

Attachment B

**Soil Boring Log and Well
Construction Report**



Boring Location Sketch

SOIL BORING LOG

Project Number

Cde 170401
COT 127

Boring Number

MW 01

Sheet

1 of 4

Project AnadarkoLocation WCR Properties 41-S/Spur 1-SDrilling Method & Equipment Direct Push - 6620DTDrilling Contractor DrillPro - Terrance ApolkaDate 11/16/18 Water Level ~10' bgs Start 1045Finish 1107Logger R. Finley

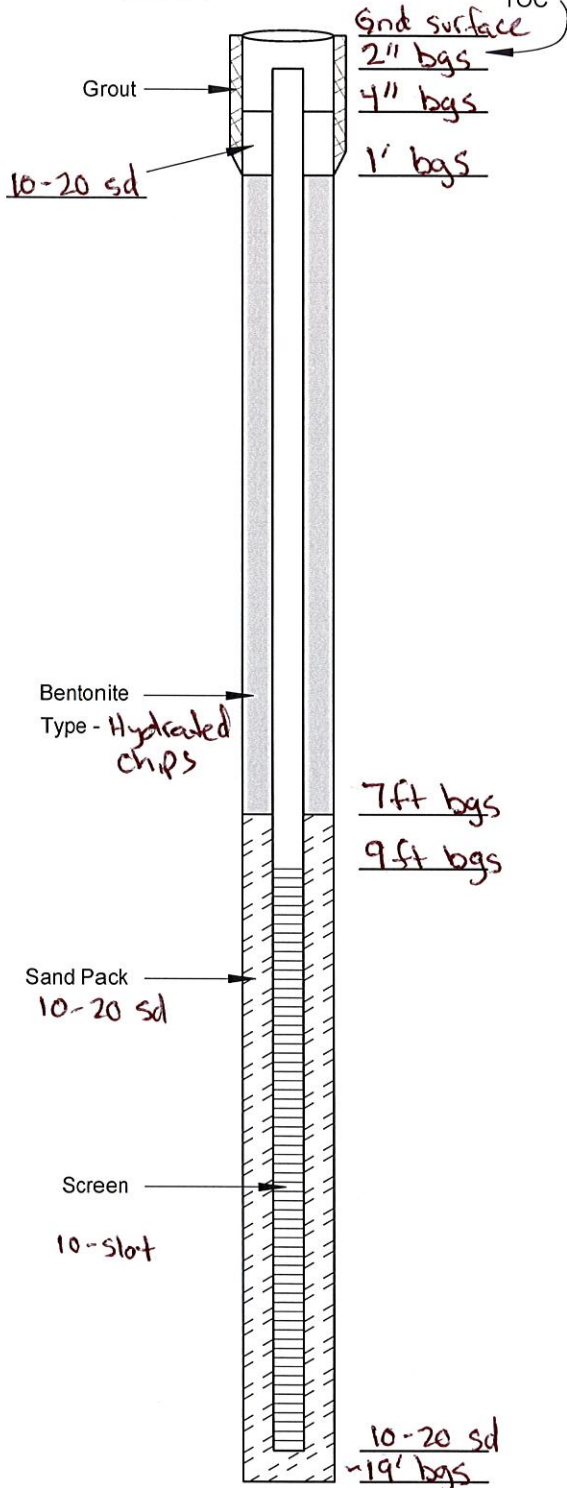
Depth Below Surface	Sample			Standard Penetration Test Results	Soil Description USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, Stain or Odor	Symbol of USCS Log	Staining	PID Readings (ppm)	PID Reading Depths (bgs)
	Interval	Depth/Time	Recovery						
				6" 6" 6" 6"					
5	/	/	/	N/A	Hydrovac potholing to 8ft bgs for utility clearance	/	/	/	/
10	8-9	X			8-10 light brown almost tan clay sand. low density, high plasticity. moist grading	Sc	N	1.8	8
	10-11	X			* Gw to interface			4.3	10 * Gw
	12-13	X			10-19 med to dk brown silty sand. med density, low plastic. Saturated. no odor/str			1.2	12
15	14-15	X				Sm	N	0.8	14
	16-17	X						1.1	16
	18-19	X						0.6	18
20									
Total Depth(s) =				Soil Sample(s):		Rationale		Additional Information:	
19 ft				0		client			



Well Completion Detail

Street Box
Diam. = _____

Surveyed Dif.
Btwn. GS and
TOC



Total Depth from TOC = 17.3'

WELL CONSTRUCTION LOG

Project WCR Properties
Number 41-5
SPUR 1-5

Well
Number MW01

Drilling Summary

Total Depth of Hole: ~19 ft bgs
Hole Diameter: 2 1/2"
Drilling Company: DrillPro
Driller: Terrance Apodaca
Rig Type: 6620 DT
Bits: Direct Push
Geologist: Ryan Finley

Time Log

	Start		Finish	
	Date	Time	Date	Time
Drilling:	<u>11/16/18</u>	<u>1045</u>	<u>11/16/18</u>	<u>1107</u>
Well Completion:	<u>↓</u>	<u>1110</u>	<u>↓</u>	<u>1118</u>
Grouting:	<u>↓</u>	<u>1120</u>	<u>↓</u>	<u>1125</u>

Depth to Water (Below TOC)

Depth: 9.34' Date: 11/20/18 Time: 1405

Well Construction Materials

	Grout	Seals	Filter
Quantity:	<u>1/2 bg</u>	<u>1/2 bg</u>	<u>2 bg</u>
Type:	<u>Quikrete</u>	<u>Bent</u>	<u>10-20sd</u>

	Screen
Size:	<u>10-foot</u>
Area/Ft.:	<u>10-slot</u>
Inside Diam.:	<u>1.049"</u>
Config.:	<u>Sch 40</u>
Comp.:	<u>PVC</u>
Outside Diam.:	<u>1.315"</u>

Comments

PID field-screening taken
every 2ft. No suspected
soil impacts noted in
boring.

