



Huddleston-Berry
Engineering & Testing, LLC

**GEOTECHNICAL AND GEOLOGIC
HAZARDS INVESTIGATION
STUDENT HOUSING
COLORADO MESA UNIVERSITY
GRAND JUNCTION, COLORADO
PROJECT#00569-0070**

**COLORADO MESA UNIVERSITY
1100 NORTH AVENUE
GRAND JUNCTION, COLORADO 81501**

MAY 9, 2026

**Huddleston-Berry Engineering and Testing, LLC
2789 Riverside Parkway
Grand Junction, Colorado 81501**

SUMMARY OF CONCLUSIONS AND RECOMMENDATIONS

A geologic hazards and geotechnical investigation was conducted for a new student housing facility at Colorado Mesa University in Grand Junction, Colorado. The project location is shown on Figure 1 – Site Location Map. The purpose of the investigation was to evaluate the surface and subsurface conditions at the site with respect to foundation design, geologic hazards, pavements, and earthwork for the proposed construction. This summary has been prepared to include the information required by civil engineers, structural engineers, and contractors involved in the project.

Subsurface Conditions (p. 2)

The subsurface investigation consisted of five borings, drilled on May 1st, 2026. The locations of the borings are shown on Figure 2 – Site Plan. The borings generally encountered soft native clay soils above dense gravel and cobble soils. Groundwater was encountered at depths of between 6.0 and 11.0 feet at the time of the investigation. The native clay soils were indicated to be slightly plastic and are anticipated to be slightly collapsible.

Geologic Hazards and Constraints (p. 3)

No geologic hazards were identified which would preclude construction on this site. However, moisture sensitive soils were encountered during the subsurface investigation and these materials may impact the design and construction of foundations, pavements, etc. In addition, shallow groundwater and associated soft soil conditions may impact the design and construction.

Summary of Foundation Recommendations

- *Foundation Type* – Driven Piles, Helical Piles, or Post-Tensioned Slab. (p. 4)

Driven Piles

- *Anticipated Length* – 53 to 64 feet (from existing grade) anticipated. (p. 4)
- *Axial Capacity* – 50 tons. (p. 4)

Helical Piles

- *Anticipated Length* – 55 to 69 feet (from existing grade) anticipated. (p. 5)
- *Axial Capacity* – 40 tons without load testing. Higher capacity possible with pile load testing. (p. 5)

Post-Tensioned Slab

- *Structural Fill Thickness* – Minimum 24-inches. (p. 5)
- *Structural Fill Materials* – Native clay soils or imported materials approved by HBET. (p. 5)
- *Allowable Bearing Capacity* – 1,500 psf. (p. 6)
- *Subgrade Modulus* – 150 pci for native clay. 250 pci for imported fill. (p. 6)
- *PT Design Coefficients (p. 6):*

	Center Lift	Edge Lift
e_m	9.0 ft	4.7 ft
y_m	0.25 in.	1.0 in.

Other Foundation Criteria

- *Seismic Design* – Site Class D (p. 6)
- *Lateral Earth Pressure* – 45 pcf active. 65 pcf at-rest. 150 pcf passive. (p. 8)

Summary of Pavement Recommendations (p. 9)

Automobile Parking Areas

ESAL's = 50,000; Structural Number = 2.75

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete Pavement	TOTAL
A	3.0	10.0			13.0
B	4.0	7.0			11.0
C	3.0	6.0	6.0		15.0
D		6.0		6.0	12.0

Truck Traffic Areas

ESAL's = 300,000; Structural Number = 3.70

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete Pavement	TOTAL
A	3.0	17.0			20.0
B	4.0	14.0			18.0
C	3.0	6.0	16.0		25.0
D		6.0		8.0	14.0

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FIGURES

Figure 1 – Site Location Map

Figure 2 – Site Plan

APPENDICES

Appendix A – UDSA NRCS Soil Survey Data

Appendix B – Typed Boring Logs

Appendix C – Laboratory Testing Results

1.0 INTRODUCTION

As part of continued expansion of their facilities, Colorado Mesa University (CMU) proposes to build a new student housing facility on the campus. As part of the design development process, Huddleston-Berry Engineering and Testing, LLC (HBET) was retained by CMU to conduct a geotechnical investigation at the site.

1.1 Scope

As discussed above, a geologic hazards and geotechnical investigation was conducted for a new student housing on the CMU campus in Grand Junction, Colorado. The scope of the investigation included the following components:

- Conducting a subsurface investigation to evaluate the subsurface conditions at the site.
- Collecting soil samples and conducting laboratory testing to determine the engineering properties of the soils at the site.
- Providing preliminary recommendations for foundation type
- Providing recommendations for lateral earth pressure.
- Providing recommendations for drainage, grading, and general earthwork.
- Providing recommendations for pavements.
- Evaluating potential geologic hazards at the site.

The investigation and report were completed by a Colorado registered professional engineer in accordance with generally accepted geotechnical and geological engineering practices. This report has been prepared for the exclusive use of Colorado Mesa University.

1.2 Site Location and Description

The site is located in the western part of the Colorado Mesa University campus in Grand Junction, Colorado. The project location is shown on Figure 1 – Site Location Map.

At the time of the investigation, most of the site consisted of gravel paved parking lot. The site was fairly flat. The site was bordered to the north by Bunting Avenue, to the south by gravel parking lots and Glenwood Avenue, to the west by existing residences, and to the east by gravel parking lots and the Centennial Village dormitory.

1.3 Proposed Construction

The proposed construction is anticipated to include a new student housing structure. New utilities will also be included in the construction. New pavements may also be included in the construction.

2.0 GEOLOGIC SETTING

2.1 Soils

Soils data was obtained from the USDA Natural Resource Conservation Service Web Soil Survey. The data indicates that the soils at the site consist of Sagers-Urban land complex, 0 to 2 percent slopes. Soil survey data is included in Appendix A.

Structure construction in the site soils is described as being not limited to somewhat limited due to shrink-swell. The site soils are indicated to have a moderate potential for frost action, moderate risk of corrosion of uncoated steel, and moderate risk of corrosion of concrete.

2.2 Geology

According to the *Geologic Map of the Grand Junction Quadrangle, Mesa County, Colorado* (2002), the site is underlain by alluvium and colluvium deposits.

2.3 Groundwater

Groundwater was encountered in the subsurface at depths of between 6.0 and 11.0 feet at the time of the investigation.

