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SOILS AND GEOLOGY STUDY
SADDLEHORN RANCH – FILING NO. 4
CURTIS ROAD & JUDGE ORR ROAD
EL PASO COUNTY, COLORADO

Prepared for:

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Attn: John Helmick

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Respectfully Submitted,

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1 SUMMARY

Project Location

The project site lies in portions northeast ¼ and southeast ¼ the of Section 3, Township 13 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 3 miles east of Falcon, Colorado, southeast of the intersection of Curtis Road and Judge Orr Road.

Project Description

Total acreage involved in the project is approximately 176 acres. The proposed site development consists of forty-two (42) single-family rural residential lots. The development will be serviced by Saddlehorn Ranch Metropolitan water and individual on-site wastewater treatment systems (OWTS).

Scope of Report

This report presents the results of our geologic evaluation and treatment of engineering geologic hazard study.

Land Use and Engineering Geology

This site was found to be suitable for the proposed development. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include areas of potentially expansive soils, hydrocompaction, loose/collapsible soils, shallow bedrock, floodplain, potentially seasonal shallow groundwater, seasonal shallow groundwater and areas of ponded water. Based on the proposed development plan, it appears that these areas will have some impact on the development. These conditions will be discussed in greater detail in the report.

In general, it is our opinion that the development can be achieved if the observed geologic conditions on site are either avoided or properly mitigated. All recommendations are subject to the limitations discussed in the report.

2 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in portions of the northeast ¼ and southeast ¼ the of Section 3, Township 13 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 3 miles east of Falcon, Colorado, southeast of Curtis Road and Judge Orr Road. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site varies from very gradually to moderately sloping generally to the south to southeast. Three drainages that are tributaries to Black Squirrel Creek bisect the overall Saddlehorn Ranch site, with the middle drainage located along the southern side of Filing 4, and the northern drainage is located within the northeastern portion of Filing No. 4. Steeper slopes are located along portions of some of the drainages on the site. The drainages in Filing No. 4 flow in a southeasterly direction through Filing No. 4 and are primarily located within drainage easements and open space tracts being avoided by the proposed lots. Water was not observed in Filing No. 4 at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included grazing and pasture land. The site contains primarily field grasses and weeds. Site photographs, taken September 28, 2022, are included in Appendix A.

Total acreage involved in the proposed development is approximately 176 acres with forty-two (42) single-family rural residential lots, with designated open space and drainage easements. The proposed residential lots range from approximately 2.5 to 3.9 acres. The majority of the lots are approximately 2.5 acres in size. The area will be serviced by Saddlehorn Ranch Metropolitan water and individual on-site wastewater treatment systems. The proposed Site Plan/Testing Location Map is presented in Figure 3.

The site was previously investigated as part of a Preliminary Soils, Geology, Geologic Hazard and Wastewater Study, Entech Job No. 181823 (Reference 1). Four (4) test borings, and forty-five (45) tactile test pits were performed on the site to determine general suitability of the site for construction and the use of on-site wastewater treatment systems. The previous report/investigation was used as part of this investigation. More specifically one (1) test boring (TB-3), and nine (9) of the previous test pits were used as part of the Saddlehorn Ranch – Filing No. 4 investigation. Eight (8) additional test borings and one (1) test pit were completed for Saddlehorn Ranch – Filing No. 4. The Test Pit Logs are included in Appendix B, the Laboratory Testing Results are included in Appendix C, and a Summary of the Laboratory Testing Results is presented in Table 1

3 SCOPE OF THE REPORT

The scope of the report includes a general geologic analysis utilizing published geologic data. Detailed site-specific mapping will be conducted to obtain general information in respect to major geographic and geologic features, geologic descriptions and their effects on the development of

the property. The site will be evaluated for individual on-site wastewater treatment systems in accordance with El Paso Land Development Code.

4 FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS) (previously the Soil Conservation Service (SCS)) survey data was also reviewed to evaluate the site. The position of mappable units within the subject property are shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements and aerial photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Geology/Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on September 28, 2022.

Four (4) test borings, and forty-five (45) tactile test pits were previously performed on the site to verify general soil conditions and the suitability of the site for the use of on-site wastewater treatment systems (Reference 1). One Test Boring (TB-3), and nine (9) of the previous Test Pits (TP-22, TP-23, TP-28, TP-29, TP-30, TP-37, TP-38, TP-39, & TP-40) were used as part of the Saddlehorn Ranch – Filing No. 4 investigation. Eight (8) additional test borings and one (1) test pit were completed for Saddlehorn Ranch – Filing No. 4. The locations of the test pits are indicated on the Site Plan/Testing Location Map, Figure 3. The Test Pit Logs are included in Appendix B, the Laboratory Testing Results are included in Appendix C, and a Summary of the Laboratory Testing Results is presented in Table 1. Results of this testing will be discussed later in this report.

Laboratory testing was also performed on some of the soils to classify and determine the soils engineering characteristics. Laboratory tests included grain-size analysis, ASTM D-422, and Atterberg Limits, ASTM D-4318 for classification purposes. Volume change testing was performed on selected samples using the FHA Swell Test and Swell/Consolidation Test, ASTM D-4546, to evaluate the expansion/consolidation potential of the soils. Soluble sulfate testing was performed on selected samples to determine the corrosive characteristics of the soils on concrete placed below ground. Results of the laboratory testing are included in Appendix C. The Laboratory Test Results are summarized in Tables 1 and 2

5 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

5.1 General Geology

Physiographically, the site lies in the western portion of the Great Plains Physiographic Province. Approximately 18 miles to the west is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southeastern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northwesterly direction (Reference 2). The rocks in the area of the site are sedimentary in nature and typically Tertiary to Upper Cretaceous in age. The bedrock underlying the site consists of the Dawson Arkose Formation. Overlying this formation are unconsolidated deposits of man-made fill deposits, residual soils, eolian soils, and alluvial soils of the Quaternary Age. The residual soils are produced by the in-situ action of weathering of the bedrock on site. The alluvial soils were deposited by water in the major drainages on the site and as stream terrace deposits. The eolian soils were deposited by prevailing winds from the west and northwest. The site's stratigraphy will be discussed in more detail in Section 5.3.