* BGS = below ground surface
& BG = Bag



Boring Location Sketch

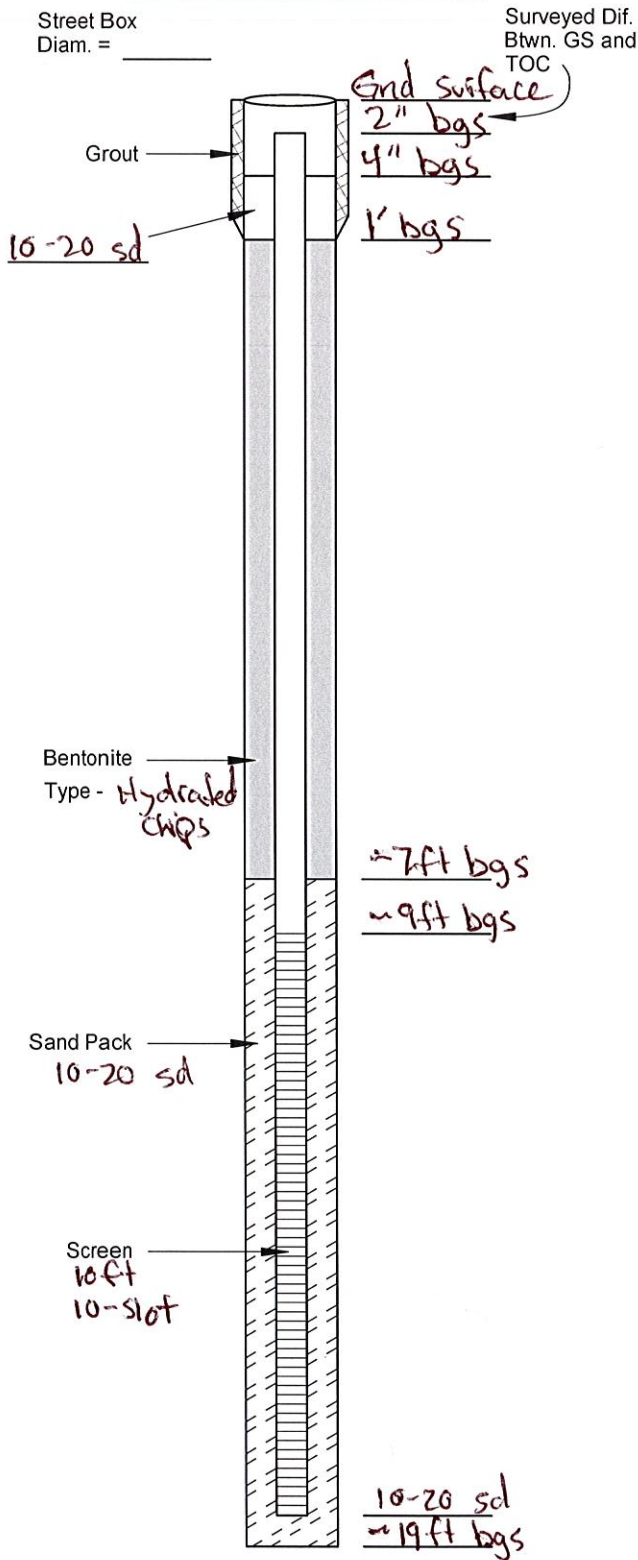
SOIL BORING LOG

Project Number
066.1704.01
COT 127Boring Number
MW 02Sheet
2 of 4Project Anadar KoLocation WCR Properties 41-5/Spaur 1-5Drilling Method & Equipment DrillPro 6620DTDrilling Contractor DrillPro-Terrance ApodacaDate 11/16/18Water Level ~9' bgsStart 0950Finish 1023Logger R. Finley

Depth Below Surface	Sample			Standard Penetration Test Results 6" / 6" / 6" / 6"	Soil Description USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, Stain or Odor	Symbol of USCS Log	Staining	PID Readings (ppm)	PID Reading Depths (bgs)
	Interval	Depth/Time	Recovery						
5	/	/	/	N/A	Hydrovac Potholing to 8ft bgs for utility clearance	/	/	/	/
10	8-9	X			8-9' med brown silty sd. vfg-fg. med dense, low plasticity. moist (hydro vac). No odor skin	SM	N	5.0	8
	10-11	X			9-10' med grey grading to black stained clay sand. Saturated Potential flow. vfg-fg. Low density. High plastic. odor mild & staining	SC	Y	0.6	10
	12-13	X			10-11' med brown w/ yellowish & reddish & mottled black staining silty sand. vfg-fg. Tightly compact at 10' grading to looser at depth w/ dense lenses ~2" thick every couple feet. @ 14' there is a 2" of higher plastic clayey sand. No plasticity elsewhere. 16-19' were very dense. No noted odor. mottled black stain	Sm	Y	153	12
15	14-15	X						176	14
	16-17	X						1.5	16
	18-19	X						0.9	18
20									
Total Depth(s) =				Soil Sample(s):		Rationale		Additional Information:	
19				0		client			



Well Completion Detail



* Measuring Point is Below Ground Surface (bgs)

Total Depth from TOC = 18.19'

WELL CONSTRUCTION LOG

Project WCR Properties
Number 41-5
Spurs 1-5

Well
Number MW #2

Drilling Summary

Total Depth of Hole: ~19 ft bgs
Hole Diameter: 2 1/2"
Drilling Company: DrillPro
Driller: Terrance Apodaca
Rig Type: 6620 DT
Bits: Direct Push
Geologist: Ryan Finley

Time Log

	Start		Finish	
	Date	Time	Date	Time
Drilling:	11/16/18	0950	11/16/18	1023
Well Completion:	↓	1115	↓	1124
Grouting:	↓	1125	↓	1132

Depth to Water (Below TOC)

Depth: 8.99' Date: 11/20/18 Time: 1420

Well Construction Materials

	Grout	Seals	Filter
Quantity:	<u>1/2 bg</u>	<u>1/2 bg</u>	<u>2 bg</u>
Type:	<u>Quikrete</u>	<u>Bent</u>	<u>10-20 sd</u>

