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## **Orton Pit Soil Investigation Report**

### **General Project Information:**

Castle Rock Construction Company is pursuing a borrow pit on the southern edge of El Paso County, located at mile post 27.7 on State Highway 115, to provide earthen fill for CDOT Project 22903 on SH115. The proposed pit would expand a historic pit from the original construction of SH115 and only be permitted/used for this one Project (less than 2 years). The proposed final grading would consist of extending the existing depression from previous mining activities using slopes 4:1 or shallower. The total proposed site is 10.1 acres and currently used for agriculture and would return to this use following borrow operations.

### **Prepared By:**

This study was conducted by Travis Bell in with laboratory testing conducted by Ground Engineering. Travis received a Bachelor of Science degree in civil engineering with a concentration in geotechnical engineering in May of 2015 from Colorado State University. He is an active engineering intern registered with DORA. Following graduation Travis continued his education working for several general contractors in heavy civil construction. Currently he is the General Superintendent managing the Grading Division of Castle Rock Construction Company, a heavy civil highway contractor in the state of Colorado. Travis was on site and witnessed all boring and exploration activities. This project was supervised by Bart Dela Cruz, a registered Professional Engineer in the State of Colorado.

### **Objectives:**

The objectives of this study were to provide general soil data for the Orton Property, locate any potential geological impediments that might exist (ie. ground water, bedrock, etc.), and collect data to assist in the design of stable slopes for the pit following construction.

### **Process and Data Collection:**

The pit was initially investigated visually, there is an existing excavation present from historic mining activities that with minimal hand digging allowed the team to inspect the general soil conditions from ground level down to 18 feet below virgin ground. The soil conditions that were observed were primarily dry silty sand with gravel and rock up to 6 inch in diameter.

Following this initial excavation, the team brought out a soil boring truck and conducted six soil borings in a grid pattern across the proposed 10-acre pit site, see the Appendix A for further details. These six borings consistently showed that beneath the topsoil the site had a lens of silty sand (A-2-4) varying in depth from 1 foot to 8 foot thick. Beneath this lens was a lens of silty and gravelly sand (A-1-b) which extended to approximately 20 feet deep. Borings were only taken up to 20 feet deep since the maximum proposed depth of the future excavation is 19 feet deep. Note that in bore holes one and two boring could not continue below 10 feet due to heavy gravel which jammed the auger. All samples removed from the 6 bore locations resembled one of the above-mentioned soil types in color, gradation, moisture, and clay content (field tested for plastic limit). At no time during boring operations did the team encounter bedrock or ground water.

Following boring operations, the assorted samples from the 6 bore holes were separated based off of the soil lens that was sampled, blended, and split into two smaller samples which were lab tested by Ground Engineering for gradation and Atterberg limits. The gravely sample was also tested for proctor density properties and R-value. These test results can be found below in Appendix C.

**Findings and Conclusions:**

Based off the soil data collected the following findings and conclusions can be made:

1. Excavation for borrow material up to 18 feet deep is possible without encountering subsurface hazards such as ground water or bedrock that would negatively impact the project. If either of these conditions are encountered during excavation the total depth of excavation shall be adjusted to leave a minimum of 2 foot of cover on the groundwater or bedrock and allow the excavation to freely drain.
2. 4:1 or shallower side and back slopes should be adequate for slope stability in the final design configuration of the pit.
3. There is adequate topsoil (6 to 12 inches) to allow for regrowth of vegetation if this material is stripped and replaced following mining.

In all, the Orton pit is a viable mine location which should not cause any long-term negative impacts to the surrounding areas. The material has adequate properties for the construction of State Highway 115; and so long as 4:1 slopes are used with a maximum excavation depth of 18 feet the final design of this pit will be structurally stable.

