

SOIL AND GEOLOGY STUDY

**2825/2819 Slocum Road
Lots 1 and 2, Amo Acres, Filing No. 1
El Paso County, Colorado**

PREPARED FOR:

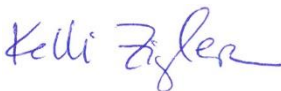
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JOB NO. 198011

January 14, 2025

**Respectfully Submitted,
RMG – Rocky Mountain Group**

**Reviewed by,
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Appendix A – Additional Referenced Documents

Appendix B – *2000 Soil Test, Lot 1 (2825)*, Colorado Engineering & Geotechnical Group, Inc.

2007 Soils Report, Lot 2 (2819), Geoquest, LLC

Appendix C – *Wastewater Study*, prepared by RMG Engineers

1.0 GENERAL SITE AND PROJECT DESCRIPTION

1.1 Project Location

The project lies in the NW¼ of Section 36, Township 13 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located south and east of the intersection of Jones Road and Slocum Road. The approximate location of the site is shown on the Site Vicinity Map, Figure 1.

1.2 Proposed Land Use and Project Description

The total calculated area of the included parcel, as recorded on the El Paso County (EPC) Assessors website, is currently 38.46 acres. The proposed site development is to consist of subdividing the parcel into two lots. Lot 1 is to be located on the northern portion of the parcel and consist of 19.03 acres. Lot 2 is to be located on the southern portion of the parcel and consist of 19.03 acres. The included parcel is:

- **EPC Schedule No. 4336000004**, reportedly contains 38.46 acres, currently addressed as 2825/2819 Slocum Road, aka Tract 1, Amo Acres, and zoned RR-5 – Residential Rural.

The site (as referenced in this report) refers to the entire 38.46-acre parcel.

It is our understanding that the parcel was not properly subdivided per the El Paso County regulations. El Paso County is requesting the lot to be replatted and properly subdivided into two new lots. For the purposes of this investigation, we are presenting our results and recommendations as though this report had been completed prior to the construction of the residence and septic system on Lot 2, when that replatting and subdivision would normally have occurred.

The *Land Survey Plat*, referenced above, indicates the residence currently addressed as 2825 Slocum Road is to remain on Lot 1, the northern lot. The residence currently addressed as 2819 Slocum Road is to remain on Lot 2, the southern lot. Both residences have an individual well and septic system that are to remain on each lot. The residence on Lot 1 was reportedly constructed in 1996 and the residence on Lot 2 was reportedly constructed in 2008. Both residences are described as a manufactured home with an attached garage.

Based on a DWR (Denver Water Resources) Well Permit Research there is one well on Lot 2 that is designated in the Upper Black Squirrel Creek Basin. This well is to remain on Lot 2.

Both lots are to maintain the existing access from Slocum Road. The Proposed Lot Layout, Figure 2, outlines the proposed subdivision and the general boundaries of our investigation.

An existing FEMA (Zone A) floodplain is mapped along the southwestern corner of the property. The floodplain is to be a No Build zone. The existing structures and OWTS are located outside of the floodplain boundary.

The structures and septic system on Lot 2 were constructed prior to any approved subdivision. The current investigation is for the subdivision of the property properly per the El Paso County

regulations. No new development is currently proposed. This report presents the results of our geologic evaluation and wastewater study for the individual on-site wastewater treatment systems.

2.0 QUALIFICATIONS OF PREPARERS

This Geology and Soils report was prepared by a professional geologist as defined by Colorado Revised Statutes section 34-1-201(3) and by a qualified geotechnical engineer as defined by policy statement 15, "Engineering in Designated Natural Hazards Areas" of the Colorado State Board of Registration for Professional Engineers and Professional Land Surveyors. (Ord. 96-74; Ord. 01-42)

The principle investigators for this study are Kelli Zigler, P.G. and Tony Munger, P.E. Ms. Zigler is a Professional Geologist as defined by State Statute (C.R.S 34-1-201) with over 24 years of experience in the geological and geotechnical engineering field. Ms. Kelli Zigler holds a B.S. in Geology from the University of Tulsa. Ms. Zigler has supervised and performed numerous geological and geotechnical field investigations throughout Colorado.

Tony Munger is a licensed professional engineer with over 24 years of experience in the construction engineering (residential) field. Mr. Munger holds a Bachelor of Science in Architectural Engineering from the University of Wyoming. Mr. Munger has supervised and performed numerous geological and geotechnical field investigation programs in Colorado.

3.0 STUDY OVERVIEW

The purpose of this investigation is to characterize the general geotechnical and geologic site conditions, and present our opinions of the potential effect of these conditions on the proposed development to include single-family within the referenced proposed development. As such, our services exclude evaluation of the environmental and/or human, health-related work products or recommendations previously prepared, by others, for this project.

This study has been prepared in accordance with the requirements outlined in the El Paso County Land Development Code (LDC) specifically Chapter 8 last updated August 27, 2019 applicable sections include 8.4.8 and 8.4.9. and the Engineering Criteria Manual (ECM), specifically Appendix C last updated July 9, 2019.

This report presents the findings of the study performed by RMG relating to the geotechnical and geologic conditions of the above-referenced site. Revisions and modifications to the conclusions and recommendations presented in this report may be issued subsequently by RMG based upon additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report.

3.1 Scope and Objective

The scope of this study included a physical reconnaissance of the site and a review of pertinent, publically available documents including (but not limited to) previous geologic and geotechnical

reports, overhead and remote sensing imagery, published geology and/or hazard maps, design documents, etc. Our services exclude the evaluation of the environmental and/or human, health-related work products or recommendations previously prepared, by others, for this project.

The objectives of our study are to:

- Identify geologic conditions that are present on this site,
- Analyze the potential negative impacts of these conditions on the proposed site development,
 - Analyze the potential negative impacts to the surrounding properties and/or public services resulting from the proposed site development as it relates to existing geologic hazards,
 - Provide our opinion of suitable techniques that may be utilized to mitigate the potential negative impacts identified herein.

This report presents the findings of the study performed by RMG relating to the geologic conditions of the above-referenced site. Revisions and modifications to this report may be issued subsequently by RMG, based upon:

- Additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report,
- Review of pertinent documents (development plans, plat maps, drainage reports/plans, etc.) not available at the time of this study,
- Comments received from the governing jurisdiction and/or their consultants subsequent to submission of this document.

3.2 Site Evaluation Techniques

The information included in this report has been compiled from:

- Field reconnaissance
- Geologic and topographic maps
- Review of selected publicly available, pertinent engineering reports
- Available aerial photographs
- Exploratory soil test borings and test pits by RMG
- Laboratory testing of representative site soil and rock samples
- Geologic research and analysis
- Site development plans prepared by others

Geophysical investigations were not considered necessary for characterization of the site geology. Monitoring programs, which typically include instrumentation and/or observations for changes in groundwater, surface water flows, slope stability, subsidence, and similar conditions, are not known to exist and were not considered applicable for the scope of this report.

3.3 Previous Studies and Field Investigation

Reports of previous geotechnical engineering/geologic investigations for this site were available for our review and are listed below:

1. *Wastewater Study, Lots 1 and 2, Amo Acres, Filing No. 1, El Paso County, Colorado*, prepared by RMG Engineers, dated January 10, 2025;
2. *Soils Report, 2819 Slocum Road, El Paso County, Colorado*, prepared by Geoquest, LLC, Job #07-0287, dated July 24, 2007;
3. *Soil test for Lot 1, Amo Estates Subdivision, El Paso County, Colorado*, prepared by Colorado Engineering & Geotechnical Group, Inc., Job # 00059, dated February 14, 2000.

The findings, conclusions and recommendations contained in those reports were considered during the preparation of this report.

3.4 Additional Documents

Additional documents reviewed during the performance of this study are included in Appendix A.

4.0 SITE CONDITIONS

4.1 Existing Site Conditions

The site contains two existing single-family residences, a horse stall/barn, and multiple sheds near the western portion of the site. Topographically, the overall slope of the site is fairly flat with a slight slope downward from the northeast to southwest. Elevation difference across the entire site ranges between 40 to 45 feet. Isolated low-lying areas are present near the front (west) portion of the site. Slopes greater than 25 percent are not located on-site.

A natural water basin (retention pond) collects surface water from a tributary of Black Squirrel Creek. This basin is located along the southwestern property boundary and lies within the FEMA floodplain. The entire site consists of low-lying native grasses and weeds. Deciduous trees are sparse across the site and are mainly located around the existing residences and detention basin.

4.2 Aerial photographs and remote-sensing imagery

Personnel of RMG reviewed aerial photos available through Google Earth Pro dating back to 1999, and historical photos by historicaerials.com dating back to 1947. Prior to 1983, the area was fairly desolate with few residences. It appears Slocum Road was a dirt road and has been in place since prior to 1947. The natural water basin (retention pond) was redefined by man and possibly “deepened” prior to 1983. The main residence on proposed Lot 1 was constructed prior to 1996. The second residence was reportedly constructed in 2008. Since 2008, little has changed on the site. Aerial photographs indicate the water basin has controlled and contained the fluctuating surface water since it was redefined. The tributary of Black Squirrel Creek appeared dry in the photos reviewed. Indications that the tributary has widened or deepened significantly was not observed.

5.0 FIELD INVESTIGATION AND LABORATORY TESTING

Once the subdivision is approved, it is our understanding that no new construction is currently proposed.

5.1 RMG Drilling

For the purposes of this investigation, we are presenting our results and recommendations as though this report had been completed prior to the construction of the residence and septic system on Lot 2. Accordingly, the subsurface conditions within the area of proposed Lot 2 were explored by RMG, by drilling two (2) exploratory borings extending to 20 and 35 feet below the existing ground surface on December 6, 2024. Additionally, two (2) test pits were observed on Lot 2 on December 19, 2024. Neither test borings nor test pits were performed within the boundaries of Lot 1 for this investigation. The approximate locations of the test borings and test pits are presented on the Test Boring and Test Pit Layout, Figure 3.

The test borings were drilled with a power-driven, continuous-flight auger drill rig. Samples were obtained during drilling of the test boring in general accordance with ASTM D-1586 and D-3550, utilizing a 2-inch O.D. Split Barrel Sampler and a 2½-inch O.D. California sampler, respectively. An Explanation of Test Boring Logs is presented in Figure 4. The Test Boring Logs are presented in Figure 5.

5.2 Drilling by Others

Two soil reports were completed previously, one for each residence, referenced above and included in Appendix C. The original soil reports were obtained from the Pikes Peak Regional Building website and discussed in some detail below.

2825 Slocum Rd

The *Soil test for Lot 1* was performed for the original existing residence on proposed Lot 1. One exploratory test boring was reportedly performed on February 2, 2000. The test boring logs indicated a brown, silty fine-grained sand from the surface to a depth of approximately 2.5 feet, overlying a fine to medium-grained sand that extended to the 10-foot termination depth of the borings. The report noted the soil density and expansion potential was low. In review of the gradation test results, the fines ranged from 10.2% at 4 feet to 12.2% at 12 feet and the soils classified as silty sand (SM) to clayey sand (SC). It was noted in the report, groundwater was not encountered in the test borings at the time of drilling.

2819 Slocum Rd

The *Soils Report* was performed for the second existing residence on proposed Lot 2. Two exploratory test holes were performed on July 2, 2007, with an additional boring performed on July 13, 2007. The first two test boring logs indicated 4 inches of topsoil overlying fine-medium grained sand with low clay content extending to the 15-foot termination depth of test hole TH-1. Underlying the topsoil in TH-2, fine grained clay with low sand content extended to the 15-foot termination depth of

the hole. The third boring TH-3 was reportedly performed due to the high clay content encountered in TH-2. TH-3 indicated 4 inches of topsoil overlying fine-medium grained sand with low clay content. In review of the gradation test results, the fines ranged from 15.9% at 12 feet to 19.1% at 3 feet. The laboratory testing indicated the soil classified as silty sand (SM) to sandy clay (CL), respectively. Groundwater depths were not reported.

5.3 RMG Laboratory Testing

The moisture content for the recovered samples was obtained in the laboratory. Grain-size analysis, Atterberg Limits, and Denver Swell/Consolidation tests were performed on selected samples for purposes of classification and to develop pertinent engineering properties. A Summary of Laboratory Test Results is presented in Figure 6. Soil Classification Data are presented in Figure 7. Due to the loose nature of the sand soils, a Denver Swell/Consolidation test was not performed. Based on the percent fines ranging between 8.6% and 14.0% and the non-plasticity of the soil below 4 feet, it is our opinion the sand soil has low swell potential.

5.4 Test Pit Excavations

The two test pits were performed to explore the subsurface soils surrounding the existing On-site Wastewater Treatment System on Lot 2. The number of test pits is in accordance with Regulations of the El Paso County Board of Health, Chapter 8, On-site Wastewater Treatment Systems (OWTS) as required by 8.5.D.3.a.

The test pits were excavated to approximately 8 feet below the existing ground surface. Additional information is provided in Section 9.0, On-site Disposal of Wastewater.

5.5 OWTS Visual and Tactile Evaluation

A visual and tactile evaluation was performed in conjunction with this investigation. The soils were evaluated to determine the soils types and structure. Neither bedrock nor restrictive layers were encountered in the test pits. Evidence of seasonally fluctuating high groundwater was not observed in the test pits. The test pit logs and soil descriptions are presented in the Wastewater Study, included in Appendix C.

5.6 Groundwater

Groundwater was not encountered at the time of our drilling. Due to the locations of the test borings, they were immediately backfilled subsequent to drilling. We do anticipate the potential for periodically high surficial and subsurface moisture conditions due to the proximity to the Black Squirrel Creek tributary and the mapped FEMA floodplain.

We do understand surface and subsurface water elevations will fluctuate throughout the year. The previous soil reports, completed in July 2007 and February 2000, provide a window of the groundwater depth through the years. Overall, the borings were drilled at various times throughout the year and groundwater has not been encountered in the two seasons (summer and winter)

explored. However, it should be noted that in granular soils and bedrock, some perched water conditions might be encountered due to the variability of the soil/bedrock. Isolated sand and gravel layers within the soil, even those of limited thickness and width, can carry water in the subsurface. Groundwater may also flow atop the underlying bedrock. If future construction was proposed on either lot, builders and planners should be cognizant of the potential for the occurrence of subsurface water conditions during on-site construction, in order to evaluate and mitigate each individual problem as necessary.

Fluctuations in groundwater and subsurface moisture conditions will occur due to variations in rainfall, irrigation, changes in surface drainage patterns, and other factors not readily apparent at this time. Development of the property and adjacent properties may also affect groundwater levels. In the absence of irrigation, we anticipate a 4- to 6-foot fluctuation in groundwater levels, perched or within the fractured bedrock, should be expected.