5.2 Soil Conservation Survey

The Natural Resource Conservation Service (Reference 2), previously the Soil Conservation Service (Reference 3) has mapped three soil types on the site (Figure 4). In general, they vary from loam, loamy sands, and sandy loam. The soils are described as follows:

Type	Description
8	Blakeland Loamy Sand, 1-9% slopes
19	Columbine Gravelly Sandy Loam, 0 to 3% slopes
29	Fluvaquentic Haplaquolls, nearly level

Complete descriptions of each soil type are presented in Appendix D. The soils have generally been described to typically have moderate to very rapid permeabilities. The majority of the soils have rapid permeabilities. Limitations described for the soils include the hazard of flooding on Soil Type Nos. 19 and 29. Soil Type No. 29 is mapped in the floodplain zone that is designated as open space. Roads may need to be designed to minimize frost-heave potential. Possible hazards with soil erosion are present on the site. The erosion potential can be controlled with vegetation. The majority of the soils have been described to have slight to moderate erosion hazards.

5.3 Site Stratigraphy

The Falcon Quadrangle Geology Map showing the site is presented in Figure 5 (Reference 5). The Geology Map prepared for the site is presented in Figure 6. Five mappable units were identified on the overall site which are described as follows presented in Figure 6. Five mappable units were identified on this site which are described as follows:

Qal **Recent Alluvium – Post Piney Creek (Alluvium One) of Late Holocene Age:** These materials consist of water deposited sands located along some of the minor drainages across the site. The materials consist of silty to clayey sand and sandy clays.

Qp **Piney Creek Alluvium (Alluvium Two) of Early Holocene Age:** These materials consist of low stream-terrace deposits above the current stream channels. The materials typically consist of silty to well graded sand.

Qb **Broadway Alluvium (Alluvium Three) of Late Pleistocene Age:** These materials consist of middle steam terrace deposits. The materials typically consist of silty to clayey gravelly sands.

Qes **Eolian Sand of Quaternary Age:** These deposits are fine to medium grained soil deposited on the site by the action of prevailing winds from the west and northwest. They typically occur as large dune deposits or narrow ridges. These soils are typically tan to brown in color and tend to have very uniform or well-sorted gradation. These materials tend to have a relatively high permeability and low density.

Qes/Tkd **Eolian Sand Deposits of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:** The Dawson Formation typically consists of arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone. Overlying this formation is a variable layer of eolian sand and residual soil, undifferentiated. The eolian sands were deposited by the action of the prevailing winds. The residual soils were derived from the in-situ weathering of the bedrock materials on-site. These soils consisted of silty to clayey sands, sandy clays and sandy silts.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Falcon Quadrangle* distributed by the Colorado Geological Survey in 2012 (Reference 5), and the

Geologic Map of the Pueblo 1^0 x 2^0 Quadrangle, distributed by the US Geological Survey in 1978 (Reference 6). The Test Pits were also used in evaluating the site and are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

5.4 Soil Conditions

The soils encountered in the Test Borings and Test Pits can be grouped into four general soil and rock types. The soils were classified using the Unified Soil Classification System (USCS). The test pit soils were also classified using the USDA Textural Soil Classification.

Soil Type 1 is a well-graded sand, slightly silty to silty sand and clayey to very clayey sand (SW, SM-SW, SM, SC). This material was encountered in all of the test pits and eight of the test borings. The sand was encountered at depths ranging from the existing surface to 4 feet and extending to depths of 4 to 11 feet bgs. These soils were encountered at loose to medium dense states and at dry to moist conditions. Samples tested had 3 to 37 percent of the soil size particles passing the No. 200 Sieve. Atterberg Limits Testing resulted in liquid limits of 19 to 21 and plastic indexes of 3 to 4, and non-plastic results. FHA Swell Testing on select samples resulted in expansion pressures of 30 to 430 psf, indicating low expansion potentials.

Soil Type 2 is a sandy clay and very sandy silt (CL, ML). This material was encountered in Test Boring Nos. 7 and Test Pit 1A. The clays were encountered at depths ranging from the existing surface and extended to depths of 8 to 9 feet. The clay was encountered at firm consistencies and moist conditions. The samples tested had 61 to 88 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing resulted in liquid limits of 32 to 41 and plastid indexes of 10 to 18. Swell/Consolidation Testing resulted in a volume change of 0.8 percent, indicating a low expansion potential. Sulfate testing resulted in less than 0.01 percent soluble sulfate by weight, indicating the sandstone exhibits negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 3 is a silty to very silty sandstone and clayey to very clayey sandstone (SM, SM-SW, SC). This material was encountered in eight of the test borings and three of the test pits. The sandstone was encountered at depths ranging from 2.5 to 11 feet bgs and extended to termination of the test borings and pits (5 to 20 feet). The sandstone was encountered at dense to very dense states and moist conditions. Samples tested had 9 to 28 percent of the soil sized particles passing the No. 200 sieve. Atterberg Limits Testing resulted in non-plastic results. Highly expansive clayey sandstone and claystone are commonly interbedded in the sandstone in the area. Sulfate testing

resulted in 0.01 percent soluble sulfate by weight, indicating the sandstone exhibits negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 4 is a very sandy claystone and very sandy siltstone (CL, ML). This material was encountered one of the test borings and test pits at 5 to 19 feet bgs and extended to the termination of the test borings and test pits (8 to 20 feet). The claystone and siltstone were encountered at hard consistencies and moist conditions. Samples tested had 57 to 59 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing resulted in a liquid limit of 41 and plastic index of 5. Swell/Consolidation Testing on a samples resulted in volume changes of 1.4, indicating a low to moderate expansion potential. FHA Swell Testing on a sample of the claystone resulted in an expansion pressure of 3160 psf, indicating a moderate to high expansion potential.

