CESARE, INC.
Geotechnical Engineers & Construction Materials Consultants

January 15, 2021

Mr. Ron Welborn
Gunnison Valley Properties, LLC
c/o Chrisman Commercial
864 West South Boulder Road, Suite 200
Louisville, CO 80027

Subject: Subsurface Study
Proposed Bore Pits
US Highway 50 Utility Crossing
Gunnison Rising Subdivision Phase 1
Gunnison, Colorado
Project No. 20.6050

Dear Mr. Welborn:

Cesare, Inc. (Cesare) conducted a subsurface study at the request of Crabtree Group, Inc. (CGI) at the locations of the proposed bore pits for the underground utility crossing across US Highway 50 in Gunnison, Colorado. The location of the crossing is shown in Figure 1. The site is currently used for agricultural purposes. The surface is flood irrigated from about May through October. The surface was dry at the time of this study.

Subsurface conditions were explored on November 17, 2020 by drilling two borings at the locations indicated in Figure 2. Borings were drilled 20 feet deep. Graphical logs of the subsurface conditions observed, locations of sampling, and further explanation of the exploration performed are presented in the boring logs and accompanying Key to Symbols contained in Appendix A.

Cesare personnel returned samples obtained during field exploration to its laboratory where professional staff visually classified them and assigned testing to selected samples to evaluate pertinent engineering properties. Laboratory tests performed consisted of grain size analysis and Atterberg limits for classification purposes. The laboratory test results are presented in Appendix B.

SUBSURFACE CONDITIONS

Cesare's exploratory borings encountered:

- 2 to 3 feet of topsoil with organic fines.
- a gravelly sand on the north side of US Highway 50. The gravelly sand was silty, medium dense, moist to wet, and light brown to brown in color. Groundwater was encountered at a depth of 5 feet at the time of drilling. The boring caved at a depth of 12 feet. The gravelly sand extended to the full depth explored of 20 feet.
- a sandy gravel on the south side of US Highway 50. The sandy gravel was silty, clayey, poorly graded, dense, very moist to wet, and brown to dark brown in color. Groundwater

was encountered at a depth of 3 feet at the time of drilling. The boring caved at a depth of 3 feet. The gravelly sand extended to the full depth explored of 20 feet.

- C no bedrock to depths of 20 feet.

Groundwater can be expected to fluctuate and can be influenced by variations in seasons, weather, precipitation, drainage, vegetation, and the onset of flood irrigation. Discontinuous zones of perched water may exist or develop above ice lenses during spring snowmelt. Cesare's field explorations were performed during the fall when groundwater levels are usually lowest. Groundwater levels will be higher in the spring, summer, and early fall.

GROUNDWATER

Groundwater will be encountered in the bore pits. The groundwater is expected to be at the surface when the vicinity is undergoing flood irrigation. Surface water from irrigation will also be present. Dewatering will be required.

EXCAVATIONS

Conventional earthmoving equipment should be adequate to excavate the onsite soil. The gravelly sands and sandy gravels will flow when beneath the groundwater table. Dewatering will be required. A contractor specializing in dewatering should be contacted. All excavations should be properly sloped and/or braced, and local and federal safety codes should be observed. Slopes and other areas void of vegetation should be protected against erosion. If temporary shoring is required a contractor specializing in design and construction of shoring should be contacted.

It is the contractor's responsibility to provide safe working conditions and comply with the regulations in OSHA Standards-Excavations, 29 CFR Part 1926. The following guidelines are provided for planning purposes. Sloping and shoring requirements must be evaluated at the time of construction by the contractor's competent person as defined by OSHA. OSHA classifications for various material types and the steepest allowable slope configuration corresponding to those classifications are shown in Table 1.

TABLE 1. Allowable Slope Configuration for Onsite Material

Material Type	OSHA Classification	Steepest Allowable Slope Configuration*
Gravelly sands and sandy gravels	Type C	1-1/2:1

* Units horizontal to units vertical. The values shown apply to excavation less than 20 feet in height. Conditions can change and evaluation is the contractor's responsibility.

The classifications and slope configurations in Table 1 assume that excavations are above the groundwater table, there is no standing water in the excavations, and there is no seepage from the slope into the excavations. The above classifications and slope configurations assume that the material in the excavations is adversely bedded, left open to desiccate, crack, or slough, and are protected from surface runoff. There are other considerations regarding allowable slope configurations that the contractor is responsible for, including proximity of equipment, stockpiles, and other surcharge loads to the excavation. The contractor's competent person is responsible for all decisions regarding slope configuration and safety conditions for excavations.