6.0 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

6.1 Geologic Conditions

The site physiographically lies in the western portion of the Great Plains Physiographic Province south of the Palmer Divide. Approximately 6 miles to the west is a major structural feature known as the Rampart Range Fault. The fault marks the boundary between the Great Plains Physiographic and Southern Rocky Mountain Province. The site exists within the southeastern edge of a large structural feature known as the Denver Basin. The bedrock underlying the site consists of the Dawson Arkose Formation. Overlying this formation are unconsolidated deposits of residual soils and alluvial soils of the upper Cretaceous and Paleocene Age. The residual soils are produced by the in-situ action of weathering of the bedrock.

6.2 Subsurface Soil Conditions

The subsurface soils encountered in the test borings performed by RMG were classified using the Unified Soil Classification System (USCS). The laboratory testing performed revealed the on-site soils and bedrock classified as sandy clay (CL), silty sand (SM), well graded sand with silty (SW-SM), and poorly graded sand with silt (SP-SM).

The subsurface soils encountered in the test pit excavations were classified using the United States Department of Agriculture (USDA). The test pit summary revealed the on-site soils classified as sandy clay loam and sandy loam.

Additional descriptions and the interpreted distribution (approximate depths) of the subsurface materials are presented in the Test Boring Logs, presented in Figure 4. The classifications shown on the logs are based upon visual classification of the samples at the depths indicated. Stratification lines shown on the logs represent the approximate boundaries between material types and the actual transitions may be gradual and vary with location.

6.3 Bedrock Conditions

Bedrock was not encountered in the test boring or test pit excavations used for this investigation. In general, the bedrock (as defined by Colorado Geologic Survey) beneath the site is considered to be part of the Dawson Formation which consists of about half silty sandstone and conglomerate and half interbedded layers of shale, claystone, and siltstone. The Dawson formation is thick-bedded to massive, generally light colored arkose, pebbly, and pebble conglomerate. The sandstones are poorly sorted with high clay contents. The sandstone is generally permeable, well drained, and has good foundation characteristics. The Dawson sandstone is generally not considered a restrictive layer for OWTS. However, the claystone bedrock would be considered a restrictive layer. Based on the depth of the sandstone encountered in the test borings (17 to 18 feet), the sandstone is expected to have sufficient separation from the bottom of the OWTS.

6.4 U.S. Soil Conservation Service

The U.S. Soil Conservation Service along with USDA has identified the soils on the property as:

- 10 – Blendon sandy loam, 0 to 3 percent slopes. The Blendon sandy loam was mapped by the USDA to encompass a narrow “strip” that runs parallel to the northern property line. Properties of the sandy loam include, well-drained soils, depth of the water table is anticipated to be greater than 6.5 feet, runoff is anticipated to be medium, frequency of flooding and ponding is none, and landforms include depressions.
- 96 – Truckton loamy sand, 0 to 3 percent slopes. The Truckton loamy sand was mapped within a “pocket” near the northeast corner of the property. The properties of the Truckton loamy sand include well drained soils, depth of the water table is anticipated to be greater than 6.5 feet, runoff is anticipated to low, frequency of flooding and ponding is none, and landforms include interfluves and fan remnants.
- 97 – Truckton loamy sand, 3 to 9 percent slopes. The Truckton loamy sand was mapped within the southeastern corner of the property. The properties of the Truckton loamy sand include well drained soils, depth of the water table is anticipated to be greater than 6.5 feet, runoff is anticipated to low, frequency of flooding and ponding is none, and landforms include interfluves and fan remnants.

The USDA Soil Survey Map is presented below.



Neither groundwater nor bedrock were encountered in the test borings or test pits performed by RMG.

6.5 General Geologic Conditions

Based on our field observations and review of relevant geologic maps, a geologic map was prepared which identifies the geologic conditions affecting the development. The geologic units present on the site are presented in the Engineering and Geology Map, Figure 8.

The site generally consists of silty to clayey sand and clay overlying the Dawson Formation. The silty sand is generally permeable, well drained, and has good foundation characteristics. As the clay content increases, the permeability and foundation characteristics decline. The sandstone (if encountered) is considered less permeable and not as well drained, but generally suitable for foundations. The geologic units mapped at the site were as follows:

- *Tkdw – Dawson Formation, (Upper Cretaceous and Paleocene)* – the unit is generally drab colored; which includes shades of grey, yellow and brown. Pebbles are mostly granitic, quarts, feldspar, with pebbles ranging up to 2 inches in diameter. This unit is approximately 1,350 feet thick in this area. The sandstone was encountered in the test borings at depths ranging between 17 and 18 feet.
- *fw – Regulatory floodway* as designated by FEMA. This area is to be designated a "No Build Area" until further investigations are completed. No new construction is currently proposed onsite.
- *da* – areas no longer in their native state due to the development on both lots.

6.6 Structural Features

Structural features such as schistosity, folds, zones of contortion or crushing, joints, shear zones or faults were not observed on the site, or in the surrounding area.

6.7 Surficial (Unconsolidated) Deposits

Swamp accumulations, sand dunes, marine terrace deposits, talus accumulations, creep, or slope wash were not observed on the site. Slump and slide debris were also not observed on the site. The alluvial deposits are non-marine terrace deposits that have been reworked from conglomerates in the Dawson Formation up-valley along nearby creeks.

6.8 Groundwater

The site contains existing structures within the western half of the property. Topographically, the site is lowest near the floodplain boundaries and the water holding ponds. Elevations gradually increase to the north and east with gentle rolling terrain.

Based on the test borings performed by RMG and our observations of the site, the groundwater information for this site is as follows:

- No groundwater at the time of drilling,
- No groundwater in the previous two soil reports,
- The ground elevation increase from the FEMA floodplain to the residences is approximately 20 to 23 feet,
- No new basement foundation construction is currently proposed.

The residence on Lot 1 does not have a basement and was reportedly constructed in 1998. The existing owner(s) of the property, who have owned the main home since 2005, have indicated that groundwater or infiltration of water into the building footprint has not been problematic to date. Additionally, the owner of the second residence, constructed in 2008, has also indicated that they have not had issues with groundwater or infiltration of water into the building footprint. It is our opinion that future basement construction should not be restricted due to groundwater or seasonally fluctuating groundwater. However, if subsurface water is encountered in a future investigation, additional drainage systems and/or basement restrictions may be recommended at that time.

6.9 Engineering Geology

Charles Robinson and Associates (1977) have mapped two environmental engineering units at the site as:

- 1A – Stable alluvium, colluvium and bedrock on gentle slopes (0 to 5%).
- 7A - Physiographic flood plain where erosion and deposition presently occurs and is generally subject to recurrent flooding. Includes the 100-year flood plain along major streams where flood plain studies have been conducted.

The engineering and geology is presented in the Engineering and Geology Map, Figure 8.

6.10 Features of Special Significance

Features of special significance such as accelerated erosion, (advancing gully head, badlands, or cliff reentrants) were not observed on the property. Features indicating settlement or subsidence such as fissures, scarplets, and offset reference features were not observed on the property or surrounding areas.

Features indicating creep, slump, or slide masses in bedrock and surficial deposits were not observed on the property.

6.11 Flooding and Surface Drainage

Based on our review of the Federal Emergency Management Agency (FEMA) Community Panel No. 08041C0785G the online ArcGIS Pikes Peak Regional Floodplain Map, an area designated Special Flood Hazard Area encroaches within the southwest corner of the site. Base Flood Elevations (BFE) have not been determined. The remainder of the site lies outside the 100-year or 500-year floodplains. The FEMA Map is presented below.



7.0 ECONOMIC MINERAL RESOURCES

Under the provision of House Bill 1529, it was made a policy by the State of Colorado to preserve for extraction commercial mineral resources located in a populous county. Review of the *El Paso Aggregate Resource Evaluation Map, Master Plan for Mineral Extraction, Map 1* indicates the site is identified as eolian deposits, windblown sands. Extraction of the sand resource is not considered to be economical compared to materials available elsewhere within the county.

According to the *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands*, the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped "Poor" for coal resources, no active or inactive mines have been mapped in the area of the site. No metallic mineral resources have been mapped on the site.

8.0 IDENTIFICATION AND MITIGATION OF POTENTIAL GEOLOGIC CONDITIONS

The El Paso County Engineering Criteria Manual recognizes and delineates the difference between hazards and constraints. A geologic hazard is one of several types of adverse geologic conditions capable of causing significant damage or loss of property and life. Geologic hazards are defined in Section C.2.2 Sub-section E.1 of the ECM. A geologic constraint is one of several types of adverse geologic conditions capable of limiting or restricting construction on a particular site. Geologic constraints are defined in Section C.2.2 Sub-section E.2 of the ECM (1.15 Definitions of Specific Terms and Phrases). The following geologic conditions were considered in the preparation of this report, and are not anticipated to pose a significant risk to the existing development:

- Avalanches
- Debris Flow-Fans/Mudslides
- Ground Subsidence and Abandoned Mining Activity
- Landslides
- Rockfall

- Steeply Dipping Bedrock
- History of Landfill or Uncontrolled/Undocumented Fill Placement
- Valley Fill
- Downhill/Down-slope Creep
- Soil Slumps and Undercutting
- Corrosive Minerals

The following section presents the geologic conditions that have been identified on the property:

8.1 Compressible Soils - *constraint*

Loose soils were encountered in RMG's test boring TB-1 at a depth of 9 feet. The overlying alluvial deposits may have localized areas of lower density.

Mitigation

Loose or compressible soils encountered beneath foundations or floor slabs can generally be mitigated through localized overexcavation and replacement. Provided that appropriate mitigations and/or foundation design adjustments were implemented during construction, the presence of compressible soils is not considered to pose a risk to the existing structures.

8.2 Expansive Soils and Bedrock - *constraint*

Based on the laboratory testing performed by RMG and on the results presented in the previous investigations referenced above for the area, the sandy clay generally possesses low swell potential.

Mitigation

Expansive soils or bedrock encountered beneath foundations or floor slabs can generally be mitigated through localized overexcavation and replacement. Provided that appropriate mitigations and/or foundation design adjustments were implemented during construction, the presence of compressible soils is not considered to pose a risk to the existing structures.

Floor slabs bearing directly on expansive material should be expected to experience a higher degree of movement. Overexcavation and replacement below the floor slabs has been successful in reducing slab movement. If slab movement cannot be tolerated drilled straight-shaft piers below foundation components is an alternative to the overexcavation and replacement.

8.3 Special Flood Hazard Area - *hazard*

Based on our review of the FEMA map and the online ArcGIS El Paso County Risk Map, the southwestern property corner lies within the 100-year floodplain of a tributary of Black Squirrel Creek. However, the majority of the site does lie outside the Regulatory Floodway.

Mitigation

The proposed residences are currently located outside the designated Regulatory Floodway as presented on Figure 8, Engineering and Geology Map. Currently, we are proposing the

southwestern portion of the lot within the Regulatory Floodway of Black Squirrel Creek be considered a "No Build Area". No construction is currently proposed within this area. If new development and/or construction are proposed within this "No Build Area" in the future, additional investigations should be performed to determine the feasibility of construction. The drainageway is fairly shallow and does not contain banks that would scour and eroded away.

Per the latest approved edition of the Pikes Peak Regional Building Code, the lowest finished floor elevation (including basement together with attendant utility and sanitary facilities) shall be elevated one-foot or more above the BFE, as designated by FEMA.

Builders should be advised that mitigation may be required for the potential floodwater and any resulting debris. Designs may be required to include (but are not limited to) openings to automatically equalize hydrostatic pressure, anchorage to resist buoyancy, "breakaway" panels, etc.

Provided that the recommendations presented herein, as well as any requirements stipulated by the governing regulatory agencies, are followed, the presence of the revised floodplain/floodway is not anticipated to preclude the proposed construction.

8.4 Springs and High Groundwater - *constraint*

Groundwater was not encountered in the test borings performed by RMG or within the test borings performed for the site-specific soil reports for the existing residences. The southwestern portion of the site does contain a low lying area that may capture surface water during heavy precipitation events.

Based on our site observations and review of the Corral Bluffs Quadrangle and Google Earth images dating back to September 1999, springs do not appear to originate on the subject site. Groundwater was not encountered at the time of drilling for this investigation or the two previous investigations. Shallow groundwater is not anticipated to impact the existing structures.

Mitigation

Currently, no new construction is proposed. However, if future construction is proposed, foundations must have a minimum 30-inch depth for frost protection. Perimeter drains are recommended around portions of the structures which will have habitable or storage space located below the finished ground surface. This includes crawlspace areas but not the walkout trench, if applicable. Perimeter drains are recommended for portions of the structures which will have below-grade spaces to help reduce the intrusion of water into areas below grade.

8.5 Surface Drainage - *constraint*

Since portions of the property lie within a designated Regulated Floodway of Black Squirrel Creek, its drainageway should be taken into consideration when considering the placement of any future structures.

Mitigation

If new construction is proposed in the future, Black Squirrel Creek and the associated floodway should be avoided. Structures should not block the creek. Any site grading should be done in a manner to avoid ponding of water around the structures and treatment area.

All construction should remain outside the Black Squirrel Creek drainageway. It is recommended the utility easement and Black Squirrel Creek be identified as a "No Build Area" unless additional studies are performed, in conjunction with the drainage engineer, prior to any new construction. These areas are shown on Figure 8.

8.6 Faults and Seismicity - hazard

Based on review of the Earthquake and Late Cenozoic Fault and Fold Map Server provided by CGS located at <http://dnrwebmapgdev.state.co.us/CGSOnline/> and the recorded information dating back to November of 1900, Colorado Springs has not experienced a recorded earthquake with a magnitude greater than 1.6 during that time period. The nearest recorded earthquakes over 1.6 occurred in December of 1995 in Manitou Springs, which experienced magnitudes ranging between 2.8 to 3.5. Additional earthquakes over 1.6 occurred between 1926 and 2001 in Woodland Park, which experienced magnitudes ranging from 2.7 to 3.3. Both of these locations are in the vicinity of the Ute Pass Fault, which is greater than 15 miles from the subject site.

Earthquakes felt at this site will most likely result from minor shifting of the granite mass within the Pikes Peak Batholith, which includes pull from minor movements along faults found in the Denver basin. It is our opinion that ground motions resulting from minor earthquakes may affect structures (and the surrounding area) at this site if minor shifting were to occur.

Mitigation

The Pikes Peak Regional Building Code, 2017 Edition, indicates maximum considered earthquake spectral response accelerations of 0.183g for a short period (S_s) and 0.056g for a 1-second period (S_1). Based on the results of our experience with similar subsurface conditions, we recommend the site be classified as Site Class D, with average shear wave velocities ranging from 2,500 to 5,000 feet per second for the materials in the upper 100 feet.