The Test Boring and Test Pit Logs are presented in Appendix B. Laboratory Test Results are presented in Appendix C, and a Summary of Laboratory Test Results is presented in Table C-1.

5.5 Groundwater

Groundwater or signs of seasonal groundwater were encountered in all of the test borings and in five of the test pits within Filing No. 4 at depths ranging from 3.5 to 16 feet. Areas of seasonal and potentially seasonal shallow groundwater have been mapped in low-lying areas and in the drainages on the site. These areas are discussed in the following section. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Isolated sand layers within the variable soil profile, sometimes only a few feet in thickness and width, can carry water in the subsurface. Additionally, perched water conditions can occur on this site where water can flow through permeable sands overlying less permeable bedrock. Builders and planners should be cognizant of the potential for the occurrence of such subsurface water features during construction on-site and deal with each individual problem as necessary at the time of construction.

6 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

Detailed mapping has been performed on this site to produce an Engineering Geology Map Figure 6. This map shows the location of various geologic conditions of which the developers should be cognizant during the planning, design and construction stages of the project. These hazards and the recommended mitigation techniques are as follows:

Hydrocompaction – Constraint

Areas in which hydrocompaction have been identified are acceptable as building sites. In areas identified for this hazard classification, however, we anticipate a potential for settlement upon saturation of these surficial soils. The low density, uniform grain sized, windblown sand deposits are particularly susceptible to this type of phenomenon.

Mitigation: The potential for settlement is directly related to saturation of the soils below the foundation areas. Therefore, good surface and subsurface drainage is extremely critical in these areas in order to minimize the potential for saturation of these soils. The ground surface around all permanent structures should be positively sloped away from the structure to all points, and water must not be allowed to stand or pond anywhere on the site. We recommend that the ground surface within 10 feet of the structures be sloped away with a minimum gradient of five percent. If this is not possible on the upslope side of the structures, then a well-defined swale should be created to intercept the surface water and carry it quickly and safely around and away from the structures. Roof drains should be made to discharge well away from the structures and into areas of positive drainage. Where several structures are involved, the overall drainage design should be such that water directed away from one structure is not directed against an adjacent building. Planting and watering in the immediate vicinity of the structures, as well as general lawn irrigation, should be minimized.

Loose or Collapsible Soils – Constraint

Loose soils were encountered in several of the test pits and one of the test borings. These soils are typically encountered in areas mapped as eolian sand deposits. Other areas of loose soils could be encountered across the site. Any loose or collapsible soils encountered beneath foundations or floor slabs will require mitigation.

Mitigation: Any loose or collapsible soils encountered beneath foundations or floor slabs should be overexcavated, moisture-conditioned and recompacted. The soils should be recompacted to 95 percent of the soils maximum Modified Proctor Dry Density ASTM D-1557 at ± 2 percent of optimum moisture content. The reconditioned soils on this site should be observed and tested to verify adequate compaction. Areas requiring recompaction should be determined after additional investigation of each building site and during the excavation observations

Expansive Soils – Constraint

Expansive soils were encountered in two test borings drilled and several test pits excavated on–site. Expansive claystone is commonly encountered within the Dawson Formation. These occurrences are typically sporadic; therefore, none have been indicated on the maps. These

expansive soils, if encountered beneath foundations, can cause differential movement in the structure foundation. These occurrences should be identified and mitigated on an individual basis.

Mitigation Should expansive soils be encountered beneath the foundation; mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Overexcavation depths of 3 to 5 feet should be anticipated where expansive soils are encountered. Another alternative in areas of highly expansive soils is the use of drilled pier foundation systems. Typical minimum pier depths are on the order of 25 feet or more and require penetration into the bedrock material a minimum of 4 to 6 feet, depending upon building loads. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. The use of structural floors should be considered for basement construction on highly expansive clays. Final recommendations should be made after additional investigation of each building site.

Shallow Bedrock

Bedrock was encountered in all the test borings and test pits at depths ranging from 2.5 to 11 feet. A Summary of the Depth to Bedrock is included in Table 2. Shallow bedrock will be encountered in some areas of this site, particularly those mapped as Qes/Tkd: eolian sands overlying the Dawson Formation. Where shallow claystone, sandstone, and siltstone are encountered, excavation/grading may be difficult requiring track-mounted excavators. Bedrock may be encountered cuts for roadways and utility excavations.

Floodplain and Drainage Areas – Constraint

Portions of the site associated with tributaries of the Black Squirrel Creek drainage are mapped within a floodplain zone according to the FEMA Map No. 08041C0558G, dated December 7, 2018 (Figure 7, Reference 7). Areas of ponded water were observed in the central portion of the site near the windmill. The floodplain areas have been designated as open space and/or can be avoided by construction. Additionally, areas of seasonal and potentially seasonal shallow groundwater were observed across the site. In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. These are low-lying areas along the drainage in the southern and northeastern portions of Filing 4 and in the low-lying areas and minor drainages across the site. These areas can likely be avoided or properly mitigated by development. Perched water conditions could be encountered across the entire site

where water can flow within permeable sand layers overlying impermeable bedrock. These areas should be identified on an individual basis at the time of construction. Where perched water conditions are encountered, the mitigation recommendations for seasonal and potentially seasonal shallow groundwater should be followed. Foundations should maintain a minimum separation of 3 feet between the foundation grade and the maximum anticipated groundwater level. The floodplain should be avoided by construction unless site-specific floodplain determination and drainage studies are performed. These areas are discussed below.

sw, psw – Seasonal and Potentially Seasonal shallow groundwater areas: In these areas, we would anticipate the potential for periodically high subsurface moisture conditions, frost heave potential, and highly organic soils. Areas where perched water conditions are encountered should also follow these recommendations. Construction proposed in or adjacent to these areas, should follow these precautions.