Excavations should not undermine existing foundation systems of structures or infrastructure unless they are adequately protected. At a minimum, new excavations should not intersect a line drawn on a 34 degree angle down and away from the bottom edge of infrastructure. If this condition cannot be met, shoring or staged excavations may be required. If shoring is required, a condition survey of the adjacent structures is recommended before construction starts and upon completion of construction. In Cesare's experience, condition surveys include, but may not be limited to photographs of any distress to adjacent infrastructure.

The exploration locations for this study were selected to obtain a reasonably accurate depiction of underground conditions. Variations from the soil conditions encountered are possible. The findings of this study are valid as of the date its preparation. Changes in the conditions of a property can occur with the passage of time, whether due to natural processes or the works of people on this or adjacent properties. Cesare's scope of services for this report did not include either specifically, or by implication, any environmental assessment of the site or identification of contaminated or hazardous material or conditions.

Please contact Cesare with any questions or comments regarding this information.

Sincerely,
CESARE, INC.

Darin R. Duran, P.E.
Principal, Manager - Salida and Crested Butte

DRD/ksm

Attachments

cc: Mr. Joe DeLuca, P.E., Crabtree Group, Inc., jdeluca@crabtreegroupinc.com
Mr. Tracy Vandaveer, P.E., Crabtree Group, Inc., tvandaveer@crabtreegroupinc.com

BASEMAP FROM GOOGLE EARTH PRO

N

0 1250' 2500'

Scale in Feet

PROJECT NO:	20.6050		
PROJECT NAME:	Gunnison Rising Phase 1 (Bore Pits)		
DRAWN BY:	RCK	CHECKED BY:	DD
DWG DATE:	01.14.21	REV. DATE:	--

FIGURE 1
Site Vicinity

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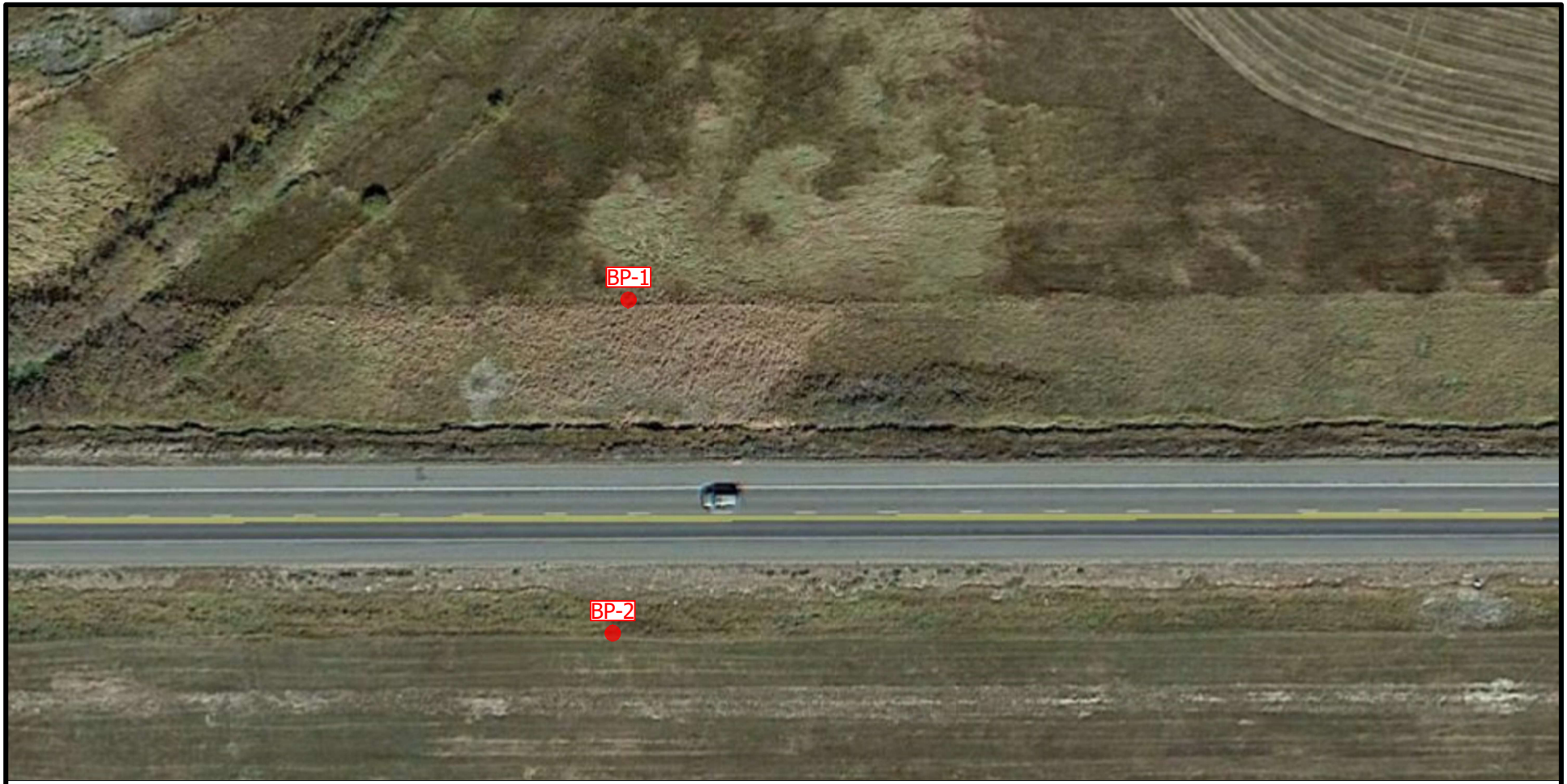