Prepared By:



Travis Bell, EI  
General Superintendent, Castle Rock Construction Company

Supervised By:














Bart Dela Cruz, PE  
Project Sponsor, Castle Rock Construction Company

# Appendix A

## Soil Boring Locations

**Legend**

-  Berm
-  Highwall Fence
-  Existing Dirt Road
-  Edge of Highway 115
-  CDOT ROW Fence
-  Structures (Houses and Shops)
-  Property Lines
-  Overhead Power Line
-  Section Lines
-  Pit Limits
-  Soil Bore Location

Found NE corner of the NW 1/4 of section 18  
3" Brass Cap

OWNER:  
Frank A Bardowski

OWNER:  
Glenn V Orton

OWNER:  
RED CREEK PROPERTIES LLC

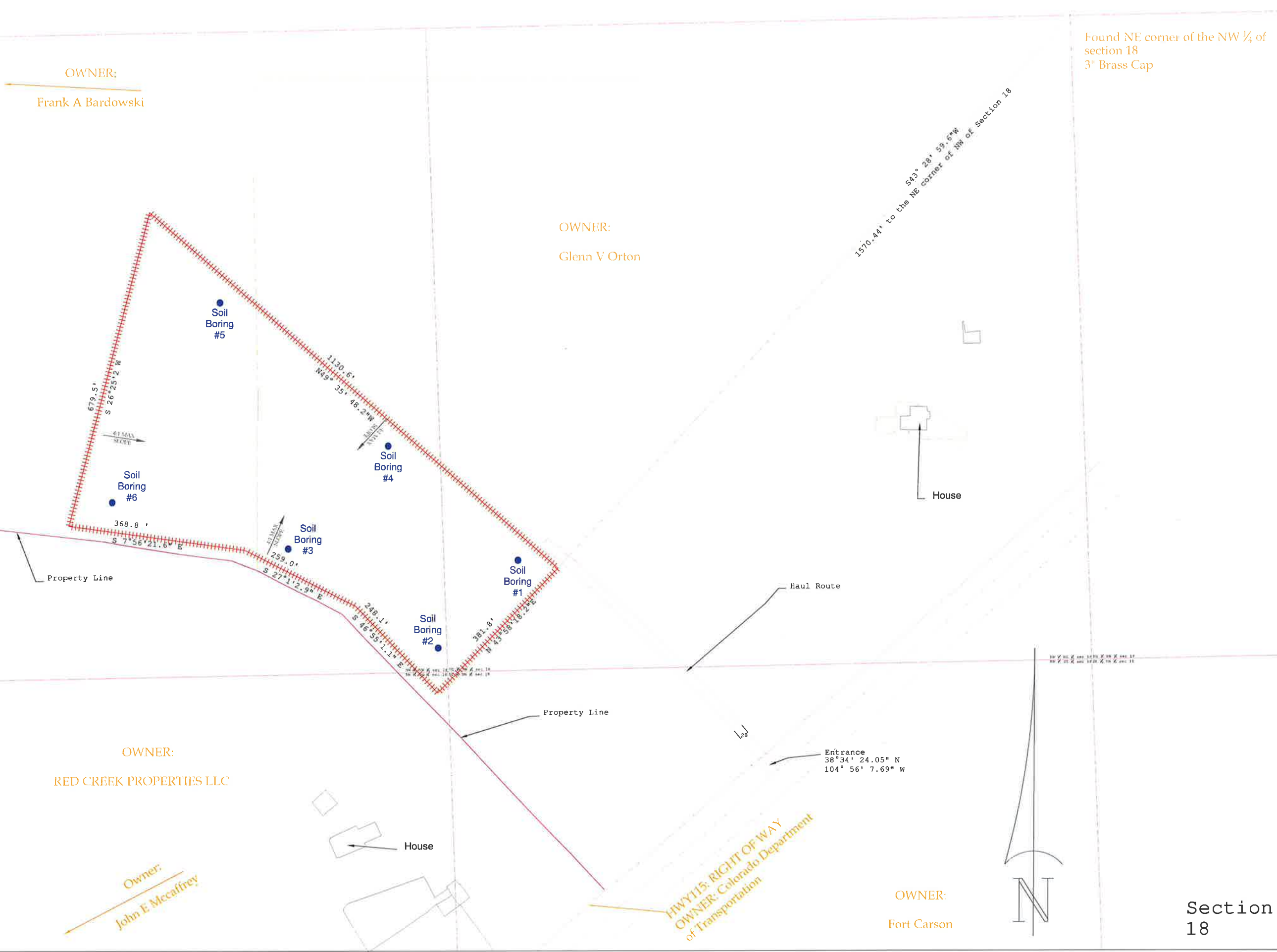
Owner:  
John E Mccaffrey

OWNER:  
Fort Carson

HWY115: RIGHT OF WAY  
OWNER: Colorado Department  
of Transportation

Section  
18

Castle Rock Construction Of Colorado, LLC  
Orton Pit  
Soil Boring Map  
May 24, 2022  
Travis Bell