	Screen
Size:	<u>10 ft</u>
Area/Ft.:	<u>10-slot</u>
Inside Diam.:	<u>1.049"</u>
Config.:	<u>Sch 40</u>
Comp.:	<u>PVC</u>
Outside Diam.:	<u>1.315"</u>

Comments

PID field screening every
2 ft of boring. Staining
+ potential soil impacts
noted from 10ft to 19ft bgs

* BGS = below ground surface
* BG = Bags



Boring Location Sketch

SOIL BORING LOG

Project Number
066.1704.01
COT#127Boring Number
MW3Sheet
3 of 4

Project Anadarko

Location WCR Properties 41-5/ Spaur 1-5

Drilling Method & Equipment Direct Push - 6620 DT

Drilling Contractor DrillPro - Terrance Apodaca

Date 11/16/18

Water Level ~9' bgs

Start 1025

Finish 1040

Logger R. Finley

Depth Below Surface	Sample			Standard Penetration Test Results 6" / 6" / 6" / 6"	Soil Description USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content, Relative Density or Consistency, Soil Structure, Mineralogy, Stain or Odor	Symbol of USCS Log	Staining	PID Readings (ppm)	PID Reading Depths (bgs)
	Interval	Depth/Time	Recovery						
5	/	/	/	N/A	Hydrovac Potholing to 8ft bgs for utility clearance	/	/	/	/
10	8-9	X			8-9 med brown silty sand, vfg-fg, low density, low plastic, cracked appearance, dry, no stain/odor	Sm N		0.2	8
	10-11	X				Sc Y		18.7	10
	12-13	X			9-10 med grey to black clay sand, vfg-fg, low density, high plastic, moist, low potential, stain & odor	Sm N		13.2	12
15	14-15	X			10-15 light grey to med brown silty sand, vfg-fg, moist, low density, med plasticity, no odor/stn			0.1	14
	16-17	X				Sm N		0.6	16
	17-18	X			15-18 med brown to yellowish silty sand, moist grading to dry, low density grading to very high, no plasticity, no odor/stn			0.1	18
20					* refusal @ 18'				

Total Depth(s) =

18

Soil Sample(s):

O

Rationale

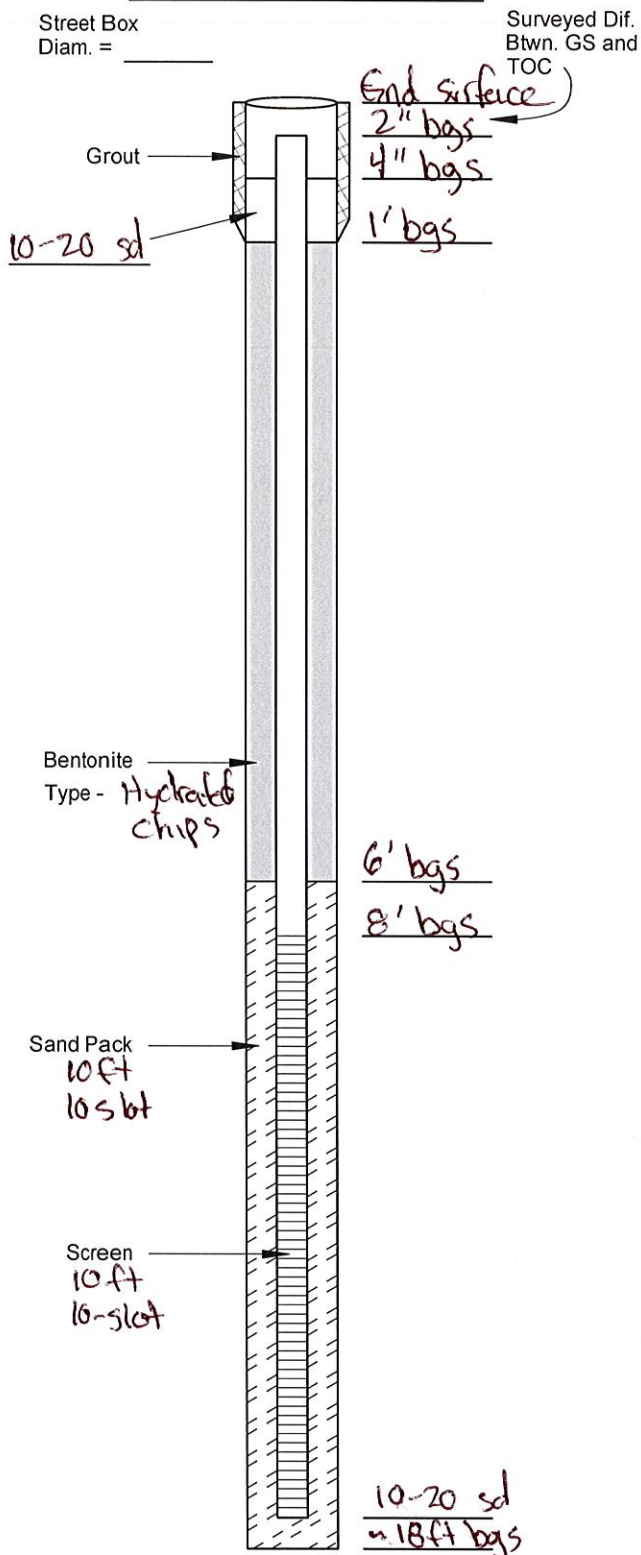
client

Additional Information:

Refusal of direct push @ 18'



Well Completion Detail



* Measuring Point is Below Ground Surface (bgs)

Total Depth from TOC = 17.22'

WELL CONSTRUCTION LOG

Project WCR Properties
Number 41-5
Spawr 1-5

Well
Number MW03

Drilling Summary

Total Depth of Hole: ~18 ft bgs

Hole Diameter: 2 1/2"

Drilling Company: Drill Pro

Driller: Terrance Apodaca

Rig Type: 6620 DT

Bits: Direct Push

Geologist: Ryan Finley

Time Log

	Start		Finish	
	Date	Time	Date	Time
Drilling:	11/16/18	1025	11/16/18	1040
Well Completion:	↓	1134	↓	1140
Grouting:	↓	1140	↓	1146