BASEMAP FROM GOOGLE EARTH PRO

LEGEND:

BP-1 BORE LOCATIONS

N

0 75' 150'

Scale in Feet

PROJECT NO:	20.6050		
PROJECT NAME:	Gunnison Rising Bore Pits		
DRAWN BY:	RCK	CHECKED BY:	DD
DWG DATE:	01.14.21	REV. DATE:	--

FIGURE 2
Location of Exploratory Borings

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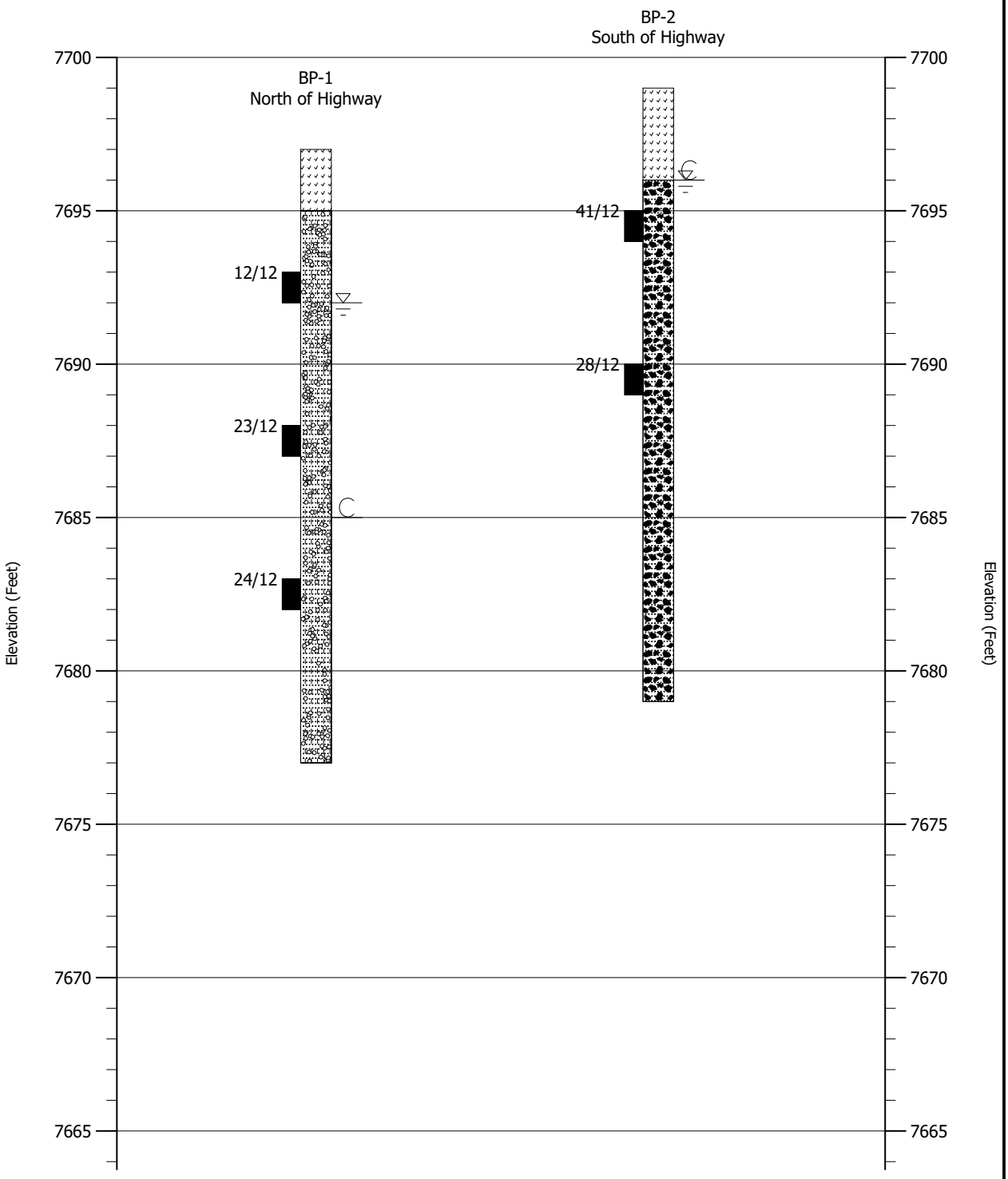
APPENDIX A