# Appendix B Soil Boring Findings

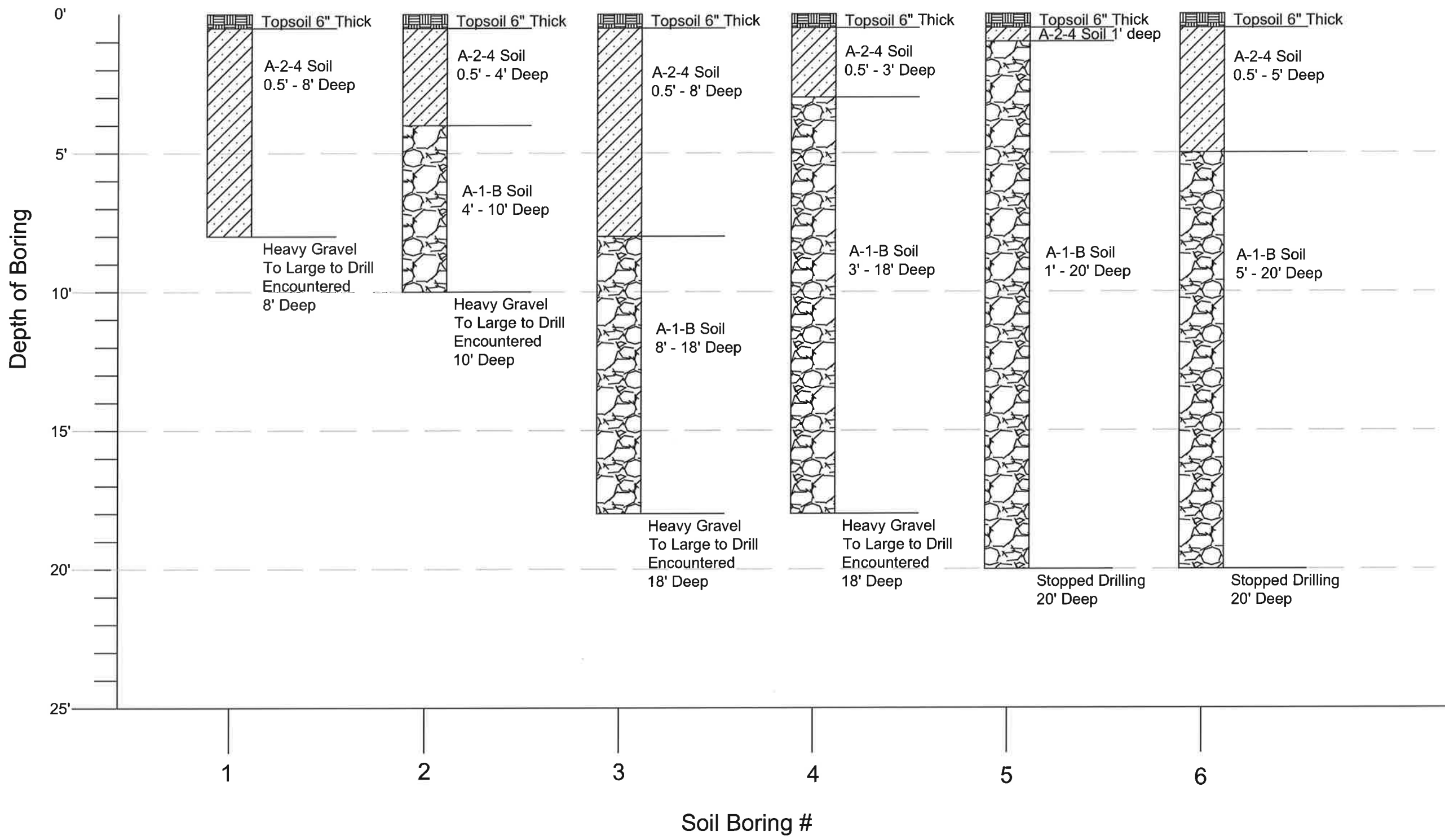


# SOIL TYPES & PROPERTIES

**Topsoil**  
 No sample collected.  
 Topsoil to be stripped and replaced

**A-2-4 Soil**  
 SAND, Silty, very dry, very light in color  
 Liquid Limit = NP  
 Plastic Limit = NP  
 Plasticity Index = NP  
 Fines Content = 24.6%