3.0 FIELD INVESTIGATION

3.1 Subsurface Investigation

The subsurface investigation was conducted on May 1st, 2026 and consisted of five borings, drilled to depths ranging from 53.0 to 57.0 feet below the existing ground surface. The locations of the borings are shown on Figure 2 – Site Plan. Typed boring logs are included in Appendix B. Samples of the subsurface soils were collected during Standard Penetration Testing (SPT) and using bulk sampling methods at the locations shown on the logs.

As indicated on the logs, the subsurface conditions at the site were fairly consistent. The borings encountered approximately 6-inches of gravel pavement above brown, moist to wet, very soft to medium stiff lean clay to lean clay with sand soils to depths of between 50.0 and 53.5 feet. The clay soils were underlain by brown, wet, dense to very dense sandy gravel and cobbles to the bottoms of the borings. As discussed previously, groundwater was encountered at depths of between 6.0 and 11.0 feet at the time of the investigation.

3.2 Field Reconnaissance

The field reconnaissance included walking the site during the subsurface investigation. In general, the site was occupied by existing gravel parking lots. No evidence of active landslides, debris flows, rockfalls, etc. was observed.

4.0 LABORATORY TESTING

Selected soil samples collected from the borings were tested in the Huddlestone-Berry Engineering and Testing LLC geotechnical laboratory for natural moisture content determination, grain-size analysis, Atterberg limits determination, and maximum dry density and optimum moisture content (Proctor) determination. The laboratory testing results are included in Appendix C.

The laboratory testing results indicate that the native soils are slightly plastic. In general, based upon the Atterberg limits and upon our experience with similar soils in the vicinity of the subject site, the native soils are anticipated to be slightly collapsible at their existing density.

5.0 GEOLOGIC INTERPRETATION

5.1 Geologic Hazards

The primary geologic hazard identified on the site is the presence of moisture sensitive soils in the shallow subsurface.

5.2 Geologic Constraints

In general, the primary geologic constraint to construction at the site is the presence of moisture sensitive soils. However, shallow groundwater and associated soft soil conditions may also impact the construction.

5.3 Water Resources

No water supply wells were observed on the property. As discussed previously, groundwater was shallow at this site. However, with proper design and construction, development of the site is not anticipated to adversely affect surface water or groundwater.

5.4 Mineral Resources

Potential mineral resources in Western Colorado generally include sand, gravel, uranium ore, and commercial rock products such as flagstone. As discussed previously, gravels were encountered in the subsurface. However, the gravels were deep. In general, based upon the size of the site and existing land use, HBET does not believe that commercial quality mineral resources exist at this site.

6.0 CONCLUSIONS

Based upon the available data sources, field investigation, and nature of the proposed construction, HBET does not believe that there are any geologic conditions which should preclude construction at this site. However, foundations, pavements, and earthwork will have to consider the impacts of moisture sensitive soils. In addition, the construction may be impacted by the presence of shallow groundwater.

7.0 RECOMMENDATIONS

7.1 Foundations

As indicated on the boring logs, the native soils are very soft for much of the soil profile and will provide limited structural support. As a result, deep foundations such as driven piles and helical piles are appropriate foundation alternatives. However, HBET understands that a post-tensioned slab foundation is being considered for the structure. A post-tensioned slab is an appropriate alternative; however, the bottom of foundation should be kept as high as possible to reduce the likelihood of encountering soft soils in the foundation excavation. The alternatives are discussed below.

Driven Piles

It is anticipated that most of the axial pile capacity will be developed in end bearing in the dense gravel and cobble soils. Therefore, concrete filled pipe piles are recommended.

Based upon the anticipated working loads and pile driving conditions, pipe piles should be a minimum of 10¾ inch diameter. The piles should penetrate the clay and silt soils and bear into the dense gravel and cobble soils. The actual penetration of individual piles will be dependent upon driving conditions and size of pile used; however, it is anticipated that the piles will reach refusal within 3 to 10 feet of the top of the gravel and cobble layer. Therefore, pile lengths of up to approximately 64 feet (from existing grade) may be possible.

The refusal criterion for driven piles is dependent upon the type and size of the hammer. However, the refusal criteria should be established as the number of blows required for the last few inches of penetration. For a hammer delivering 20,000 foot-pounds of energy to a 10¾ inch pipe pile, we would expect refusal to be at approximately 5 to 8 blows per inch. However, the contractor should coordinate with HBET to develop specific pile refusal criteria for the specific hammer. Due to the nature of the gravel and cobble soils, to reduce the possibility of excessive tip deflection and tip damage, pile tip reinforcement is recommended.

For 10¾-inch diameter, concrete filled pipe piles driven to refusal, HBET recommends an allowable geotechnical capacity of 50 tons. In general, a minimum 3/8-inch wall thickness is recommended. However, ¼-inch wall thickness may be utilized provided the structural engineer and/or contractor can verify that the driving stresses will not damage the thinner walled piles. The lateral capacity of the piles should consider the low lateral support provided by the soft clay soils.

To eliminate reductions in capacity from group effects, the minimum center-to-center spacing of piles should be 3 pile diameters. Group effects should be considered for piles grouped less than 3 diameters apart.

In general, for steel pipe piles driven to refusal, HBET anticipates total settlement to be 1.0-inch or less.

Helical Piles

Helical piles consist of circular or square steel shafts with load carrying helices attached to them. Some of these types of piers are proprietary. In general, the precise type, size, and quantity of piles should be established by the contractor in conjunction with the structural engineer. However, HBET provides the following design comments.

In general, helical piles should be designed to penetrate the upper clay and sand soils and bear into the dense gravel and cobble soils. To eliminate reductions in capacity from group effects, the piles should be spaced a distance equal to three times the diameter of the largest helix. It is anticipated that the helical piles will reach refusal within 5 to 15 feet of the top of the gravels. Therefore, pile lengths of up to approximately 69 feet (from existing grade) may be possible.

Based upon our experience on the CMU campus with other projects utilizing helical piles, an allowable axial capacity of 40 tons is appropriate for piles with a minimum shaft diameter of 4-inches without load testing. However, higher capacities are possible depending upon the results of pile load testing conducted on the project site prior to final design. Also, the design of helical piles should consider the low lateral support provided by the shallow native soils and slenderness buckling should be evaluated for small diameter helical piles. In addition, where necessary, piles battered up to 15° should be utilized to carry lateral loads.

In general, for properly installed helical piles, HBET anticipates total settlement to be 1.0-inch or less.

Post-Tensioned Slab

As discussed previously, the native clay soils are moisture sensitive. Therefore, in order to create a uniform bearing stratum and reduce the potential for excessive differential movements, it is recommended that the slab be constructed above a minimum of 24-inches of structural fill.