Mitigation: In these locations, foundations are subject to severe frost heave and should penetrate to a sufficient depth so as to prevent the formation of ice lenses beneath foundations. At this location and elevation, a foundation depth for frost protection of 30-inches is recommended. In areas where high subsurface moisture conditions are anticipated periodically, a subsurface perimeter drain will be necessary to help prevent the seepage of water into areas below grade. A typical perimeter drain detail is presented in Figure 8. Any grading in these areas should be done in a manner that directs surface flow around construction to avoid areas of ponded water. Areas of organic material will require removal prior to any fill placement. Unstable soil conditions should be expected in areas of shallow groundwater. Where foundations approach the groundwater level, stabilization of the excavations utilizing shot rock may be necessary. Underslab drains or capillary breaks, and interceptor drains may be necessary to prevent intrusion of water into areas below grade. Typical drain details are presented in Figures 9 and 10

w – Areas of ponded water: These are areas where water could potentially pool in low-lying areas of the drainages. According to the site plan, Figure 6 these areas are within designated as open space. Any areas of ponded water to be filled or regraded should have all soft organic soils removed prior to fill placement. All uncontrolled fill associated with the dams should be recompacted at a minimum of 95% of its maximum Modified Dry Density ASTM D-1557.

fp – Floodplain: Areas of the site have been mapped as floodplains according to the FEMA Map No. 08041C0558G (Figure 7, Reference 7). The physiographic floodplains on site have been mapped on the Engineering Geology Map (Figure 6). The floodplain areas have been designated as open space and area to be avoided by development. Any area within the FEMA floodplain area

will require approval of the Drainage Report. Finished floor levels must be a minimum of one foot above the floodplain level. Structures should not block drainages. Specific floodplain locations and drainage studies are beyond the scope of this report.

6.1 Relevance of Geologic Conditions to Land Use Planning

We understand that the development will be rural residential lots utilizing municipal water and individual on-site wastewater treatment systems. It is our opinion that the existing geologic and engineering geologic conditions will impose some minor constraints on the proposed development and construction. The most significant problems affecting development will be those associated with the shallow groundwater areas on-site that can be avoided or properly mitigated during construction on each lot. Other hazards on site can be satisfactorily mitigated through proper engineering design and construction practices or avoidance.

The upper materials are typically at medium dense to dense states. Areas of loose soils were encountered that may require recompaction. The medium dense to dense granular soils encountered in the upper soil profiles of the test borings and test pits should provide good support for foundations. Loose soils, if encountered beneath foundations or slabs, will require removal and recompaction. Expansive soils, although sporadic, were encountered. Expansive clayey sandstone and claystone are common in the Dawson Formation, and may require mitigation. Foundations anticipated for the site are standard spread footings possibly in conjunction with overexcavation in areas of expansive soils or loose soils. Areas containing arkosic sandstone will have high allowable bearing conditions. Expansive layers may also be encountered in the soil and bedrock on this site. Expansive soils, if encountered, will require special foundation design and/or overexcavation. These soils will not prohibit development.

Areas of seasonal and potentially seasonal shallow groundwater, ponded water, and floodplains exist on this site. The floodplains and areas of ponded water are to be avoided by development and preserved as open space in drainage easements. Finished floor levels must be a minimum of one foot above the floodplain level. Exact floodplain locations are beyond the scope of this report. According to the site plan (Figure 6), some of the minor drainages can be avoided or filled which will mitigate the hazard.

Areas of perched groundwater may be encountered on this site. Permeable sands exist on the site that may carry water in the subsurface perched on less permeable bedrock. Groundwater was encountered at depths ranging from 6 to 16 feet in the test borings (Reference 1). Fluctuation in groundwater conditions may occur due to variations in rainfall, soil conditions and development

of surrounding areas. Foundations should maintain a minimum separation of 3 feet between the foundation grade and the maximum anticipated groundwater level. Builders should be cognizant of the potential for the occurrence of subsurface water features during construction and deal with each individual problem as necessary at the time of construction. Subsurface drains may be necessary in some areas to prevent the intrusion of water below grade. Dewatering systems may be necessary in some areas where seepage and perched water occurs. Drain details are included in Figures 8 through 10. Unstable conditions should be expected where excavations approach the groundwater level. Stabilization using geofabric or shot rock may be necessary.

Areas of hydrocompation have been identified on this site where there is the potential for settlement movements upon saturation of the surficial soils. Good surface and subsurface drainage are critical in these areas and the ground surface should be positively sloped away from structures at all points. Roof drains should be made to discharge well away from structures and planting and watering in the immediate vicinity of structures should be minimized.

In summary, development of the site can be achieved if the items discussed above are mitigated. These items can be mitigated through proper design and construction or by avoidance. Investigation on each lot is recommended prior to construction.

7 ROADWAY AND EMBANKMENT CONSTRUCTION RECOMMENDATIONS

In general, the site soils are suitable for the proposed roadways and embankments. Groundwater should be expected to be encountered in deeper cuts and along drainage areas. If excavations encroach on the groundwater level unstable soil conditions may be encountered. Excavation of saturated soils will be difficult with rubber-tired equipment. Stabilization using shot rock or geogrids may be necessary.

Based on the available grading plans, cuts for the roadway in areas are minimal and in the areas where shallow groundwater was encountered fill will be placed. The shallowest groundwater was encountered in TB-6 at 6 feet on Lot No. 12. The corresponding lot numbers have been added to Table 2 (Summary of Test Boring Results). If shallow groundwater conditions are encountered during roadway subgrade preparation, we recommend overexcavating 6 to 12 inches below the subgrade, pushing 2 to 4-inch shot rock into the subgrade for stabilization, as required, followed by a layer of Tensar BX1200 geogrid (or equivalent). The stabilization should extend a minimum of 2 feet beyond the unstable area. We then recommend placing compacted granular fill or

aggregate roadbase. After placement of backfill the subgrade should be proofrolled and evaluated to ensure the subgrade is not pumping.

Any areas to receive fill should have all topsoil, organic material or debris removed. Prior to fill placement Entech should observe the subgrade. Fill must be properly benched and compacted to minimize potentially unstable conditions in slope areas. Fill slopes should be 3:1. The subgrade should be scarified and moisture conditioned to within 2% of optimum moisture content and compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557, prior to placing new fill. Areas receiving fill may require stabilization with rock or fabric if shallow groundwater conditions are encountered.