Field Exploration

FIELD EXPLORATION DRILLING

Samples of the subsoil were obtained at this site using a modified California sampler which was driven into the soil by dropping a 140 pound hammer through a free fall of 30 inches. The modified California sampler is a 2-1/2 inch outside diameter by 2 inch inside diameter device lined with brass tubes. The procedure to drive the modified California sampler into the soil and to record the number of blows required to drive the sampler into the soil is known as a penetration test. The number of blows required for the sampler to penetrate 12 inches gives an indication of the relative density of non-cohesive soil material encountered. Bulk samples were collected from cuttings generated during drilling. Locations of penetration test results are presented on the boring logs and key to symbols/legend contained in this Appendix.



LOGS OF EXPLORATORY BORINGS

PROJECT NO:	20.6050
PROJECT NAME:	Gunnison Rising Phase I (Bore Pits)
DWG DATE:	1/14/2021

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KEY TO SYMBOLS

Symbol Description

Strata symbols

Topsoil

SAND, gravelly, silty, medium dense, moist to wet, light brown to brown (SM; A-2-4 to A-1-b).

SAND, gravelly to GRAVEL, sandy, silty, clayey, dense, poorly graded, very moist to wet, brown to dark brown (GP, GC, GM; A-1-a to A-1-b).

Misc. Symbols

Water level during drilling

Depth to caving

Soil Samplers

Modified California sample

Notes:

1. 12/12 indicates that 12 blows with a 140-pound hammer falling 30 inches were required to drive a modified California sampler 12 inches.

2. Exploratory borings were drilled on November 17, 2020 using a CMR-55 track mounted drill rig equipped with a 4-inch continous flight solid stem auger.

3. Groundwater was encountered at various depths at the time of drilling. Botings were backfilled at the completion of this study.

4. Contacts between soil units are approximate and may be gradational.

5. These logs are subject to the limitations, conclusions, and recommendations in this report.
Project No. 20.6050.

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APPENDIX B

Laboratory Testing

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SUMMARY OF LABORATORY TEST RESULTS
Gunnison Rising Phase 1 (Bore Pits)
Project No. 20.6050

Sample Location		Gradation			Atterberg Limits		
Boring	Depth (feet)	Gravel (%)	Sand (%)	Silt/ Clay (%)	Liquid Limit (%)	Plasticity Index (%)	Material Type
BP-1	5 to 10	24	52	24	NV	NP	(SM) Silty sand with gravel; A-2-4(0)
BP-1	10 to 20	39	43	18	NV	NP	(SM) Silty sand with gravel; A-1-b
BP-2	9	48	47	5			(GP-GM) Poorly graded gravel with sand and silt; A-1-a
BP-2	15 to 20	45	35	20	NV	NP	(GM) Silty gravel with sand; A-1-b