Depth to Water (Below TOC)

Depth: 9.74' Date: 11/20/18 Time: 1437

Well Construction Materials

	Grout	Seals	Filter
Quantity:	<u>1/2 bg</u>	<u>1/2 bg</u>	<u>2 bg</u>
Type:	<u>Quikrete</u>	<u>Bent</u>	<u>10-20</u>

	Screen
Size:	<u>10 ft</u>
Area/Ft.:	<u>10-slot</u>
Inside Diam.:	<u>1.049"</u>
Config.:	<u>Sch 40</u>
Comp.:	<u>PVC</u>
Outside Diam.:	<u>1.315"</u>

Comments

PID field-screening taken
every 2ft of boring.
Staining + potential soil
impacts noted 10-12 ft bgs
Direct Push refusal @ 16'
* BGS = below ground surface
* BG - Bags



Boring Location Sketch

SOIL BORING LOG

Project Number
066.1704.0
COTØ127Boring Number
MW4Sheet
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Project Anadourko

Location WCR Properties 41-5/ Spar 1-5

Drilling Method & Equipment Direct Push - 66200T

Drilling Contractor DrillPro - Terrace Apolaca

Date 11/6/18

Water Level N/A

Start 0930

Finish 0945

Logger R. Finley

Depth Below Surface	Sample			Standard Penetration Test Results 6" / 6" / 6" / 6"	Soil Description USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content Relative Density or Consistency, Soil Structure, Mineralogy, Stain or Odor	Symbol of USCS Log	Staining	PID Readings (ppm)	PID Reading Depths (bgs)
	Interval	Depth/ Time	Recovery						
5				N/A	Hydrovac pot holing to 8ft bgs for utility clearance				
10	8-9	X			8-9 Black stained sandy clay w/ high med-high density, high plasticity, moist. mild HC odor.	Sc	y	1544	8
	10-11	X			9-11 yellowish, Black and grey stained silty sand. vfg-fg. High density, no plasticity. Dry, HC odor + stain	Sm	y	1760	9
	12-13	X			11-16 yellowish med brown silty sand with patchy black staining staining clods v. 1-15 bgs. vfg-fg. Low density, no plasticity grading to high density at 15-16'. Soil from 14-16 expanded to 4" in sleeve	Sm	y	746	10
15	14-15	X						656	12
	15-16	X						97.1	14
20					No significant indication that groundwater was reached			13.1	16
					#1 Refusal @ 16'				

Total Depth(s) =

16' bgs

Soil Sample(s):

O

Rationale

Client

Additional Information:

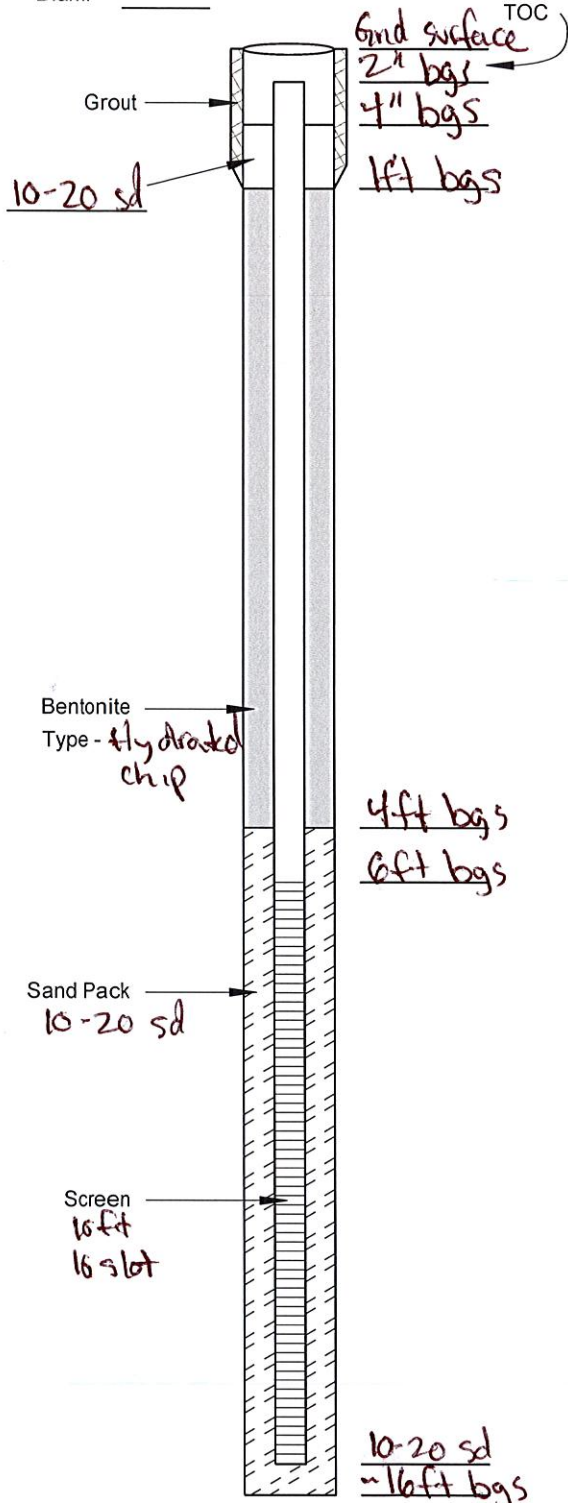
Direct Push Refusal @ 16'. No GW detected date of drilling. later determined @ 11ft bgs



Well Completion Detail

Street Box
Diam. = _____

Surveyed Dif.
Btwn. GS and
TOC



* Measuring Point is Below Ground Surface (bgs)

Total Depth from TOC = 15.5'

WELL CONSTRUCTION LOG

Project WCR Properties
Number 41-5
Spur 1-5

Well
Number MW04

Drilling Summary

Total Depth of Hole: ~16 ft bgs
Hole Diameter: 2 1/2"
Drilling Company: DrillPro
Driller: Terrance Apodaca
Rig Type: C620 DT
Bits: Direct Push
Geologist: Ryan Finley