The native soils, exclusive of any deleterious materials, are suitable for reuse as structural fill. Imported structural fill should consist of a granular, non-expansive, **non-free draining** material with greater than 10% passing the #200 sieve and Liquid Limit of less than 30. However, all proposed imported structural fill materials should be approved by HBET.

Prior to placement of structural fill, it is recommended that the bottom of the foundation excavation be scarified to a depth of 6 to 8-inches, moisture conditioned, and re-compacted to a minimum of 95% of the standard Proctor maximum dry density, within 0 to -2% of the optimum moisture content as determined in accordance with ASTM D698. However, as discussed previously, soft soil conditions were encountered at the site, and this may make compaction of the subgrade difficult. It may be necessary to utilize geotextile and/or geogrid in conjunction with up to 30-inches of additional granular fill to stabilize the subgrade. HBET should be contacted to provide specific recommendations for subgrade stabilization based upon the actual conditions encountered during construction.

Structural fill should extend laterally beyond the edges of the foundation a minimum of 24-inches. Structural fill should be moisture conditioned, placed in maximum 8-inch loose lifts, and compacted to a minimum of 95% of the standard Proctor maximum dry density for fine grained soils or modified Proctor maximum dry density for coarse grained soils, within 0 to -2% of the optimum moisture content as determined in accordance with ASTM D698 or D1557C, respectively.

For foundation building pad preparation as recommended with structural fill consisting of the native soils or imported granular materials, a maximum allowable bearing capacity of 1,500 psf may be used. In addition, a modulus of subgrade reaction of 150 pci may be used for structural fill consisting of the native soils and a modulus of 250 pci may be used for approved imported structural fill. Foundations subject to frost should extend at least 24-inches below the final grade for frost protection.

In accordance with the *Design of Post-Tensioned Slabs-on-Ground* by the Post-Tensioning Institute, 3rd Edition, for post-tensioned slab foundations, the estimated Edge Moisture Variation Distance (e_m) and Differential Soil Movement (y_m) are summarized in the following table.

	Center Lift	Edge Lift
e_m	9.0 ft	4.7 ft
y_m	0.25 in.	1.0 in.

In general, for a properly constructed post-tensioned slab foundation, HBET anticipates total settlement to be 1.5-inches or less.

7.2 Seismic Design Criteria

As discussed above, the subsurface profile at the site generally consists of soft clay and silt soils above dense gravel and cobble soils. In general, the low blow counts (N-values) in some of the borings suggest that the site should be classified as seismic Site Class E. However, HBET was provided with a report titled *Geophysical Report for Refraction Micro-Tremor (ReMi) Seismic Survey, Mesa State College – Residence Halls, Grand Junction, Colorado* prepared by Zonge Geosciences, Inc., dated January 20, 2006. The report summarizes a seismic refraction survey conducted for residence halls located on the campus. The purpose of the survey was to determine the shear wave velocity of the upper soils to refine the seismic site classification. In addition, HBET has reviewed the results of other seismic refraction surveys in the vicinity of the CMU campus.

Based upon the results of the geophysical investigations, the seismic site class was determined to be Site Class D. In general, due to reasonable consistency in the subsurface conditions across the Colorado Mesa University campus, HBET believes that Site Class D can be used at the parking garage site in accordance with the International Building Code.

7.3 Lateral Resistance for Seismic and Wind Loads

As discussed above, the native clay soils are soft through most of the profile and are anticipated to provide limited lateral capacity for deep foundations. Based upon the results of the subsurface investigation, the following soil parameters are recommended for use in lateral pile capacity analyses:

Depth from Grade (in).	0 to 72	72+
Soil Type	Soft Clay	Soft Clay
Density (pci)	0.0637	0.0318
Cohesion (psi)	3	3
Friction Angle (ϕ)	0	0
ϵ_{50} (in/in)	0.02	0.02
K (pci)	30	30

In addition to lateral resistance of the piles, lateral resistance can be developed from sliding friction between the floor slab or post-tensioned slab and the ground. In general, for the native soils, a sliding friction angle of 18° is recommended. This corresponds to a friction factor of 0.32.

7.4 Flooring and Exterior Flatwork

As discussed previously, moisture sensitive soils were encountered at the site. In general, with deep foundations, the only way to eliminate the risk of differential movement of the flooring would be to use a framed first floor or structural floor slab supported by the foundations. However, this may be cost prohibitive. Where a conventional floating floor slab is used, to reduce the potential for excessive differential movement, it is recommended that the floor slab be constructed above a minimum of 24-inches of structural fill with subgrade preparation, structural fill materials, and structural fill placement in accordance with the *Foundations* section of this report. It is recommended that exterior slabs-on-grade be constructed above a minimum of 12-inches of structural fill.

Due to the presence of shallow groundwater, a capillary break and vapor retarder are recommended below floor slabs where moisture sensitive floor coverings are utilized.

7.5 Corrosion of Concrete and Steel

As discussed previously, the USDA Soil Survey data suggests that the native soils have a moderate risk of corrosion of concrete. Therefore, at a minimum, Type I-II sulfate resistant cement is recommended for construction at this site.

The Soil Survey data indicates that the native soils are moderately corrosive to uncoated steel. Based upon our experience on the CMU campus, HBET believes that the native soils have a resistivity of less than 1,000 ohm-cm. Pile design should consider corrosion in their design based upon these resistivity values either through galvanization or accounting for section loss.

7.6 Lateral Earth Pressures

Stemwalls or retaining walls should be designed to resist lateral earth pressures. For backfill consisting of the native soils or imported granular, non-free draining, non-expansive material, an active equivalent fluid unit weight of 45 pcf may be used in areas where no surcharge loads are present. An at-rest equivalent fluid unit weight of 65 pcf may be used for braced walls. Due to the magnitude of movement necessary to mobilize passive pressures, HBET recommends that passive pressures be limited to an equivalent fluid unit weight of 150 pcf. Lateral earth pressures should be increased as necessary to reflect any surcharge loading behind the walls.

7.7 Grading and Drainage

Grading and drainage at the site are critical to the long-term performance of structure foundations and slabs-on-grade. Grading around the structure should be designed to carry precipitation and runoff away from the structure. It is recommended that the finished ground surface drop at least twelve inches within the first ten feet away from the structure. However, where impermeable surfaces (i.e. sidewalks, pavements, etc.) are adjacent to the structure, the grade can be reduced to 2.5-inches (ADA grade) within the first ten feet away from the structure.