NP = non plastic
NV = no value

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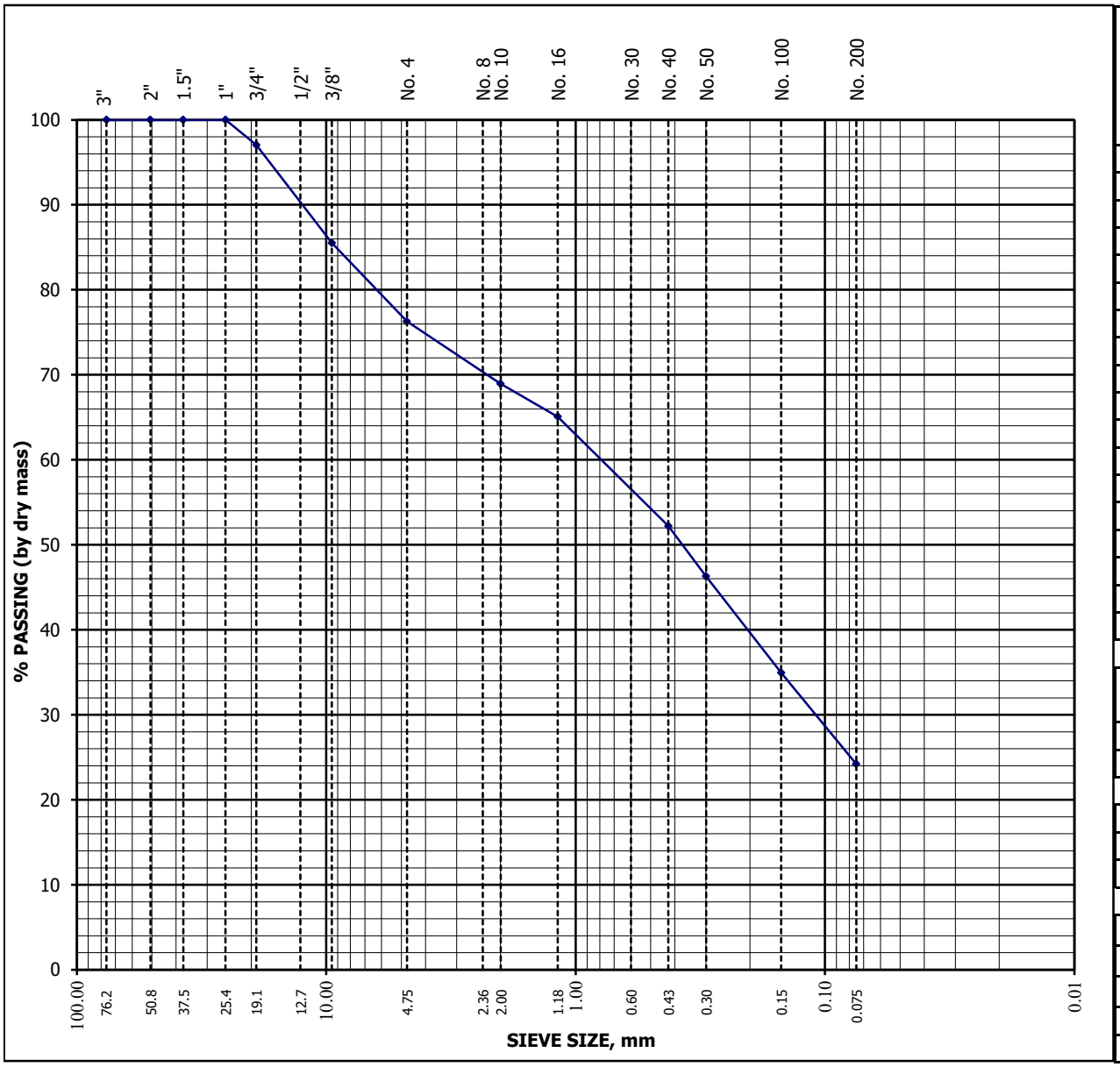
GRADATION PLOT - SOIL & AGGREGATE

Project Number:	20.6050, Gunnison Valley Properties, LLC.	Date:	20-Dec-20
Project Name:	Gunnsion Rising Phase 1 (Bore Pits)	Technician:	K. Frazier
Lab ID Number:	SC2020129	Reviewer:	D. Duran
Sample Location:	BP-1 at 5' to 10'		
Visual Description:	SAND, silty with gravel, brown		

AASHTO M 145 Classification: A-2-4 Group Index: 0

Unified Soil Classification System (ASTM D 2487): (SM) Silty sand with gravel



Sieve Size	% Passing
3"	
2"	
1.5"	
1"	100
3/4"	97
1/2"	
3/8"	86
#4	76
#8	
#10	69
#16	65
#30	
#40	52
#50	46
#100	35
#200	24.2

Moisture (M) & Density (D)	
M, %:	16.7
D, pcf:	