**A-1-b Soil**  
 SAND, Silty with Gravel, very dry,  
 very light in color  
 Liquid Limit = NP  
 Plastic Limit = NP  
 Plasticity Index = NP  
 Fines Content = 17.9%



# Appendix C

## Soil Lab Testing



## CRCC SH-115

Report Date: May 19, 2022

Work Order No.: 22-8535.SoilSampling.0001; ver: 1

Work Order Date: May 16, 2022

Reviewed by: Don Van Devener

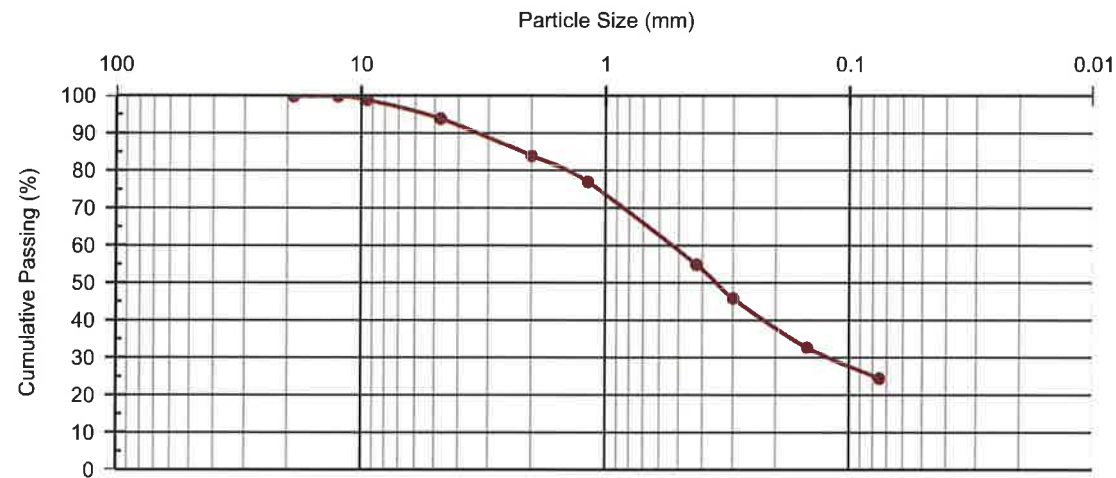
### Soil/Aggregate Laboratory Summary

Sample No.: 1  
Dropped Off By: CRCC \*Sampling may not be in accordance with reported method.  
Sampling Method: ASTM D75 / AASHTO T2 / CDOT CP30  
Sample Location: Delivered by CRCC  
Lab ID: Soil13054

### Atterberg Limits (AASHTO T89 & T90) and Classification (ASTM D2487 & AASHTO M145)

Method	Liquid Limit		Plastic Limit		Plasticity Index		Classification	
	Value	Spec.	Value	Spec.	Value	Spec.	USCS	AASHTO
Single Point	-	-	NP	-	NP	-	SM	A-2-4 (0)

### Soil Gradation (AASHTO T88)



Coarse Gradation				Fine Gradation			
Sieve Size	Particle Size (mm)	Cumulative Passing (%)	Specified (%)	Sieve Size	Particle Size (mm)	Cumulative Passing (%)	Specified (%)
6 in	150	-	-	No. 4	4.75	94	-
5 in	125	-	-	No. 8	2.36	-	-
4 in	100	-	-	No. 10	2.00	84	-
3 in	75	-	-	No. 16	1.18	77	-
2.5 in	63	-	-	No. 20	0.85	-	-
2 in	50	-	-	No. 30	0.60	-	-
1.5 in	37.5	-	-	No. 40	0.425	55	-
1 in	25.0	-	-	No. 50	0.300	46	-
3/4 in	19.0	100	-	No. 60	0.250	-	-
1/2 in	12.5	100	-	No. 100	0.150	33	-
3/8 in	9.5	99	-	No. 140	0.090	-	-
No. 4	4.75	94	-	No. 200	0.075	24.6	-