HBET recommends that surface downspout extensions be used which discharge 15 feet from the structures or beyond the backfill zone, whichever is greater. However, if subsurface downspout drains are utilized, they should be carefully constructed of solid-wall PVC and should daylight a minimum of 15-feet from the structure. In addition, an impermeable membrane is recommended below subsurface downspout drain lines. Dry wells should not be used.

7.8 Below Grade Construction

As discussed previously, shallow groundwater was encountered in the borings at depths as shallow as 6.0 feet. Therefore, any below grade construction should be waterproofed and include a drainage system to prevent standing water from accumulating inside the structure. Below grade portions of the structure may need to be anchored by deep foundations to resist buoyancy forces.

7.9 Excavations

Excavations in the soils at the site may stand for short periods of time but should not be considered to be stable. Therefore, trenching and excavations should be sloped back, shored, or shielded for worker protection in accordance with applicable OSHA standards. The native soils at the site generally classify as Type C soil with regard to OSHA's *Construction Standards for Excavations*. For Type C soils, the maximum allowable slope in temporary cuts is 1.5H:1V.

7.10 Pavements

The proposed construction may include new paved parking and/or truck traffic areas around the structure. From the subsurface investigation, the pavement subgrade soils at the site consist primarily of clay and silt soils. Due to the collapse potential of the native soils, the minimum recommended Resilient Modulus of 3,000 psi was used for the pavement section design.

Based upon the subgrade conditions and anticipated traffic loading, pavement section alternatives were developed in accordance with AASHTO design methodologies. The following minimum pavement section alternatives are recommended:

Automobile Parking Areas

ESAL's = 50,000; Structural Number = 2.75

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete Pavement	TOTAL
A	3.0	10.0			13.0
B	4.0	7.0			11.0
C	3.0	6.0	6.0		15.0
D		6.0		6.0	12.0

Truck Traffic Areas

ESAL's = 300,000; Structural Number = 3.70

ALTERNATIVE	PAVEMENT SECTION (Inches)				
	Hot-Mix Asphalt Pavement	CDOT Class 6 Base Course	CDOT Class 3 Subbase Course	Concrete Pavement	TOTAL
A	3.0	17.0			20.0
B	4.0	14.0			18.0
C	3.0	6.0	16.0		25.0
D		6.0		8.0	14.0

Prior to pavement placement, areas to be paved should be stripped of all topsoil, fill, or other unsuitable materials. It is recommended that the subgrade soils be scarified to a depth of 12-inches; moisture conditioned, and recompact to a minimum of 95% of the standard Proctor maximum dry density, within $\pm 2\%$ of optimum moisture content as determined by AASHTO T-99. However, as discussed previously, soft soils were encountered in some areas of the site and subgrade stabilization using geotextile and/or geogrid in conjunction with up to 30-inches of granular fill may be required in these areas. HBET should be contacted to provide specific recommendations for subgrade stabilization based upon the actual subgrade conditions during construction.

Aggregate base course and subbase course should be placed in maximum 9-inch loose lifts, moisture conditioned, and compacted to a minimum of 95% and 93% of the maximum dry density, respectively, at -2% to +3% of optimum moisture content as determined by AASHTO T-180. In addition to density testing, base course should be proofrolled to verify subgrade stability.

It is recommended that Hot-Mix Asphaltic (HMA) pavement conform to CDOT grading SX or S specifications and consist of an approved 75 gyrations Superpave method mix design. HMA pavement should be compacted to between 92% and 96% of the maximum theoretical density. An end point stress of 50 psi should be used. It is recommended that rigid pavements consist of CDOT Class P concrete or alternative approved by the Engineer. Dowels at transverse joints and tie bars at longitudinal joints should be considered to limit the potential for differential movements between panels. In addition, reinforcement of the concrete should be considered to limit cracking.

The long-term performance of the pavements is dependent on positive drainage away from the pavements. Ditches, culverts, and inlet structures in the vicinity of paved areas must be maintained to prevent ponding of water on the pavement.

8.0 GENERAL

The recommendations included above are based upon the results of the subsurface investigation and on our local experience. These conclusions and recommendations are valid only for the proposed construction.

As discussed previously, the subsurface conditions at the site were fairly consistent. However, the precise nature and extent of any subsurface variability may not become evident until construction. As a result, it is recommended that HBET provide construction materials testing and engineering oversight during the entire construction process.

It is important to note that the recommendations herein are intended to reduce the risk of structural movement and/or damage, to varying degrees, associated with volume change of the subsurface materials. However, HBET cannot predict long-term changes in subsurface moisture conditions and/or the precise magnitude or extent of volume change. Where significant changes in shallow subsurface moisture occur due to poor grading, improper stormwater management, utility line failure, excess irrigation, or other cause, either during construction or the result of actions of the property owners, several inches of movement are possible. In addition, any failure to comply with the recommendations in this report releases Huddlestone-Berry Engineering & Testing, LLC of any liability with regard to the performance of structures, flatwork, etc. at this site.

Huddlestone-Berry Engineering and Testing, LLC is pleased to be of service to your project. Please contact us if you have any questions or comments regarding the contents of this report.