8.7 Radon - constraint

Radon is a gas that can move freely within the soil and air but can become trapped in structures constructed on the soil. Radon is a byproduct of the natural decay of uranium and radium. Trace amounts of radioactive nuclides are common in the soils and bedrock that underlie this region and site.

"Radon Act 51 passed by Congress set the natural outdoor level of radon gas (0.4 pCi/L) as the target radon level for indoor radon levels.

El Paso County has an EPA assigned Radon Zone of 1. A radon zone of 1 predicts an average indoor radon screening level greater than 4 pCi/L, which is above the recommended levels

assigned by the EPA. Black Forest is located in a high risk area of the country. *The EPA recommends you take [corrective measures](#) to reduce your exposure to radon gas.*

Most of Colorado is generally considered to have the potential of high levels of radon gas, based on the information provided at: http://county-radon.info/CO/El_Paso.html. There is not believed to be unusually hazardous levels of radon from naturally occurring sources at this site.

Mitigation

Radon hazards are best mitigated at the building design and construction phases. Providing increased ventilation of basements, crawlspaces, creating slightly positive pressures within structures, and sealing of joints and cracks in the foundations and below-grade walls can help mitigate radon hazards.

Measures that can be taken after the residence is enclosed include installing a blower connected to the foundation drain and sealing the joints and cracks in concrete floors and foundation walls. If the occurrence of radon is a concern, it is recommended that the residence be tested after it is enclosed and commonly utilized techniques are in place to minimize the risk.

9.0 ON-SITE DISPOSAL OF WASTEWATER

It is our understanding the On-site Wastewater Treatment Systems (OWTS) for both lots are installed, and no new OWTS are currently proposed. The site was evaluated by observing two profile pits on Lot 2, within or near the existing OWTS location, to obtain a general understanding of the soil and bedrock conditions. The Test Pit Logs are presented in the Wastewater Study included in Appendix C.

9.1 Subsurface Materials

The subsurface materials encountered in the test pit excavations were classified using Table 10-1 Soil Treatment Area Long-term Acceptance Rates from the EPCDHE Chapter 8, OWTS Regulations and the USDA Soil Structure Shape and Grade. The materials were grouped into the following general categories:

- Clay
USDA Soil Texture: Sandy Clay Loam
USDA Soil Type: 3
USDA Structure Shape and Grade: Granular, Strong
Non-cemented
- Sandy Clay
USDA Soil Texture: Loamy Sand
USDA Soil Type: 1
USDA Structure Shape and Grade: Single-Grain, Structureless
Non-cemented

Limiting layers were not encountered in the test pits. The long term acceptance rate (LTAR) associated with the most restrictive soils observed in the test pits was 0.20 gallons per day per square foot (gpd/sf) for the sandy clay loam (Soil Type 4). Neither groundwater nor indications of seasonally shallow groundwater were observed in the test pit excavations at the time of the field observation.

9.2 Bedrock Conditions

Bedrock (as defined by USDA Soil Structure and Grade) was not encountered in the test pits observed by RMG. In general, the bedrock (as defined by Colorado Geologic Survey) beneath the site is considered to be part of the Dawson. The Dawson sandstone is generally considered a restrictive layer for OWTS.

9.3 Treatment Areas

Treatment areas at a minimum must achieve the following:

- The treatment areas must be 4 feet above groundwater or bedrock as defined by the Definitions 8.3.4 of the Regulations of the El Paso County Board of Health, Chapter 8, *OWTS Regulations*, effective July 7, 2018, amended May 23, 2018;
- Prior to construction of an OWTS, an OWTS design prepared per *the Regulations of the El Paso County Board of Health, Chapter 8, OWTS Regulations* will need to be completed. A scaled site plan and engineered design will also be required prior to obtaining a building permit;
- Comply with any physical setback requirements of Table 7-1 of the El Paso County Department of Health and Environment (EPCDHE);
- Treatment areas are to be located a minimum 100 feet from any well (existing or proposed), including those located on adjacent properties per Table 7-2 per the EPCDHE;
- Treatment areas must also be located a minimum 50 feet from any spring, lake, water course, irrigation ditch, stream or wetland, and 25 feet from dry gulches;
- Other setbacks include the treatment area to be located a minimum 10 feet from property lines, cut banks and fill areas (from the crest);
- The lots have been laid out to ensure that the proposed OWTS does not fall within any restricted areas, (e.g. utility easements, right of ways, Preservation Areas). Based on the test pit observations, the parcel has a minimum of two locations for the OWTS.

Contamination of surface and subsurface water resources should not occur provided the OWTS is installed according to the El Paso County Guidelines and property maintained.

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems within the cited limitations. It should be noted that the LTAR values stated above are for the test pit locations performed only, for the purpose of demonstrating suitability of the proposed systems. The final OWTS systems shall be designed based on an LTAR determined at the time of the OWTS Site Evaluation.

This does not constitute an OWTS design. If a future structure and/or OWTS are proposed, an individual OWTS site evaluation and system design will need to be completed prior to construction of the new residence.

10.0 BEARING OF GEOLOGIC CONDITIONS UPON PROPOSED DEVELOPMENT

Geologic hazards (as described in Section 8.0 of this report) that were found to be present at this site include radon and faults/seismicity. Geologic constraints (also as described in section 8.0 of this report) include potentially compressible soils, expansive soils/bedrock, and lies within a Special Hazard Floodway. It is our opinion that the existing geologic and engineering conditions can be satisfactorily mitigated through proper engineering and design contraction practices and avoidance when deemed necessary.

11.0 ADDITIONAL STUDIES

The findings, conclusions and recommendations presented in this report were provided to evaluate the suitability of the site for future development. Unless indicated otherwise, the test borings, laboratory test results, conclusions and recommendations presented in this report are intended for use for design and construction.

A site-specific Subsurface Soil Investigation for any proposed future structure(s) and/or a site-specific OWTS Site Evaluation and OWTS Design for any future proposed on-site wastewater systems will need to be prepared for future development.

12.0 CONCLUSIONS

Based upon our evaluation of the geologic conditions, it is our opinion that the proposed development is feasible. The geologic conditions identified herein are not considered unusual for the Front Range region of Colorado. Mitigation of geologic conditions is most effectively accomplished by avoidance. However, where avoidance is not a practical or acceptable alternative, geologic conditions should be mitigated by implementing appropriate planning, engineering, and local construction practices.

In addition to the previously identified mitigation alternatives, surface and subsurface drainage systems should be implemented. Exterior, perimeter foundation drains should be installed around below-grade habitable or storage spaces. Surface water should be efficiently removed from the building area to prevent ponding and infiltration into the subsurface soil.

The foundation and floor slabs of the structure should be designed using the recommendations provided in a lot-specific Subsurface Soil Investigation performed for Lot 1. In addition, appropriate surface drainage should be established during construction and maintained by the homeowner.

All construction should remain outside the Special Flood Hazard Area. It is recommended the area near the southwestern property corner be identified as a "No Build Area" unless additional studies are performed, in conjunction with the drainage/civil engineer, prior to any new construction.

We believe the surficial sand soils will classify as Type C materials and the clay soils will classify as Type B as defined by OSHA in 29CFR Part 1926, date January 2, 1990. OSHA requires temporary slopes made in Type C materials be laid back at ratios no steeper than 1.5:1 (horizontal to vertical) and slopes made in Type B materials be laid back at ratios no steeper than 1:1 (horizontal to vertical) unless the excavation is shored or braced.

Long term cut slopes in the upper soil should be limited to no steeper than 3:1 (horizontal to vertical). Flatter slopes will likely be necessary should groundwater conditions occur. It is recommended that long term fill slopes be no steeper than 3:1 (horizontal to vertical).

Revisions and modifications to the conclusions and recommendations presented in this report may be issued subsequently by RMG based upon additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report.

It is important for the Owner(s) of these properties read and understand this report, as well as the previous reports referenced above, and to carefully to familiarize themselves with the geologic hazards associated with construction in this area. This report only addresses the geologic constraints contained within the boundaries of the site referenced above.

13.0 CLOSING

This report is for the exclusive purpose of providing geologic hazards information and preliminary geotechnical engineering recommendations. The scope of services did not include, either specifically or by implication, evaluation of wild fire hazards, environmental assessment of the site, or identification of contaminated or hazardous materials or conditions. Development of recommendations for the mitigation of environmentally related conditions, including but not limited to, biological or toxicological issues, are beyond the scope of this report. If the owner is concerned about the potential for such contamination or conditions, other studies should be undertaken.

This report has been prepared for **Mary Lee DeConza-Winblad** in accordance with generally accepted geotechnical engineering and engineering geology practices. The conclusions and recommendations in this report are based in part upon data obtained from review of available topographic and geologic maps, review of available reports of previous studies conducted in the site vicinity, a site reconnaissance, and research of available published information, soil test borings, soil laboratory testing, and engineering analyses. The nature and extent of variations may not become evident until construction activities begin. If variations then become evident, RMG should be retained to re-evaluate the recommendations of this report, if necessary.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by geotechnical engineers and engineering geologists practicing in

this or similar localities. RMG does not warrant the work of regulatory agencies or other third parties supplying information which may have been used during the preparation of this report. No warranty, express or implied, is made by the preparation of this report. Third parties reviewing this report should draw their own conclusions regarding site conditions and specific construction techniques to be used on this project.

If we can be of further assistance in discussing the contents of this report or analysis of the proposed development, from a geotechnical engineering point-of-view, please feel free to contact us.

FIGURES



NOT TO SCALE

Architecture
Structural
Geotechnical



Engineers / Architects

SOUTHERN COLORADO OFFICE
2910 AUSTIN BLUFFS PKWY, SUITE 100,
COLORADO SPRINGS, CO 80918
(719) 548-0600 ~ WWW.RMGENGINEERS.COM

SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

Materials Testing
Forensics
Civil / Planning

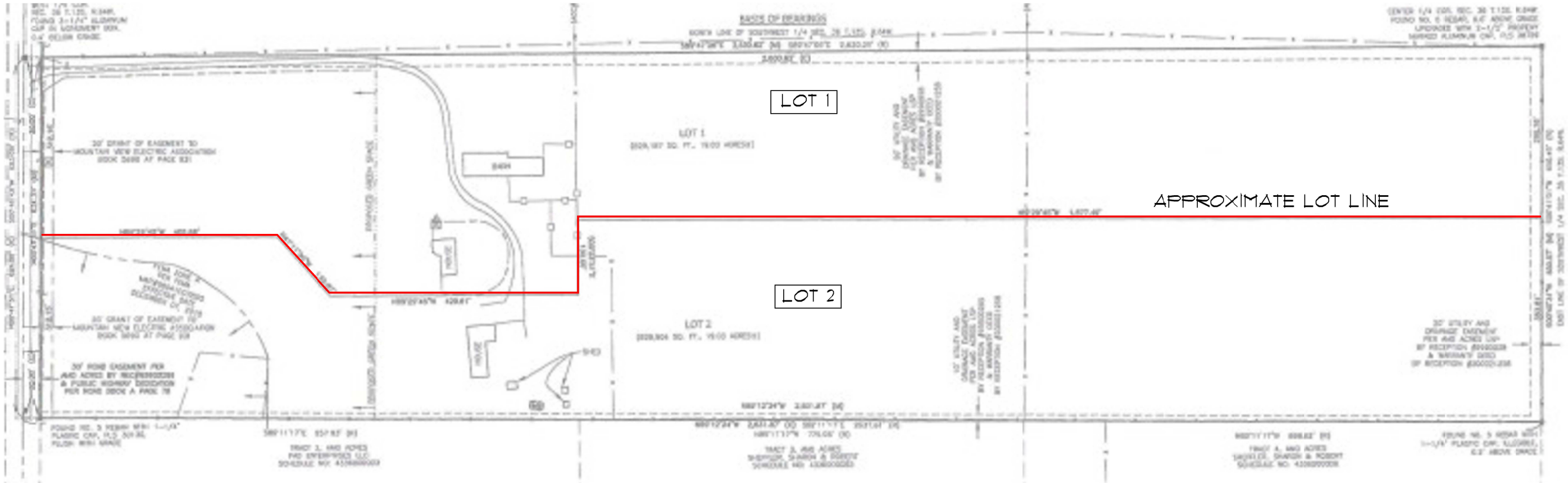
SITE VICINITY MAP

2825/2819 SLOCUM RD
LOT 1 and 2, AMO ACRES, FILING NO. 1
EL PASO COUNTY, CO
MARY LEE DECONZA-WINBLAD

JOB No. 198011

FIG No. 1

DATE 1-14-2024



NOT TO SCALE

BASE MAP PROVIDED BY:
APEX LAND SURVEYING AND MAPPING, LLC

JOB No. 198011

Materials Testing
Forensics
Civil / Planning



Architecture
Structural
Geotechnical

Engineers / Architects

SOUTHERN COLORADO OFFICE
2910 AUSTIN BLUFFS PKWY, SUITE 100,
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SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

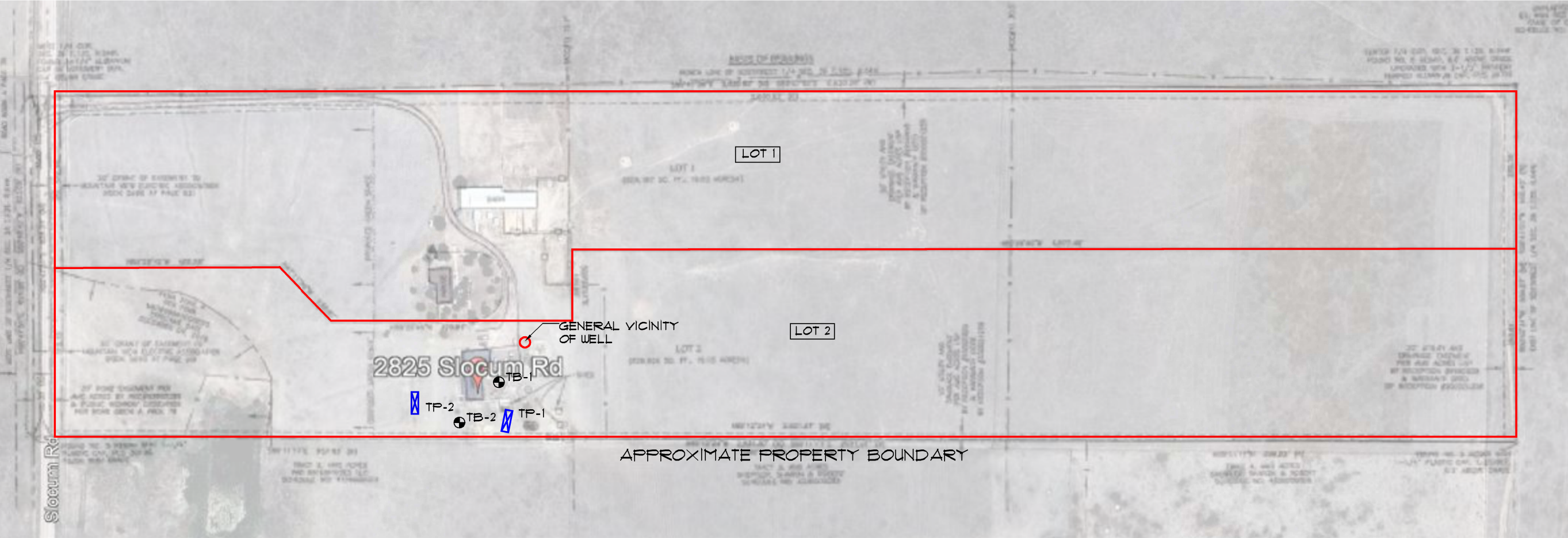
2825 / 2819 SLOCUM RD
LOTS 1 AND 2, 4MO ACRES
FILING NO. 1
EL PASO COUNTY, CO
MARY LEE DECONZA-WINBLAD

ENGINEER: TM
DRAWN BY: KZ
CHECKED BY: TM

ISSUED: 1-14-2024

PROPOSED LOT
LAYOUT

SHEET No.
FIG-2



● DENOTES APPROXIMATE LOCATION OF TEST BORINGS

⌘ DENOTES APPROXIMATE LOCATION OF TEST PITS



NOT TO SCALE

Materials Testing
Forensics
Civil / Planning



Engineers / Architects

SOUTHERN COLORADO OFFICE
2910 AUSTIN BLUFFS PKWY, SUITE 100,
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SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

2825 / 2819 SLOCUM RD
LOTS 1 AND 2, AMO ACRES
FILING NO. 1
EL PASO COUNTY, CO
MARY LEE DECONZA-WINBLAD

ENGINEER:	TM
DRAWN BY:	KZ
CHECKED BY:	TM
ISSUED:	1-14-2024

TEST PIT/BORING
LOCATION PLAN

SHEET No.

