA @ 29-30'	
(CL)			N				32	silty clay - brown (7.5YR 5/4) SLM, soft to med-stiff clay: 60% silt: 40% trace sand med. plasticity	
(CL)		27.4	N				33	no odor	
(ML)			N		5'		34	SAA @ 29-31'	
(ML)			N				35	reddish brown (5YR 5/4) no odor	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger		Page 5 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
CL		27.4	N		5'		35	SAA @ 31-32' reddish brown (5YR 5/4) soft to stiff, med. plasticity trace gravel clay: 75% silt: 25% sand: 5% no odor	
CL			N		5'		36	SAA @ 35-36' reddish brown (5YR 4/4) clay: 60% silt: 40% soft to med. stiff no odor	
ML			N		5'		37	SAA @ 29-30' yellowish red (5YR 6/6) trace gravel up to 3/8" trace sand no odor	
ML		27.4	N		5'		38		
ML			N		5'		39		
ML			N		5'		40		
ML	373.6		N		5'		41	SAA no trace gravel no odor	
ML			N		5'		42	weak odor	
ML		24.4	N		5'		43	SAA @ 37-38' trace gravel to 1/2" silt: 50% clay: 40% sand: 10% F: 30% M: 50% C: 20% (qtz, feld, lith) odor present	
ML			N		5'		44		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger				
					Date: Page 6 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML		24.4	N		5'		44	SAA silt: 50% clay: 30% sand: 20% trace gravel up to 1/2"	
ML			N				45		
ML			N				46	strong odor	
ML			N				47	SAA brown (7.5 YR 4/4) silt: 60% clay: 30% sand: 10% strong odor	
ML			N				48		
ML		27.7	N		5'		49	SAA @ 44-45' reddish brown strong odor	
ML			N				50		
ML	27.0		N				51		
ML			N				52	SAA silt: 65% sand: 25% clay: 10% reddish brown trace gravel to 1/2" s. odor	
ML		23.4	N		5'		53	SAA reddish brown silt: 75% sand: 20% F: 60% M: 40% trace coarse sand clay: 5% trace gravel to 3/8" s. odor	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 7 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML			N				53	SAA silt=80% sand=15% clay=5% reddish brown SR 5/4	
ML		23.4	N				54		s. odor
ML			N				55		
ML			N				56	SAA silt=SM trace gravel to 1 3/8" 1 1/2"	
ML			N				57	silt=90% sand=10%	
ML		25.0	N				58		
ML			N				59		
ML			N				60		
ML	3239		N				61		
SM			N				62	Silty sand - brown (7.5YR 4/4) loose, SLM sand=80% F=20% M=60% C=20% (Qtz, feld, lith) SA-SR; silt=15% nonplastic gravel=5% up to 1/4" (Qtz + lith) s. odor	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BTF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106V2

Logged By: J. Messenger

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW-SM				N				62	well graded sand with gravel and silt - brown (5YR 5/4) loose, SLM. Sand = 80% : F = 10% M = 70% C = 20% SA-SR (Qtz, feld, lith); gravel = 10% up to 1" (Qtz + lith); silt = 10% non plastic	
SW-SM				N				63		
SW-SM			25.1	N				64		s. odor
SW-SM				N				65		
ML				N				66	silt with sm clayey silt - reddish brown (5YR 5/4) loose to very dense, soft to hard; silt = 90% clay = 10%	s. odor
SW-SM				N				67	SAA @ 62-63'	
ML				N				68	SAA @ 65-66' silt, non plastic	
ML			23.2	N				69		
ML				N				70	silt with sand - reddish brown (5YR 5/4) loose, SLM silt = 60% non plastic; sand = 40% : F = 30% F = 30% M = 30% C = 10% SA-SR (Qtz, feld, lith)	s. odor
ML		23.59		N				71	SAA - silt = 80% sand = 10% clay = 10% trace gravel up to 2"	s. odor

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 9 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				71	silt - brown (7.5YR 5/4) loose, soft, nonplastic, SLM silt = 70% clay = 10%	
ML			N				72	SAA - soft to stiff s. odor	
ML		24.4	N		5'		73	SAA @ 71-72 w/ trace sand in with sand silt = 70% clay = 10% sand = 20% VF = 20% F = 20% M = 60% trace coarse sand - trace gravel to 1/2" (lith)	
ML			N				74	SAA s. odor	
ML			N				75	SAA silt = 70% sand = 20% clay = 10% trace gravel to 1/2"	
ML			N				76		
ML			N				77		
ML		28.9	N				78	trace gravel to 1 1/4"	
ML			N		5'		79		
ML			N				80	silt = 75% sand = 15% clay = 10%	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAPB-1060V2					Logged By: J. Messenger Page 10 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
ML	3254		N	P, Y			80	SAA silt = 75% sand = 10% clay = 15% (s. odor)	
ML			N				81		
ML			N				82	SAA trace gravel to 1 1/2" silt + clay chunks coated with secondary calcium carbonate (fizzes) (s. odor)	
ML			N				83		
ML	22.6		N		5'		84		
ML			N				85	SAA - sand = 10% trace coarse sand	
ML			N				86		
ML	25.4		N		2'		87	SAA	
SM			N				88	silty sand - reddish brown (5YR 5/4) loose, SLM sand = 60% VF = 30% F = 30% M = 30% C = 10% SA-SR (qtz, feld, lith); silt = 35% non plastic; clay = 5% trace gravel to 3/8"	
SM	67.9		N		3'		89	SAA - trace coarse gravel to 1" sand = 60% silt = 25% clay = 10% gravel = 5%	
Additional Comments: 88-91 disturbed									
Recovery: None ☐ Partial ☒ Complete ☒ DISBURBED									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 11 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP-SM		67.9	N		3'		89	poorly graded sand w/silt - yellowish brown (10YR 5/4) loose, silt; sand = 85% VF = 40% F = 40% M = 20% trace coarse sand; silt = 10% nonplastic; clay = 5% soft nonplastic; gravel = 5% up to 3/8" (Qtz, feld, lith)	
SP-SM	2288		N				90	SA-SR - sand (Qtz, feld, lith)	
							91	S. odor	
SP-SM			N				92	SAA - pale brown (10YR 6/3)	S. odor
SP			N				93	poorly graded sand - yellowish brown (10YR 5/4) loose, silt - sand = 95% : VF = 40% F = 50% M = 10% SA-SR (Qtz, feld, lith); silt = 5% soft, nonplastic - trace gravel to 1" (lithic)	
SR		24.7	N		5'		94	S. odor	
SR			N				95	SAA @ 92-94 trace coarse sand - SM	S. odor
SR			N				96		
SP-SC			N				97	poorly graded sand with clay - light brownish gray (10YR 6/2) loose, silt - sand 90% : VF = 30% F = 50% M = 20% SA-SR (Qtz, feld, lith); clay = 10% soft, nonplastic trace coarse sand	S. odor
SW		59.9	N		4'		98	well graded sand - pale brown (10YR 6/3) loose, silt sand = 85% : VF = 20% F = 50% M = 20% C = 10% SA-SR (Qtz, feld, lith); gravel = 10% up to 5/8" (Qtz + lithic); clay = 5% soft, nonplastic	S. odor
Additional Comments:									
88-91 disturbed									
96-98 disturbed									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 12 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							98	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
							99	NO RECOVERY	
							100		
							101		
SP	1278	57.2	N				101	100-102 taken for sampling - 3m poorly graded sand - grayish brown (10YR 5/2) loose, SLM; sand = 95%: F = 60% M = 10% VF = 30% SA-SR (qtz, feld, lith); silt = 5% nonplastic - trace gravel to 1 1/2" (lithics)	
SP			N				102	SAA - light brownish gray (10YR 6/2) sand = 90%: VF = 20% F = 60% M = 20% trace coarse sand silt = 5% gravel = 5% up to 1/2" (lithics) S. odor	
SP		38.8	N		5'		103	102-104 taken for sampling SAA as 101-102 no trace gravel S. odor	
SP			N	P, V			104		
SP		48.5	N				105	SAA @ 100-101 no trace gravel S. odor	
SP		37.8	N		5'		106	SAA @ 100-101 no silt or trace gravel clay = 5% soft, non plastic nodules brown 7.5YR 5/3 to 106.4'	
MG			N				107	silt - light yellowish brown (10YR 6/4) soft, SLM silt = 100% nonplastic	
Additional Comments: 98-100 NO RECOVERY									
Recovery: None ☐ Partial ☒ Complete ☒ NO RECOVERY									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KARB-106V2

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				107	↓ to 107.7'	
CL		37.8	N				108	clay-brown (7.5YR 5/4) med stiff to very stiff med. plasticity	
CL			N		5'		109	↓	
SA			N				110	SAA @ 105-106.4'	
ML	1972		N				111	SAB @ 112-113' 80% silt 15% clay 5% gravel up to 2" (lithic)	
ML			N				112	clay coating gravel in between clay + gravel is a thin coating of secondary calcium carbonate (fizzes)	
ML		25.7	N		5'		113	clayey silt - brown (7.5YR 5/4) soft to med. stiff low plasticity: silt = 80% clay = 20%	
ML			N				114	silt - light yellowish brown (10YR 6/4) soft, non plastic silt = 95% clay = 5%	
ML			N				115	↓	
ML	1805	25.4	N		5'		116	clayey silt - brown (7.5YR 5/4) soft to med. stiff medium plasticity silt = 70% clay = 30%	

Additional Comments:

SAB = Same as below

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 14 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL	2075		N				116	SAA JM SAMPLED clay - brown (2.5 YR 5/4) very stiff, very dense med. plasticity	
CL			N	P, Y			117	SAB @ 118-119' light yellowish brown (10 YR 6/3)	
ML	1609	25.4	N		5'		118	SAA @ 115-116' silt = 90% clay = 10% soft, low plasticity	
ML			N				119		
	1724		Y				120	SAMPLING	
			Y				121		
			Y				122		
		29.0	Y		5'		123		
			Y				124		
CL			N				125	clay - brown (7.5 YR 5/4) very stiff, very dense med. plasticity	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 15 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(CL)			N				125	SAA	
(CL)			N				126	SAA @ 126-126.5' cobbles + gravel of secondary calcium carbonate (caliche) clay coating caliche (fizzes)	S. odor
(CL)		25.7	N				127	SAA @ 125-126' med. stiff, med. dense med. plasticity	S. odor
(ML)			N				128	clayey silt - brown (7.5YR 5/3), soft, nonplastic silt = 80% clay = 20% exist as nodules	S. odor
(ML)			N				129	silt - brown (8.5YR 5/3), soft, nonplastic	S. odor
(SP-SM)			N				130	129.5' Poorly graded sand w/ silt - brown (10YR 5/3) loose, SLAY caliche sand = 85% VF = 20% F = 6.5% M = 15% SA-SR (qtz, feld, lith) trace coarse sand - silt = 10% nonplastic - clay = 5% as nodules	
(SP)	1904		N				131	SAA sand = 95% silt = 5% no trace coarse sand; no clay	S. odor
(SP)		29.7	N				132		
(SP)			N				133		
(SP-SM)			N				134	SAA @ 129.5'-130' 5% clay as nodules no trace coarse sand	S. odor
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 16 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP-SM			N				134	SAA @ 129.5-130' 90% sand trace coarse sand 10% silt trace clay no nodules	S. odor
SW		29.7	N				135	well graded sand - brown (10YR 5/3) loose, SLM sand = 90%: F = 20% M = 70% C = 10% SA-SR (qtz, feld, lith); silt = 5% nonplastic; gravel = 5% up to 1 1/4"	S. odor
SW			N				136		
SW			N				137	SAA sand = 80% gravel = 15% up to 1 1/4" silt = 5%	S. odor
SP		30.3	N				138	poorly graded sand - brown (10YR 5/3) loose, SLM sand = 95%: F = 70% M = 30% trace coarse sand SA-SR (qtz, feld, lith); 5% silt nonplastic trace gravel to 3/8" (qtz + lith)	
SP			N				139	SAA @ 129.5-130' with trace gravel to 3/8" (qtz + lith)	
SP-SM			N				139.41		
SW			N				140	well graded sand SAA @ 135-136 gravel = 20% up to 2" sand = 75% silt = 5%	
ML	2230		N				141	SAA @ 115-116' silt = 70% soft clay = 30% low plasticity	S. odor
ML		29.5	N				142	(mildly mottled to a very pale brown (10YR 7/3)	
ML			N				143	to 142.8' silty clay - very pale brown (10YR 7/3) very dense + stiff mottled throughout to brown (7.5YR 5/4) clay = 60% silt = 40%	
CL									