Respectfully Submitted:
Huddlestone-Berry Engineering and Testing, LLC

Michael A. Berry, P.E.
Vice President of Engineering



FIGURES

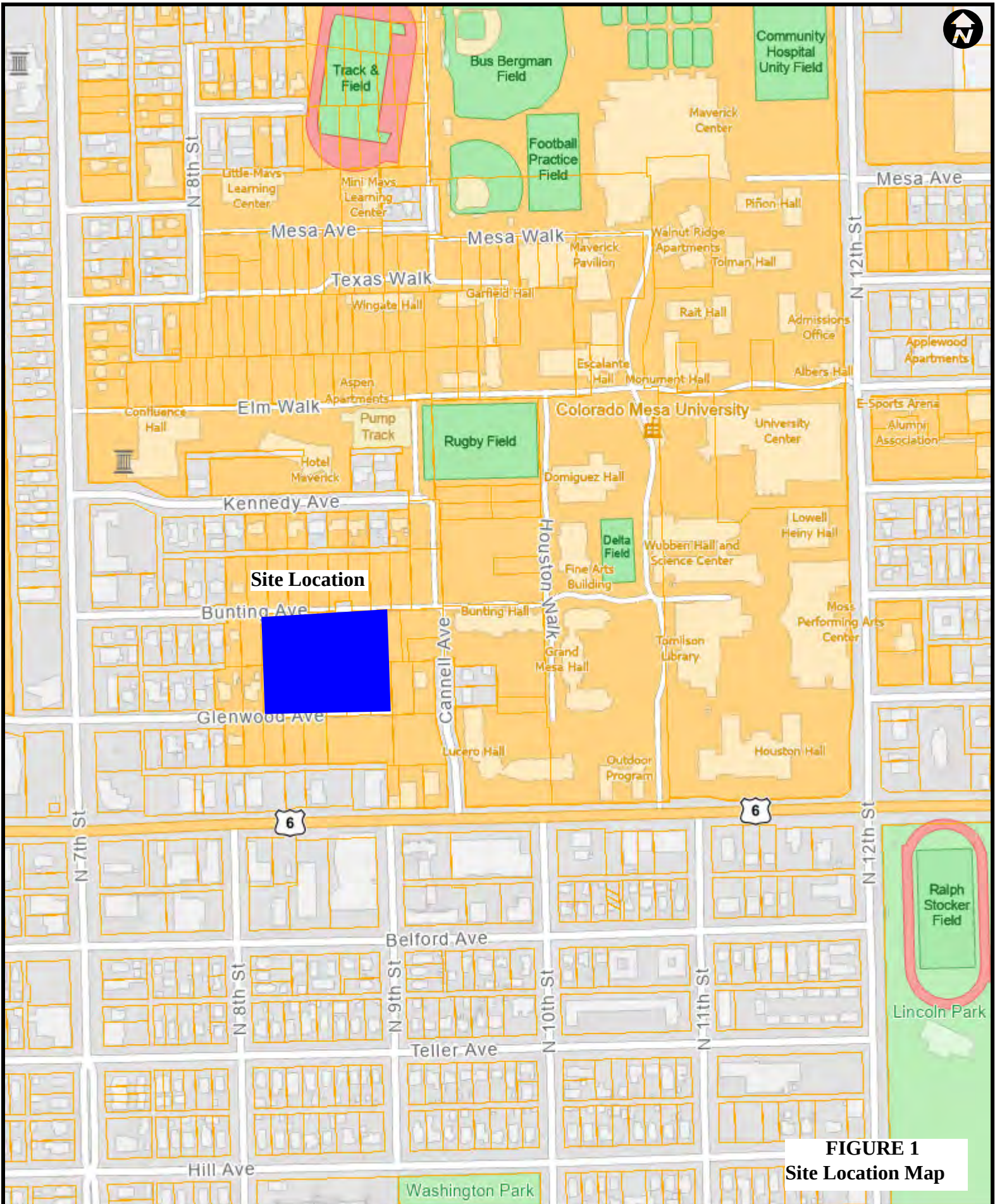
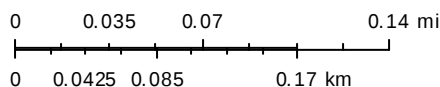


FIGURE 1
Site Location Map

Mesa County Map

The Geographic Information System (GIS) and its components are designed as a source of reference for answering inquiries, for planning and for modeling. GIS is not intended or does not replace legal description information in the chain of title and other information contained in official government records such as the County Clerk and Records office or the courts. In addition, the representations of location in this GIS cannot be substituted for actual legal surveys. The information contained herein is believed accurate and suitable for the limited uses, and subject to the limitations, set forth above. Mesa County makes no warranty as to the accuracy or suitability of any information contained herein. Users assume all risk and responsibility for any and all damages, including consequential damages, which may flow from the user's use of this information.



Mesa County, Colorado

GIS/IT Department
gis.mesacounty.us

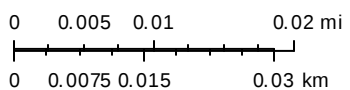
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FIGURE 2
Site Plan

Mesa County Map

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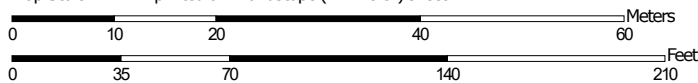


APPENDIX A
Soil Survey Data

Soil Map—Mesa County Area, Colorado



Map Scale: 1:741 if printed on A landscape (11" x 8.5") sheet.



Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84



**Natural Resources
Conservation Service**

Web Soil Survey
National Cooperative Soil Survey

5/8/2026
Page 1 of 3

MAP LEGEND

Area of Interest (AOI)

 Area of Interest (AOI)

Soils

 Soil Map Unit Polygons

 Soil Map Unit Lines

 Soil Map Unit Points

Special Point Features



Blowout



Borrow Pit



Clay Spot



Closed Depression



Gravel Pit



Gravelly Spot



Landfill



Lava Flow



Marsh or swamp



Mine or Quarry



Miscellaneous Water



Perennial Water



Rock Outcrop



Saline Spot



Sandy Spot



Severely Eroded Spot



Sinkhole



Slide or Slip



Sodic Spot



Spoil Area



Stony Spot



Very Stony Spot



Wet Spot



Other



Special Line Features

Water Features



Streams and Canals

Transportation



Rails



Interstate Highways



US Routes



Major Roads



Local Roads

Background



Aerial Photography

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: Mesa County Area, Colorado

Survey Area Data: Version 17, Sep 8, 2025

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

Date(s) aerial images were photographed: Jun 24, 2020—Jul 8, 2020

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
BcU	Sagers-Urban land complex, 0 to 2 percent slopes	2.7	100.0%
Totals for Area of Interest		2.7	100.0%



Map Unit Description

The map units delineated on the detailed soil maps in a soil survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this report, along with the maps, can be used to determine the composition and properties of a unit.

A map unit delineation on a soil map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named, soils that are similar to the named components, and some minor components that differ in use and management from the major soils.

Most of the soils similar to the major components have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, components. They may or may not be mentioned in a particular map unit description. Some minor components, however, have properties and behavior characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. If included in the database for a given area, the contrasting minor components are identified in the map unit descriptions along with some characteristics of each. A few areas of minor components may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of minor components in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives important soil properties and qualities.



Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

Some map units are made up of two or more major soils or miscellaneous areas. These map units are complexes, associations, or undifferentiated groups.

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Alpha-Beta complex, 0 to 6 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Alpha-Beta association, 0 to 2 percent slopes, is an example.

An *undifferentiated group* is made up of two or more soils or miscellaneous areas that could be mapped individually but are mapped as one unit because similar interpretations can be made for use and management. The pattern and proportion of the soils or miscellaneous areas in a mapped area are not uniform. An area can be made up of only one of the major soils or miscellaneous areas, or it can be made up of all of them. Alpha and Beta soils, 0 to 2 percent slopes, is an example.

Some surveys include *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Rock outcrop is an example.