Sampling Method: ASTM D75 / AASHTO T2 / CDOT CP30

Sample Location: Delivered by CRCC



## CRCC SH-115

Report Date: May 19, 2022

Work Order No.: 22-8535.SoilSampling.0001; ver: 1

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Reviewed by: Don Van Devener

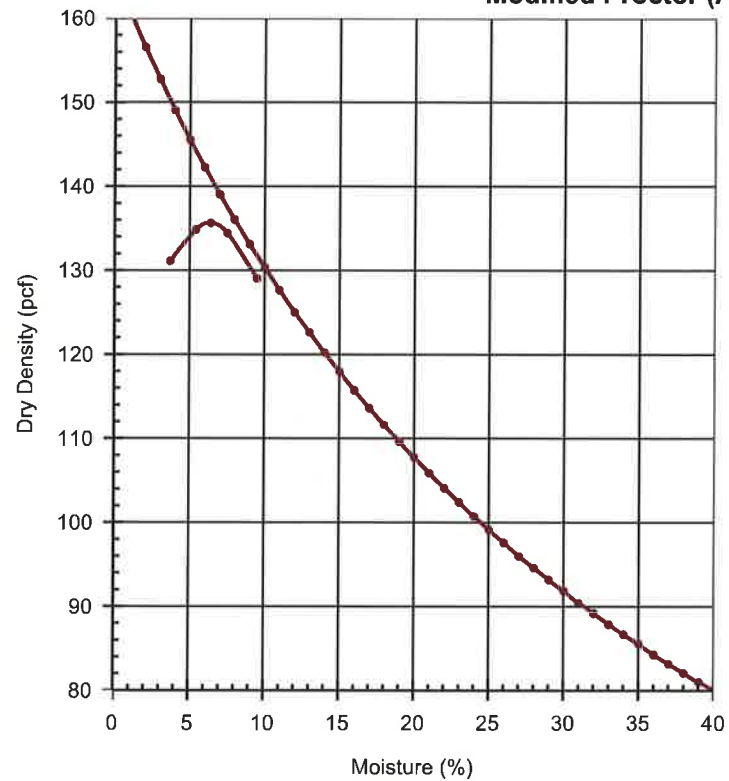
### Soil/Aggregate Laboratory Summary

Lab ID: Soil13055

#### Atterberg Limits (AASHTO T89 & T90) and Classification (ASTM D2487 & AASHTO M145)

Method	Liquid Limit		Plastic Limit		Plasticity Index		Classification	
	Value	Spec.	Value	Spec.	Value	Spec.	USCS	AASHTO
Single Point	-	-	NP	-	NP	-	(SM)g	A-1-b (0)

#### Modified Proctor (AASHTO T180)



Method	Preparation	Hammer
Method D	Moist Preparation	Manual

Maximum Dry Density (pcf)	Optimum Moisture (%)	Oversize Corrected	
		Maximum Dry Density (pcf)	Optimum Moisture (%)
135.7	6.4	137.0	6.1

Oversize Sieve: 3/4 in  
 Coarse Fraction (%): 6  
 Fine Fraction (%): 94  
 Coarse Specific Gravity: Measured 2.62  
 Coarse Absorption (%): 1.16  
 Fine Specific Gravity: Estimated 2.65