FIG-3

SOILS DESCRIPTION



SANDSTONE



SANDY CLAY



SILTY SAND



SILTY TO CLAYEY SAND

UNLESS NOTED OTHERWISE, ALL LABORATORY
TESTS PRESENTED HEREIN WERE PERFORMED BY:
RMG - ROCKY MOUNTAIN GROUP
5085 LIST DRIVE, SUITE 200
COLORADO SPRINGS, COLORADO

SYMBOLS AND NOTES



XX

STANDARD PENETRATION TEST - MADE BY DRIVING A SPLIT-BARREL SAMPLER INTO THE SOIL BY DROPPING A 140 LB. HAMMER 30", IN GENERAL ACCORDANCE WITH ASTM D-1586. NUMBER INDICATES NUMBER OF HAMMER BLOWS PER FOOT (UNLESS OTHERWISE INDICATED).



XX

UNDISTURBED CALIFORNIA SAMPLE - MADE BY DRIVING A RING-LINED SAMPLER INTO THE SOIL BY DROPPING A 140 LB. HAMMER 30", IN GENERAL ACCORDANCE WITH ASTM D-3550. NUMBER INDICATES NUMBER OF HAMMER BLOWS PER FOOT (UNLESS OTHERWISE INDICATED).



FREE WATER TABLE



DEPTH AT WHICH BORING CAVED



BULK DISTURBED BULK SAMPLE



AUG AUGER "CUTTINGS"

4.5

WATER CONTENT (%)

ROCKY MOUNTAIN GROUP

Structural
Forensics



Geotechnical
Materials Testing

Colorado Springs: (Corporate Office)
5085 List Drive, Suite 200
Colorado Springs, CO 80918
(719) 548-0600

SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

EXPLANATION OF TEST BORING LOGS

JOB No. 198207

FIGURE No. 4

DATE Jan/14/2025

TEST BORING: 1	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %	TEST BORING: 2	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
DATE DRILLED: 12/6/24 NO GROUNDWATER ON 12/6/24						DATE DRILLED: 12/6/24 NO GROUNDWATER ON 12/6/24					
SAND, SILTY, dark brown, moist						SAND, SILTY, with gravel, light brown to dark brown, medium dense, moist					
CLAY, SANDY, tan, medium stiff, moist	5			7	9.5		5		18	4.6	
SAND, SILTY TO CLAYEY, with gravel, light brown to tan, loose to medium dense, moist									10	4.7	
	10			17	8.7		10				
	15			28	3.0		15		12	4.6	
	20			22	3.2	SANDSTONE, SILTY, with gravel, tan, medium hard, moist	20		40	4.8	
SANDSTONE, SILTY, dark brown, very hard, moist	25			50/5"	15.7						
	30			50/5"	15.0						

ROCKY MOUNTAIN GROUP

Structural
Forensics



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Colorado Springs, CO 80918
(719) 548-0800

SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

Geotechnical
Materials Testing

TEST BORING LOG

JOB No. 198211

FIGURE No. 5

DATE Jan/14/2025

Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	Load at Saturation (psf)	% Swell/ Collapse	USCS Classification
1	4.0	9.5		29	10	0.0	61.8			CL
1	9.0	8.7								
1	14.0	3.0		NP	NP	6.2	8.6			SW-SM
1	19.0	3.2								
1	24.0	15.7								
1	29.0	15.0								
2	2.0	4.6								
2	7.0	4.7		NP	NP	0.0	14.0			SM
2	14.0	4.6								
2	19.0	4.8		NP	NP	16.3	11.9			SP-SM

ROCKY MOUNTAIN GROUP

Structural
Forensics



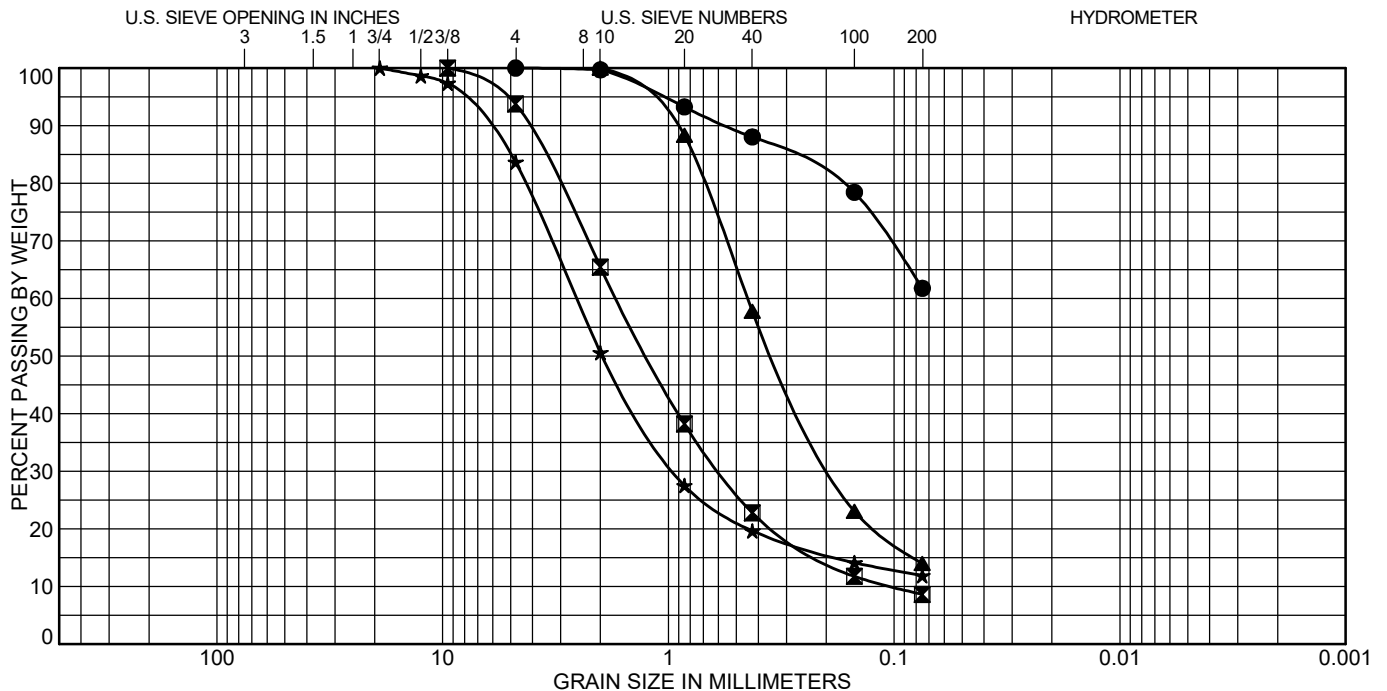
Colorado Springs, (Corporate Office)
5085 List Drive, Suite 200
Colorado Springs, CO 80918
(719) 548-0600

SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

Geotechnical
Materials Testing

SUMMARY OF LABORATORY TEST RESULTS

JOB No. 198011
FIGURE No. 6
PAGE 1 OF 1
DATE Jan/14/2025



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Test Boring	Depth (ft)	Classification	LL	PL	PI
● 1	4.0	SANDY LEAN CLAY(CL)	29	19	10
■ 1	14.0	WELL-GRADED SAND with SILT(SW-SM)	NP	NP	NP
▲ 2	7.0	SILTY SAND(SM)	NP	NP	NP
★ 2	19.0	POORLY GRADED SAND with SILT and GRAVEL(SP-SM)	NP	NP	NP

Test Boring	Depth (ft)	%Gravel	%Sand	%Silt	%Clay
● 1	4.0	0.0	38.2	61.8	
■ 1	14.0	6.2	85.1	8.6	
▲ 2	7.0	0.0	86.0	14.0	
★ 2	19.0	16.3	71.8	11.9	

ROCKY MOUNTAIN GROUP

Structural
Forensics



Geotechnical
Materials Testing

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(719) 548-0600

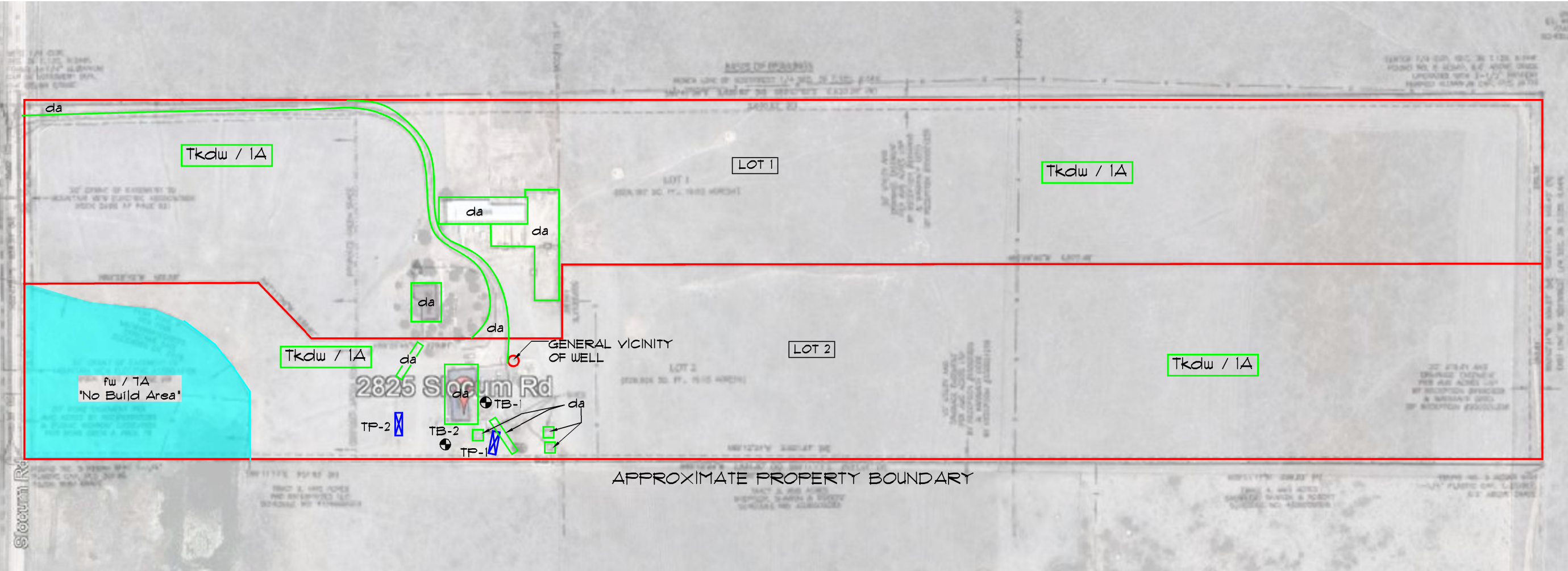
SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

SOIL CLASSIFICATION DATA

JOB No. 198011

FIGURE No. 7

DATE Jan/14/2025



LEGEND

GEOLOGIC CONDITIONS

- *Tkdw - Dawson Formation, (Upper Cretaceous and Paleocene)* - the unit is generally drab colored; which includes shades of grey, yellow and brown. Pebbles are mostly granitic, quarts, feldspar, with pebbles ranging up to 2 inches in diameter. This unit is approximately 1,350 feet thick in this area. The sandstone was encountered in the test borings at depths ranging between 17 and 18 feet.
- *fw - Regulatory floodway* as designated by FEMA. This area is to be designated a "No Build Area" until further investigations are completed.
- *da* - areas no longer in their native state due to the development on both lots.



ENGINEERING GEOLOGY

- 1A - Stable alluvium, colluvium and bedrock on gentle slopes (0 to 5%).
- 7A - Physiographic flood plain where erosion and deposition presently occurs and is generally subject to recurrent flooding. Includes the 100-year flood plain along major streams where flood plain studies have been conducted.