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger		Page 17 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
CL			N				143	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
							144		
		29.5	Y	B, M, Therm. Cond.			145		
			Y				146		
SP-SM			N				147	SAA @ 134-135'	s. odor
SW			N				148	SAA @ 135-136' gravel 5% up to 2 1/4"	s. odor
SW		31.1	N				149	gravel 10% to 2"	
SW			N				150		
SP	1806		N				151	SAA @ 137-138' sand = 90% F = 40% M = 60% gravel: 5% up to 2 3/8" (qtz + lith) silt = 5% trace coarse sand	s. odor
SW		27.4	N				152	well graded sand w/ gravel - brown (10YR 5/3) loose SLM: sand = 75% F = 25% M = 60% C = 15% SA-SR (qtz, feld, lith); gravel = 20% up to 2" (qtz + lith) silt = 5% nonplastic and caliche	s. odor
Additional Comments:									
Therm. Cond. = Thermal Conductivity Analysis									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 18 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW							152	SAA to 152.5'	
CL			N				153	clay - yellowish brown (10YR 5/4) stiff, dense, med. plasticity clay = 75% silt = 25%	
SW		27.4	N		6		154	SAA @ 151-152' sand = 90% silt = 5% gravel = 5% up to 1 1/2"	
CL			N				155	SAA @ 152.5 brown (7.5YR 5/3) stiff to very stiff dense to very dense 100% clay to 154.5' silty sand - yellowish brown (10YR 5/4) loose, SLM sand = 85% VF = 30% F = 45% M = 25% SA-SR (Qtz, feld, lith); silt = 15% non plastic	
SM			N				156	SAA sand = 65% w/ trace coarse sand silt = 35% non plastic	
SM		26.2	N		2		157	to 157.8' with silt	
SW			N				158	well graded sand - brown (7.5YR 5/3) loose, SLM sand = 85% F = 60% M = 50% C = 20% - silt = 10% non plastic; gravel = 5% up to 3/8" sand = Qtz, feld, lith - SA-SR - gravel = Qtz + lithics SAMPLER	
SW		22.6	N				159	SAA - sand = 90% gravel = 5% silt = 5%	
SW		20.8	N	PV	5		160	poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 90% F = 60% M = 40% trace coarse sand SA-SR (Qtz, feld, lith); gravel = 5% up to 1" (Qtz + lith) silt = 5% non plastic	
SP	2040		N				161		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017		Date:		
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger		Page 19 of 32		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)		
(SP)		23.9 N 20.8 SW					161	SAA	
(SW)	1944	25.4 N					162	SAA w/ coarse sand fraction + trace clay Sand = 90% : F = 50% M = 40% C = 10%	
							163	S. odor	
(SP)			N				164	SAA @ 160-161 ft no gravel 95% sand 5% silt	odor present
(SP)			N				165		S. odor
(SP)		30.9 N	N				166		
(SP)			N				167		
(SP)			N				168		
			Y				169	SAMPLED	
			Y				170		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 20 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW	2706		N				170	well graded sand - pale brown (10YR 6/3) loose, SLM + caliche sand = 90%: F=40% M=50% C=10% SA-SR (Qtz, feld, lith) clay = 5% nonplastic; gravel = 5% up to 1" (Qtz + lithics) clay conts to 170.8' caliche in sand (S. odor)	
CL							171	clay - brown (7.5YR 5/4) soft, med plasticity clay = 90% 10% gravel up to 1" (lithics + Qtz)	
SW			N				172	SAA @ 170-171 (S. odor)	
SW		25.9	N				173	SAA @ 170-171 sand 90%: F=30% M=50% C=20% no clay gravel 5% up to 1" silt = 5% nonplastic (S. odor)	
SW			N				174	SAA @ 170-171 silt 5%; no clay	
SW			N				175		
SW			N				176		
SW			N				177	SAA	
SP-3M		28.1	N				178	poorly graded sand w/ silt - yellowish brown (10YR 5/4) loose, SLM - sand = 90% F=55% M=45% SA-SR (Qtz, feld, lith, caliche); silt = 10% nonplastic (S. odor)	
SP-SM		26.7	N				179		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 21 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
(SP) SM		26.7	N		4'		179	SAA	
(SP) SM	2385		N				180	SAA	S. odor
(SW)			N				181	SAA @ 172-173	
(SW)		27.4	N		6'		182		
(SW)			N				183		
(SW)			N				184		
(SW)			N				185		
(SW)			N				186		
(SP)			N				187	poorly graded sand - brown (10 YR 5/3) loose, SLM sand: 95% : F = 45% M = 55% trace coarse sand SA-SR (Qtz, feld, lith, caliche); silt = 5% nonplastic	S. odor
(SP)		24.1	N		3'		188		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106V2

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP		24.1	N		3'		188	SAA trace gravel to 5/8" s. odor	
(SP)			N				189		
							190	SAA @ 188-189 no silt - 100% sand w/trace gravel	
(SP)	2687		N				191		
(SW)			N				192	well graded sand with gravel and silt - brown (10% 6/3) loose, SLAM - sand = 55% : F = 25% M = 50% C = 25% SA-SR (Qtz, feld, lith, caliche); gravel = 40% up to 2" (Qtz + lith) silt = 5% nonplastic s. odor	
(SW)		28.8	N		7'		193	sand = 65% (Qtz, feld, lith, caliche) gravel = 30% (Qtz, lith, caliche) silt = 5%	
(SW)			N				194		
			X				195	Removed for sampling	
			Y				196		
(SW)		30.2	N		2'		197	SAA @ 192-194' sand: 65% gravel: 30% silt: 5% s. odor	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106V2

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		30.2	N		1	197	197	SAA	S. odor
SW			N		2	198	198		
SW			N				199	SAA @ 192-194' 10YR 6/3	S. odor
SW			N				200		
SW	3331		N				201	Sand = 70% gravel = 25% up to 2 1/2" silt = 5%	
SW			N				202		
SW		32.8	N		8		203	Sand = 85%: F=30% M=60% C=10% gravel = 10% up to 2" silt = 5%	S. odor
SW			N				204		
SW			N				205	Sand = 75% - no caliche gravel = 20% up to 1 1/2" silt = 5%	
SW			N				206		
SW - SM			N					Sand in	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106V2

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SW)			N				206	SAA @ 204-206' sand ~ 65% gravel ~ 30% up to 1 5/8" silt ~ 5%	
(SW)			N				207		
			N				208	SAA @ 202-203' caliche present	
(SW)		24.3	N				209	SAA	
(SP)			N				210	poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 85%: F = 50% M = 50% trace coarse sand SA-SR (Qtz, feld, lith, caliche); gravel = 10% up to 1" (Qtz + lith) silt ~ 5% non plastic	
(SP)	3351		N				211	SAA @ 209-210' gravel up to 1 3/8" (Qtz, lith, caliche)	
(SP)			N				212		
(SP)			N				213	SAA - trace coarse sand + trace gravel to 1 1/2"	
(SP)		25.6	N				214		
			Y				215	Removed for sampling	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106VZ					Logged By: J. Messenger Page 25 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP	3023	31.2	N	P, V, B, M			215	SAA @ 209-210' sand = 85% F = 45% M = 55% trace coarse sand gravel = 10% up to 1 5/8" (qtz + lith) silt = 5%	
SP	2552		N				216		
SP		23.3	N				217	SAA @ 209-216' sand = 95% trace coarse sand silt = 5% NO gravel	
SP	2233		N				218		
SP		22.0	N				219	SAA @ 216-218	
SP			N				220		
SP	3087		N				221	poorly graded sand - light yellowish brown (10YR 6/4) loose, SLM - sand = 95% F = 80% M = 20% trace coarse sand SA-SR (qtz, feld, lith, caliche); silt = 5% nonplastic trace gravel to 1/2" (qtz)	
SW			N				222	well graded sand - yellowish brown (10YR 5/4) loose, SLM sand = 80% F = 40% M = 50% C = 10% SA-SR (qtz, feld, lith, caliche); 15% gravel up to 2" (qtz + lith); 5% silt nonplastic	
SW		34.5	N				223	well g. sand w/ gravel @ 222.5 sand = 70% gravel = 25%	
SP			N				224	@ 223.5': poorly graded sand w/ silt - brown (10YR 5/3) loose, SLM - sand = 90% VF = 20% F = 70% M = 10% SA-SR (qtz, feld, lith, caliche); silt = 5% nonplastic; clay = 5% soft, nonplastic exist as small clay nodules	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 26 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							224	soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content	
							225	% sand (include grain size %; fine, medium, coarse, etc.)	
							226	sand mineralogy	
							227	% gravel	
							228	gravel mineralogy	
							229	angularity/roundedness	
							230	% fines (silt/clay)	
SP		34.5	N				224	SAA - 95% sand; 5% silt - trace clay + trace gravel to 1/2" (lithic)	
SP			N				225		S. odor
SW			N				226	SAA @ 221-222' - yellowish brown (10YR 5/8) F=30% M=45% C=25%	
SP			N				227	@ 226.8 SAA @ 221-222' (10YR 5/4) F=40% M=50% Sand=90% gravel=5% Clay=5% nodules C=10%	
SP			N				228	SAA @ 224-225'	S. odor
SW			N				229	SAA @ 221-222' Sand=65% gravel=30% silt=5%	S. odor
CL		32.2	N				230	clay-brown (7.5 YR 5/2) med. stiff, med dense med. plastic	S. odor
SW			N				231	SAA @ 229-229.5	S. odor
SW			N				232		
SW			N				233		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106V2

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SW)							233		
(SW)							234		
(SW)							235		
(SW)							236	SAA sand = 75% gravel = 15%, silt = 5%, clay = 5% gravel up to 1 1/2" (qtz + lith) s. odor	
(SW)							237	SAA @ 235-236 F = 30% M = 40% C = 30% s. odor	
(SW)							238		
(SW)							239		
(SW)							240		
(SW)							241	SAA sand = 85% F = 25% M = 60% C = 15% gravel = 10% up to 1 1/2" silt = 5% s. odor	
(SW)							242		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 28 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SP)			N				242	poorly sorted sand - pale brown (10YR 6/3) loose, SLM sand = 90% : F = 90% M = 10% trace coarse sand SA-SR (qtz, feld, lith, caliche); silt = 5% nonplastic clay = 5% exists as nodules (brown 7.5YR 5/3) soft	
(SP)			N				243	SAA - light yellowish brown (10YR 6/4) loose, SLM sand = 90% : F = 50% M = 50% trace coarse sand 5% silt (SAA) 5% clay (SAA)	
		42.9	N				244		S. odor
(SP)			N				245		
(SP)			N				246	SAA sand = 85% (SAA) clay = 10% nodules up to 2 1/2" brown (7.5YR 5/3) soft to very stiff, very dense; silt = 5%	
(SP)			N				247	SAA @ 243-244	S. odor
(SP)		27.5N	N				248	SAA @ 242-243	S. odor
(SP)			N				249	SAA @ 247-248	S. odor
(CG)			N				250	clay - light brown (7.5YR 6/4) soft to very stiff and very dense - med. plasticity	
(SP)			N				251	SAA @ 243-244 trace gravel to 3/8" (qtz + lith)	S. odor
(SP)	3033	28.5	N					SAA	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