Time Log

	Start		Finish	
	Date	Time	Date	Time
Drilling:	<u>11/16/18</u>	<u>0930</u>	<u>11/16/18</u>	<u>0945</u>
Well Completion:	<u>↓</u>	<u>1148</u>	<u>↓</u>	<u>1155</u>
Grouting:	<u>↓</u>	<u>1155</u>	<u>↓</u>	<u>1203</u>

Depth to Water (Below TOC)

Depth: 11.00' Date: 11/20/18 Time: 1447

Well Construction Materials

	Grout	Seals	Filter
Quantity:	<u>1/2 bg</u>	<u>1/2 bg</u>	<u>2 bg</u>
Type:	<u>Quikrete</u>	<u>Bent</u>	<u>10-20 sd</u>

	Screen
Size:	<u>10 feet</u>
Area/Ft.:	<u>10-slot</u>
Inside Diam.:	<u>1.049"</u>
Config.:	<u>Sch 40</u>
Comp.:	<u>PVC</u>
Outside Diam.:	<u>1.315"</u>

Comments

PID field-screening taken every 2ft of boring.
Staining + odor noted high at 8-11ft bgs, and minor throughout. GW infiltrates extremely slow.
* BGS = below ground surface
* BG = Bgs



Boring Location Sketch

SOIL BORING LOG

Project Number

Boring Number

Sheet

COT0127

MW05

1 of 4



Project WCR Properties

Location WCR Properties 41-5

Drilling Method & Equipment Direct Push 6620

Drilling Contractor DrillPro - T. Apodaca

Date 3/27/19

Water Level ~ 9 ft

Start 1000

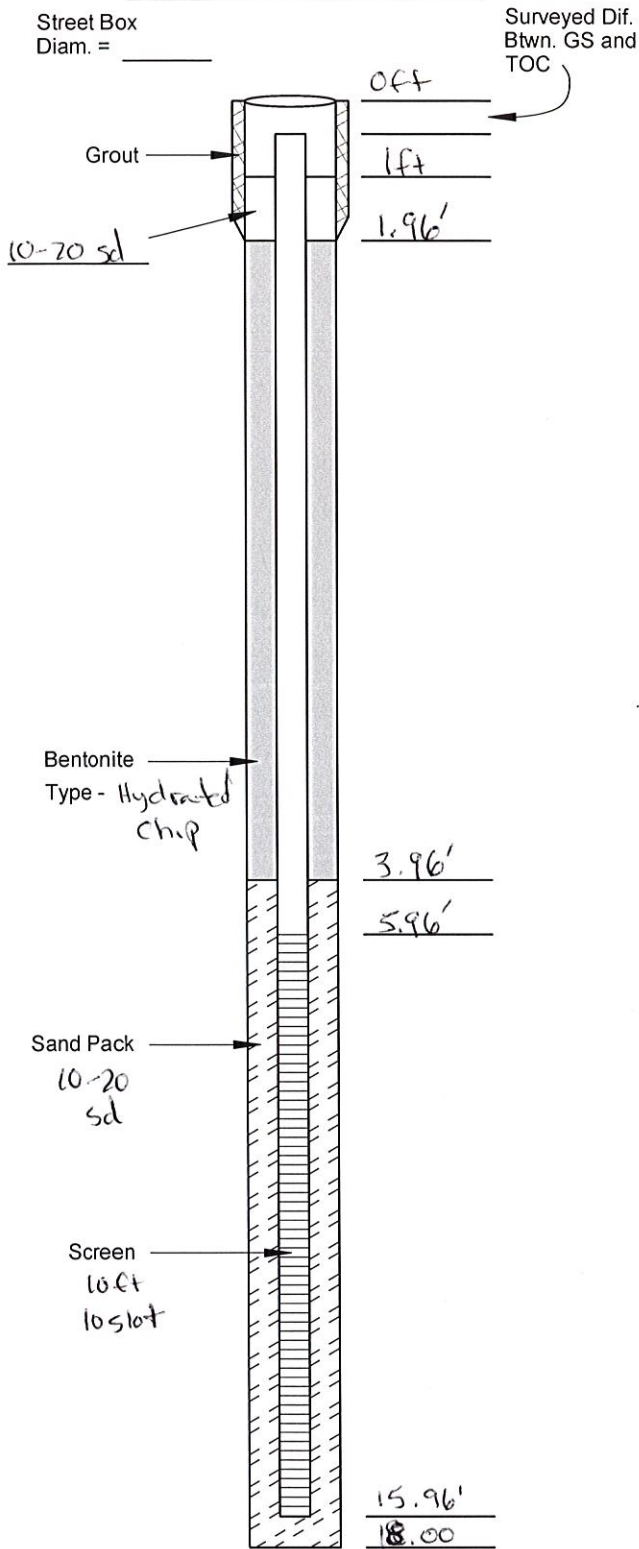
Finish 1030

Logger R. Finley

Depth Below Surface	Sample			Standard Penetration Test Results 6" / 6" / 6" / 6"	Soil Description USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content Relative Density or Consistency, Soil Structure, Mineralogy, Stain or Odor	Symbol of USCS Log	Staining	PID Readings (ppm)	PID Reading Depths (bgs)
	Interval	Depth/Time	Recovery						
5					hydraulic pothole to 8 ft bgs				
10				X	8-9' - DK blk + grey clay sand vfg-fg, slightly crumbly Low dense, med plastic med odor, high stain	Sc	Y	1,057	8
15				X	9-15 med grey sandy clay vfg-fg, slightly damp Possibly from hydraulic low dense high plastic High odor, high stain	Sc	Y	1,269	10
20				X	15-18 Light to med brown sandy silt. vfg-fg, dry, loose no dense no plastic no dampness, no odor or stain	Sm	N	1,218	12
								812	14
								77.2	16
								3832	18
					* refusal @ 18'				
Total Depth(s) =				Soil Sample(s):		Rationale		Additional Information:	
~ 18 ft				None		client			