NOT TO SCALE

X DENOTES APPROXIMATE LOCATION OF TEST PITS

● DENOTES LOTS WHERE TEST BORINGS WERE PERFORMED



2825 / 2819 SLOCUM RD
LOTS 1 AND 2, 4MO ACRES
FILING NO. 1
EL PASO COUNTY, CO
MRS. DECONZA-WINBLAD

ENGINEER:	TM
DRAWN BY:	KZ
CHECKED BY:	TM
ISSUED:	1-14-2024

ENGINEERING AND GEOLOGY MAP

APPENDIX A

Additional Reference Documents

1. *Flood Insurance Rate Map, El Paso County, Colorado and Unincorporated Areas, Community Panel No. 08041C0785G*, Federal Emergency Management Agency (FEMA), effective December 7, 2018. <https://msc.fema.gov/portal/home>.
2. *Geologic Map of the Corral Bluffs Quadrangle, El Paso County, Colorado*, by Soister, P.E. 1968, US Geological Survey, Geologic Quadrangle Map GQ-783.
3. *Environmental and Engineering Geologic Map for Land Use*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
4. *Map of Potential Geologic Hazards and Surficial Deposits*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
5. *Reconnaissance Geologic Map of Colorado Springs and Vicinity, Colorado*, Department of the Interior United State Geologic Survey, prepared by Glenn R. Scott and Reinhold A. Wobus, Miscellaneous Field Studies, Map MF-482, Sheets 1 and 2, 1973.
6. *El Paso County, Master Plan for Mineral Extraction*, dated February 8, 1996.
7. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands Administered by the Colorado State Land Board*, prepared by Colorado Geological Survey, dated February 19, 2003, Open-file Report OF-03-07.
8. *USDA – Natural Resources Conservation Service, Web Soil Survey*
<https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx>
9. *Colorado Springs Landslide Susceptibility, Colorado Geological Survey:*
<https://cologeosurvey.maps.arcgis.com/apps/webappviewer/index.html?id=5e7484a637c4432e84f4f16d0af306d3>
10. *Colorado Landslide Inventory, Colorado Geological Survey:*
<https://cologeosurvey.maps.arcgis.com/apps/webappviewer/index.html?id=9dd73db7fbc34139abe51599396e2648>.
11. *Pikes Peak Regional Building Department:* <https://www.pprbd.org/>.
12. *City of Colorado Springs, Subdivision Document Viewer:*
<http://www.springsgov.com/SubDivView/default.asp?cmdGoBack=New+Search...>.
13. *El Paso County Assessor, El Paso County, Colorado:*
<https://property.spatalest.com/co/elpaso/#/property/4336000004>
14. *Colorado Geological Survey, USGS Geologic Map Viewer:*
<http://coloradogeologicalsurvey.org/geologic-mapping/6347-2/>.
15. *Historical Aerials:* <https://www.historicaerials.com/viewer>, Images dated 1947, 1955, 1960, 1969, 1983, 1999, 2005, 2009, 2011, 2013, 2015, 2017, 2019, and 2021.
16. *USGS Historical Topographic Map Explorer:* <http://historicalmaps.arcgis.com/usgs/> Images dated 1947, 1952, 1955, 1960, 1983, 1966, 1999, 2005, 2009, 2011, 2013, 2015, 2017, 2019, and 2024.
17. *Google Earth Pro*, Imagery dated 1999, 2003, 2004, 2005, 2006, 2011, 2015, 2017, 2019, 2022, and 2024.

APPENDIX B

2000 Soil Test, Lot 1 (2825), Colorado Engineering & Geotechnical Group, Inc.
2007 Soils Report, Lot 2 (2819), Geoquest, LLC



February 14, 2000
Job # 00059

Paul R. Bryant, P.E.
Civil Engineer



Double Diamond Construction
105 West Rockrimmon Blvd. #110
Colorado Springs, Colorado 80919

16902

Re: Soil test for Lot 1, Amo Estates Subdivision, El Paso County, Colorado

Dear Sir:

Attached are the results of the soil test performed for you.

If you have any questions concerning this report, or if we can assist you in any other matter, please contact us at (719) 488-2145.

Sincerely,

Paul Bryant P.E.

Mailing Address:

Monument Office

P.O. Box 1298
19375 Beacon Lite Rd.
Momonment, Co. 08132

Phone: (719) 488-2145

Fax: (719) 488-2895

Woodland Park Office

P.O. Box 5816
321 West Henrietta Ave.
Woodland Park, Co. 80866

Phone: (719) 687-6077

Fax: (719) 687-6151

REGIONAL BLDG. DEPT.

MAR 17 2000

APPROVED BY RDW

RED'S copy

INTRODUCTION:

This report summarizes the results of data obtained during a geotechnical investigation of Lot 1, Amo Estates Subdivision, El Paso County, Colorado. Investigation occurred February 2, 2000 and was performed in undisturbed soil. The purpose of the investigation was to reveal the engineering properties pursuant to the construction of a single-family residence. The site is currently vacant. Other aspects relating to the construction are presented.

FINDINGS:

The soil encountered was a brown, silty fine-grained sand from the surface to a depth of approximately 2.5 feet, then tan, fine to medium-grained sand (Unified Soil Classification System symbol **SP-SM**) from 2.5 feet to the bottom of the boring. Attached is a boring log of the conditions encountered and a summary of laboratory testing results. Density was low. Expansion potential is low.

Groundwater was not encountered in the test borings at the time of this investigation. The presence of shallow bedrock beneath surficial soils is favorable for the formation of "perched" groundwater. The depth and occurrence of groundwater can vary over time depending on hydrologic conditions such as precipitation, surface drainage, and irrigation, and other conditions not apparent at the time of this report.

RECOMMENDATIONS:

Maximum allowable bearing strength of the soil shall not be taken as greater than 1,000 pounds per square foot for elements resting on undisturbed soil. Equivalent fluid pressure of the soil in the active state may be taken at 45 pounds per cubic foot.

The preferred foundation design will consist of a reinforced concrete stem wall resting on a concrete footer of a size determined by the foundation engineer. Depth of foundation elements shall be determined by the foundation engineer, but should be at least as deep as the minimum depth required by the governing building authority. Concrete slabs shall be free floating and isolated from load-bearing elements. Partition walls, utility and HVAC connections shall be capable of a minimum of 1-1/2 inches of movement of the foundation and slab. Owners shall be made aware of the contents of this report and the fact that *water accumulation around foundation elements is the primary cause of foundation distress.*

FIELD INVESTIGATION PROCEDURE:

Exploratory borings were advanced using a four-inch nominal diameter, truck-mounted continuous-flight auger. The location designated for exploration was determined by the builder. At depths determined by the supervising geologist, samples were obtained by means of a two-inch diameter split-spoon sampler, advanced by a 140-pound drop-hammer falling a distance of 30 inches, in general compliance with ASTM D-1586. The number of hammer blows required to advance the sampler provides an indication of the in-situ relative density of the soil, and in combination with the laboratory analysis of the soil, provides data required for derivation of the engineering properties sought by this exploration.

TOPOGRAPHY AND WEATHER:

The general topography around the site of this investigation is a 4 percent slope to the south/southwest with grass cover. Weather was cool and clear.

FOUNDATION DESIGN:

This report is not a foundation design. It does not address general hillside stability, landslide potential, or other hazards from off the general building site. The foundation design engineer will determine the exact configuration of foundation elements, to include footer (if any) width and thickness, wall thickness and height, pad and pier sizes and reinforcement schedules. However, the foundation should be designed for a ten-foot free span.

SUBSURFACE DRAINAGE:

A perimeter foundation drain is required around below-grade useable space. See the attached detail sheet.

BACKFILL:

Any soil disturbed adjacent to bearing foundation components shall be recompact to a minimum of 85% Modified Proctor Density. Soil supporting concrete slabs shall be compacted to 95% Modified Proctor Density. Mechanical compaction methods shall be utilized; water-flooding techniques are prohibited.

CONCRETE:

All concrete shall be Type II, Sulfate Resistive, with 28-day strength requirements determined by the foundation design engineer.

EXTERIOR AND INTERIOR CONCRETE SLABS:

Interior concrete slabs shall be isolated from the foundation, utility lines and non-bearing partition walls. Exterior slabs may be doweled to the foundation to prevent settlement. Slabs shall have control joints at approximately ten feet on center each way to lessen the possibility of random cracking. Excess moisture in the soil and improper compaction under slabs will increase the possibility of slab heave, settlement and cracking.

SURFACE DRAINAGE:

The excavation shall be protected from surface runoff and excess precipitation during construction. After backfilling, the soil around the foundation shall be graded away from the structure at a slope of six inches over ten feet. Gutters and downspouts shall be installed to carry water across the area disturbed by construction. Areas which settle shall be backfilled to prevent ponding of water. No vegetation requiring irrigation shall be installed within five feet of the foundation. Water from uphill shall be diverted around the structure.

OPEN HOLE OBSERVATION:

It is necessary to assume the soil in the surrounding area will be similar to that which was observed in this initial investigation. However, variations across the test borings and site can and do occur. *Therefore, it is required that a qualified soil engineer inspect the completed foundation excavation prior to the placement of any foundation component to determine whether any significant variation from this report exists and whether the foundation design will require modification. Please contact this office a minimum of 24 hours in advance to schedule a representative to observe the completed excavation.* Failure to obtain this required inspection prior to placement of foundation elements renders this report and its recommendations null and void.

CONCLUSIONS:

This report is valid only for the use of Double Diamond Construction for the type of construction listed above. Use by any other is prohibited, as is the use for other types of construction without the express, written permission of this office. Property owners and builders are reminded that water accumulation around foundation elements is a primary cause of structural distress in homes. **Foundation movement under any condition can be minimized by maintaining stable moisture content of the soil supporting the foundation.** Surface drainage is paramount to minimizing the potential for water to penetrate backfill to the level of the foundation. If water penetrates through to the soil supporting the foundation, movement is likely. Any movement which does occur should be less than 1".

LIMITATIONS:

This report and its recommendations do not apply to any other site other than the one described herein and are predicated on the assumption that the actual soil conditions do not deviate in any significant way from those described in this report. In the event that any variations or undesirable conditions are detected during the construction phase or if the proposed construction varies from that planned as of this report date, then the owner shall immediately notify Colorado Engineering and Geotechnical Group, Inc., in order that supplemental recommendations can be provided, if needed.