KAFB-106V2

Logged By:

T. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP			N				251	SAA S. odor	
SP			N				252		
SP			N				253		
SP	3507	28.5	N		6'		254		
SP			N	P, V			255		
SP	3334		N				256	SAA @ 242 - 243' (10YR 5/3) brown trace gravel to 3/8" (lith. rate) S. odor	
SP			N				257		
SP			N				258		
SP	26.0		N		4'		259		
SP			N				260		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106Y2					Logged By: J. Messenger Page 30 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP	3707						260	Soil Description: -- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW							261	Well graded sand - light brown (7.5YR 6/4) loose, SLM Sand = 85% : F = 20% M = 70% C = 10% SA-SR (qtz, feld, lithics, caliche); gravel = 5% up to 1" (lith + caliche) silt = 5% nonplastic; clay = 5% as nodules (strong brown 7.5YR 5/8)	S. odor
SP							262	SA-SR @ 260-261	
SP		23.4					263		S. odor
SP							264		
SP							265		
SW							266	Well graded sand - yellowish brown (10YR 5/4) loose, SLM Sand = 70% : F = 35% M = 45% C = 20% SA-SR (qtz, feld, lith) gravel = 30% up to 2" (qtz + lith)	S. odor
SM		24.5					267	267 - 267.4' - silty sand - yellowish brown (10YR 5/4) loose, SLM Sand = 85% : VF = 20% F = 75% M = 5% SA-SR (qtz, feld, lith) silt = 15% nonplastic	
SW							268	SA-SR @ 266-267 : Sand = 85% : F = 10% M = 75% C = 15% gravel = 15% up to 1 1/4" qtz + lith moist brown (10YR 5/3) well graded sand w/ gravel	
CD							269	removed for sampling JM 268-268.8' - well graded sand with gravel - brown (7.5YR 4/4) loose moist; sand = 60% F = 10% M = 60% C = 30% SA-SR (qtz, feld, lith) gravel = 40% 35% up to 1 1/4" (qtz + lith); silt = 5% nonplastic and caliche	
Additional Comments:								268.8 - 269 = SAB @ 278.5 - 279 : clay = 60% clay mottled SAB @ 275-276 silt = 40%	
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017 Date:				
Boring/Well ID: KAFB-106V2					Logged By: J. Messenger Page 31 of 32				
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				269	removed for sampling from SAA - silty clay strong odor	
CL			N				270	SAB @ 270-271 strong odor	
CL	763.3		N	P, V			270	clay - brown (7.5YR 5/3) very stiff to hard, very dense med. plasticity	
CL			N				271		odor present
CL			N				272		
CL		23.9	N				273		
CL			N				274		
CL			N				275		
CL	452.1		N				276	SAA - medium stiff - clay is mottled to light gray (10YR 7/2) - mottling fades from acid and is bright under UV light - indication of secondary calcium carbonate weak odor	
CL			N				276.3		
CL		28.4	N				277	SAB @ 276.3-277.7 clay = 60% silt = 40%	
CL			N				278	SAB @ 278.5-279 weak odor	
CL			N				279	SAA @ 270-271	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID:

Logged By:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily fine); moisture content -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL	122.8						278	SAA @ 270-271	
CL		28.4	N		5'		279	278.5-279 - silty clay - yellowish brown (10YR 5/4) clay = 60% SAA @ 270-271 silt = 40% soft + nonplastic NO odor	
CL			N				280	SAA @ 270-271 ↓ to 279.8 weak odor	
SM	231.3	36.5	N				281	279.8 - 281 - silty sand - brown (10YR 5/3) loose, silty sand = 70% VF = 30% F = 65% M = 5% SA-SR (qtz, feld, lith) silt = 30% nonplastic weak odor	
SW	71.3		N				282	SAA @ 266-267 sand = 70% F = 25% M = 60% C = 15% gravel = 25% up to 2 5/8" (qtz, lith, caliche) silt = 5% nonplastic moist caliche in sand	
SW			N				283	↓ to 283.41 weak odor	
SW	25.5	34.3	N				284	283.4 - 284.8 - SAA but larger fine sand fraction sand = 80% F = 35% M = 45% C = 20% silt = 5% gravel = 15% up to 2" (qtz, lith, caliche)	
SW			N				285	poorly graded sand w/ silt - pale brown (10YR 6/3) loose, silty sand = 90% VF = 20% F = 50% M = 30% SA-SR (qtz, feld, lith) silt = 10% nonplastic weak odor	
SP-SM	34.0		N				286	weak odor	
SP-SM			N				287	SAA @ 286.7' brown (10YR 5/3) silty sand clay present ≈ 5% as nodules (10YR 3/4) dark yellowish brown weak odor	

Additional Comments:

TD = 287 ft bgs

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Drilling Company: Cascade

Start Time/Date:

Lead Driller: Roger Rodriguez

Completion Time/Date:

Drilling Method: SONIC

Final Depth:

Casing Diameter OD: 8-inch

Bit Type and Outer Diameter 7-inch

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity (primarily
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW							1	0-8': well graded sand: F=100% trace fine gravel (feld+lith)	
SW							2		
SW							3		
SW							4		
SW							5		
SW							6		
SW							7		
SW							8		

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 2 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				8	clay w/sand - brown (4.5YR 5/3) soft - med. stiff	
CL			N				9	Med. plasticity - clay = 90% - sand = 10% F = 40% M = 40% C = 20% (Qtz, feld, lith) SA-SR - trace gravel up to 3/8" (lith)	
CL	0.3		N				10	SAA w/silt: clay = 70% sand = 10% silt = 20% nonplastic	
CL			N				11	SAA w/more silt clay = 50% silt = 40% sand = 10%	
ML		26.9	N				12	silt w/clay: reddish brown (5YR 5/4) soft, low-med plasticity - silt = 65%; clay = 30%; sand = 5% F-M (Qtz, lith) SA-SR slightly mottled to pink (5YR 7/3)	
ML			N				13	FXN w/acid - sec. calcium carbonate	
ML			N				14	SAA w/trace gravel to 3/8" (lith)	
ML			N				15	SAA w/more sand	
ML			N				16	silt = 70% clay = 20% sand = 10%	
ML		28.8	N				17	SAA brown (7.5YR 5/3) silt = 75% clay = 10% sand = 15%	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML				N				17	SAA trace gravel to 1/2"	
ML			22.8	N		4'		18	SAA w/less clay + sand	
ML				N				19	no trace gravel silt slightly mottled	
ML	0.5			N				20	silt - strong brown (7.5 YR 5/6) 100% silt nonplastic and soft	
ML				N				21	trace F-M sand trace mottle SAA	
ML				N				22	SAA	
ML			22.8	N		6'		23		
ML				N				24	clayey silt w/sand - brown (7.5 YR 5/3) soft - med. stiff low plasticity - silt = 75%; clay = 10%; sand = 15%	
ML				N				25	F: 00% M: 40% (qtz, lith) SA-SR	
ML				N				26	SAA @ 20-21' brown (7.5 YR 5/3)	

Additional Comments:

Recovery: None ☐

Partial ☒

Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 4 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				26	Clay - brown (7.5YR 5/4) med. stiff, med. plasticity trace silt and F-M sand SLM	
CL			N				27		
CL			N				28		
CL			N				29		
CL			N				30		
ML	0.2	22.2	N				31	clayey silt - brown (7.5YR 5/4) soft-med. stiff low plasticity, SLM silt = 85% clay = 15% trace fine sand	
ML			N				32	SAA silt = 90% clay = 10%	
CL			N				33	SAA @ 26 - 28'	
CL			N				34		
CL			N				35		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 5 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML		22.2	N		10'		35	clayey silt w/ sand - yellowish red (5YR 5/6) soft, SLM, low plasticity: silt = 80%; clay = 10%; sand = 10%; F = 60% M = 40% trace coarse sand (qtz, feld, lith) SA-SR no odor	
CL			N				36	clay w/ silt + sand - light brown (7.5YR 6/4) soft - med. stiff med. plasticity - clay = 85%; sand = 25%; F = 40% M = 45% C = 15% (qtz, feld, lith) SA-SR; silt = 10% highly mottled throughout to pink (7.5YR 7/3) rxn w/ acid trace gravel to 3/8" (lith) sec. cal. carbonate	
CL			N				37		
CL			N				38		
CL			N				39	SAA	
CL			N				40	SAA w/ less silt + sand clay = 90% silt + sand = 5% each still highly mottled in med. stiff SLM	
SM	0.6	26.7	N		10'		41	silty sand w/ clay - brown (7.5YR 5/3) SLM, soft sand = 80% F = 30% M = 40% C = 15% (qtz, feld, lith) SA-SR silt = 30% nonplastic; clay = 10% to mp sm VF = 15% mod. mottled to pinkish gray (7.5YR 7/6) rxn w/ acid s.c.c. no odor	
SM			N				42		
SM			N				43	SAA w/ less clay sand = 80% silt = 15% clay = 5% trace gravel to 3/8" (lith)	
SM			N				44		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SM)			N				44	SAA @ 40-41' slightly mottled trace gravel up to 1/2" (lith + Qtz) sand = 75% : F = 30% M = 60% C = 10% silt = 20% M = 15% clay = 10% no odor	
(SM)		26.7	N				45		
(CL)			N				46		
(CL)			N				47	sandy clay - brown (7.5YR 5/2) med. stiff med. plasticity SLM - sand 5m clay = 70% ; sand = 30% : VF = 20% F = 20% M = 45% C = 15% (Qtz, feld, lith) SA-SR trace silt no odor	
(CL)			N				48	SAA w/ more silt clay = 60% low plasticity sand = 25% silt = 15%	
(ML)		19.9	N				49		
(ML)	0.4		N				50	silt w/ sand - brown (7.5YR 5/4) soft, SLM silt = 80% nonplastic ; sand = 20% : VF = 20% F = 50% M = 30% trace coarse sand (Qtz, feld, lith) SA-SR trace gravel to 1/2" (lith) trace clay	
(ML)			N				51		
(ML)			N				52		
(ML)			N				53		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 7 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								Well Details	
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML							53		
ML		19.9	N				54		
CL							55		
CL							56	SAA @ 39-40' highly mottled ran w/acid S.C.C.	
CL							57	sandy clay w/silt - brown (7.5YR 5/4) med-stiff, low plasticity, SLM - clay = 50% ; sand = 35% ; VF = 20% ; F = 20% ; M = 40% ; C = 20% (qtz, feld, lith) SA-SR ; silt = 10% ; gravel = 5% up to 1/2" (qtz, lith) mod. mottled to pink (7.5YR 7/3) w/acid no odor	
ML			N				58	SAA @ 49-50'	
CL		21.5	N				59	SAA @ 56-57' clay = 70% sand = 25% silt = 5% slightly mottled trace gravel to 3/8"	
CL			N				60	brown (7.5YR 5/3)	
CL	0.9		N				61	clay = 75% sand = 20% silt = 5% trace gravel to 1/2"	
CL			N				62		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 8 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				62	SAA @ 49-50' brown (7.5YR 5/3) soft-med. stiff silt = 75% sand = 15% clay = 10% gravel to 1/2"	
ML			N				63		
ML		21.5	N				64	SAA soft-med. stiff low-med. plasticity silt = 85% sand = 10% VF = 20% F = 40% M = 40% clay = 5% trace coarse	
ML			N				65	SAA soft - low plasticity silt = 65% sand = 30% F = 30% M = 60% C = 10% clay = 5%	
ML			N				66		
ML			N				67	SAA @ 64-65'	
CL			N				68	SAA @ 56-57' w/less clay & M sand stiff-v. stiff m. plasticity clay = 70% sand = 20% VF = 20% F = 35% M = 40% C = 5% silt = 10% trace gravel to 3/8"	
ML		22.4	N				69	SAA @ 65-66' silt = 75% trace gravel to 3/8" (lith) soft-m. stiff low plas. sand = 20% clay = 5%	
CL			N				70	Clay - brown (7.5YR 5/4) stiff, med. plasticity, SLM clay = 100% trace F-M sand trace silt	
CL	1.1		N				71		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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Soil Description