Well Completion Detail



* Measuring Point is Below Ground Surface (bgs)

Total Depth from TOC = 15.96'

WELL CONSTRUCTION LOG

Project COTØ127
Number 89633985

Well
Number MWØ5

Drilling Summary

Total Depth of Hole: 18ft
Hole Diameter: 2 1/4"
Drilling Company: DrillPro
Driller: Terrance Apodaca
Rig Type: DT6620
Bits: Direct Push
Geologist: Ryan Finley

Time Log

	Start	Finish
	Date Time	Date Time
Drilling:	<u>3/27/19 1000</u>	<u>3/27/19 1030</u>
Well Completion:	<u>3/27/19 1030</u>	<u>↓ 1040</u>
Grouting:	<u>↓ 1230</u>	<u>↓ 1240</u>

Depth to Water (Below TOC)

Depth: 9.08' Date: 4/9/19 Time: 1510

Well Construction Materials

	Grout	Seals	Filter
Quantity:	<u>1/3 bag</u>	<u>1/4 bag</u>	<u>1 bag</u>
Type:	<u>quikrete</u>	<u>bent</u>	<u>10-20 sd</u>

	Screen
Size:	<u>10 slot</u>
Area/Ft.:	<u>10 feet</u>
Inside Diam.:	<u>1.049"</u>
Config.:	<u>Sch 40</u>
Comp.:	<u>PVC</u>
Outside Diam.:	<u>1.315"</u>

Comments

Direct Push refusal @ 18ft
due to extremely dense
clay



Boring Location Sketch

SOIL BORING LOG

Project Number
COT0127

Boring Number
MW06

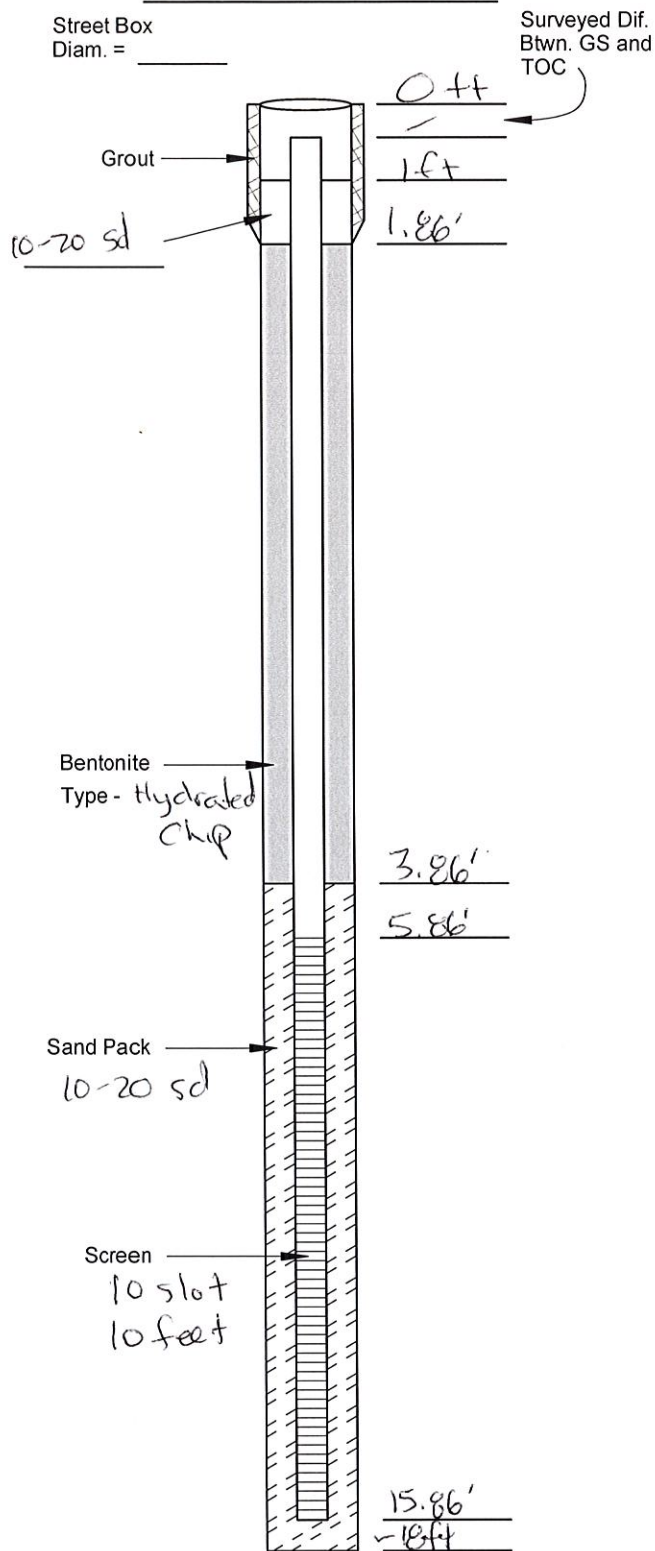
Sheet
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Project 066.1704.01-COT0127 (89633985)Location WCR Properties 41-5Drilling Method & Equipment Direct Push - DT6620Drilling Contractor DrillPro-T. ApodacaDate 3/27/19 Water Level ~10ftStart 1137Finish 1215Logger R. Finley

Depth Below Surface	Sample			Standard Penetration Test Results 6" / 6" / 6" / 6"	Soil Description USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content Relative Density or Consistency, Soil Structure, Mineralogy, Stain or Odor	Symbol of USCS Log	Staining	PID Readings (ppm)	PID Reading Depths (bgs)
	Interval	Depth/Time	Recovery						
5					Hydrovac Potholing to 8ft bgs				
10				X	8-10 med brown sandy silt vfg-fg, dry + crumbly no density, not loose, no plastic no odor/stn	Sm	N	197	8
				X	10-14 Black sandy silt. vfg-fg, moist grading saturated @ 12-14" med plastic, low dense, med odor, high stain	Sm	Y	477	10
15				X	14-15 med brown silty sand vfg-fg, med dense, no plastic Dry + crumbly, no odor/stn	Sm	N	539	12
				X	15-17 Black silty sand vfg-fg, saturated, high stain, med odor, low dense, low plastic	Sm	Y	751	14
20					17-18 dk brown silty sand vfg-fg, med dense, no plastic no odor/stn	Sm	N	270	16
								212	18
Total Depth(s) =				Soil Sample(s):		Rationale		Additional Information:	
18ft				Ø		client			