## CRCC SH-115

Report Date: May 19, 2022

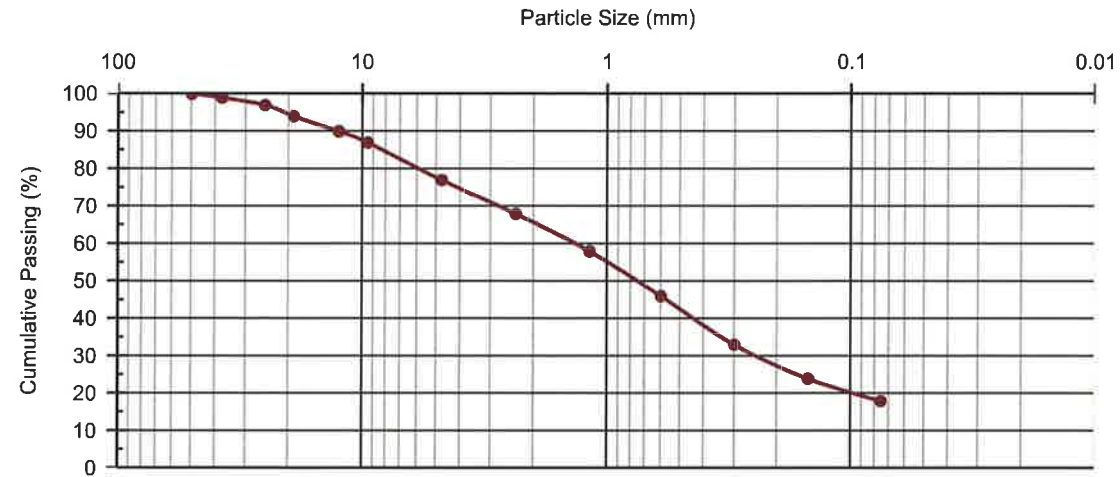
Work Order No.: 22-8535.SoilSampling.0001; ver: 1

Work Order Date: May 16, 2022

Reviewed by: Don Van Devener

### Soil/Aggregate Laboratory Summary

#### Soil Gradation (AASHTO T88)



Coarse Gradation				Fine Gradation			
Sieve Size	Particle Size (mm)	Cumulative Passing (%)	Specified (%)	Sieve Size	Particle Size (mm)	Cumulative Passing (%)	Specified (%)
6 in	150	-	-	No. 4	4.75	77	-
5 in	125	-	-	No. 8	2.36	68	-
4 in	100	-	-	No. 10	2.00	-	-
3 in	75	-	-	No. 16	1.18	58	-
2.5 in	63	-	-	No. 20	0.85	-	-
2 in	50	100	-	No. 30	0.60	46	-
1.5 in	37.5	99	-	No. 40	0.425	-	-
1 in	25.0	97	-	No. 50	0.300	33	-
3/4 in	19.0	94	-	No. 60	0.250	-	-
1/2 in	12.5	90	-	No. 100	0.150	24	-
3/8 in	9.5	87	-	No. 140	0.090	-	-
No. 4	4.75	77	-	No. 200	0.075	17.9	-

## CRCC SH-115

Report Date: May 24, 2022

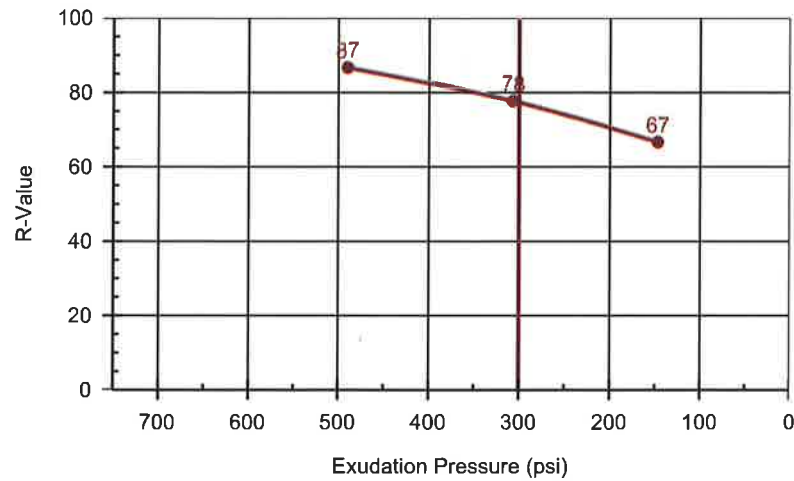
Work Order No.: 22-8535.SoilSampling.0001; ver: 3