New fill should be placed in thin lifts not to exceed 6 inches after compaction while maintaining at least 95% of its maximum Modified Proctor Dry Density, ASTM D-1557. These materials should be placed at a moisture content conducive to compaction, usually 0 to ±2% of Proctor optimum moisture content. The placement and compaction of fill should be observed and tested by Entech during construction. Entech should approve any import materials prior to placing or hauling them to the site. **Additional investigation will be required for pavement designs once roadway grading is completed and utilities are installed.**

8 ECONOMIC MINERAL RESOURCES

Some of the sandy materials on-site could be considered a low-grade sand resource. According to the *El Paso County Aggregate Resource Evaluation Map* (Reference 8), the area is mapped with upland deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 9), areas of the site are mapped with alluvial fan: sand deposits, upland deposits: sand and probable aggregate resource, and valley fill: probable aggregate resource. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 10), the area of the site has been mapped as “Good” for industrial minerals. However, considering the abundance of similar materials through the region and the close proximity to developed land, they would be considered to have little significance as an economic resource.

According to *the Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 9), the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped as “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 (Reference 9).

The site has been mapped as “Fair” for oil and gas resources (Reference 10). No oil or gas fields have been discovered in the area of the site. The sedimentary rocks in the area may lack the geologic structure for trapping oil or gas; therefore, it may not be considered a significant resource. Hydraulic fracturing is a new method that is being used to extract oil and gas from rocks. It utilizes pressurized fluid to extract oil and gas from rocks that would not normally be productive. The area of the site has not been explored to determine if the rocks underlying the site would be commercially viable utilizing hydraulic fracturing. The practice of hydraulic fracturing has come under review due to concerns about environmental impacts, health and safety.

9 EROSION CONTROL

The soil types observed on the site are mildly to highly susceptible to wind erosion, and moderately to highly susceptible to water erosion. A minor wind erosion and dust problem may be created for a short time during and immediately after construction. Should the problem be considered severe enough during this time, watering of the cut areas or the use of chemical palliative may be required to control dust. However, once construction has been completed and vegetation re-established, the potential for wind erosion should be considerably reduced.

With regard to water erosion, loosely compacted soils will be the most susceptible to water erosion, residually weathered soils become increasingly less susceptible to water erosion. For the typical soils observed on-site, allowable velocities or unvegetated and unlined earth channels would be on the order of 3 to 4 feet/second, depending upon the sediment load carried by the water. Permissible velocities may be increased through the use of vegetation to something on the order of 4 to 7 feet/second, depending upon the type of vegetation established. Should the anticipated velocities exceed these values, some form of channel lining material may be required to reduce erosion potential. These might consist of some of the synthetic channel lining materials on the market or conventional riprap. In cases where ditch-lining materials are still insufficient to control erosion, small check dams or sediment traps may be required. The check dams will serve to reduce flow velocities, as well as provide small traps for containing sediment. The determination of the amount, location and placement of ditch linings, check dams and of the special erosion control features should be performed by or in conjunction with the drainage engineer who is more familiar with the flow quantities and velocities.

Cut and fill slope areas will be subjected primarily to sheetwash and rill erosion. Unchecked rill erosion can eventually lead to concentrated flows of water and gully erosion. The best means to combat this type of erosion is, where possible, the adequate re-vegetation of cut and fill slopes. Cut and fill slopes having gradients more than three (3) horizontal to one (1) vertical become increasingly more difficult to revegetate successfully. Therefore, recommendations pertaining to the vegetation of the cut and fill slopes may require input from a qualified landscape architect and/or the Soil Conservation Service.

10 CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose some constraints on development and construction of the site. The majority of these conditions can be mitigated through proper engineering design and construction practices. The proposed development and use are consistent with anticipated geologic and engineering geologic conditions.

It should be pointed out that because of the nature of data obtained by random sampling of such variable and non-homogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Individual investigations for building sites will be required prior to construction. Construction and design personnel should be made familiar with the contents of this report. Reporting such discrepancies to Entech Engineering, Inc. soon after they are discovered would be greatly appreciated and could possibly help avoid construction and development problems.

This report has been prepared for PT Overlook, LLC. for application to the proposed project in accordance with generally accepted geologic soil and engineering practices. No other warranty expressed or implied is made.

We trust that this report has provided you with all the information that you required. Should you require additional information, please do not hesitate to contact Entech Engineering, Inc.

11 BIBLIOGRAPHY

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9. Schwochow, S.D.; Shroba, R.R. and Wicklein, P.C. 1974*. Atlas of Sand, Gravel, and Quarry Aggregate Resources, Colorado Front Range Counties*. Colorado Geological Survey. Special Publication 5-B.

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TABLES

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT GUMAN AND ASSOC.
PROJECT JUDGE ORR AND CURTIS ROAD
JOB NO. 222006

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	5			37.3	21	4	0.04			SM	SAND, SILTY
1	5	5			20.0				30		SM	SAND, SILTY
1	6	2-3			12.5						SM	SAND, SILTY
2	7	5			60.9				170		ML	SILT, VERY SANDY
3	2	15			9.1	NV	NP	0.02			SM-SW	SANDSTONE, SLIGHTLY SILTY
3	3	15			28.1						SM	SANDSTONE, SILTY
3	8	10			8.4						SM-SW	SANDSTONE, SLIGHTLY SILTY
4	4	20	31.1	77.4	58.9	41	5			1.4	ML	SILTSTONE, VERY SANDY

Table 2: Summary Test Boring Results

Test Boring No.	Depth to Bedrock (ft.)	Depth to Groundwater or Seasonally Occurring Groundwater (ft.)	Lot Number
1	9	12	Lot 28
2	9	8.5	Lot 33
3	4	7	Lot 37
4	9	16	Lot 41
5	7	7.5	Lot 9
6	11	6	Lot 12
7	9	7	Lot 17
8	9	9	Lot 1
3*	9	12	Lot 11