- soil type; Munsell color; density (primarily coarse)/consistency & plasticity
- % sand (include grain size %; fine, medium, coarse, etc.)
- sand mineralogy
- % gravel
- gravel mineralogy
- angularity/roundedness
- % fines (silt/clay)

Well
Details

USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
CL							71	↓ to 71.5'	
ML			N				72	SAA @ 68-69' soft - low plasticity silt = 85% sand = 10% clay = 5%	no odor
SM			N				73	silty sand - yellowish brown (10YR 5/4) soft, loose, SLM sand = 70% VF = 20% F = 20% M = 50% C = 10% (qtz, feld, lith) SA-SR; silt = 30% nonplastic trace gravel to 3/8" (lith)	no odor
ML	22.4		N		10'		74	silt - brown (7.5YR 5/4) soft, SLM silt = 100% nonplastic trace F-M sand 2 to 73.75'	
SM			N				75	SAA @ 72-73' SM trace gravel up to 2"	
SM			N				76	SAA sand = 85% F = 30% M = 50% C = 20% silt = 15% trace gravel to 2" (qtz + lith)	
CL			N				77	SAA @ 69-70'	
SW-SM			N				78	poorly sorted sand w/ silt - brown (7.5YR 5/2) loose SLM - sand = 85% F = 35% M = 50% C = 15% (qtz, feld, lith) SA-SR; silt = 10% nonplastic gravel = 5% up to 3/4" (qtz + lith)	no odor
SW-SM	32.2		N		10'		79		
ML			N				80	SAA @ 73-73.75' 100% silt trace F-sand	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 10 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
	0.8						80	clay - reddish brown (5YR 4/4) very stiff, med. plasticity clay = 90% silt = 10% no odor	
MD			N				81		
CL			N				82	↓ to 82.25' SAA @ 79-80'	
CL			N				83		
ML		32.2	N				84	SAA trace F-M sand	
ML			N				85		
ML			N				86	Clayey silt - brown (7.5YR 5/4) soft-med. stiff low plasticity - silt = 80% ; clay = 20% trace F-M sand slightly mottled to light brown and pinkish gray (7.5YR 6/3) (7.5YR 7/2) rxn w/acid no odor	
ML			N				87		
ML		34.5	N				88		
ML			N				89		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 11 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SM							89	silty sand - brown (7.5 YR 5/3) loose SLM sand = 65% : VF = 25% F = 35% M = 35% C = 5% (Qtz, fld, lith) SA-SR - trace gravel to 1/2" (lith + Qtz); silt = 35% nonplastic ↓ to 90.25'	
SM	0.9						90		
CL							91	clay - brown (7.5 YR 5/4) stiff, SLM, low plasticity clay = 100% slightly mottled to pinkish gray (7.5 YR 7/2) rxn w/acid - trace silt and F sand Trace gravel to 3/8" (lith)	
CL							92		
CL							93	SAA w/silt + sand clay = 80% silt = 10% sand = 10% : VF = 20% F = 55% M = 25%	
CL	34.5	N					94		
CL							95	clay = 70% silt = 20% sand = 10% clayey silt - brown (7.5 YR 5/4) soft-med. stiff, low plasticity SLM - silt = 70%; clay = 20% trace fine sand	
ML							96		
ML							97	SAA silt = 100% highly mottled to white (7.5 YR 8/1) rxn w/acid (s.c.c.) dry-SLM no trace sand SAA - dry	
ML	38.7	N					98		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(ML)				N				98	SAA - silt = 100% highly mottled dry	
(ML)				N				99		
(ML)	1.1			N				100		
(ML)			38.7	N		8'		101	SAA - 100% sm silt = 90% clay = 10% SLM slightly mottled	
(ML)				N				102	SAA - not mottled SLM	
(ML)				N				103		
(ML)				N				104		
(ML)				N				105	✓ @ 103.75' SAA @ 100-101' s. mottled	
(ML)				N				106	SAA @ 100-101' dry - SLM highly mottled to white (10YR 8/1) strong rxn w/ acid	
(CL)			38.5	N		12'		107	silty clay - brown (7.5YR 5/3) very stiff, low-med plasticity - clay = 80%; silt = 20% slightly SLM mottled to white (7.5YR 8/1) strong rxn w/ acid no odor	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				107	SAA trace F-M sand	
CL			N				108		
CL			N				109		
CL	0.8		N				110	clay = 90%; silt = 10% very stiff - hard dry - SLM highly mottled	
CL		38.5	N		12'		111		
CL			N				112	111-112 brown (7.5YR 5/4) SLM slightly mottled	
ML			N				113	SAA @ 100-101' trace F-M sand brown (7.5YR 5/4)	
ML			N				114		
ML			N				115	SAA - trace F-C sand slightly mottled to pinkish gray (7.5YR 7/2)	
ML			N				116		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description -- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	Well Details
(ML)		24.9	N		2'		116	SAA - SLM trace F-M sand silt = 90% clay = 10% not mottled	no odor
(ML)			N				117	SAA but med. stiff - stiff	
(ML)			N				118		
(ML)			N				119	SAA - soft-med. stiff brown (7.5 YR 5/3) low-med. plasticity	(SLM)
(ML)	0.7		N	P, V, FOC			120		
(ML)		24.2	N				121	SAA - no trace sand	
(ML)			N		6'		122		
(ML)			N				123	SAA w/ less clay silt = 95% clay = 5% low plasticity no trace sand	
(ML)			N				124		
(ML)		24.6 N	N		6'		125	SAA - increasing clay fraction down silt = 85% clay = 15% med. plasticity med. stiff SLM	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

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Soil Description								Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				125	SAA - silt = 75% clay = 25% SLM
CL			N				126	clay - brown (7.5YR 5/3) med. sh ^{ft} , med. plasticity
CL			N				127	clay = 80% silt = 20% SLM no odor
CL		24.6	N		6'		128	@ 127.75' SAA w/ sand clay = 80% silt = 10% sand = 10%; VF = 20% F = 45% M = 35% (Qtz, feld, lith) SA-SR
CL			N				129	SAA @ 126-127' clay = 90% silt = 10% slightly mottled to pinkish white (7.5YR 8/2) rxn w/ acid (s.a.c.) SLM
CL			N				130	SLM
ML	1.1		N				131	silt - brown (7.5YR 5/4) soft, SLM nonplastic silt = 95%; clay = 5% trace fine sand SLM
ML		34.8	N		6'		132	@ 131.75-132 SAA - trace F-C sand SLM
ML			N				133	SAA w/ more clay brown (7.5YR 5/3) silt = 85% clay = 15% low plasticity SLM
ML			N				134	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

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SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand minerology -- % gravel -- gravel minerology -- angularity/roundedness -- % fines (silt/clay)	
ML			34.8	N		6'		134	SAA w/ more clay silt = 65% clay = 35% SLM strong rxn w/ acid	
CL				N				135	@ ML-CL interface - clay highly mottled, hard, dry 135-136' = clay - brown (7.5YR 5/3) very stiff med. plasticity slightly mottled to white (7.5YR 8/1)	
CL				N				136	no odor	
CL				N				137	clay - SAA - med. plasticity 95% clay soft - med. stiff 5% silt trace F-M sand no mottling	
CL				N				138	SAA but med. stiff - stiff	
CL				N				139	SAA @ 139' @ CL-ML interface clay is pale olive no rxn w/ acid (5Y 6/3)	
ML			32.9	N		6'		140	@ 139' - reddish silt w/ clay - brown (7.5YR 5/4) soft - med. stiff low plasticity - silt = 80%; clay = 20% SLM no odor	
ML	0.7			N				140.5'		
CL				N				141	clay - brown (7.5YR 5/3) hard, dry, nonplastic highly mottled throughout to white (7.5YR 8/1) highly sm strong rxn w/ acid (s.c.c.)	
CL				N				142		
CL			28.7	N		4'		143	clay w/ silt - brown (7.5YR 5/3) med. stiff, med. plasticity SLM - clay = 80%; silt = 20% no odor	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(ML)			28.7	N	B, M			143	silt w/clay - brown (7.5YR 5/4) soft, SLM low plasticity - silt = 80%; clay = 20%	(no odor)
								144	144-146' not logged - sent for thermal conductivity sampling	
								145		
								146	SAA @ 143-144' - silt = 95% soft, nonplastic clay = 5% SLM (7.5YR 5/4) (no odor)	
(ML)				N				147		
(ML)				N				148		
(ML)				N				149	SAA to 149.25'	
(ML)			35.6	N				150	stiff clay - brown (7.5YR 5/3) stiff, SLM, med. plasticity clay = 100% mottled to pinkish gray (7.5YR 7/2) strong rxn w/acid (s.c.c.) 149.8' - 152' - clayey silt - brown (7.5YR 5/4) loose, gm soft, SLM, nonplastic silt = 90% clay = 10% as nodules + chunks minor mottling in clay chunks to pinkish gray (7.5YR 7/2) rxn w/acid (s.c.c.)	
(CL)				N				151		
(ML)				N				152		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 18 of 50	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
(ML)		29.1	N				152	SAA w/ more clay silt = 80% clay = 20% (SLM) (no odor)	
(CL)			N				153	@ 153' ML-CL interface clay is hard, dry and highly mottled to white (7.5 YR 8/1) - strong rxn w/ acid (S.C.C.)	
(CL)			N				154	153-154' - clay - brown (7.5 YR 5/3) very stiff, SLM med. plasticity - trace F-M sand (no odor)	
(CL)			N				155	SAA - stiff - very stiff (SLM)	
(CL)			N				156		
(CL)			N				157	SAA - stiff; med. plasticity slightly mottled to white (7.5 YR 8/1) strong rxn w/ acid (S.C.C.) (SLM)	
(CL)			N				158	@ 157.6' - silty clay - brown (7.5 YR 5/3) soft, SLM, low plasticity clay = 70% silt = 30%	
(ML)		26.5	N				159	SAA @ 152-153' trace F-M sand soft trace gravel to 3/8" (1.1th) silt = 80% clay = 20% (SLM)	
(ML)			N				160		
(ML)	0.6		N				161	Sandy silt - brown (7.5 YR 4/3) med. stiff, SLM low plasticity - silt = 90%; sand = 10%; VF = 25% F = 50% M = 25% trace coarse sand (Qtz, feld, lith) trace gravel to 1/2" (Qtz + lith) (no odor)	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

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Date:

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Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SW)		26.5	N		6'		161	gravely sand - brown (2.5YR 5/3) loose, SLM sand = 65%: F=30% M=50% C=20% (Qtz, fld, lith) gravel = 35% up to 1" (Qtz + fld lith) SA-SR no odor	
(SW)			N				162	SAA w/less gravel - pale brown (10YR 6/3) SLM loose. - sand = 80%: F=45% M=45% C=10% gravel = 20% up to 1 1/2" (Qtz + lith) no odor	
(SW)		17.5	N		4'		163	trace silt	
(SW)			N	P, V, FOC			164	SAA sand = 75% gravel = 25% trace silt	
(SW)			N				165	SAA sand: F=40% M=45% C=15% trace silt	
(SW)			N				166		
(GW)			N				167	sandy gravel - pale brown (10YR 6/3) loose, SLM gravel = 60% up to 2 1/4" (Qtz + lith) sand = 40%: F=30% M=55% C=15% (Qtz, fld, lith) SA-SR trace silt no odor	
(SW)			N				168	SAA @ 162-163' sand = 90% gravel = 10% up to 1"	
(SW)		24.7	N		10'		169	SAA sand = 75% brown (10YR 5/3) gravel = 25% up to 1"	
(SW)			N				170		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