BORING LOGS

OWNER/BUILDER: DOUBLE DIAMOND CONSTRUCTION

JOB NUMBER: 00059

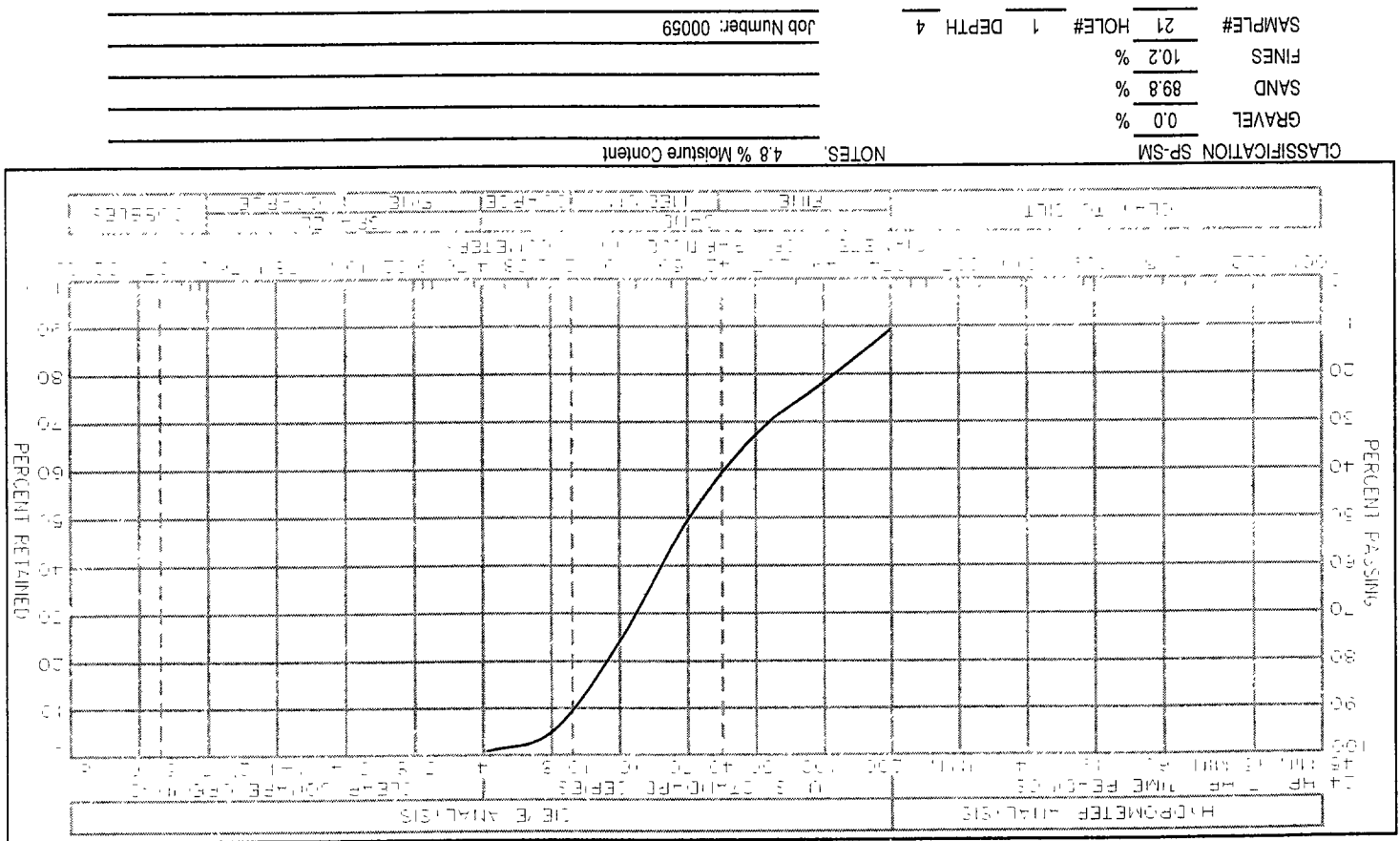
JOB ADDRESS: LOT 1, AMO ESTATES

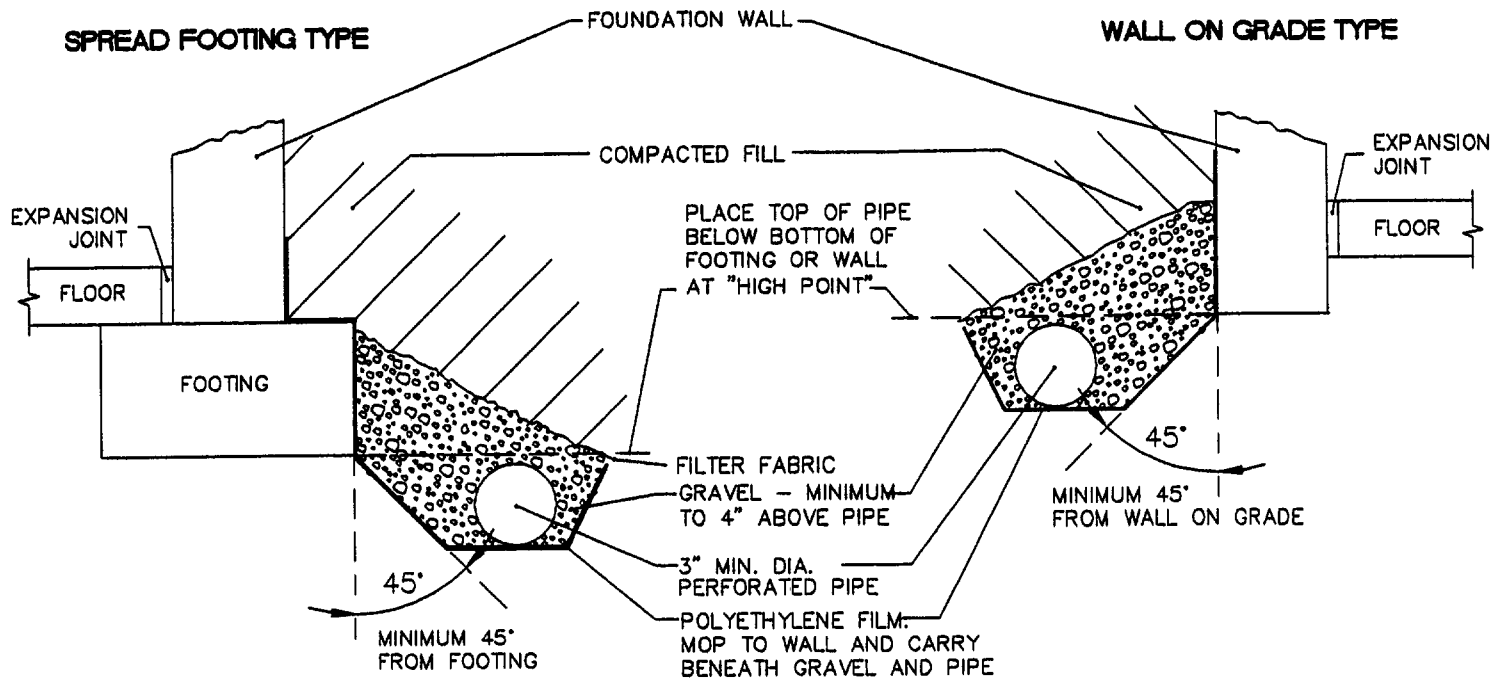
TEST BORING: 1				
DATE: 16 FEBRUARY 00				
SOIL DESCRIPTION	DEPTH (FT)	SAMPLE	MOISTURE	BLOW COUNT/FT
0 - 2.5' SILTY SAND				
GRAIN: FINE DENSITY: LOW MOISTURE: LOW-MODERATE CLAY: LOW COHESION: LOW-MODER. PLASTICITY: LOW COLOR: BROWN	2			
	4	4.8	10	SP SM
2.5' - 10' SAND	6			
GRAIN: FINE-MODERATE DENSITY: LOW MOISTURE: LOW-MODERATE CLAY: LOW COHESION: LOW PLASTICITY: LOW COLOR: TAN	8			
	10	6.0	7	SP SM
	12			
	14			
	16			
	18			
	20			

COLORADO ENGINEERING & GEOTECHNICAL
 19375 Beacon Life Road
 Monument, CO 80132
 719-488-2145

GROUP INC.

Job Number: 00059





1. Gravel size shall not be less than 1/2" in diameter and not greater than 1 1/2" in diameter.
2. Diameter of perforated pipe varies with amount of seepage expected, three inch diameter is most common.
3. Pipe shall be laid at a minimum grade of 1" in 10'.
4. Outfall to be unobstructed, gravity outfall if possible. Use sump and pump only if gravity outfall does not exist. Discharge portion of pipe shall be non perforated past area to be drained. Owner is responsible to maintain daylighting of drain.
5. Exterior earth backfill material should be compacted to at least 30% maximum modified proctor density in the upper three feet of fill.
6. Filter fabric shall be mirafi 140 s or equivalent.
7. Drain pipe shall be laid below area serviced or protected, as shown in detail above.
8. Mop polyethylene film to wall and carry beneath gravel and pipe.
9. The polyethylene film shall be continued to the edge of the excavation.

* TH-1

* TH-2

* P-3

* P-1 *
PROFILE

* P-2

FENCE LINE

FENCE CORNER

LOCATIONS:

FROM PROFILE TO P-1; 9' N85W
FROM PROFILE TO P-2; 27' S28W
FROM PROFILE TO P-3; 32' N21W
FROM PROFILE TO TH-2; 91' N32E
FROM TH-2 TO TH-1; 31' N14E
FROM PROFILE TO FENCE CORNER; 279' S74E



0 10 20 30 40 50
GRAPHIC SCALE IN FEET
SCALE: 1" = 50'

COLORADO ENGINEERING & GEOTECHNICAL
19375 Beacon Lite Road
Monument, CO 80132
719-488-2145
GROUP, INC.

PROJECT: DOUBLE DIAMOND CONSTRUCTION
LOT 1, AMO ESTATES
EL PASO COUNTY, COLORADO

DRAWN BY: JML

DATE: 02/16/00

JOB #: 00059



PO Box 5, Monument, CO 80132
(719) 481-4560

SOILS REPORT
FOR
POULSON CONSTRUCTION

JOB #07-0287

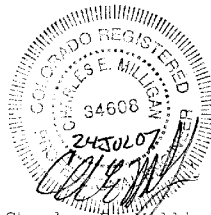
2819 Slocum Road,
El Paso County,
Colorado

Released for Permit
DEC 14 2007
SLH
RBD Construction

Respectfully submitted,

TW

Taylor Watkins
Geologist



Charles E. Milligan, P.E.
Civil Engineer

RBD

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✓RED

INTRODUCTION

The owners must be made aware of the contents of this report. This is to ensure that the recommendations and requirements of the report, especially regarding the surface drainage, are acknowledged and followed. This report is prepared for Poulson Construction, builder on 0 Slocum Road, El Paso County, Colorado. It is my understanding that a single-family residence is planned for this site. The site is currently occupied.

CONCLUSIONS

Due to encountering unsuitable clay material in TH-2, it is advised, to abandon this test boring and shift the house site in the area of TH-1 and TH-3. If this unsuitable clay material is present in the excavation it must be removed and replaced with approved material. Values in this report refer to the sand material only.

A satisfactory foundation for this structure is a properly designed shallow foundation system consisting of foundation components resting directly on undisturbed materials. Foundation components resting directly on undisturbed materials shall be designed for a loading of not greater than 2000 pounds per square foot. The compressibility of this material is low. This bearing capacity is calculated with a safety factor of three. The type of foundation configuration used depends on the building loads applied. The depth of foundation elements shall be determined by the foundation engineer, but should be at least as deep as the minimum depth required by the governing building authority. The laboratory testing revealed that the on-site soil is silty sand and low plasticity clay in TH-2 (U.S.C. Classification Symbol SM and CL). The unit weight of equivalent fluid soil pressure of this material is 40 (SM) and 100 (CL) pounds per cubic foot. The owners shall be made aware that movement will occur if surface or subsurface water is allowed to collect around the foundation wall.

GENERAL

The investigation was made to reveal important characteristics of the soils and of the site influencing the foundation design. Also evaluated during the investigation were subsurface conditions that affect the depth of the foundation and subsequent loading design, such as ground water levels, soil types, and other factors which affect the bearing capacity of the soils. Design loadings are based on soils characteristics and represent the maximum permissible loads for these conditions.

FIELD AND LABORATORY INVESTIGATION

Two exploratory holes were drilled on July 2, 2007, and an additional boring was performed on July 13, 2007, at the locations shown on the enclosed site map. The location of these test holes were determined by Aron Poulson. The test holes were drilled with a 4-inch diameter auger. At intervals anticipated to be the foundation depths, and as determined by the soils conditions, the drill tools were removed and samples were taken by the use of a 2-inch split barrel sampler connected to a 140 pound drop-hammer. This hammer is dropped 30 inches to drive the penetration sampler into the soil (ASTM D-1586). The depths and descriptions of the materials encountered in each test boring at which the samples were taken are shown on the enclosed log sheets. All samples were classified both in the field and in the laboratory to evaluate the physical and mechanical properties of the materials encountered.

TOPOGRAPHY

The topography of this site is that of an incline sloping down towards the north-northeast at 2%.

WEATHER

The weather at the time of the soil examination consisted of partly cloudy skies, with hot temperatures.

DESIGN AND CONSTRUCTION CONSIDERATIONS

Residential basement slabs-on-grade may move and crack. Vertical slab movement of one to three inches is considered normal for soils of low to moderate expansion potential and for compacted structural fill after removal of highly expansive soils. In some cases vertical movement may exceed this range. If movement and associated damage to basement floors and finish cannot be tolerated, a structural floor system should be installed. If compaction is not performed, settlement may occur causing cracking of foundation walls and floors. Soil located beneath concrete walls shall be compacted to at least 95% Modified Proctor density. Soil located beneath concrete floors shall be compacted to at least 85% Modified Proctor density. Special care is to be taken to recompact the material above utility lines to a minimum of 85% Modified Proctor density. During construction, conditions that could cause settlement shall be eliminated. Interior non-bearing partition walls shall be constructed such that they do not transmit floor slab movement to the roof or overlying floor. The gap or void (1.5" min.) installed in these non bearing partitions may require re-construction over the life of the structure to re-establish the gap or void to allow for vertical slab movement. Stairwells, doorways and sheeted walls should be designed for this movement. The following are general recommendations of on-grade slabs:

1. Slabs shall be placed on well-compacted, non-expansive materials, and all soft spots shall be thoroughly excavated and replaced with non-expansive fill materials as stated above.
2. Separate the slab from all foundation walls, load bearing members, and utility lines.
3. At intervals not to exceed 12 feet in each direction, provide control joints to reduce problems with shrinkage and curling as recommended by the American Concrete Institute (ACI). Moisten the ground beneath the slab prior to placement of concrete.
4. All concrete placed must be cured properly as recommended by the American Concrete Institute (ACI). Separate load bearing members from slabs, as discussed above. Care must be exercised to prevent excess moisture from entering the soil under the structure, both during and after construction.
5. Due to the exposure of exterior concrete to variations in moisture fluctuations, heaving and cracking of exterior slabs-on-grade should be expected. Placement of at least 3 feet of non-expansive fill beneath the slabs can help to reduce the impact of differential movement and cracking but may not eliminate movement.

DESIGN AND CONSTRUCTION CONSIDERATIONS (CONTINUED)

6. The soil has been analyzed for its expansion potential. Basement slabs, garage slabs, and all concrete floor slabs, however, exert a very low dead-load pressure on the soil. Since this soil contains at least a moderate amount of expansion potential, slabs will crack and heave if excess water is allowed to penetrate the subgrade. For example, column openings to pads below the placed slab, if exposed to precipitation during construction, will conduct water to the subgrade, possibly causing it to expand. Also, if the slab is placed with concrete too wet, expansion may occur. We recommend 3,000 psi concrete placed at a maximum slump of 4 inches.

RECOMMENDATION REMARKS

The recommendations provided in this report are based upon the observed soil parameters, anticipated foundation loads, and accepted engineering procedures. The recommendations are intended to minimize differential movement resulting from the heaving of expansive soil or from the settlement induced by the application of loads. **It must be recognized that the foundation will undergo some movement on all soil types.** In addition, concrete floor slabs will move vertically, therefore, adherence to those recommendations which isolate floor slabs from columns, walls, partitions or other structural components is extremely important, if damage to the superstructure is to be minimized. Any subsequent owners should be apprized of the soil conditions and advised to maintain good practice in the future with regard to surface and subsurface drainage and partition framing, drywall and finish work above floor slabs.

Geoquest, LLC does not assure that the contractor and/or homeowner will comply with the recommendations provided in this report. Geoquest, LLC provides recommendations and requirements only and does not supervise, direct or control the implementation of such.

COLD TEMPERATURE CONSIDERATIONS

✓ RECD

1. Concrete shall not be placed upon frozen soil.
2. Concrete shall be protected from freezing until it has been allowed to cure for at least 7 days after placement in forms.
3. Snow or other frozen water shall not be allowed in the forms during placement of concrete.
4. Concrete shall be cured in forms for at least 72 hours.
5. The site shall be kept well drained at all times.

SURFACE DRAINAGE

After construction of foundation walls, the backfill material shall be well compacted to 80% Modified Proctor density, to prevent future settlement. Any areas which settle after construction shall be filled to eliminate ponding of water adjacent to the foundation walls. The finished grade shall have a positive slope away from the structure with an initial slope of 6" in the first 10'. If a 10' zone is not possible on the upslope site of the structure, then a well defined swale should be created a minimum of 5' from the foundation and sloped parallel with the wall at a 2% grade to intercept the surface water and carry it around and away from the structure. Homeowners shall maintain the surface grading and drainage installed by the builder to prevent water directed in the wrong direction. All downspouts shall have splash blocks that will remove runoff to outside the foundation area and carried across backfill zones. No irrigation devices shall be placed within 7' of the foundation. Shrubs and plants requiring minimal watering shall be established in this area. Irrigated grass shall not be located within 5' of the foundation. Sprinklers shall not discharge water within 5' of the foundation. Irrigation should be limited to the minimum amount sufficient to maintain vegetation. Application of more water will increase likelihood of floor slab and foundation movement.

SUBSURFACE DRAINAGE

The necessity for perimeter drains will be determined at the time of the Open Hole Observation.

REINFORCING

The concrete foundation walls shall be properly reinforced as per the specific design for this foundation by a Professional Engineer.

Exact requirements are a function of the design of the structure.
Questions concerning the specific design requirements shall be referred to the design engineer.

FOOTING DESIGN

The design for footings for this structure is determined by applying the dead load and full live load to the foundation walls.

CONSTRUCTION DETAILS

It is necessary with any soils investigation to assume that the materials from the test holes are representative of the materials in the area. On occasion variations in the subsurface materials do occur, therefore, should such variations become apparent during construction, the owner is advised to contact this office for a determination as to whether these variations will affect the design of the structure's foundation. If clay layers are observed during the excavation for the dwelling, this office should be contacted to determine whether the layers will adversely affect the design.

✓ RBD

MINIMUM MATERIALS SPECIFICATIONS

1. Minimum materials specifications of the concrete, reinforcing, etc., shall be determined by the Professional Engineer.
2. Compact beneath foundation walls a minimum of 95% Modified Proctor density to prevent settlement.
3. Compact all backfill material located around the perimeter of the foundation to a minimum of 80% Modified Proctor density.
4. Concrete shall be vibrated or rodded in forms to avoid segregation and cold joints.
5. The site shall be kept well drained at all times.

OPEN HOLE OBSERVATION (added cost)

The owner, or a representative of the construction company shall contact **Geoquest, LLC.** a minimum of **24 hours** prior to excavating for the foundation. An Open Hole Observation must be performed on each individual structure prior to the placement of concrete, and preferably prior to the placement of forms in the excavated area. **The failure to request or obtain an Open Hole Observation prior to the placement of foundation components may result in this Soils Report being declared null and void.** This is to insure that soft areas, anomalies, etc., are not present in the foundation region. At the time of the open hole observation the **foundation type recommendations, maximum allowable bearing capacity may be revised** according to soil conditions found at that time. If revisions are made to the Soils Report Due to the soil conditions of the excavation, **the Foundation Design Engineer must be notified of all revisions.**

✓ RBD



DRILL LOGS

JOB#: 07-0287

TEST BORING

NO.: TH-1

DATE: 07-02-07

DEPTH (in ft.)