Well Completion Detail



Total Depth from TOC = 15.86'

WELL CONSTRUCTION LOG

Project COTØ127
Number 89633985

Well
Number MWØ6

Drilling Summary

Total Depth of Hole: 18 ft
Hole Diameter: 2 1/4"
Drilling Company: DrillPro
Driller: Terrance Apodaca
Rig Type: DT6620
Bits: Direct Push
Geologist: Ryan Finley

Time Log

	Start	Finish
	Date Time	Date Time
Drilling:	<u>3/27/19 1137</u>	<u>3/27/19 1215</u>
Well Completion:	<u>↓ 1215</u>	<u>↓ 1230</u>
Grouting:	<u>↓ 1240</u>	<u>↓ 1250</u>

Depth to Water (Below TOC)

Depth: 10.05' Date: 4/9/19 Time: 1530

Well Construction Materials

	Grout	Seals	Filter
Quantity:	<u>1 1/2 bg</u>	<u>4 bg</u>	<u>1 bg</u>
Type:	<u>Quikrete</u>	<u>bent</u>	<u>10-20 sd</u>

	Screen
Size:	<u>10 slot</u>
Area/Ft.:	<u>10 feet</u>
Inside Diam.:	<u>6.049"</u>
Config.:	<u>Sch 40</u>
Comp.:	<u>PVC</u>
Outside Diam.:	<u>1.315"</u>

Comments



Boring Location Sketch

SOIL BORING LOG

Project Number

Boring Number

Sheet

COTØ127

MW Ø7

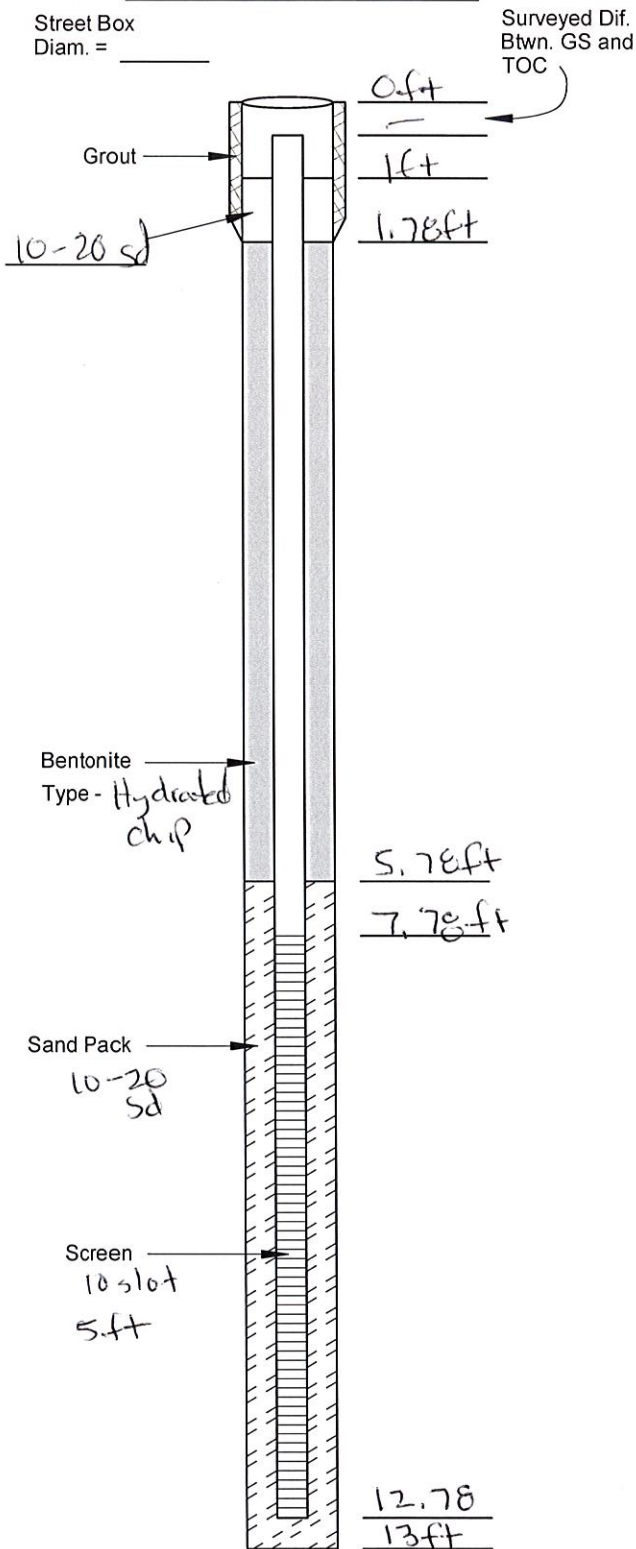
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Project 066.1704.01 - COTØ127 (89633985) Location WCR PropertiesDrilling Method & Equipment Direct Push - DTØ620 Drilling Contractor Dr. IlproDate 3/27/19 Water Level ~10ft Start 1110 Finish 1125 Logger R. Finley

Depth Below Surface	Sample			Standard Penetration Test Results 6" 6" 6" 6"	Soil Description USCS Group Symbol, Name, Gradation or Plasticity, Particle Size Distribution, Color, Moisture Content Relative Density or Consistency, Soil Structure, Mineralogy, Stain or Odor	Symbol of USCS Log	Staining	PID Readings (ppm)	PID Reading Depths (bgs)
	Interval	Depth/Time	Recovery						
					Hydrovac Potholing to 7ft bgs				
10				X	8-13.5 med brown silty sand with streaks of black vfg-fg. slightly crumbly slightly moist 13-14 then dry again. no density but not loose. no plastic nor odor/stain	Sm	N	236.7	8
								409.0	10
15								333.7	13
					* refusal @ 13.5ft bgs perhaps no GW				
Total Depth(s) = 13ft				Soil Sample(s): Ø		Rationale client		Additional Information:	