LL	NV
PL	NP
PI	NP

D_{60}	
D_{30}	
D_{10}	
Cu	
Cc	

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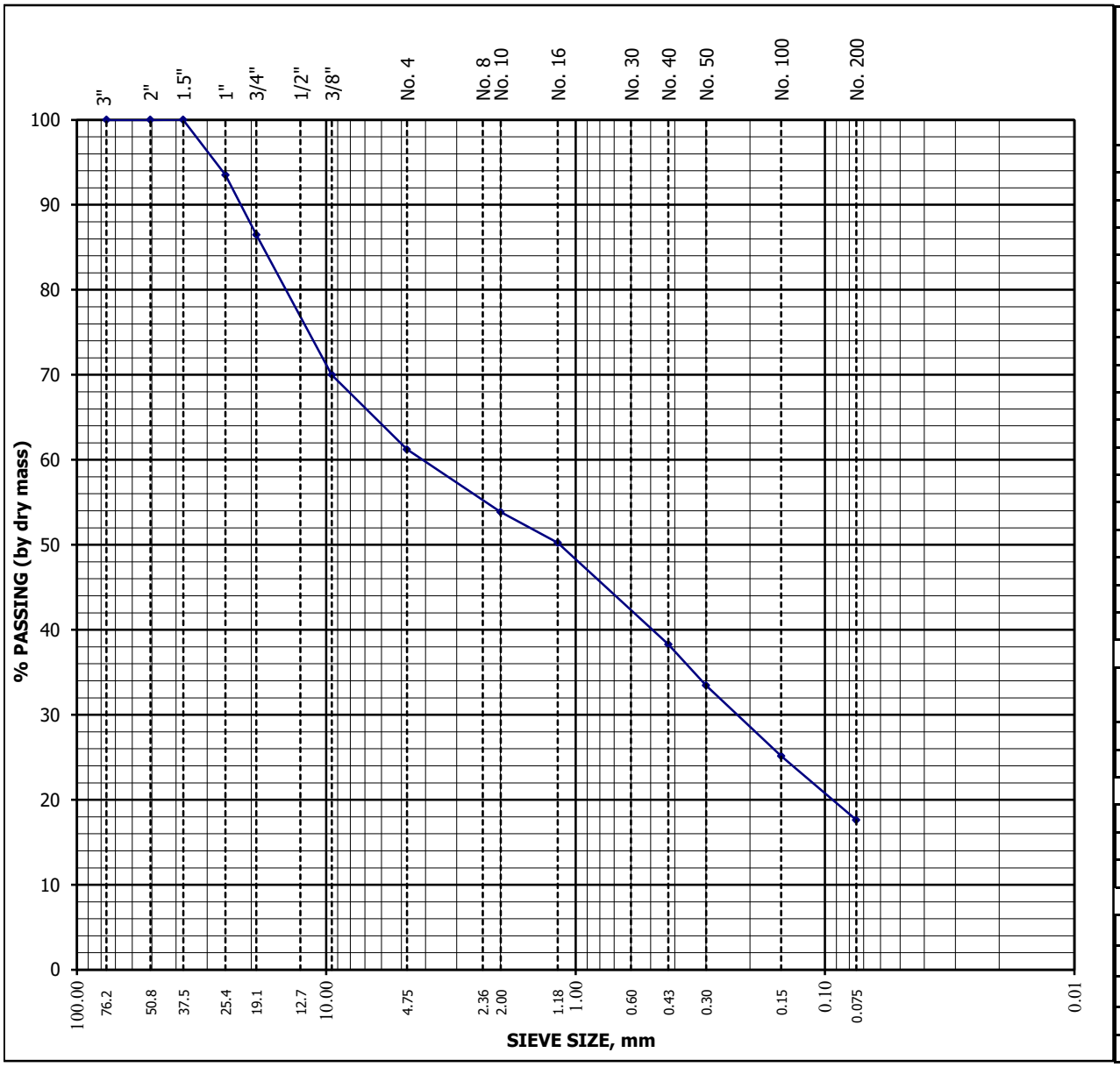
GRADATION PLOT - SOIL & AGGREGATE

Project Number:	20.6050, Gunnsion Valley Properties, LLC.	Date:	20-Dec-20
Project Name:	Gunnison Rising Phase 1 (Bore Pits)	Technician:	K. Frazier
Lab ID Number:	SC2020130	Reviewer:	D. Duran
Sample Location:	BP-1 at 10' to 20'		
Visual Description:	SAND silty with gravel, brown		

AASHTO M 145 Classification: **A-1-b** **Group Index:** **0**

Unified Soil Classification System (ASTM D 2487): **(SM)** **Silty sand with gravel**



Sieve Size	% Passing
3"	
2"	
1.5"	100
1"	94
3/4"	86
1/2"	
3/8"	70
#4	61
#8	
#10	54
#16	50
#30	
#40	38
#50	33
#100	25
#200	17.6

Moisture (M) & Density (D)	
M, %:	14.7
D, pcf:	