Work Order Date: May 16, 2022

Reviewed by: Don Van Devener

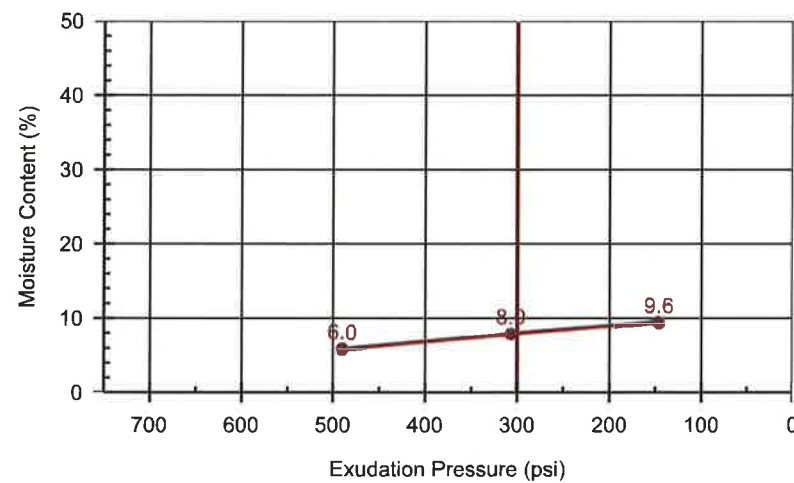
### Soil/Aggregate Laboratory Summary

#### R-Value (CDOT CP-L 3101 / AASHTO T-190)



Test Point	Moisture (%)	Exudation Pressure (psi)	R-Value
1	9.6	147	67
2	6.0	490	87
3	8.0	307	78

R-Value at 300 psi Exudation Pressure
78





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May 23, 2022

El Paso County Planning and  
Community Development Department  
2880 International Circle, Suite 110  
Colorado Springs, CO 80910

Re: Soils Analysis Report

To Whom it Concerns,

Castle Rock Construction Company of Colorado, LLC. Has accessed the USDA website to gain a soils analysis for the proposed plant site on the Golden Eagle Ranch Property. Attached is the report, which shows the existing soil to be a Bresser Sandy Loam.

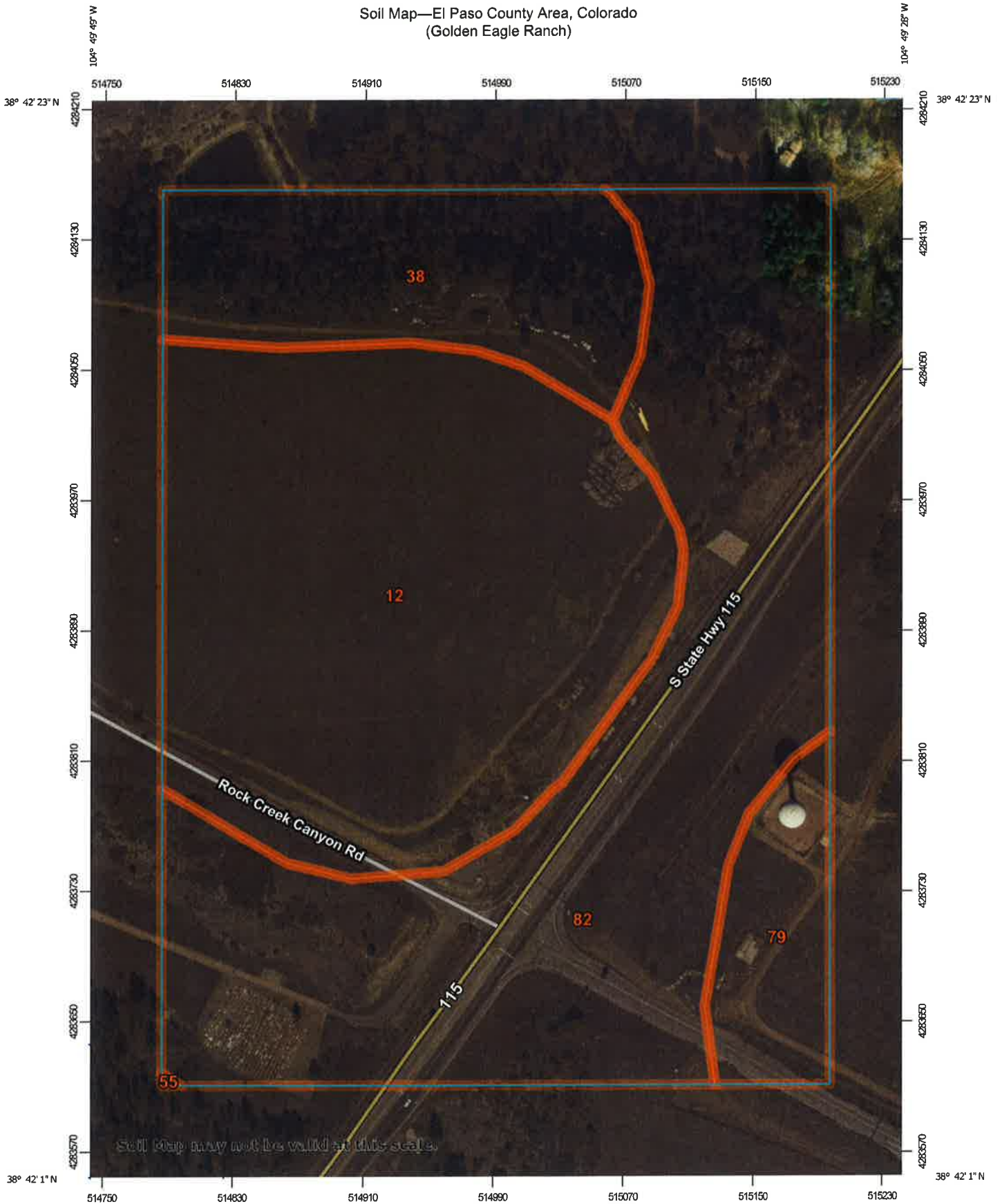
It is the intent of Castle Rock Construction Company of Colorado, LLC. to leave this material in place once we reclaim the property after construction activities on SH 115.