Well Completion Detail



* Measuring Point is Below Ground Surface (bgs)

Total Depth from TOC = 12.78

WELL CONSTRUCTION LOG

Project COT#127
Number 89633985

Well
Number MW07

Drilling Summary

Total Depth of Hole: 13 ft
Hole Diameter: 2 1/4"
Drilling Company: DrillPro
Driller: Terrance Apodaca
Rig Type: DT6620
Bits: Direct Push
Geologist: Ryan Finley

Time Log

	Start Date	Time	Finish Date	Time
Drilling:	3/27/19	1110	3/27/19	1125
Well Completion:	↓	1125	↓	1135
Grouting:	↓	1250	↓	1300

Depth to Water (Below TOC)

Depth: 9.73' Date: 4/9/19 Time: 1555

Well Construction Materials

	Grout	Seals	Filter
Quantity:	1/4 bgs	1/3 bgs	1/2 bgs
Type:	Quikrete	Bent	10-20 sd

	Screen
Size:	10 slot
Area/Ft.:	5 ft
Inside Diam.:	1.049"
Config.:	Sch 40
Comp.:	PVC
Outside Diam.:	1.315"

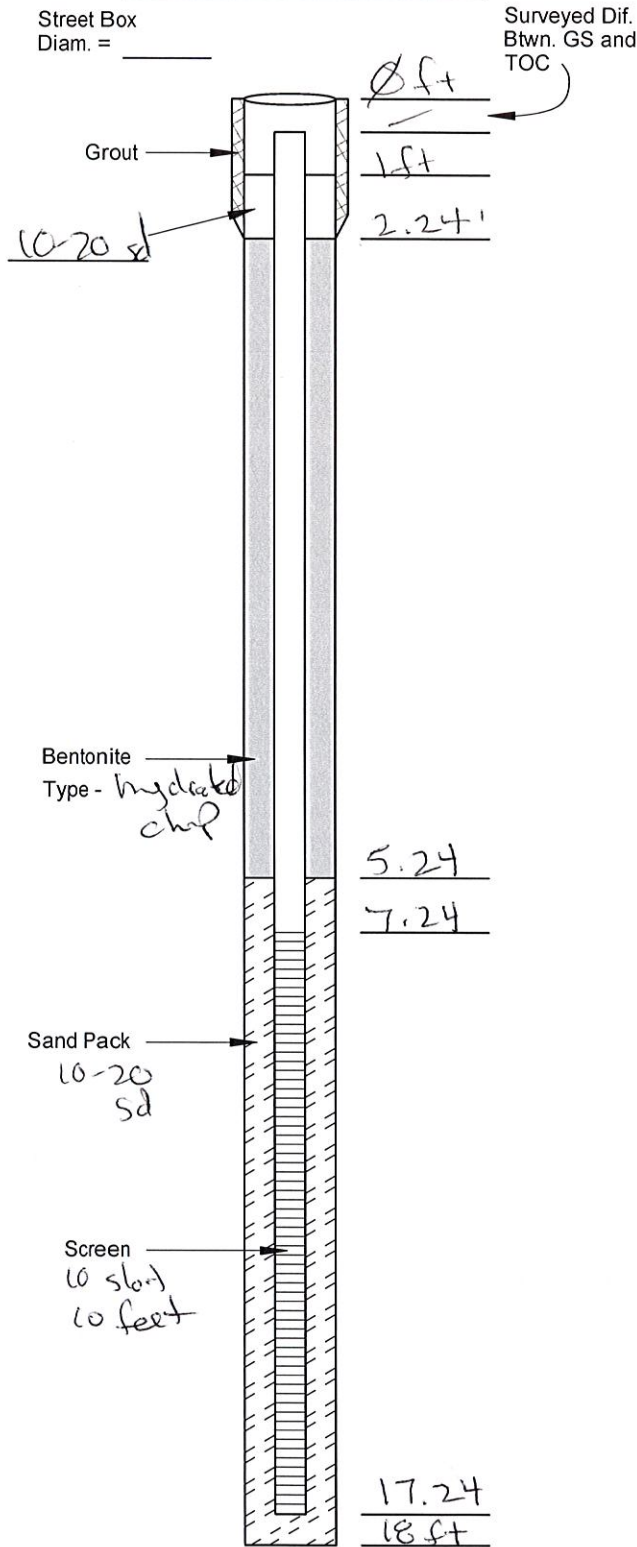
Comments

Direct push refusal @
13 ft bgs. due to
extremely dense clay

Client



Well Completion Detail



* Measuring Point is Below Ground Surface (bgs)

Total Depth from TOC = 17.24'

WELL CONSTRUCTION LOG

Project COT 127
Number 89633985

Well
Number MW08

Drilling Summary

Total Depth of Hole: 18 ft
Hole Diameter: 2 1/4"
Drilling Company: Drill Pro
Driller: Terrance Apodaca
Rig Type: DT6620
Bits: Direct Push
Geologist: Ryan Finley

Time Log

	Start		Finish	
	Date	Time	Date	Time
Drilling:	3/27/19	1035	3/27/19	1105
Well Completion:	↓	1105	↓	1115
Grouting:	↓	1300	↓	1310

Depth to Water (Below TOC)

Depth: 8.79' Date: 4/9/19 Time: 1615

Well Construction Materials

	Grout	Seals	Filter
Quantity:	1 1/3 bg	1/4 bg	1 bg
Type:	Quikrete	bent	10-20 sd

	Screen
Size:	10 slot
Area/Ft.:	10 feet
Inside Diam.:	1.049"
Config.:	Skh 40
Comp.:	PVC
Outside Diam.:	1.315"

Comments

* Direct push refusal
@ 18 ft bgs due to
extremely dense clay