LL	NV
PL	NP
PI	NP

D_{60}	
D_{30}	
D_{10}	
Cu	
Cc	

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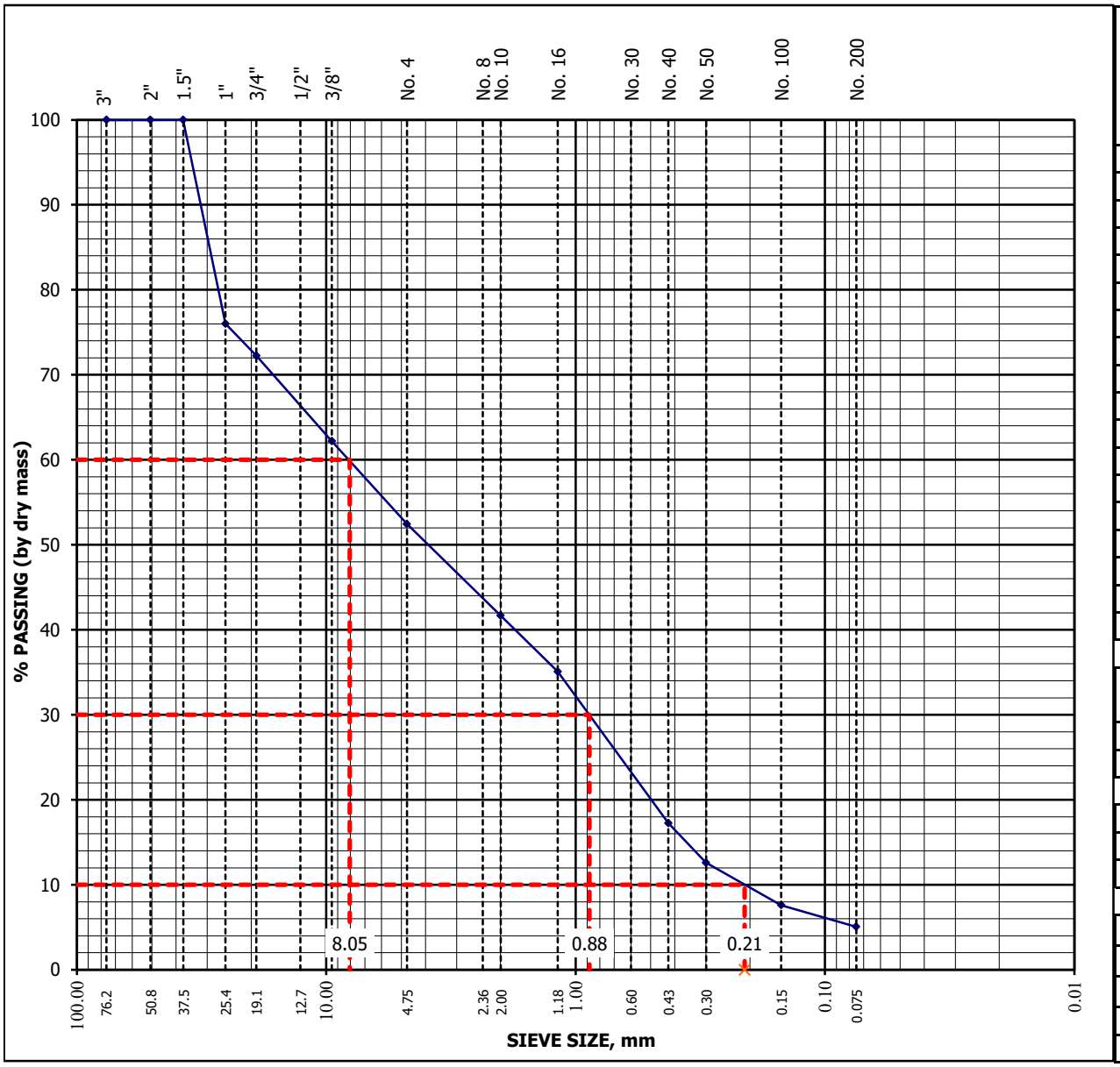
GRADATION PLOT - SOIL & AGGREGATE

Project Number:	20.6050, Gunnison Valley Properties, LLC.	Date:	20-Dec-20
Project Name:	Gunnison Rising Phase 1 (Bore Pits)	Technician:	K. Frazier
Lab ID Number:	SC2020131	Reviewer:	D. Duran
Sample Location:	BP-2 at 9'		
Visual Description:	GRAVEL, sandy, dark brown		

AASHTO M 145 Classification: **A-1-a** **Group Index:** _____

Unified Soil Classification System (ASTM D 2487): **(GP-GM) Poorly graded gravel with sand and silt**



Sieve Size	% Passing
3"	
2"	
1.5"	100
1"	76
3/4"	72
1/2"	
3/8"	62
#4	52
#8	
#10	42
#16	35
#30	
#40	17
#50	13
#100	8
#200	5.1

Moisture (M) & Density (D)	
M, %:	7.5
D, pcf:	