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Date:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW	0.6						170	SAA @ 167-168' pale brown (10YR 6/3) no odor ↓ to 170.5' sand = 90% gravel = 5% silt = 5%	
SP-SM							171	poorly graded sand w/ silt - pale brown (10YR 6/3) loose, SLM - sand = 90% F = 70% M = 30% (qtz, feld, lith) SA-SR silt = 10% non plastic ← 171.5'	
SW							172	SAA @ 170-170.5' 172-172.5' SAA @ 170.5-171.5' sand = 95% silt = 5% SP ← SAA w/ trace silt	
SW							173	@ 171.5-172' sand = 80% gravel = 20% up to 1"	
SW							174		
SW							175	SAA @ 172.5-173' (SW) w/ gravel pale brown (10YR 6/3) loose, SLM sand = 90% F = 40% M = 50% C = 10% gravel = 10% up to 3/4" (qtz + lith) trace silt	
SW							176		
SP							177	poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 95% F = 40% M = 60% trace coarse sand (qtz, feld, lith) SA-SR; gravel = 5% up to 1/2" (qtz + lith) trace silt no odor	
SW							178	SAA @ 172.5-174' - 176' sand = 90% gravel = 10%	
SW							179	SAA - grayish brown (10YR 5/2) sand = 75% gravel = 25% up to 2"	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SW)			N				179		
(SP)	0.5		N				180		
(SP)			N				181	Poorly graded sand - light grayish brown (10YR 6/2) loose, SLM - sand = 90% F=60% M=40% trace coarse sand (Qtz, feld, lith) SA-SR - silt = 5% nonplastic gravel = 5% up to 1" (Qtz + lith) <u>no odor</u>	
(SP)			N				182	SAA w/o gravel	
(SP)	29.4		N				183		
(SP)			N				184	pale brown (10YR 6/3)	
(SP)			N				185		
(SW)			N				186	well graded sand - pale brown (10YR 6/3) loose SLM - sand = 90% F=30% M=55% C=15% SA-SR (Qtz, feld, lith); gravel = 10% up to 5/8" (Qtz + lith) trace silt <u>no odor</u>	
(SW)			N				187	SAA sand = 85% gravel = 15%	
(SW)	28.5		N				188		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 22 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							188	soil type; Munsell color; density (primarily coarse)/consistency & plasticity	
							189	% sand (include grain size %; fine, medium, coarse, etc.)	
							190	sand mineralogy	
							191	% gravel	
							192	gravel mineralogy	
							193	angularity/roundedness	
							194	% fines (silt/clay)	
SW			N				188		
SP			N				189		
SW	0.1		N				190	SAA @ 181-182' pale brown (10YR 6/3)	
SC			N				191	well graded sand w/clay + gravel - brown (10YR 5/3) loose, SLM - sand = 80% F=90% M=50% C=10% SA-SP (Qtz, feld, lith); clay = 10% as nodules + chunks - low plasticity (brown 7.5YR 5/3); gravel = 10% up to 1/8" (Qtz + lith)	
SP			N				192	SAA @ 189-190 - JM 180-181'	
SP		29.5	N				193	SAA - no gravel + trace clay	
SP			N				194	poorly graded sand w/silt - brown (7.5YR 5/2) loose SLM - sand = 90% VF=25% F=55% M=20% (Qtz, feld, lith) SA-SP; silt = 10% nonplastic	
SP			N				195		
SP			N				196	poorly graded sand - light brownish gray (10YR 6/2) loose, SLM - sand = 100% F=80% M=20% (Qtz, feld, lith) SA-SP trace silt	
SP			N				197	SAA - sand = 100% F=45% M=55% trace coarse sand trace gravel to 1/8" (Qtz + lith) JM trace silt	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 23 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP			N				197	soil type; Munsell color; density (primarily coarse)/consistency & plasticity % sand (include grain size %; fine, medium, coarse, etc.) sand mineralogy % gravel gravel mineralogy angularity/roundedness % fines (silt/clay)	
SP			N			198			
SW			N			199			
SW	0.5		N			200			
SW		24.7	N			201			
SW			N			202			
SW			N			203			
SW			N			204			
SP			N			205			
SP			N			206			
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒ SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 24 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							206	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SP)			N				207	SAA w/trace silt brown (10YR 5/3) no odor	
(SA)			N				208		
(SW)			N	P, V, B, M			209	well graded sand - pale brown (10YR 6/3) loose SLM - sand = 95% : F = 25% M = 65% C = 10% (Qtz, feld, lith) SA-SR; clay = 5% as nodules - brown (7.5YR 5/4) nonplastic, med. stiff trace gravel to 3/8" (lith)	
(SP)	0.8	23.5	N				210	209-210' SAA @ 204-205' no caliche sand = 95% silt = 5% nonplastic light brownish gray (10YR 6/2)	
(SC)			N				211	clayey sand - grayish brown (10YR 5/2) loose SLM sand = 85% : VF = 30% F = 50% M = 20% (Qtz, feld, lith) SA-SR; clay = 15% as nodules - reddish brown (5YR 5/3) med. stiff - low plasticity	
(SC)			N				212	clay SAA w/more clay - sand = 75% : VF = 20% F = 55% M = 25% clay = 25% SAA 20% 55% 25% clay - light brownish gray (2.5Y 6/2) soft, SLM med. plasticity	
(CL)			N				213	SAA - grayish brown (2.5Y 5/2) med. stiff - stiff med. plasticity SLM no odor	
(CL)		19.6	N				214	SAA - clay - light brownish gray (2.5YR 6/2) soft - med. stiff med. plasticity SLM no odor	
(SP)		19.6	N				215	poorly graded sand w/silt - pale brown (10YR 6/3) loose SLM - sand = 90% : VF = 30% F = 70% trace med. sand (Qtz, feld, lith) SA-SR; silt = 10% nonplastic	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 25 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SM		19.6	N		2'		215	silty sand - brown (10YR 5/2) loose, SLM - sand = 70% : VF = 40% F = 60% SA-SR (qtz, feld, lith); silt = 30% nonplastic to 215.5'	
CL							216	sandy clay - brown (10YR 5/2) SLM - sand = 70% very stiff low plasticity; sand = 30% : VF = 50% F = 50% (qtz, feld, lith) SA-SR no odor	
SC							217	clayey sand - brown (10YR 5/3) loose, SLM sand = 70% : F = 40% M = 60% trace coarse sand (qtz, feld, lith, caliche) trace gravel to 1/2" (lith, caliche) SA-SR; clay = 30% soft, nonplastic no odor	
CL							218	clay - light brownish gray (10YR 6/2) SLM, stiff - very stiff low plasticity @ 217.75' SAA but soft to med. stiff no odor	
CL							219	219 - 219.25' SAA but stiff - very stiff - light brown (7.5YR 6/3)	
CL							220	219.25 - 220' SAA but soft - med. stiff (light yellowish brown - 10YR 6/3)	
CL	0.3	26.0	N		10'		221	to 221.25' sm to 221.50'	
SW							222	well graded sand w/ gravel - brown (10YR 5/3) loose SLM - sand = 70% : F = 40% M = 50% C = 10% (qtz, feld, lith) gravel = 25% up to 1 5/8" (qtz + lith); silt = 5% nonplastic to 222.25'	
GN							223	well graded gravel w/ sand - pale brown (10YR 6/3) loose, SLM gravel = 70% up to 1 1/4" (qtz, lith); sand = 30% : F = 20% M = 60% C = 20% SA-SR (qtz, feld, lith) trace silt no odor to 223.25'	
SP							224	poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 90% : F = 40% M = 60% trace coarse sand (qtz, feld, lith) gravel = 10% up to 5/8" (qtz + lith) SA-SR trace silt	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 26 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV Fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SN		26.0	N				224	well graded sand - pale brown (10YR 6/3) loose, SLM Sand = 75% : F = 20% M = 70% C = 10% (Qtz, feld, lith) gravel = 25% up to 1 1/8" (Qtz + lith) trace silt SAA - SE no odor	
SW			N				225	224.75 - 225.5 - SAA w/less gravel : sand = 90% gravel = 10% clay as chunks + nodules grayish brown (10YR 5/2)	
SW-SR			N				226	@ 225.75' SAA w/less gravel + clay : sand = 85% ; gravel = 5% ; clay = 10% SAA @ 224-225' sand = 85% : F = 35% M = 55% C = 10% (Qtz, feld, lith, caliche) ; gravel = 15% up to 1 1/8" (Qtz + lith) SAA-SR trace silt no odor	
SW			N				227	to 227.5'	
SW			N				228	SAA @ 222.25' - 223.25' gravel = 60% sand = 40%	
SW			N				229	SAA @ 226-227.5' gravel up to 1 1/2" no caliche in sand + gravel pale brown (10YR 6/3)	
SW		26.7	N				230	229-229.25' SAA : sand = 65% gravel = 35% - 229.25 - 229.5 SAA @ 228-229' - 229.5 - 230 - SAA : sand = 95% gravel = 5% caliche in sand	
SW	0.5		N				231	SAA @ 224-225' Sand = 75% : F = 20% M = 65% C = 15% (Qtz, feld, lith, caliche) gravel = 25% (Qtz, lith, caliche) up to 1 1/4"	
SW			N				232		
SW			N				233	SAA : sand = 85% gravel = 15% up to 2"	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
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Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 37 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							233	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW			N				234	@ 233-233.25' sand = 65% gravel = 35% @ 233.25-234' sand = 75% gravel = 25% light brownish gray (10YR 6/2) SAA - SW - pale brown (10YR 6/3) no caliche sand = 80% gravel = 15% silt = 5% nonplastic 234.5-235' - SAA w/trace silt no caliche	
SW	26.7		N				235	235-236' SAA - sand = 75% gravel = 25% trace silt no caliche	
SW			N				236		
SW			N				237	SAA - grayish brown (10YR 5/2) sand = 65% gravel = 45% trace silt	
SP			N				238	poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 95% : F = 70% M = 30% (Qtz, feld, lith) SA-SR no odor silt = 5% nonplastic	
SP			N				239		
SP			N				240	SAA - sand = 100% : F = 40% M = 60% trace silt	
SP	1.5		N				241	to 240.75' well graded sand w/gravel - pale brown (10YR 6/3) loose SLM - sand = 80% : F = 30% M = 60% C = 10% (Qtz, feld, lith, caliche) SA-SR; gravel = 20% up to 1 1/8" (Qtz, lith, caliche) trace silt no odor	
SW			N				242		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SW)			N				242	SAA -	
(SW)			N				243	SAA - sand = 80% F = 20% M = 60% C = 20%	
(SW)		30.6	N		10'		244	SAA - sand = 70% gravel = 30%	
(SW)			N				245		
(SW)			N				246	SAA - sand = 85% gravel = 15% trace silt light gray (10YR 7/1)	
(SW)			N				247	SAA w/more silt sand = 80% gravel = 15% silt = 5% nonplastic	
(SW)			N				248	to 248.25' = 248-248.25' SAA grayish brown (10YR 5/2) sand = 60% gravel = 35% silt = 5%	
(SP)		34.5	N		10'		249	poorly graded sand w/silt brown (10YR 5/3) loose, SLM sand = 95% VF = 20% F = 80% trace medium sand (Qtz, feld, lith) SA-SR; silt = 10% nonplastic	
(SP)			N				250		
(SP)	10.8		N				251	SAA - w/less silt sand = 95% silt = 5%	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP			N				251	SAA: Sand=95% VF=20% F=85% M=15% SAA w/ trace coarse sand + trace gravel to 3/16" (qtz+lith)	
SP			N				252		
SP			N				253		
SP	34.5		N		10'		254		
SP			N				255		
SP			N				256	well graded sand w/ gravel - yellowish brown (10YR 6/4) loose, SLM - sand = 70%: F=20% M=60% C=20% sh-sz (qtz, feld, lith); gravel = 30% up to 2" (qtz+lith) trace clay as nodules - brown (7.5YR 5/3) SAA - pale brown (10YR 6/3) - @ 257.75 - 258' SAA w/ trace silt ↓ to 258.5' SAA @ 254-255' pale brown (10YR 6/3) sand=95% gravel=5% ↓ w/ trace clay as nodules brown (7.5YR 5/3) - 259.5-260' - sand=90%; gravel=5% silt=5% nonplastic	
SW			N				257		
SW			N				258		
SW	44.6		N		10'		259		
SP			N				260		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 30 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SP	0.6						260	SAA w/ more clay - brown (10YR 5/3) (no odor) trace sand sand = 90% coarse gravel = 5% 260-260.25' clay = 5% low plasticity as nodules SAA	
CL			N				261	260.25' - 262' - brown (10YR 5/3) stiff, SLM clay = 100% - med. plasticity (no odor)	
CL			N				262	@ 261.75 - 262' SAA but soft w/ sand + silt low plasticity clay = 80%, silt = 10%, sand = 10% VF = 40% F = 60% (Qtz, feld, lith) SA-SR	
CL			N				262.25	262.25 - 263.25' SAA @ 260.25 - 261.75' clay = 100% very stiff (no odor) low plasticity	
CL		44.6	N				263	silty clay - brown (10YR 5/3) soft, SLM, low plasticity clay = 80% silt = 20% to 264.25' trace VF - F sand	
CL			N				264	poorly graded sand w/ silt - yellowish brown (10YR 5/4) loose, SLM - sand = 90% VF = 20% F = 70% M = 10% (Qtz, feld, lith) SA-SR; silt = 10% nonplastic trace clay	
SP-SM			N				265	poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 95% F = 45% M = 55% trace coarse sand (Qtz, feld, lith, caliche) SA-SR; silt = 5% nonplastic (no odor) trace gravel to 3/8" (lith)	
SP			N				266	clay - pale brown (10YR 6/3) to very pale brown (10YR 7/2) hard, SLM, nonplastic - no odor clay = 100% rxn to acid throughout (no odor)	
CL			N				267		
CL		35.8	N				268	silty clay - pale brown (10YR 6/3) soft to stiff nonplastic, SLM clay = 85% trace F-M sand (caliche) silt = 15%	
CL			N				269		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 31 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
CL			N				269	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				270	clay - reddish brown (7.5YR 5/4) soft to med. stiff, SLM low plasticity - trace F-C sand (caliche) trace silt	
ML	0.7		N				271	clayey silt - brown (7.5YR 5/2) soft, nonplastic SLM - silt = 70%; clay = 20%; 10% F-M sand F = 70% M = 30% (qtz, feld, lith, caliche) SR-SA (270-270.35)	
SM			N				272	270.25 - 270.75' - silty sand - brown (7.5YR 5/2) SLM loose sand = 70% VF = 20% F = 70% M = 10% (qtz, feld, lith, caliche) SA-SR silt = 30% nonplastic	
SW			N				273	270.75 - 272' - well graded sand - pale brown (10YR 6/3) loose, SLM - sand = 90% F = 25% M = 55% C = 20% SA-SR (qtz, lith, feld, caliche); gravel = 10% up to 1" (qtz, lith, caliche) trace silt	
ML		35.8	N				274	clayey silt - brown (10YR 5/3) stiff, SLM, nonplastic silt = 75%; clay = 25%	
ML			N				275	SAA but soft - med. stiff	
ML			N				276	SAA @ 272-273	
ML			N				277	SAA @ 273-274 silt = 70% clay = 20% Sand = 10% VF = 60% F = 40% (qtz, feld, lith) SA-SR	
CL			N				278	clay - brown (7.5YR 5/3) very stiff, SLM - low plasticity slightly mottled to white - 7.5YR 8/1 - strong rxn w/acid (s.c.c.)	
CL		30.4	N				279	@ 277' moderately mottled 277.5 highly mottled brown (7.5YR 5/2) nonplastic dry very stiff	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 32 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				278	SAA - very strongly mottled to white (75% 8/1) Very strong rxn w/ acid (s.c.c.) hard - dry, nonplastic	
CL			N				279	SAA @ 277.5'	
CL	0.3		N				280	↓ to 280.25'	
CL			N				281	SAA @ 276' - clay - low plasticity, stiff, SLM slightly mottled	
CL			N				282	@ 281 SAA - clay = 100% silt = 20% SM weakly mottled	
CL	30.4		N				283	SLM	
CL			N				284	@ 283.75' SAA @ 280.25'	
CL			N				285	SLM	
CL			N				286	SAA - very stiff - low plasticity moderately mottled	
CL			N				287	SAA - med. stiff - stiff med. plasticity no mottling SLM	
CL	46.4		N				288	clay = 85% silt = 15% no odor	
CL			N				289	SAA @ 278-279'	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 33 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							287	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				288	clay - brown (10YR 5/3) soft-med. stiff, SLM low plasticity clay = 85% silty clay silt = 15% no odor	
CL			N				288.5	to 288.5'	
CL			N				289	SAA @ 280.25' - 281' v. stiff, SLM low plasticity slightly mottled to white (10YR 8/1) rxn w/acid	
CL	1.2	46.4	N				290	clay - dark grayish brown (10YR 4/2) v. stiff, SLM low plasticity, weakly mottled to very pale brown (10YR 8/2) weak rxn w/acid	
CL			N				291	@ 291.5' no mottling - silty clay SAA @ 287' SLM	
CL			N				292	SLM	
CL			N				293	SAA @ 290-291' dry to SLM	
CL			N				294	SAA moderately mottled hard dry	
CL		46.9	N				295		
CL			N				296		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(CL)			N				296	no mottling, dry, hard	
(CL)			N				297		
(CL)			N				298		
(CL)			N				299		
(SP)	0.8	46.9	N		12		300	to 299.25' poorly graded sand - grayish brown (10YR 5/2) loose, SLM Sand = 95% VF = 25% F = 65% M = 10% trace coarse sand (qtz, feld, lith) SA-SR; silt = 5% nonplastic	
(SP)			N				301	SAA w/ gravel 90% sand 5% silt 5% gravel to 1" (Qtz + lith)	
(SP)			N				302	@ 301 - 301.25' light gray (10YR 7/1) 301.25 - 302' - light brownish gray (10YR 6/2)	
(SP)			N				303	SAA w/ trace gravel to 1" (lith) Sand = 95% silt = 5%	
(SP)			N				304		
(SP)			N				305		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 35 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
GW		46.9	N		12'		305	well graded gravel w/sand - Brown (10YR 5/3) loose, SM gravel = 70% up to 2 3/8" (Qtz + lith) sand = 30%: F = 20% M = 40% C = 20% (Qtz, feld, lith) SA-SR	
							306	no odor	
SW			N				307	well graded sand w/gravel - light brownish gray (10YR 6/2) loose, SM - sand = 60%: F = 15% M = 60% C = 25% (Qtz, feld, lith); gravel = 40% up to 1 1/4" (Qtz + lith) SA-SR trace clay	
SW			N				308		
GW			N				309	SAA @ 305-306' - light brownish gray (10YR 6/2) gravel = 65% up to 1 1/4" sand = 35%	
GW		53.0	N		10'		310		
GW	0.5		N				311	SAA - brown (10YR 5/3) gravel = 70% up to 1 1/2" sand = 30%	
GW			N				312	SAA	
GW			N				313	312.75 - 313.5' - light gray (10YR 7/2) - 312.75 - 314' - gravel = 75% up to 1 1/2" sand = 25%: F = 30% M = 60% C = 10%	
GW			N				314	SAA 313.5 - 314' - pale brown (10YR 6/3)	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: T. Messenger			Page 36 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
GW							314	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW		53.0	N				315	SAA to 314.5' Well graded sand - grayish brown (10YR 5/2) loose, SLM sand = 95%: F = 50% M = 40% C = 10% (qtz, fld, lith) gravel = 5% up to 1/2" (qtz, lith) SA-SR - trace silt	
SP			N				316	315-315.5' - poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 100%: F = 70% M = 30% trace coarse sand - trace gravel to 3/8" (qtz, lith) L (qtz, fld, lith) SA-SR	
SW			N				317	315.5-316 - SAA @ 314.5-315' - sand = 70% gravel = 30% up to 2"	
SP			N				318	to 316.75' SAA @ 315-315.5' - very pale brown (10YR 7/3) @ 317.5' - 318' - light gray (10YR 7/2) SM sand = 90% sand = 85% gravel = 10% up to 2" silt = 5% nonplastic	
SP			N				319	SAA w/more gravel sand = 70% gravel = 25% up to 1 1/2" silt = 5%	
SW	0.9	53.1	N				320	SAA @ 314.5-315' - pale brown (10YR 6/3) sand = 85% gravel = 15% trace cobble to 3/8" - lith	
SW			N				321		
GW			N				322	well graded gravel w/sand - pale brown (10YR 6/3) loose SLM - gravel = 80% up to 2 5/8" (qtz, lith) sand = 20%: F = 30% M = 50% C = 20% (qtz, fld, lith) SA-SR trace silt	
GW			N				323	SAA - trace cobble to 3 1/2" (lith)	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW				N				323	well graded sand w/gravel - light brownish gray (10YR 6/2) loose, SLM - sand = 70% F = 20% M = 70% C = 10% (qtz, feld, lith) gravel = 25% up to 1 3/4" (qtz + lith) silt = 5% non plastic	
SP								324	⌞ @ 323.75'	
SP			53.1	N					SAA @ 315 - 315.5' - light grayish brown (10YR 6/2) sand = 85% gravel = 10% up to 1" silt = 5% non plastic	
SP								325	@ 324.5 - SAA w/trace gravel to 2" + trace silt ⌞ to 325.5' sand = 100%	
SP				N				326	SAA sand = 95% gravel = 5% up to 1 1/4"	
GW				N					gravel w/sand SAA @ 321 - 327 light brownish gray (10YR 6/2) trace cobble to 4" (lith)	
GW				N				327		
GW				N				328		
GW			36.1	N				329	SAA w/less gravel gravel = 65% sand = 35%	
GW				N				330		
GW	0.9			N					SAA w/trace silt	
GW				N				331	well graded gravel w/silt - light gray (10YR 7/2) loose, SLM gravel = 50% up to 2 1/4" (qtz + lith); sand = 40% F = 40% M = 50% C = 10% (qtz, feld, lith) silt = 10% non plastic	
GW				N					⌞ to 331.5'	no odor
CL								332	clay - brown (7.5YR 5/2) dry, low plasticity, hard ⌞ to 331.75'	no odor