SYMBOL

SAMPLES

BLOW COUNT

WATER %

SOIL TYPE

0"-4" TOPSOIL

4"-15' SAND

fine-medium grained

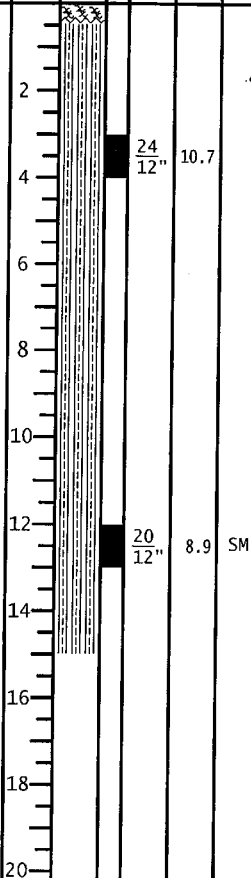
moderate density

moderate moisture
content

low clay content

non-plastic

tan color



JOB#: 07-0287

TEST BORING

NO.: TH-2

DATE: 07-02-07

DEPTH (in ft.)

SYMBOL

SAMPLES

BLOW COUNT

WATER %

SOIL TYPE

0"-4" TOPSOIL

4"-15' CLAY

fine grained

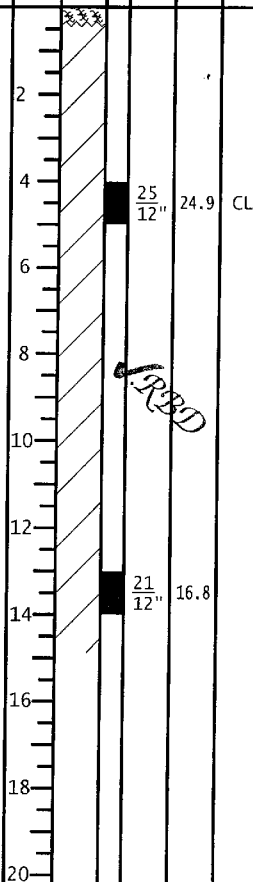
moderate density

high moisture
content

low sand content

high plasticity

tan color





DRILL LOGS

JOB#: 07-0287

TEST BORING

NO.: TH-1

DATE: 07-13-07

DEPTH (in ft.)

SYMBOL

SAMPLES

BLOW COUNT

WATER %

SOIL TYPE

0"-4" TOPSOIL

4"-15' SAND

fine-medium grained

moderate density

low moisture
content

low clay content

non-plastic

tan color

2
4
6
8
10
12
14
16
18
20



25
12"

3.6

SM

21
12"

3.5

JOB#:

TEST BORING

NO.:

DATE:

DEPTH (in ft.)

SYMBOL

SAMPLES

BLOW COUNT

WATER %

SOIL TYPE

2
4
6
8
10
12
14
16
18
20

Handwritten signature/initials

GEOQUEST LLC

SITE MAP

0 Slocum Road,
El Paso County,
Colorado
Job #07-0287

Southeast
House
Corner

✓ RBD

TH-1-○

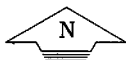
TH-3-○

○-P-3

P-2-○ ○-PROFILE

○-P-1

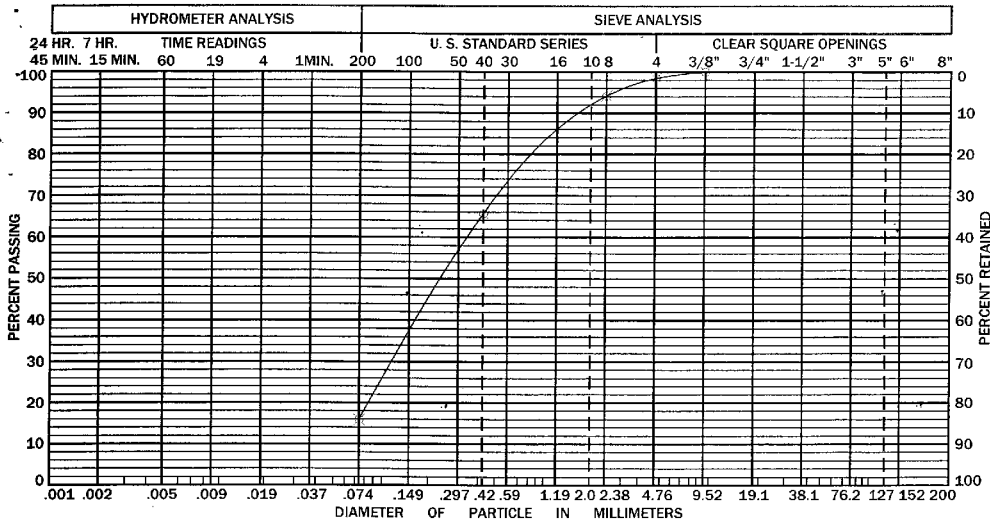
TH-2-○



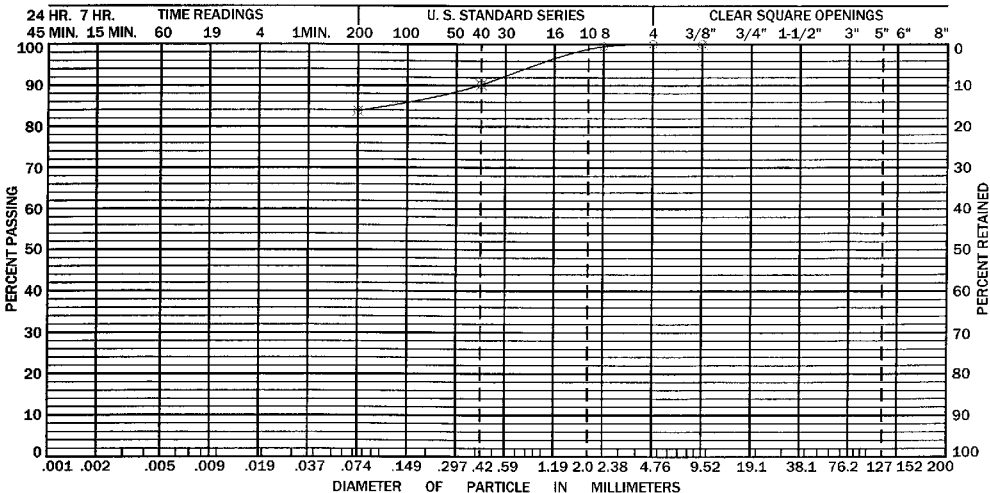
0 10 20 30 40 50
GRAPHIC SCALE IN FEET
SCALE: 1" = 50'

GEOQUEST LLC

GRADATION TEST RESULTS



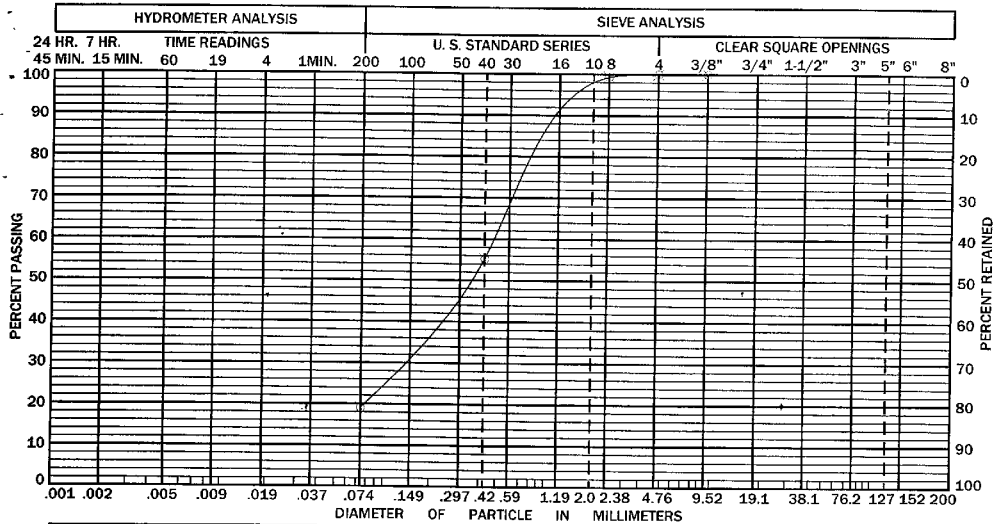
CLAY TO SILT	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	
CLASSIFICATION <u>SM</u>	NOTES: <u>8.9 % Moisture content</u>					
GRAVEL <u>1.5 %</u>	<u>LL = could not be determined</u>					
SAND <u>82.6 %</u>	<u>PL = non-plastic</u>					
FINES <u>15.9 %</u>						
SAMPLE# <u>1</u> HOLE# <u>TH-1</u> DEPTH <u>12</u> FEET						



CLAY TO SILT	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	
CLASSIFICATION <u>CL</u>	NOTES: <u>24.9 % Moisture content</u>					
GRAVEL <u>0.0 %</u>	<u>LL = 30.5 %</u>					
SAND <u>16.2 %</u>	<u>PL = 14.3 %</u>					
FINES <u>83.8 %</u>	<u>PI = 16.2 %</u>					
SAMPLE# <u>1</u> HOLE# <u>TH-2</u> DEPTH <u>4</u> FEET	Job: #07-0287 By: BY 07/05/2007					

GEOQUEST LLC

GRADATION TEST RESULTS



CLAY TO SILT	SAND			GRAVEL		COBBLES
	FINE	MEDIUM	COARSE	FINE	COARSE	

CLASSIFICATION SM

GRAVEL 0.0 %

SAND 80.9 %

FINES 19.1 %

SAMPLE# 1 HOLE# TH-3 DEPTH 3 FEET

NOTES: 3.6 % Moisture Content

LL = could not be determined

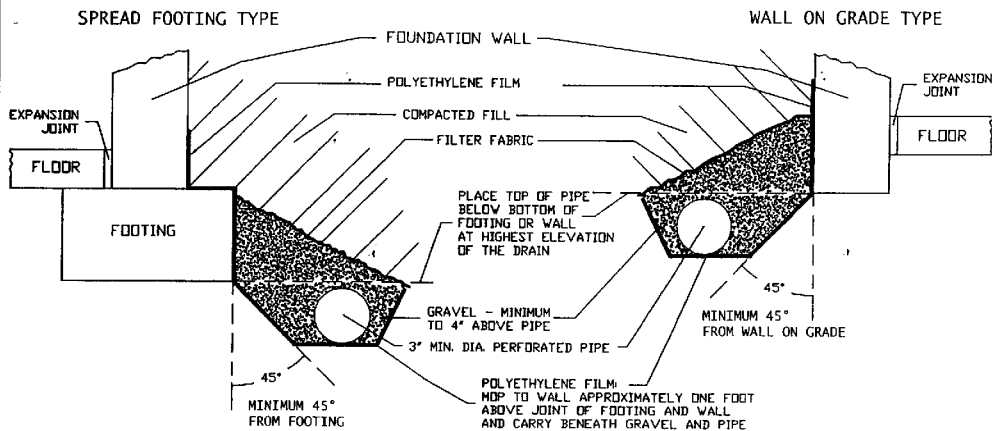
PL = non-plastic

Job: #07-0287 By: BY 07/16/2007

✓ RBD



EXTERIOR DRAIN DETAIL



1. Gravel size shall not be less than 1/2" in diameter and not greater than 1-1/2" in diameter.
2. Diameter of perforated pipe varies with amount of seepage expected, three inch diameter is most common.
3. Pipe shall be laid at a minimum grade of 1" in 10'.
4. Outfall to be unobstructed, gravity outfall if possible. Discharge portion of pipe shall be non perforated past area to be drained. Owner is responsible to maintain daylighting of drain.
5. If gravity outfall is not possible, a sump pit with an operational pump must be installed.
6. Exterior earth backfill material should be compacted to at least 80% maximum modified Proctor density in the upper three feet of fill.
7. Filter fabric shall be mirafi 140 s or equivalent. Roofing felt is not acceptable.
8. Drain pipe shall be laid below area serviced or protected, as shown in the detail above.
9. Mop polyethylene film to wall approximately one foot above joint of footing and wall and carry beneath gravel and pipe.
10. The polyethylene film shall be continued to the edge of the excavation.

✓ RBD

LIMITATIONS

This report is issued based on the understanding that the owner or his representative will bring the information, data, and recommendations contained in this report to the attention of the project engineer and architect, in order that they may be incorporated into the plans for the structure. It is also the owner's responsibility to ensure that all contractors and sub-contractors carry out these recommendations during the construction phase.

This report was prepared in accordance with generally accepted professional geotechnical/engineering methods. However, Geoquest, LLC makes no other warranty, express or implied, as to the findings, data, specifications, or professional advice rendered hereunder.

This report is considered valid as of the present date. The owner acknowledges, however, that changes in the conditions of the property might occur with the passage of time, such as those caused by natural effects or man-made changes, both on this land and on abutting properties. Further, changes in acceptable tolerances or standards might arise as the result of new legislative actions, new engineering advances, or the broadening of geotechnical knowledge. Thus certain developments beyond our control may invalidate this report, in whole or in part.

This report and its recommendations do not apply to any other site than the one described herein and are predicated on the assumption that the soil conditions do not deviate from those described. In the event that any variations or undesirable conditions should be detected during the construction phase or if the proposed construction varies from that planned as of this report date, the owner shall immediately notify Geoquest, LLC in order that supplemental recommendations can be provided, if so required.

✓ RBD

Appendix C

Wastewater Study, prepared by RMG – Rocky Mountain Group

Job No. 198011

January 14, 2025

Mary Lee DeConza-Winblad
2825 Slocum Road
Peyton, CO 80831

Re: Wastewater Study
2819 and 2825 Slocum Road
Lots 1 and 2, Amo Acres, Filing No. 1
El Paso County, Colorado

Ref: *Land Survey Plat, Amo Acres, Filing No. 1*, prepared by Apex Land Surveying and Mapping, LLC. dated September 30, 2024.

Dear Mr. and Mrs. Wilson:

As requested, personnel of RMG – Rocky Mountain Group has performed a preliminary investigation and site reconnaissance at the above referenced address. It is our understanding the parcels included in this study are:

- **EPC Schedule No. 4336000004**, addressed as 2825 Slocum Rd, which consists of 38.46 acres and is zoned RR-5, Residential Rural. This schedule number is also currently being used for 2819 Slocum Road.