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

Report—Map Unit Description

Mesa County Area, Colorado

BcU—Sagers-Urban land complex, 0 to 2 percent slopes

Map Unit Setting

National map unit symbol: k1rq

Landscape: Valleys



Elevation: 4,490 to 4,920 feet
Mean annual precipitation: 6 to 9 inches
Mean annual air temperature: 50 to 55 degrees F
Frost-free period: 140 to 180 days
Farmland classification: Not prime farmland

Map Unit Composition

Sagers and similar soils: 55 percent
Urban land: 40 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Sagers

Setting

Landscape: Valleys
Landform: Terraces
Landform position (three-dimensional): Tread
Down-slope shape: Linear, concave
Across-slope shape: Linear
Parent material: Cretaceous source alluvium derived from sandstone and shale

Typical profile

Ap - 0 to 12 inches: silty clay loam
C - 12 to 25 inches: silty clay loam
Cy - 25 to 60 inches: silty clay loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat):
Moderately high (0.21 to 0.71 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 5 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.7 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 7c
Hydrologic Soil Group: C
Ecological site: R034BY106UT - Desert Loam (Shadscale)
Hydric soil rating: No



Description of Urban Land

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 8

Hydric soil rating: No

Data Source Information

Soil Survey Area: Mesa County Area, Colorado

Survey Area Data: Version 17, Sep 8, 2025



Dwellings and Small Commercial Buildings

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. This table shows the degree and kind of soil limitations that affect dwellings and small commercial buildings.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.



Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Information in this table is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil between the surface and a depth of 5 to 7 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this table. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Report—Dwellings and Small Commercial Buildings

[Onsite investigation may be needed to validate the interpretations in this table and to confirm the identity of the soil on a given site. The numbers in the value columns range from 0.01 to 1.00. The larger the value, the greater the potential limitation. The table shows only the top five limitations for any given soil. The soil may have additional limitations]

Dwellings and Small Commercial Buildings—Mesa County Area, Colorado							
Map symbol and soil name	Pct. of map unit	Dwellings without basements		Dwellings with basements		Small commercial buildings	
		Rating class and limiting features	Value	Rating class and limiting features	Value	Rating class and limiting features	Value
BcU—Sagers-Urban land complex, 0 to 2 percent slopes							
Sagers	55	Somewhat limited		Somewhat limited		Somewhat limited	
		Shrink-swell	0.03	Shrink-swell	0.03	Shrink-swell	0.03
Urban land	40	Not rated		Not rated		Not rated	



Data Source Information

Soil Survey Area: Mesa County Area, Colorado

Survey Area Data: Version 17, Sep 8, 2025



Soil Features

This table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage, or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion also is expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Report—Soil Features

Soil Features—Mesa County Area, Colorado									
Map symbol and soil name	Restrictive Layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		<i>Low-RV-High</i>	<i>Range</i>		<i>Low-High</i>	<i>Low-High</i>			
		<i>In</i>	<i>In</i>		<i>In</i>	<i>In</i>			
BcU—Sagers-Urban land complex, 0 to 2 percent slopes									
Sagers		—	—		0	0	Moderate	Moderate	Moderate
Urban land		—	—		—	—			

Data Source Information

Soil Survey Area: Mesa County Area, Colorado

Survey Area Data: Version 17, Sep 8, 2025



APPENDIX B
Typed Boring Logs



Huddlestone-Berry Engineering & Testing, LLC
2789 Riverside Parkway
Grand Junction, CO 81501
970-255-8005

BORING NUMBER B-1

PAGE 1 OF 1

CLIENT CMU

PROJECT NAME 2026 Housing

PROJECT NUMBER 00569-0070

PROJECT LOCATION Grand Junction, CO

DATE STARTED 5/1/26 COMPLETED 5/1/26

GROUND ELEVATION HOLE SIZE 4

DRILLING CONTRACTOR S. McCracken

GROUND WATER LEVELS:

DRILLING METHOD Simco 3000 Truck

▽ AT TIME OF DRILLING 6.0 ft

LOGGED BY TEC CHECKED BY MAB

▼ AT END OF DRILLING 6.0 ft

NOTES

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Gravel Pavement										
		Lean CLAY to Lean CLAY with Sand (cl), brown, moist to wet, very soft to medium stiff	SS 1	50	2-3-3 (6)							
10			SS 2	56	2-3-3 (6)							
20			SS 3	100	0-0-1 (1)							
			SS 4	100	3-1-2 (3)							
30												
40												
50												
		Sandy GRAVEL and COBBLES (gw), brown, wet, dense to very dense										
		Bottom of hole at 55.0 feet.										

GEOTECH BH COLUMNS 00569-0070 2026 HOUSING.GPJ GINT US LAB.GDT 5/9/26



Huddlestone-Berry Engineering & Testing, LLC
2789 Riverside Parkway
Grand Junction, CO 81501
970-255-8005

BORING NUMBER B-2

PAGE 1 OF 1

CLIENT CMU

PROJECT NAME 2026 Housing

PROJECT NUMBER 00569-0070

PROJECT LOCATION Grand Junction, CO

DATE STARTED 5/1/26 COMPLETED 5/1/26

GROUND ELEVATION HOLE SIZE 4

DRILLING CONTRACTOR S. McKracken

GROUND WATER LEVELS:

DRILLING METHOD Simco 3000 Truck

AT TIME OF DRILLING 11.0 ft

LOGGED BY TEC CHECKED BY MAB

AT END OF DRILLING 11.0 ft

NOTES

AFTER DRILLING --

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Gravel Pavement										
		Lean CLAY to Lean CLAY with Sand (CL), brown, moist to wet, very soft to medium stiff	SS 1	44	3-3-5 (8)							
		SS-2: Lab Classified	SS 2	56	1-1-1 (2)			25	28	16	12	95
10			SS 3	100	1-0-1 (1)							
20			SS 4	100	2-1-2-1 (3)							
30												
40												
50												
		Sandy GRAVEL and COBBLES (gw), brown, wet, dense to very dense										
		Bottom of hole at 57.0 feet.										