Additional Comments:

SAA @ 323.75 - 325' sand = 90%
gravel = 5% up to 5/8"
silt = 5%Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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Soil Description								Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	
							-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity	
							-- % sand (include grain size %; fine, medium, coarse, etc.)	
							-- sand mineralogy	
							-- % gravel	
							-- gravel mineralogy	
							-- angularity/roundedness	
							-- % fines (silt/clay)	
SW			N				332	SAA @ 323 - 323.75'
SP			N				333	Sand = 75% : F = 25% M = 60% C = 15% Gravel = 20% up to 1" Silt = 5% (no odor)
SW		36.1	N				334	SAA @ 321.75 - 322' ↓ to 333.25' poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 90% : F = 20% M = 70% C = 10% (qtz, feld, lith) gravel = 10% up to 1 1/8" (qtz + lith)
SW			N				335	SAA - brown (10YR 5/3) sand = 80% gravel = 20%
SW			N				336	↓ to 335.75'
SP			N				337	Poorly graded sand - pale brown (10YR 6/3) loose, SLM - sand = 100% F = 35% M = 65% trace coarse sand + gravel to 3/8" (qtz + lith) SA-SR
SP			N				338	SAA w/ trace silt
SW		29.1	N				339	SAA @ 333.25 - 334' sand = 70% gravel = 30% trace silt
SP			N				340	SAA @ 335.75 - 336' - light gray (10YR 7/2) trace coarse sand + gravel to 1" (qtz + lith)
SP	0.8		N				341	@ 339.5 - 340' SAA - pale brown (10YR 6/3)
SW			N				342	↓ to 340.75'
SW			N				343	SAA @ 338 - 338.75' brown (10YR 5/3)