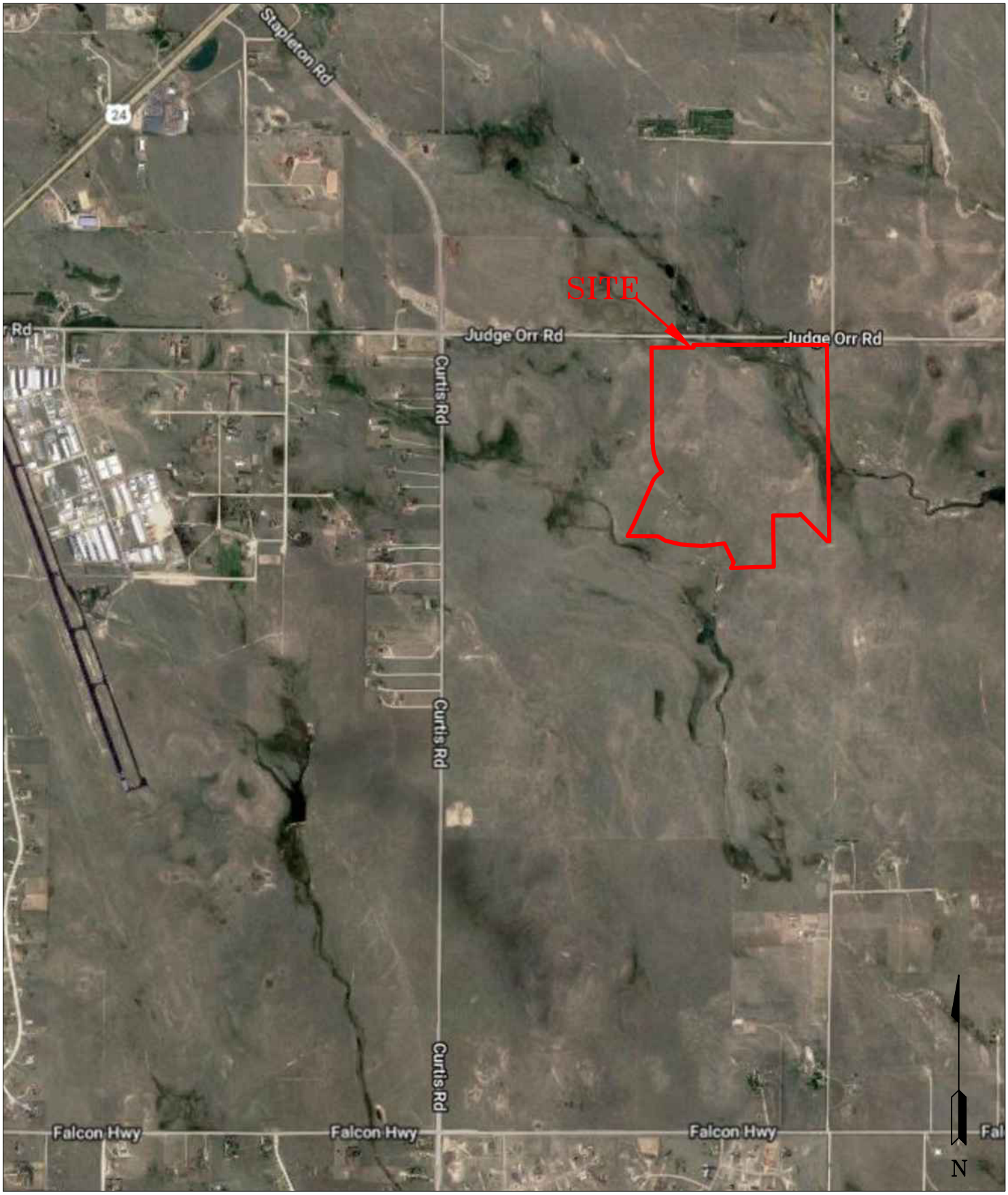
*- Test Boring from EEI Job No. 181823

Table 3: Summary Tactile Test Pit Results

Test Pit No.	USDA Soil Type	LTAR Value	Depth to Bedrock (ft.)	Depth to Groundwater or Seasonally Occurring Groundwater (ft.)
1A	4A*	0.15	>8	5*
22**	2A	0.5	>8	>8
23**	4A*	0.15	2*	>8
28**	2A	0.5	>8	6.5
29**	2A	0.5	>8	>8
30**	4A*	0.15	4*	6.5
37**	3A*	0.3	>8	>8
38**	2A	0.5	>8	>8
39**	2A	0.5	>8	>8
40**	4A*	0.15	2.5*	3.5

*- Conditions that will require an engineered OWTS
**- Test Pits from EEI Job No. 181823