Thank you for your assistance.

Sincerely,

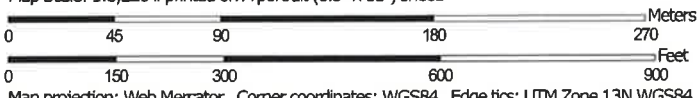
Richard Timian  
General Superintendent

Soil Map—El Paso County Area, Colorado  
(Golden Eagle Ranch)



Soil map may not be valid at this scale.









Map Scale: 1:3,220 if printed on A portrait (8.5" x 11") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84



## MAP LEGEND

	Area of Interest (AOI)		Spoil Area
	Area of Interest (AOI)		Stony Spot
	Soil Map Unit Polygons		Very Stony Spot
	Soil Map Unit Lines		Wet Spot
	Soil Map Unit Points		Other
	Special Point Features		Special Line Features
	Blowout		Water Features
	Borrow Pit		Streams and Canals
	Clay Spot		Transportation
	Closed Depression		+++ Rails
	Gravel Pit		Interstate Highways
	Gravelly Spot		US Routes
	Landfill		Major Roads
	Lava Flow		Local Roads
	Marsh or swamp		Background
	Mine or Quarry		Aerial Photography
	Miscellaneous Water		
	Perennial Water		
	Rock Outcrop		
	Saline Spot		
	Sandy Spot		
	Severely Eroded Spot		
	Sinkhole		
	Slide or Slip		
	Sodic Spot		

## MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:24,000.

**Warning:** Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service  
Web Soil Survey URL:  
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: El Paso County Area, Colorado  
Survey Area Data: Version 19, Aug 31, 2021

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Nov 19, 2013—Oct 20, 2018

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

## Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
12	Bresser sandy loam, cool, 3 to 5 percent slopes	21.5	38.2%
38	Jarre-Tecolote complex, 8 to 65 percent slopes	7.5	13.3%
55	Nederland cobbly sandy loam, 9 to 25 percent slopes	0.0	0.0%
79	Satanta loam, 0 to 3 percent slopes	3.2	5.7%
82	Schamber-Razor complex, 8 to 50 percent slopes	24.0	42.7%
<b>Totals for Area of Interest</b>		<b>56.1</b>	<b>100.0%</b>