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 39 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SC			N				341	clayey sand w/ gravel - brown (10YR 5/3) loose, SLM sand = 70% : F=20% M=65% C=15% (qtz, feld, lith); gravel = 10% up to 1 1/8" (qtz+lith) SA-SR; clay = 20% as nodules & chunks - brown (7.5YR 5/3) stiff; med. plasticity	(NO ODOR)
SP-SC							342	poorly graded sand w/ clay - light brownish gray (10YR 6/2) loose, SLM sand = 90% : F=40% M=60% (qtz, feld, lith) SA-SR; clay = 10% nonplastic	342.25'
CU			N				343	clay - olive gray (5Y 5/2) SLM, stiff med. plasticity	(no odor)
CL		29.1	N				344	SAA @ 342-342.25' but w/ silt - sand = 90% silt = 10% nonplastic to 344.5'	
SP-SM			N				345	SAA @ 342.25 - 344'	
CL			N				346	poorly graded sand - grayish brown (10YR 5/2) loose, SLM sand = 90% : VF=15% F=40% M=45% trace coarse sand (qtz, feld, lith) SA-SR; silt = 5% nonplastic - trace gravel to 3/8" (lith)	
SP			N				347	SAA @ 335.75 - 336'	
GWL			N				348	346.5-347.25 - well graded gravel w/ sand - light brownish gray (10YR 6/2) loose, SLM - gravel = 65% up to 2" (qtz+lith) sand = 35% : F=20% M=65% C=15% (qtz, feld, lith) SA-SR	(no odor)
SW		48.2	N				349	well graded sand w/ gravel - light brownish gray (10YR 6/2) loose, SLM - sand = 70% : F=15% M=65% C=20% SA-SR (qtz, feld, lith); gravel = 30% up to 2 1/8" (qtz+lith)	
SW			N				350	SAA w/ trace silt gravel up to 1 5/8"	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(Sw)	1.1		N				350	350-350.5' sand = 95%; gravel = 5% up to 1" 350-351 SAA no trace silt	
(Sw)			N				351	351-351.5' sand = 85%; gravel = 15% up to 1 1/2" 351.5-352' sand = 75%; gravel = 25% up to 2 1/4"	
(Sw)			N				352	sand = 90%; F = 25% M = 65% C = 10% pale brown gravel = 10% up to 1" trace silt (10YR 6/3)	
(Sw)	48.2		N		10'		353		
(Sw)			N				354	sand = 85%; gravel = 15% up to 1 1/2" light brownish gray trace silt (10YR 6/2)	
(Sw)			N				355	355.5-356' no trace silt	
(Sw)			N				356		
(Sw)			N				357	to 357.25'	
(Sw)			N				358	SAA@ 345.5-346' light brownish gray (10YR 6/2)	
(SP)	38.1		N		10'		359		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

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Date:

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Soil Description								Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	
SP							359	↓ to 359.25'
SW			N				360	SAA @ 354-355'
	1.1							↓ to 360.25'
SM			N				361	silty sand - pale brown (10YR 6/3) loose, SLM sand = 70% : VF = 35% F = 55% M = 10% (qtz, feld, lith) SA-SR silt = 30% nonplastic
SP-SM			N				362	SAA w/less silt - light yellowish brown (10YR 6/4) loose, SLM - sand = 90% : VF = 25% F = 75% trace Med. sand (qtz, feld, lith) SA-SR; silt = 10% nonplastic
SP		38.1	N				363	SAA w/less silt - pale brown (10YR 6/3) loose, SLM sand = 100% : F = 40% M = 10% (qtz, feld, lith) SA-SR trace silt
SP			N				364	SAA - sand = 100% : F = 30% M = 70% trace coarse sand trace gravel to 1" (lith)
SP			N				365	this description is for 364-366'
SP			N				366	gravel w/ sand
SW-BC			N				367	well graded sand w/ gravel and clay - brown (10YR 5/3) loose SLM - gravel = 50% up to 2 1/2" (qtz + lith); sand = 40% F = 25% M = 55% C = 20% (qtz, feld, lith) SA-SR Clay = 10% as nodules + chunks - brown (7.5YR 5/3) and brown (10YR 5/3) very stiff, med. plasticity
SW-BC		40.1	N				368	

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

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Date:

Boring/Well ID: KAFB-106247

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
GW	GC							368		
GW	GC							369	SAA w/less clay and silt gravel = 50%; sand = 40%; silt = 10% nonplastic - trace clay clay - brown (7.5YR 5/3) silty, hard - low plasticity	
SP								370	R to 369.25' Poorly graded sand - pale brown (10YR 6/3) silty, loose - sand = 95%; VF = 15% F = 75% M = 10% hard coarse sand (qtz, feld, lith); gravel = 5% up to 1/4" (lith) trace silt	
SP		1.1						370.25	370 - 370.25' SAA w/more gravel sand = 65% gravel = 35% up to 2 1/2"	
GW								371	well graded gravel w/sand - light brownish gray (10YR 6/2) loose silty - gravel = 60% up to 2 1/2" (qtz + lith) SA - sand = 35%; F = 20% M = 65% C = 15% (qtz, feld, lith) SP silt = 5% non plastic	
GW		4/0.1						372		
SP								373	SAA @ 369.25 - 370.25' trace silt	
SP								374	373 - 374' SAA w/more gravel sand = 85% gravel = 15% trace silt	
GW								375	SAA @ 370.25 - 372' - gravel = 75% up to 2" trace silt sand = 25%; F-C SAA	
GW								376	375 - 376' SAA @ 374 - 375 gravel = 65% up to 2 1/2" trace silt sand = 35%; F = 20% M = 50% C = 30% brown (10YR 5/3)	
GW								377	Gravel = 55% up to 2 1/2" sand = 45%; F = 30% M = 60% C = 10% no trace silt	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
GW			N				377	SAA - gravel = 80% up to 3" sand = 20% F=15% M=65% C=20% no trace silt	
GW			N				378		
GW			N				379	gravel up to 2 1/2" trace cobble to 4"	
GW	0.4		N				380		
SW			N				381	well graded sand w/gravel - brown (10YR 5/3) loose SR SLM - sand = 70% F=20% M=65% C=15% (Qtz, feld, lith) gravel = 30% up to 2" (Qtz + lith)	
SW			N				382		
SW			N				383	381-382' SAA - pale brown (10YR 6/2) sand = 70% F=30% M=55% C=15% gravel = 30% up to 1 3/4" trace silt sand = 65% very pale brown (10YR 7/3) gravel = 30% silt = 5% nonplastic	
SW			N				384		
SW			N				385		
SW			N				386		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW			N				386	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
CL			N				387	light brownish gray (10YR 6/2) loose, SLM sand = 90%: F=20% M=65% C=15% gravel = 10% up to 1 1/4"	
SW			N				388	clay - light brown (7.5YR 6/3) SLM, hard, med. plasticity well graded sand w/ gravel - pale brown (10YR 6/3) loose sand = 70%: F=25% M=50% C=25% (arg, feld, lith) gravel = 25% up to 1 5/8" (arg, lith); clay = 5% nonplastic	
SW			N				388.5	↓ to 388.5'	
SP			N				389	poorly graded sand - vary pale brown (10YR 7/3) loose, SLM sand = 95%: VF=20% F=60% M=20% trace coarse sand (arg, feld, lith) SA-SR - silt = 5% nonplastic	
SW			N				389.25	↓ to 389.25' trace gravel up to 1 3/8" (lith)	
SW			N				390	well graded sand - SAA @ 387.00 - 387.25' gravel up to 2 5/8"	
SW	1.5	36.3	N				391	gravel up to 1 5/8" sand = 75% gravel = 25% trace silt	
SW			N				392		
SW			N				393	393-393.25' sand = 75%; gravel = 20% light gray (10YR 7/2) silt = 5%	
SW			N				393.25	↓ to 393.25'	
SP			N				394	SAA @ 388.5 - 389.25' - SP - pale brown (10YR 6/3) trace gravel up to 1" trace clay as nodules - red (2.5YR 4/8)	
SP			N				395	SAA - no trace clay	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							395	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP		36.3	N				396		
SP			N				397		
SW			N				398	well graded sand w/ gravel - pale brown (10YR 6/3) loose sum - sand = 85% : F = 25% M = 60% C = 15% (qtz, fld, lith); gravel = 15% up to 1 1/8" (qtz + lith) SA-SR trace silt + trace clay as nodules - light olive brown (2.5Y 5/3)	
SP			N				399	SAA @ 394-395' - light gray (10YR 7/2) sand = 95% silt = 5%	
SW		48.3	N				400	SAA @ 397-398' sand = 85% gravel = 10% silt = 5% nonplastic SAA @ 398-399' trace gravel to 1 1/4" (lith) trace cobble - conglomerate (sand & gravel) cemented by secondary calcification	
SW	0.3		N				401	SAA @ 399-399.25' sand = 70% gravel = 30% up to 2" trace silt	
SP			N				402	SAA @ 398-399' sand = 90% : F = 30% M = 70% pale brown (10YR 6/3) trace coarse sand no trace silt gravel = 10% up to 1 3/8"	
SP			N				403	CLAY - brown (10YR 5/3) hard, SLM, nonplastic	
SW			N				404	SAA @ 397-398' no trace clay trace cobble to 4" (lith)	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

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USCS Soil Type		PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
									-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SW				N				404	no trace cobble	
SP		483		N		10'		405	SAA @ 401 - 402.75'	
SW				N				406	SAA @ 404 - 404.75'	
SP				N				407	Poorly graded sand - pale brown (10YR 6/3) loose, SLM sand = 95%: F=50% M=50% (Qtz, feld, lith) SA-SR silt = 5% nonplastic	
SW				N				408	well graded sand - pale brown (10YR 6/3) loose, SLM sand = 95%: F=20% M=60% C=20% (Qtz, feld, lith) gravel = 5% up to 1" (Qtz + lith) SA-SR trace silt	
SW		41.1		N				409	SAA - sand = 90% gravel = 10%	
SP				N		10'		410	SAA @ 406 - 407' trace coarse sand light gray (10YR 7/2) sand = 90% gravel = 5% up to 1" (Qtz + lith) silt = 5%	
SP	0.2			N				411	sand = 95% silt = 5% trace gravel to 1" trace clay as nodules - dark reddish brown (5YR 3/4)	
SP				N				412	SAA - no trace clay or gravel sand = 100%	
SP				N				413		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 47 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
(SP)							413	soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SW)							414	SAA @ 411-412' (10' odor) SAA @ 408-409' no trace silt (413.5-413.75')	
(SP)		41.1	N				415	SAA - trace coarse sand trace gravel to 3/4" (lith) trace silt	
(CL)			N				416	clay - brown (7.5YR 5/3) hard - dry to SAA low plasticity - slightly mottled to white (7.5YR 8/1) strong rxn w/acid (6.0-6.5)	
(SP)			N				417	SAA @ 414-415' trace gravel to 3/8"	
			N				418	416-418 NO RECOVERY	
(ML)		51.2	N				419	silt - light gray (10YR 7/1) soft, dry, nonplastic silt - 100% - trace clay no nodules - dark brown (10YR 3/3) very strong rxn w/acid (no odor)	
(ML)			N				420		
(ML)	4.5		N				421	SAA - no trace clay trace gravel + cobbles of highly cemented F-C sand - same color 10YR 7/1 same strong rxn w/acid	
(ML)			N				422		
Additional Comments:									
218-226' highly disturbed (pulverized caliche)									
Recovery: None ☐ Partial ☒ Complete ☐									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
							422	-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(ML)			N				423		
(ML)			N				424		
(ML)		51.2	N				425		
(ML)			N				426	poorly graded sand - light brownish gray (10YR 6/2) loose, SLM sand = 100%: F = 80% M = 20% (qtz, feld, lith) SA - SE trace gravel to 3/8" (lith)	
(SP)			N				427	@ 427-427.25' - highly cemented F-M sand strong rxn w/acid - caliche - white (7.5YR 8/1)	
(SP)			N				428		
(SP-SM)			N				429	SAA @ 425.5-426' w/silt - pale brown (10YR 6/3) loose, SLM - sand = 90%: 80% = F M = 20% (qtz, feld, lith) SA-SR - silt = 10% nonplastic no trace gravel	
(SP)			N				430	SAA @ 425.5-426' trace gravel to 1"	
(ML)	4.7	65.3	N				431	SAA @ 418-419' silt = 80% clay = 20% as nodules as @ 418-419'	
Additional Comments:									
★ 218-226' highly disturbed (pulverized caliche)									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
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Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 49 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
ML			N				431	SAA w/less clay - clay is trace as above trace F-C sand trace gravel to 1/2"	
ML			N				432		
SP		65.3	N		5'		433	SAA @ 425.5 - 426' SLM trace gravel to 1" f sm - brown	
SP			N				434	(433-435' not disturbed)	
SP			N				435		
ML			N				436	SAA @	NO obs
SP			N				437	poorly graded sand - pale brown (10YR 6/3) loose, SLM Sand = 95% : VF = 20% F = 65% M = 15% (qtz, feld, lith) SAA silt = 5% nonplastic	
SP		21.2	N		6'		438	438-438.25' SAA w/less silt + larger m. sand fraction Sand = 100% : F = 60% M = 40% trace coarse sand trace silt	
SW			N				439	well graded sand - pale brown (10YR 6/3) loose, SLM Sand = 95% : F = 30% M = 60% C = 10% (qtz, feld, lith) SAA gravel = 5% up to 2 1/8" (lith) - trace sm	
SW			N				440		
Additional Comments:									
* 430-433' highly disturbed									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