PROJECT DESCRIPTION

It is our understanding that the parcel was not properly subdivided per the El Paso County regulations. El Paso County is requesting the lot to be replatted into two new lots. The *Land Survey Plat*, referenced above, indicates the residence currently addressed as 2825 Slocum Road is to remain on Lot 1, the northern lot. The residence currently addressed as 2819 Slocum Road is to remain on Lot 2, the southern lot. Both residences have an individual well and septic systems that are to remain on each lot. The residence on Lot 1 was reportedly constructed in 1996 and the residence on Lot 2 was reportedly constructed in 2008. Both residences are described as a manufactured home with an attached garage.

The approximate location of the site is shown on the Site Vicinity Map, Figure 1.

This letter is to provide information for the on-site wastewater report per the On-Site Wastewater Treatment Systems (OWTS) Regulations of the El Paso County Board of Health pursuant to Chapter 8.

The following are excluded from the scope of this report including (but not limited to) foundation recommendations, site grading/surface drainage recommendations, subsurface drainage

recommendations, geologic, natural and environmental hazards such as landslides, unstable slopes, seismicity, snow avalanches, water flooding, corrosive soils, erosion, radon, wild fire protection, hazardous waste and natural resources.

Previous Studies and Field Investigation

Reports of previous geotechnical engineering/geologic investigations for this site were available for our review and are listed below:

1. *Soil and Geology Study, Lots 1 and 2, Amo Acres, Filing No. 1, El Paso County, Colorado*, prepared by RMG Engineers, dated January 14, 2025
2. *Soils Report, 2819 Slocum Road, El Paso County, Colorado*, prepared by Geoquest, LLC, Job #07-0287, dated July 24, 2007;
3. *Soil test for Lot 1, Amo Estates Subdivision, El Paso County, Colorado*, prepared by Colorado Engineering & Geotechnical Group, Inc., Job # 00059, dated February 14, 2000.

The findings, conclusions and recommendations contained in these reports were considered during the preparation of this report.

SITE CONDITIONS

Personnel of RMG performed a reconnaissance visit on December 19, 2024. The purpose of the reconnaissance visit was to evaluate the site surface characteristics including landscape position, topography, vegetation, natural and cultural features, and current and historic land uses. Two 8-foot deep test pits were performed around the existing residence and septic field on Lot 2, during our reconnaissance visit. A Test Pit Location Plan is presented in Figure 2.

The site surface characteristics were observed to consist of low lying grasses and weeds across the entire site. Deciduous trees are located around the residences on the property. A horse stall and barn is located northeast of the residence addressed as 2825 Slocum Road. Three sheds are located south of the residence addressed as 2819 Slocum Road, near the southern property boundary.

The following conditions were observed with regard to the 38.46-acre parcel:

- Two wells currently **do** exist on the existing 38.46-acre site;
- No runoff or irrigation features anticipated to cause deleterious effects to treatment systems on the site were observed;
- A minor waterway exists near the southwestern corner of the property. This portion of the property lies within the designated floodway or floodplain;
- Slopes greater than 20 percent **do not** exist on the site; and
- Significant man-made cuts **do not** exist on the site.

Treatment Areas

Treatment areas at a minimum must achieve the following:

- The treatment areas must be 4 feet above groundwater or bedrock as defined by the Definitions 8.3.4 of the Regulations of the El Paso County Board of Health, Chapter 8, *OWTS Regulations*, effective July 7, 2018;
- Prior to construction of an OWTS, an OWTS design prepared per *the Regulations of the El Paso County Board of Health, Chapter 8, OWTS Regulations* will need to be completed. A scaled site plan and engineered design will also be required prior to obtaining a building permit;
- Comply with any physical setback requirements of Table 7-1 of the El Paso County Department of Health and Environment (EPCDHE);
- Treatment areas are to be located a minimum 100 feet from any well (existing or proposed), including those located on adjacent properties per Table 7-2 per the EPCDHE;
- Treatment areas must also be located a minimum 50 feet from any spring, lake, water course, irrigation ditch, stream or wetland, and 25 feet from dry gulches;
- Other setbacks include the treatment area to be located a minimum 10 feet from property lines, cut banks and fill areas (from the crest);
- The lots are laid out to ensure that the proposed OWTS does not fall within any restricted areas, (e.g. utility easements, right of ways). Based on the test pit observations, each lot has a minimum of two locations for the OWTS.

It is our understanding the existing wastewater treatment systems are to remain in service, and no new OWTS are currently proposed.

Contamination of surface and subsurface water resources should not occur if the existing treatment areas were evaluated and installed according to El Paso County Health Department and State Guidelines in conjunction with proper maintenance.

DOCUMENT REVIEW

RMG has reviewed the above referenced site plan. We have identified the soil conditions that would have likely been encountered during construction of the OWTS on Lot 2. Our review included a review of documented Natural Resource Conservation Service (NRCS) data provided by websoilsurvey.nrcs.usda.gov. The Soil Survey Descriptions are presented below. A review of FEMA Map No. 08041C0785G, effective December 7, 2018 indicates that the existing treatment areas are not located within an identified floodplain. The FEMA Map is presented below.



SOIL EVALUATION

Personnel of RMG performed a soil evaluation to include two 8-foot deep test pits, on December 19, 2024 (Test Pit TP-1 and TP-2), utilizing the visual and tactile method for the evaluation of the site soils. The test pits were excavated in areas that appeared most likely to be used for residential construction. The Test Pit Logs are presented in Figure 3.

The soil conditions as indicated by the NRCS data are anticipated to consist of:

- 10 – Blendon sandy loam, 0 to 3 percent slopes. The Blendon sandy loam was mapped by the USDA to encompass a narrow “strip” that runs parallel to the northern property line. Properties of the sandy loam include, well-drained soils, depth of the water table is anticipated to be greater than 6.5 feet, runoff is anticipated to be medium, frequency of flooding and ponding is none, and landforms include depressions.
- 96 – Truckton loamy sand, 0 to 3 percent slopes. The Truckton loamy sand was mapped within a “pocket” near the northeast corner of the property. The properties of the Truckton loamy sand include well drained soils, depth of the water table is anticipated to be greater than 6.5 feet, runoff is anticipated to low, frequency of flooding and ponding is none, and landforms include interfluvies and fan remnants.
- 97 – Truckton loamy sand, 3 to 9 percent slopes. The Truckton loamy sand was mapped within the southeastern corner of the property. The properties of the Truckton loamy sand include well drained soils, depth of the water table is anticipated to be greater than 6.5 feet, runoff is anticipated to low, frequency of flooding and ponding is none, and landforms include interfluvies and fan remnants.

The USDA Soil Survey Map is presented below.



Neither groundwater nor bedrock were encountered in the test pits performed by RMG.

An OWTS was previously installed on each lot. The OWTS for Lot 1 (2825) was reportedly installed in 1996. The OWTS for Lot 2 (2819) was reportedly installed in 2008, prior to the subdivision. At this time, no additional OWTS are proposed for either lot. If an OWTS is proposed for either lot in the future, an additional OWTS site evaluation will need to be performed in accordance with the applicable health department codes prior to construction. This report may require additional profile pits in the vicinity of the proposed treatment field. A minimum separation of 4 feet shall be maintained from groundwater and bedrock to the infiltrative surface. The Septic Suitability Map, presented in Figure 4, indicates the existing location of each OWTS, along with an alternate location.

An OWTS has been installed on both lots. We have not verified that the OWTS's conforms to the recommendations presented in accordance with the applicable health department codes. We are under the assumption that the appropriate designs and inspections were performed at the time of installation. Any future OWTS will likely require a report for an additional OWTS. The report may require additional test pits in the vicinity of the proposed treatment field. A minimum separation of 4 feet shall be maintained from groundwater and bedrock to the infiltrative surface. Redoximorphic features indicating the fluctuation of groundwater or higher ground water levels were not observed in the test pits.

CONCLUSIONS

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems within the cited limitations. There are no foreseeable or stated construction related issues or land use changes proposed at this time.

Soil and groundwater conditions at the site are suitable for individual treatment systems. The soil types ranged between 1 to 3 with an associated Long Term Acceptance Rate (LTAR) between 0.8 and 0.5. It should be noted that the LTAR values stated are for the test pit locations performed for this report only. The LTAR values may change throughout the site. If an LTAR value of less than 0.35 (soil types 3A to 5) or greater than 0.80 (soil type 0) is encountered at the time of the site specific OWTS evaluation, an "engineered system" will be required.

Additionally, limiting layers (e.g. groundwater and/or bedrock) were not encountered in the test pits performed for this study. If a limiting layer were encountered in the future, the maximum

depth of the OWTS components may be limited to less than 4 feet below the existing ground surface or mound systems (above finished ground surface) may be required.

LIMITATIONS

The information provided in this report is based upon the subsurface conditions observed in the profile pit excavations and accepted engineering procedures. The subsurface conditions encountered in the excavation for the treatment area may vary from those encountered in the test pit excavations. Therefore, depth to limiting or restrictive conditions, bedrock, and groundwater may be different from the results reported in this letter.

An OWTS site evaluation will need to be performed in accordance with the applicable health department codes prior to construction.

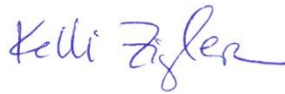
I hope this provides the information you have requested. Should you have questions, please feel free to contact our office.

Cordially,

Reviewed by,

RMG – Rocky Mountain Group

RMG – Rocky Mountain Group



Kelli Zigler
Project Geologist

Tony Munger, P.E.
Sr. Geotechnical Project Manager





NOT TO SCALE

Architecture
Structural
Geotechnical



Engineers / Architects

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SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

Materials Testing
Forensics
Civil / Planning

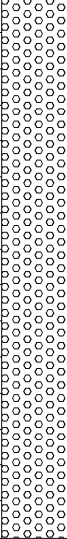
SITE VICINITY MAP

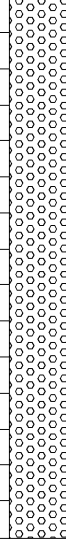
2825/2819 SLOCUM RD
LOT 1 and 2, AMO ACRES, FILING NO. 1
EL PASO COUNTY, CO
MARY LEE DECONZA-WINBLAD

JOB No. 198011

FIG No. 1

DATE 1-14-2024

TEST PIT TP-1			
DATE OBSERVED: 12/19/24			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 0.5 FT SANDY CLAY LOAM (GRANULAR, STRONG)			3
0.5 TO 8.0 FT LOAMY SAND (SINGLE-GRAIN, STRUCTURELESS)	2ft 4ft 6ft 8ft		1

TEST PIT TP-2			
DATE OBSERVED: 12/19/24			
SOIL DESCRIPTION	DEPTH (FT)	SYMBOL	SOIL TYPE
0 - 0.5 FT SANDY CLAY LOAM (GRANULAR, STRONG)			3
0.5 TO 8.0 FT LOAMY SAND (SINGLE-GRAIN, STRUCTURELESS)	2ft 4ft 6ft 8ft		1

SOIL DESCRIPTIONS



SANDY CLAY
LOAM



LOAMY SAND

Architecture
Structural
Geotechnical



Engineers / Architects

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Materials Testing
Forensics
Civil / Planning

TEST PIT LOGS

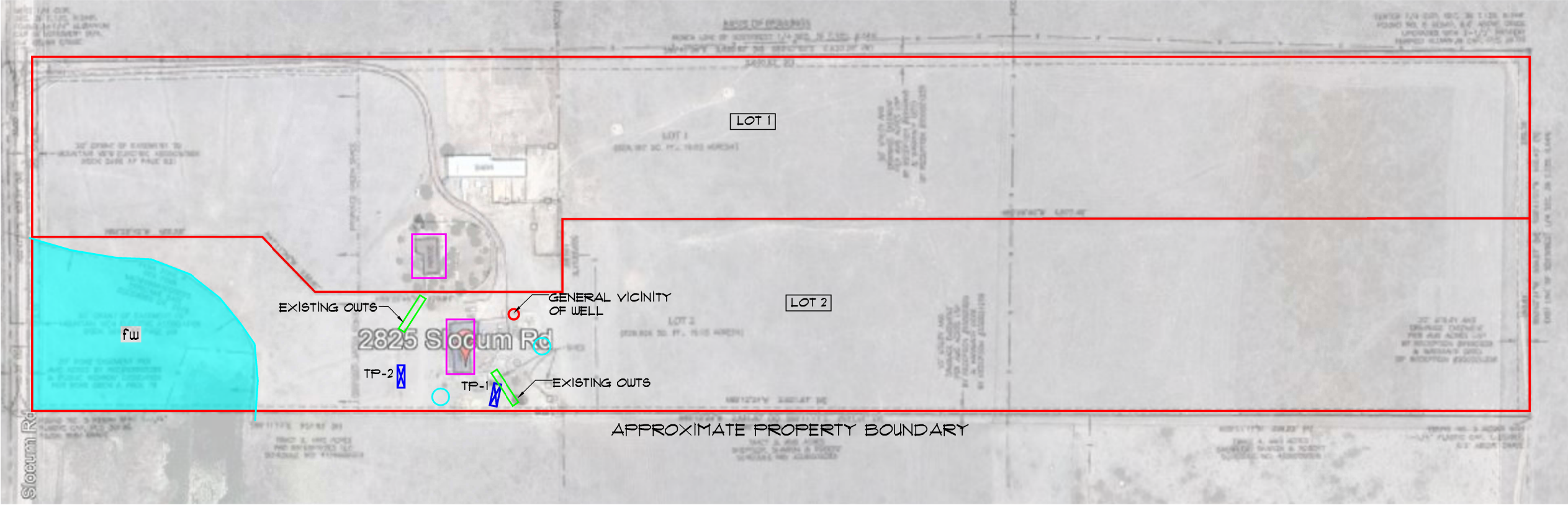
2528 / 2518 SLOCUM ROAD
LOTS 1 AND 2, AMO ACRES
FILING NO. 1

EL PASO COUNTY, CO
MARY LEE DECONZA-WINBLAD

JOB No. 198011

FIG No. 3

DATE 1-14-2025



LEGEND

OWTS CONDITIONS

- Area mapped within the FEMA Floodway
- Existing location of the OWTs
- Alternate location of the OWTs
- Existing location of the house

- fw* - *Regulatory floodway* as designated by FEMA, this area is not to be disturbed or regraded during construction of any proposed future residences and/or OWTs. Currently, future development is not proposed. This area is to be designated a “No Build Zone” until further investigations are completed.



NOT TO SCALE

JOB No. 198011

Materials Testing
Forensics
Civil / Planning



Architecture
Structural
Geotechnical

Engineers / Architects

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2825 / 2819 SLOCUM RD
LOTS 1 AND 2, AMO ACRES
FILING NO. 1
EL PASO COUNTY, CO
MRS. DECONZA-WINBLAD

ENGINEER: TM
DRAWN BY: KZ
CHECKED BY: TM
ISSUED: 1-14-2024

SEPTIC
SUITABILITY MAP

SHEET No.

FIG-4