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Grand Junction, CO 81501
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BORING NUMBER B-3

PAGE 1 OF 1

CLIENT	CMU	PROJECT NAME	2026 Housing
PROJECT NUMBER	00569-0070	PROJECT LOCATION	Grand Junction, CO
DATE STARTED	5/1/26	COMPLETED	5/1/26
DRILLING CONTRACTOR	S. McCracken	GROUND ELEVATION	
DRILLING METHOD	Simco 3000 Truck	HOLE SIZE	4
LOGGED BY	TEC	CHECKED BY	MAB
NOTES			
GROUND WATER LEVELS:			
▽ AT TIME OF DRILLING		9.0 ft	
▼ AT END OF DRILLING		9.0 ft	
AFTER DRILLING		---	

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTEBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Gravel Pavement										
		Lean CLAY to Lean CLAY with Sand (cl), brown, moist to wet, very soft to medium stiff	SS 1	78	2-3-4 (7)							
10			SS 2	56	1-0-1 (1)							
			SS 3	100	0-1-1 (2)							
20			SS 4	79	5-6-4-9 (10)							
30												
40												
50		Sandy GRAVEL and COBBLES (gw), brown, wet, dense to very dense										
		Bottom of hole at 54.0 feet.										

GEOTECH-BH COLUMNS 00569-0070 2026 HOUSING.GPJ GINT US LAB.GDT 5/9/26



Huddlestone-Berry Engineering & Testing, LLC
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970-255-8005

BORING NUMBER B-4

PAGE 1 OF 1

CLIENT CMU

PROJECT NAME 2026 Housing

PROJECT NUMBER 00569-0070

PROJECT LOCATION Grand Junction, CO

DATE STARTED 5/1/26 COMPLETED 5/1/26

GROUND ELEVATION HOLE SIZE 4

DRILLING CONTRACTOR S. McCracken

GROUND WATER LEVELS:

DRILLING METHOD Simco 3000 Truck

▽ AT TIME OF DRILLING 7.0 ft

LOGGED BY TEC CHECKED BY MAB

▼ AT END OF DRILLING 7.0 ft

NOTES

AFTER DRILLING ---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Gravel Pavement										
		Lean CLAY to Lean CLAY with Sand (cl), brown, moist to wet, very soft to medium stiff	SS 1	56	4-4-3 (7)							
10			SS 2	89	0-1-1 (2)							
			SS 3	100	1-0-1 (1)							
20			SS 4	83	1-2-2-2 (4)							
30												
40												
50		Sandy GRAVEL and COBBLES (gw), brown, wet, dense to very dense										
		Bottom of hole at 54.0 feet.										

GEOTECH BH COLUMNS 00569-0070 2026 HOUSING.GPJ GINT US LAB.GDT 5/9/26



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BORING NUMBER B-5

PAGE 1 OF 1

CLIENT	CMU	PROJECT NAME	2026 Housing
PROJECT NUMBER	00569-0070	PROJECT LOCATION	Grand Junction, CO
DATE STARTED	5/1/26	COMPLETED	5/1/26
DRILLING CONTRACTOR	S. McCracken	GROUND ELEVATION	
DRILLING METHOD	Simco 3000 Truck	HOLE SIZE	4
LOGGED BY	TEC	CHECKED BY	MAB
NOTES			
		GROUND WATER LEVELS:	
		▽ AT TIME OF DRILLING	7.5 ft
		▼ AT END OF DRILLING	7.5 ft
		AFTER DRILLING	---

DEPTH (ft)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	RECOVERY % (RQD)	BLOW COUNTS (N VALUE)	POCKET PEN. (tsf)	DRY UNIT WT. (pcf)	MOISTURE CONTENT (%)	ATTERBERG LIMITS			FINES CONTENT (%)
									LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0		Gravel Pavement										
		Lean CLAY to Lean CLAY with Sand (cl), brown, moist to wet, very soft to medium stiff	SS 1	39	2-3-2 (5)							
10			SS 2	61	1-0-1 (1)							
			SS 3	100	0-1-1 (2)							
20			SS 4	92	1-2-1-2 (3)							
30												
40												
50		Sandy GRAVEL and COBBLES (gw), brown, wet, dense to very dense										
		Bottom of hole at 53.0 feet.										

GEOTECH BH COLUMNS 00569-0070 2026 HOUSING.GPJ GINT US LAB.GDT 5/9/26

APPENDIX C
Laboratory Testing Results



Huddlestone-Berry Engineering & Testing, LLC
2789 Riverside Parkway
Grand Junction, CO 81501
970-255-8005