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Soil Description							Well Details
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	
						Depth, ft bgs	
						-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity	
						-- % sand (include grain size %; fine, medium, coarse, etc.)	
						-- sand mineralogy	
						-- % gravel	
						-- gravel mineralogy	
						-- angularity/roundedness	
						-- % fines (silt/clay)	
SW	0.5	21.2	N		6'	440	
						441	
SP			N				
SP			N			442	
SP			N			443	
SP			N			444	
SP		31.2	N		9'	445	
SP						446	
SW			N			447	
SP			N			448	
SP			N			449	

Additional Comments:

Recovery: None ☐Partial ☒Complete ☒

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	
								Well Details	
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
SP		31.2	N				449		
SW	0.3		N				450	well graded sand w/gravel - pale brown (10YR 6/5) loose sum sand = 75%; F = 40% M = 45% C = 15% SA - (qtz, feld, lith); gravel = 25% up to 1 5/8" (qtz + lith) SR	
SW		55.5	N		3'		451		
SW			N				452	sand = 90%; gravel = 10% trace silt	
SW			N				453		
SW			N				454	sand = 80%; gravel = 20% up to 1 3/8" trace clay as nodules - very dark grayish brown (10YR 3/2)	
SW		46.3	N		3'		455	SAA - no trace clay light brownish gray (10YR 6/2) sand = 85% gravel = 15% up to 1 1/4"	
SW			N				456	SAA - sand = 75% pale brown (10YR 6/3) gravel = 25% up to 2 5/8"	
SW			N				457	SAA - light brownish gray (10YR 6/2) sand = 70% gravel = 30% up to 2" trace cobble to 3 1/2" (lith)	
SW		34.9	N		16'		458		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 52 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
SW							458	soil type; Munsell color; density (primarily coarse)/consistency & plasticity % sand (include grain size %; fine, medium, coarse, etc.) sand mineralogy % gravel gravel mineralogy angularity/roundedness % fines (silt/clay)	
SP							458.5	SAA w/less gravel and no cobble sand=70% gravel=30% (no odor) poorly graded sand - pale brown (10YR 6/3) loose, sum sand=100%; F=45% M=55% trace coarse sand (qtz, feld, lith) trace gravel to 1" (lith+qtz) SA-SR trace silt	
SP							459		
SW							460	SAA @ 458-458.5' no cobble gravel=30% up to 2 5/8"	
SW	0.7						461	sandy clay w/gravel - pale olive (5Y 6/3) SLM, high plasticity very stiff - clay=50%; gravel=30% up to 2 3/8" (qtz+lith) sand=20%; F=35% M=55% C=10% (qtz, feld, lith) SA-SR	
SW							462	this description is for 461.5-462'	
SW		34.9					463	SAA @ 459.5-461.5' sand=60% gravel=35% silt=5% nonplastic trace clay - pale olive (5Y 6/3)	
SP							464	SAA @ 458.5-459.5' no trace gravel sand=95% silt=5% nonplastic	
SP							465		
SP							466	SAA - trace coarse sand trace gravel to 1/2" (qtz+lith)	
SP							467		
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									



SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

Boring/Well ID: KAFB-106247

Logged By: J. Messenger

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description -- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	Well Details
SP			N				467		
SP		44.7	N		4'		468		
SP			N				469		
SP	1.4		N				470		
SP			N				471	MOIST brown (10YR 5/3)	
SP			N				472		
SP		27.4	N		6'		473		
SP			N				474		
SP			N	FOC, B, M			475		
SP			N				476		

Additional Comments:

Recovery: None ☐Partial ☒Complete ☐

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG										
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:		
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 54 of 58		
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details	
SP SP SP SP SP SP SP SP SP SP								SAA w/trace gravel to 1 1/8" (lith) SAA - w/silt sand = 95% : F = 65% M = 35% Silt = 5% nonplastic no trace gravel grayish brown (10 YR 5/2) SAA @ 480.75 - 482' SAA @ 476 - 477' gravel = (Qtz) trace gravel to 1 3/8" (lith)		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAPB-106247					Logged By: J. Messenger			Page 55 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SP)		42.5	N		10'		485	SAA	
(SW)			N				486	well graded sand w/ gravel - brown (10YR 5/3) loose moist - sand = 90%: F=25% M=65% C=10% (qtz, feld, lith) gravel = 10% up to 2 7/8" (qtz + lith) trace silt	
(SW)			N				487	SAA w/ more gravel sand = 75% gravel = 25%	
(SW)			N				488	to 488.25'	
(SP)			N				489	SAA @ 482-483' trace gravel to 1 1/4" (qtz + lith)	
(SP)		34.7	N	B.M.P. ✓ FOC			490		
	1.3		N				491	496-492' removed for sampling	
			N				492		
(GW)			N				493	well graded gravel w/ sand - dark grayish brown (10YR 4/2) loose, moist - gravel = 70% up to 2 7/8" (qtz + lith) sand = 30%: F=20% M=60% C=20% (qtz, feld, lith) trace clay as nodules - same color	
(GW)			N				494		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☐

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity
 R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB-106247					Logged By: J. Messenger			Page 56 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand minerology -- % gravel -- gravel minerology -- angularity/roundedness -- % fines (silt/clay)	
(SW)		34.7	N		16'		494		
(SW)			N				495		
(SW-SC)			N				496	well graded sand w/ gravel + clay - grayish brown (10YR 5/2) loose moist - sand = 50% F = 20% M = 65% C = 15% (qtz, feld, lith); gravel = 40% up to 2 1/4" (qtz + lith) SA + SR clay = 10% soft, nonplastic -	
(SW-SC)		34.3	N		41'		497		
(SW)			N				498		
(SW)			N				499	SAA w/ more gravel and less clay gravel = 50% sand = 45% clay = 5%	
(SW)			N	B, M, P, V			500		
(SW)	0.6		N				501	to 500.5' SAA well graded sand - grayish brown (10YR 5/2) loose moist sand = 90% F = 15% M = 75% C = 10% (qtz, feld, lith); gravel = 10% up to 2" (qtz + lith) SA = SR trace clay	
(SW)		34.4	N		15'		502		
(SW)			N				503	502-503' sand = 80% F = 15% M = 65% C = 20% gravel = 20% up to 3"	
Additional Comments:									
Recovery: None ☐ Partial ☒ Complete ☒									
SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None									
Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity									
R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel									

SONIC CORING BORING/WELL CONSTRUCTION LOG									
Project: Kirtland BFF					Project Number: 62735DM02.1017			Date:	
Boring/Well ID: KAFB - 106247					Logged By: J. Messenger			Page 57 of 58	
USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
GW			N				503	SAA @ 498-499 gravel = 60% up to 2 7/8" sand = 40% trace clay (no odor)	
GW			N				504		
SW			N				505	SAA @ 502-503' sand = 70% gravel = 30% up to 2" trace clay	
SW-SC			N				506	SAA w/ more clay: sand = 70% gravel = 20% clay = 10% soft low plasticity clayey sand - very pale brown (10YR 7/3) soft, SLM sand = 70% VF = 35% F = 65% trace medium sand (Qtz, feld, lith) SA-SR clay = 30% soft, high plasticity @ 506-506.15' F-M sand highly cemented by s.c.c. - caliche	
SC			N				507	sandy clay - light brownish gray (10YR 6/2) stiff, SLM clay = 90% med. plasticity; sand = 10% VF = 35% F = 65% trace medium sand (Qtz, feld, lith) SA-SR - trace gravel to 3/8" (lith)	
CL			N				508	clayey sand - light brownish gray (10YR 6/2) loose, SLM SAA @ 506-506.75' clay soft + low plasticity	
CL			N				509	poorly graded sand w/ silt - light brownish gray (10YR 6/2) loose, moist sand = 90% VF = 25% F = 75% trace medium sand (Qtz, feld, lith) SA-SR; silt = 10% nonplastic	
SP			N				510	poorly graded sand - SAA w/ less silt moist sand = 95% F = 25% M = 75% trace coarse sand silt = 5% nonplastic trace gravel to 2" (lith)	
SP	2.7		N				511	SAA w/ more gravel sand = 75% F-M w/ trace C moist gravel = 20% up to 2 1/2" silt = 5% trace clay as nodules	
SP			N				512		

Additional Comments:

Recovery: None ☐ Partial ☒ Complete ☒

SAA = Same as Above Qtz = quartz Fld = feldspar Y = Yes N = No/None

Samples: V = VOCs/EDB; P = TPH; M = mineralogy; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel

SONIC CORING BORING/WELL CONSTRUCTION LOG

Project: Kirtland BFF

Project Number: 62735DM02.1017

Date:

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USCS Soil Type	PID Reading (ppm)	Temperature (°C)	UV fluorescence	Samples collected	Core Run	Recovery	Depth, ft bgs	Soil Description	Well Details
								-- soil type; Munsell color; density (primarily coarse)/consistency & plasticity -- % sand (include grain size %; fine, medium, coarse, etc.) -- sand mineralogy -- % gravel -- gravel mineralogy -- angularity/roundedness -- % fines (silt/clay)	
(SP)			~				512	SAA w/ trace cobble to 3 1/4" (lith) sand = 65% gravel = 30% up to 2" silt = 5% (moist) (no odor)	
(SP)		34.4	~		15		513		
(SP)			~				514		
(SP)	1.0		~				515		
								TD = 515' reached 2-5-19 @ 1130	

Additional Comments:

Recovery:	None
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Partial	
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Complete

SAA = Same as Above Qtz = quartz

Fld = feldspar

Y = Yes

N = No/None

Samples: V = VOCs/EDB; P = TPH; M = minerology; B = biologic; W = moisture analysis; G = geotechnical; UV = ultraviolet; T = thermal conductivity

R = Rounded, SR = Subrounded, SA = Subangular, A = Angular, VF = Very Fine, F = Fine, M = Medium, C = Coarse, G = Gravel