FIGURES



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505 ELKTON DRIVE
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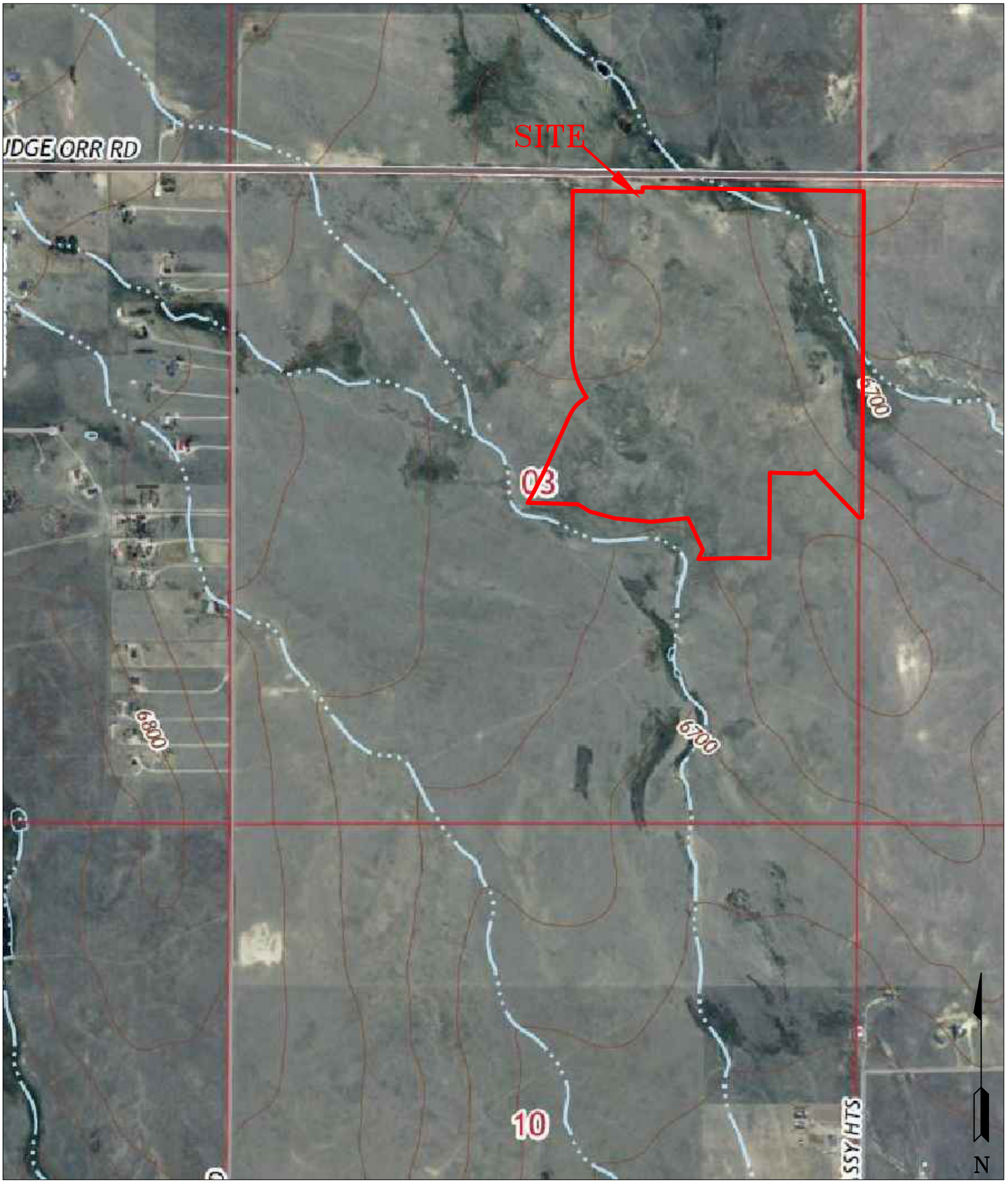
VICINTY MAP
SADDLEHORN RANCH FILING NO. 4
CURTIS ROAD AND JUDGE ORR ROAD
EL PASO COUNTY, CO
FOR: GORILLA CAPTIAL

DRAWN BY:	DATE:	DESIGNED BY:	CHECKED BY:
LLL	9/27/23	-	-

JOB NO.: 230509

FIG. NO.: 1



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USGS MAP
SADDLEHORN RANCH FILING NO. 4
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EL PASO COUNTY, CO
FOR: GORILLA CAPTIAL

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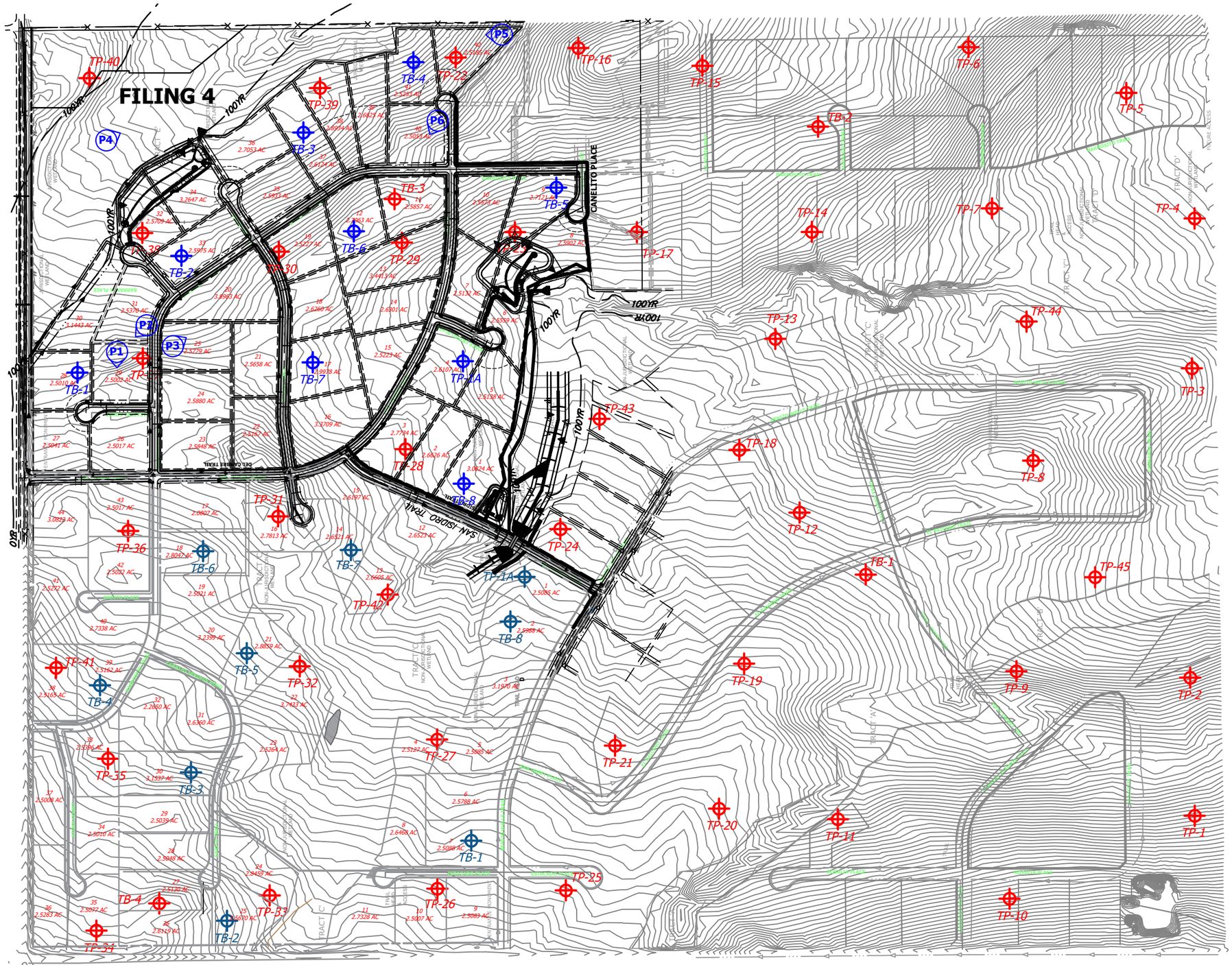
JOB NO.: 230509