LL	
PL	
PI	

D_{60}	8.05
D_{30}	0.88
D_{10}	0.21
Cu	**38.33**
Cc	**0.46**

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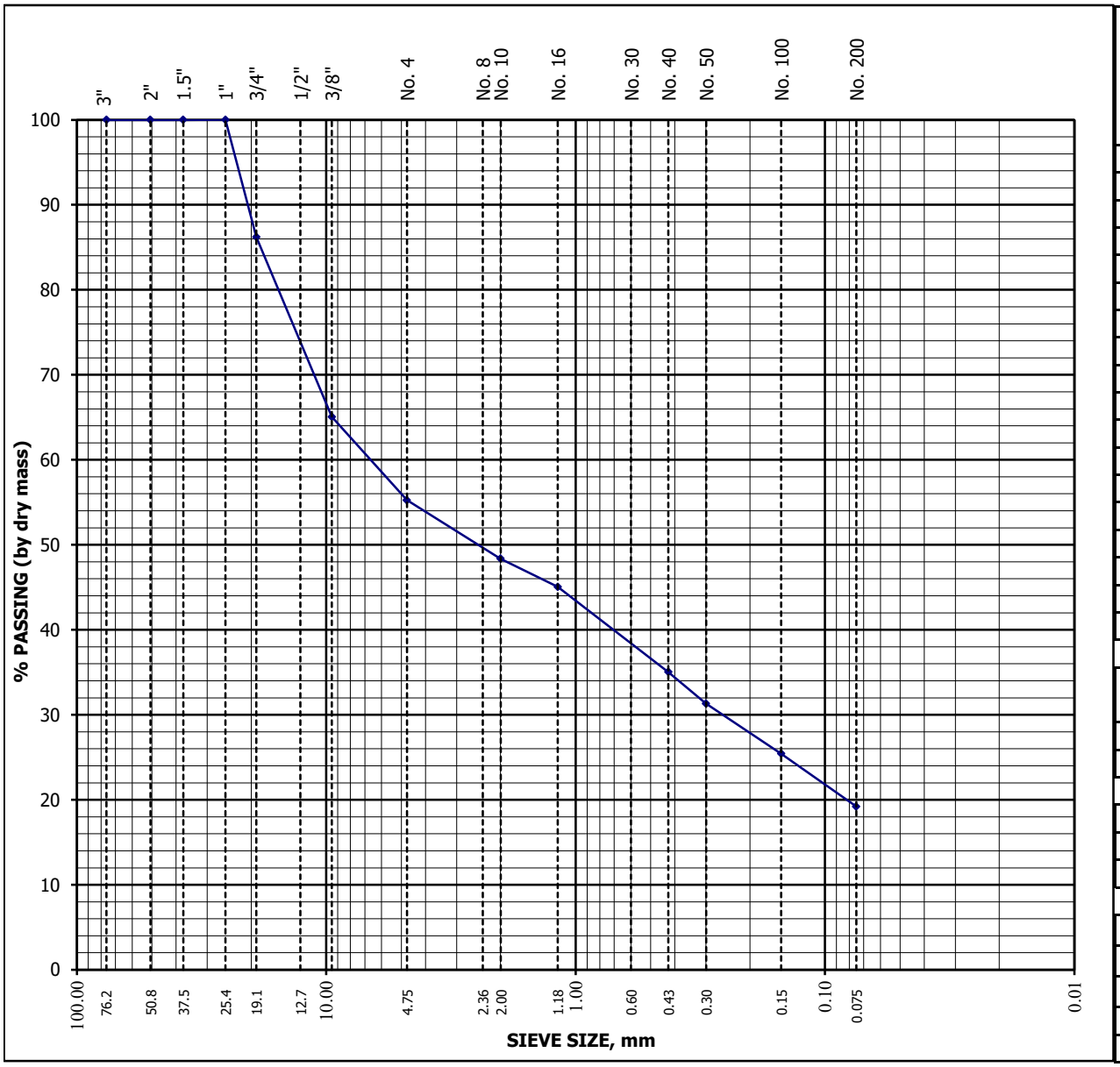
GRADATION PLOT - SOIL & AGGREGATE

Project Number:	20.6050, Gunnison Valley Properties, LLC.	Date:	20-Dec-20
Project Name:	Gunnison Rising Phase 1 (Bore Pits)	Technician:	K. Frazier
Lab ID Number:	SC2020132	Reviewer:	D. Duran
Sample Location:	BP-2 at 15' to 20'		
Visual Description:	GRAVEL, sandy, silty, dark brown		

AASHTO M 145 Classification: **A-1-b** **Group Index:** _____

Unified Soil Classification System (ASTM D 2487): **(GM)** **Silty gravel with sand**



Sieve Size	% Passing
3"	
2"	
1.5"	
1"	100
3/4"	86
1/2"	
3/8"	65
#4	55
#8	
#10	48
#16	45
#30	
#40	35
#50	31
#100	25
#200	19.2

Moisture (M) & Density (D)	
M, %:	13.0
D, pcf:	

LL	
PL	
PI	

D_{60}	
D_{30}	
D_{10}	
Cu	
Cc	