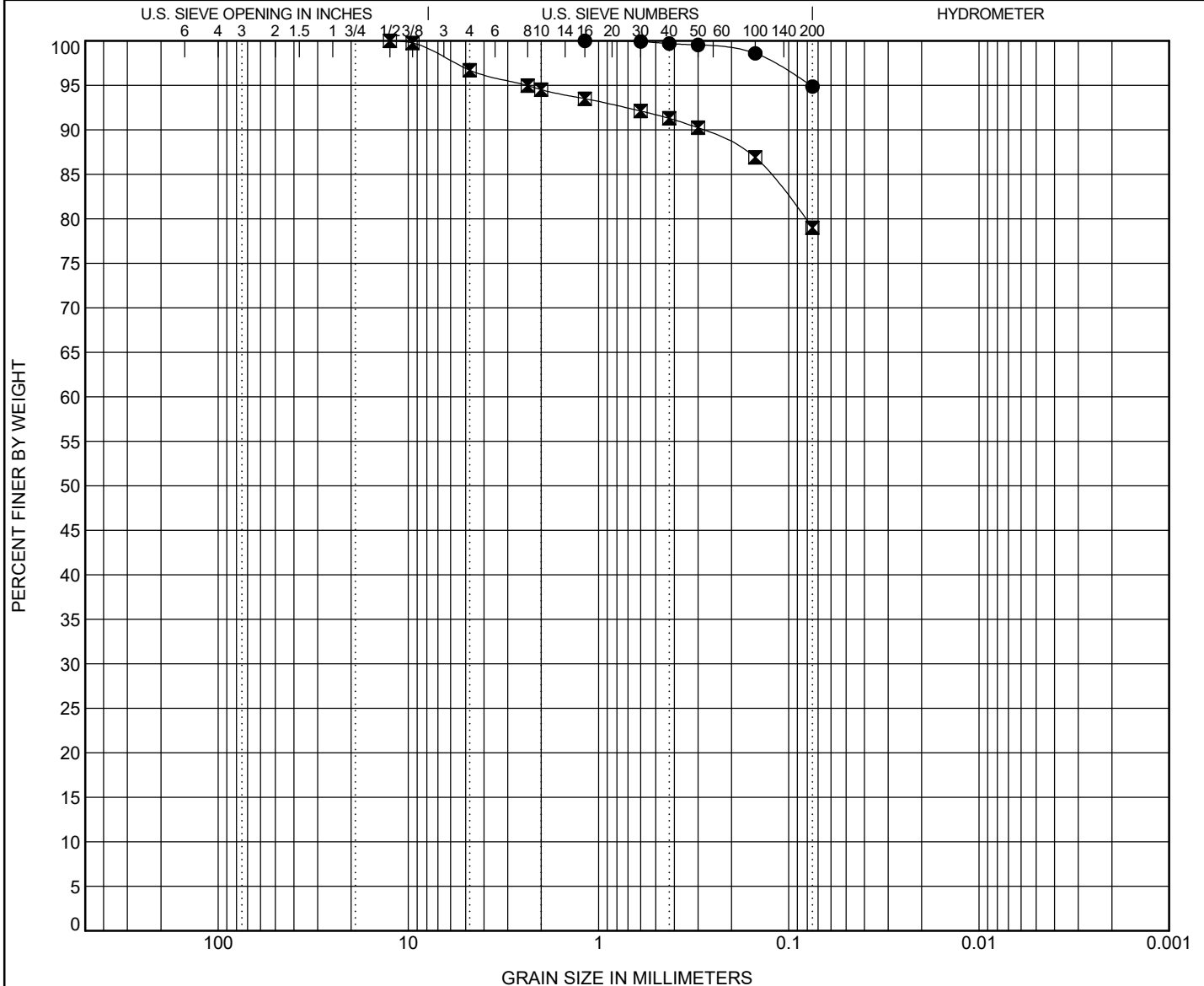
GRAIN SIZE DISTRIBUTION

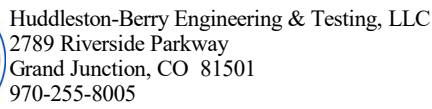
CLIENT CMU

PROJECT NAME 2026 Housing

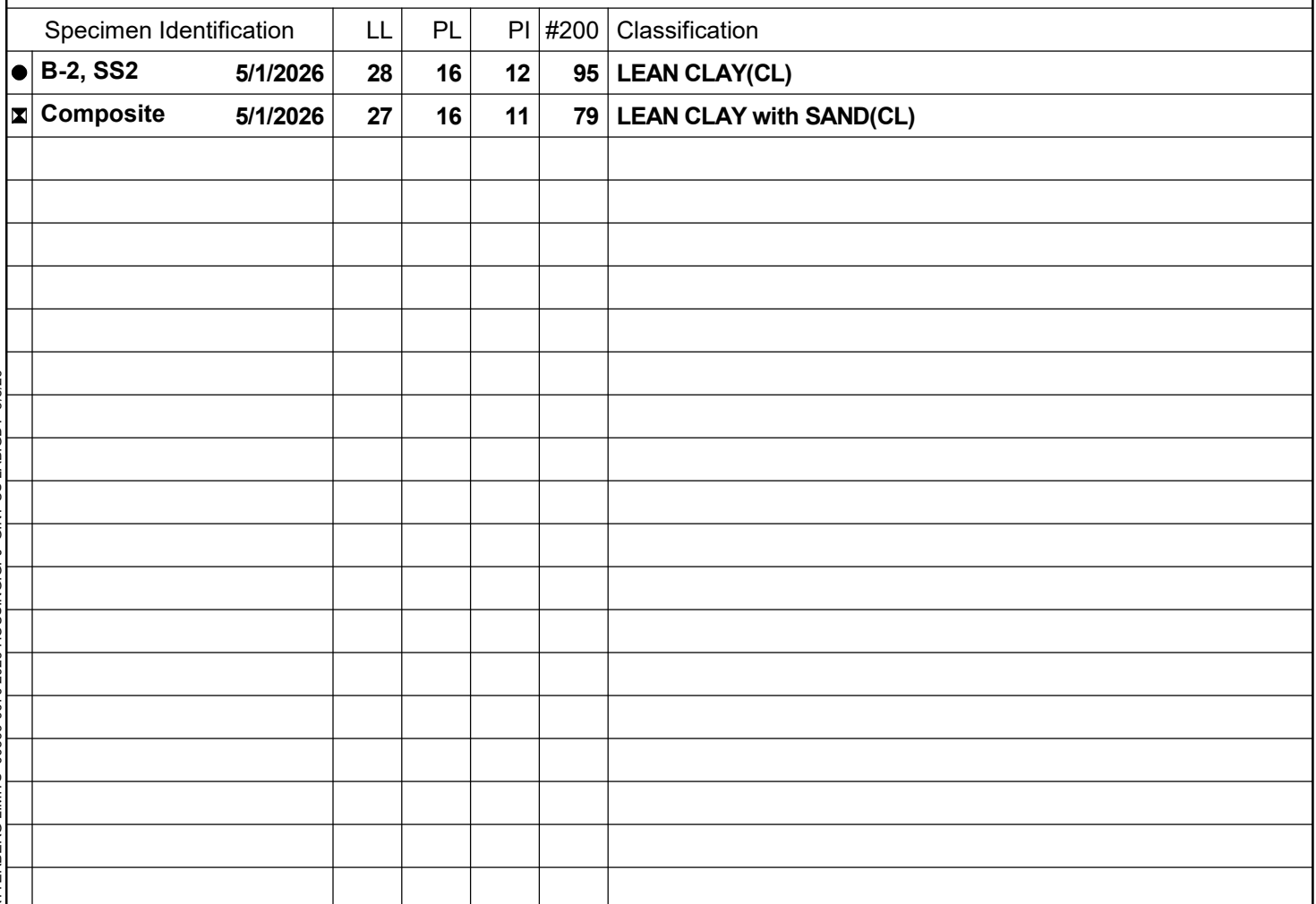
PROJECT NUMBER 00569-0070

PROJECT LOCATION Grand Junction, CO





PROJECT LOCATION Grand Junction, CO





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2789 Riverside Parkway
Grand Junction, CO 81501
970-255-8005

MOISTURE-DENSITY RELATIONSHIP

CLIENT CMU

PROJECT NAME 2026 Housing

PROJECT NUMBER 00569-0070

PROJECT LOCATION Grand Junction, CO

Sample Date: 5/1/2026
Sample No.: 1
Source of Material: Composite
Description of Material: LEAN CLAY with SAND(CL)
Test Method (manual): ASTM D698A

TEST RESULTS

Maximum Dry Density 117.5 PCF
Optimum Water Content 14.0 %

GRADATION RESULTS (% PASSING)

#200	#4	3/4"
79	97	100

ATTERBERG LIMITS

LL	PL	PI
27	16	11

Curves of 100% Saturation
for Specific Gravity Equal to:

2.80

2.70

2.60