FIG. NO.: 2



LEGEND:

- TB- APPROXIMATE TEST BORING LOCATION AND NUMBER
- TP- APPROXIMATE TEST PIT LOCATION AND NUMBER
- P2 - APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER
- TB- APPROXIMATE TEST BORING LOCATION AND NUMBER (EEI JOB NO. 181823)
- TP- APPROXIMATE TEST PIT LOCATION AND NUMBER (EEI JOB NO. 181823)

600 300 0 600 1200

N

Revisions:

No.	Description	By	Date

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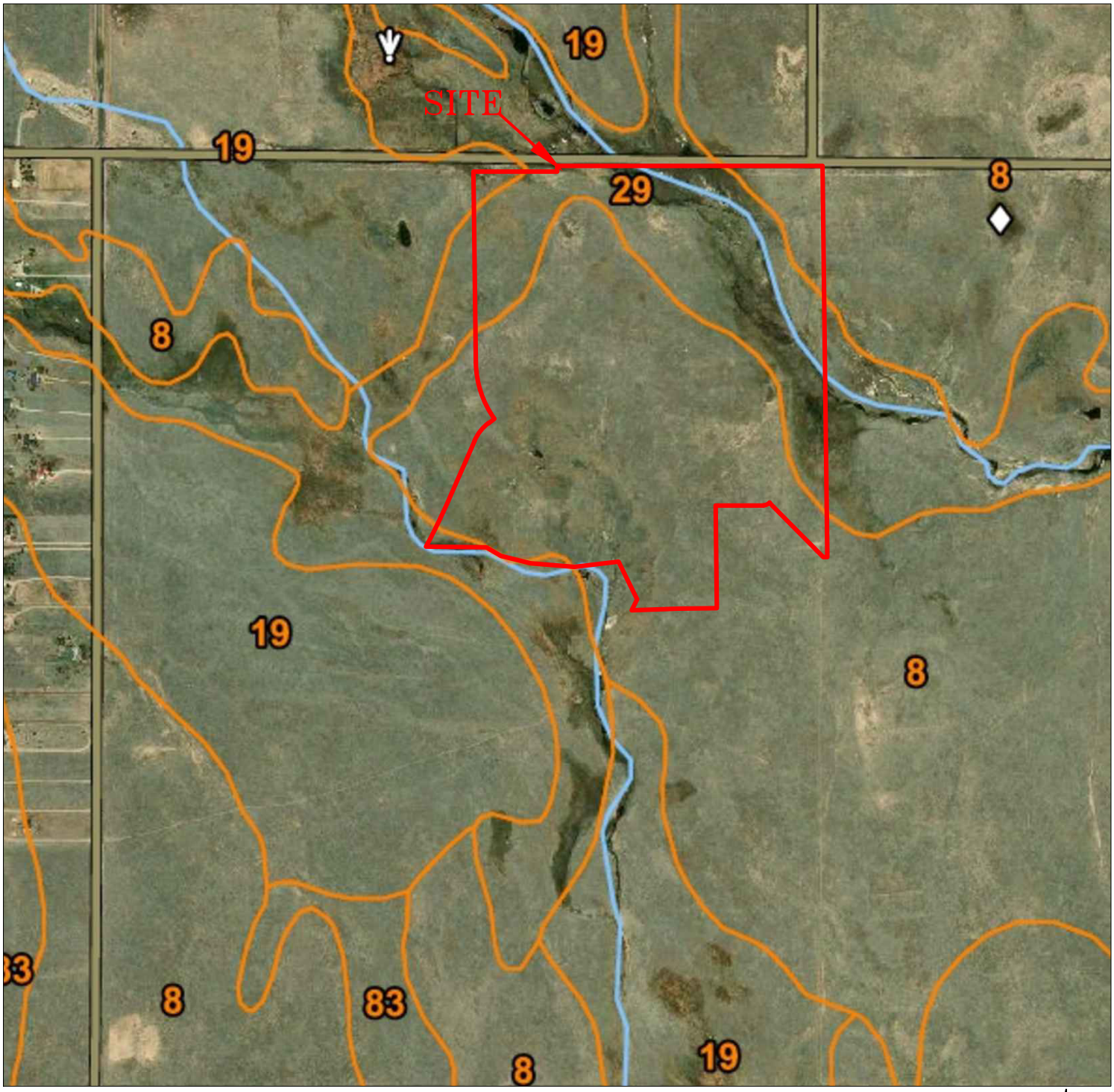
SITE PLAN/ TEST BORING LOCATION MAP
SADDLEHORN RANCH FILING NO. 4
CURTIS ROAD AND JUDGE ORR ROAD
EL PASO COUNTY, CO
FOR: GORILLA CAPITAL

DRAWN BY:	LLL
DESIGNED BY:	–
CHECKED BY:	–
DATE:	9/27/23
SCALE:	AS SHOWN
JOB NO.:	230509
SHEET NO.:	3



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SOIL SURVEY MAP
SADDLEHORN RANCH FILING NO. 4
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EL PASO COUNTY, CO
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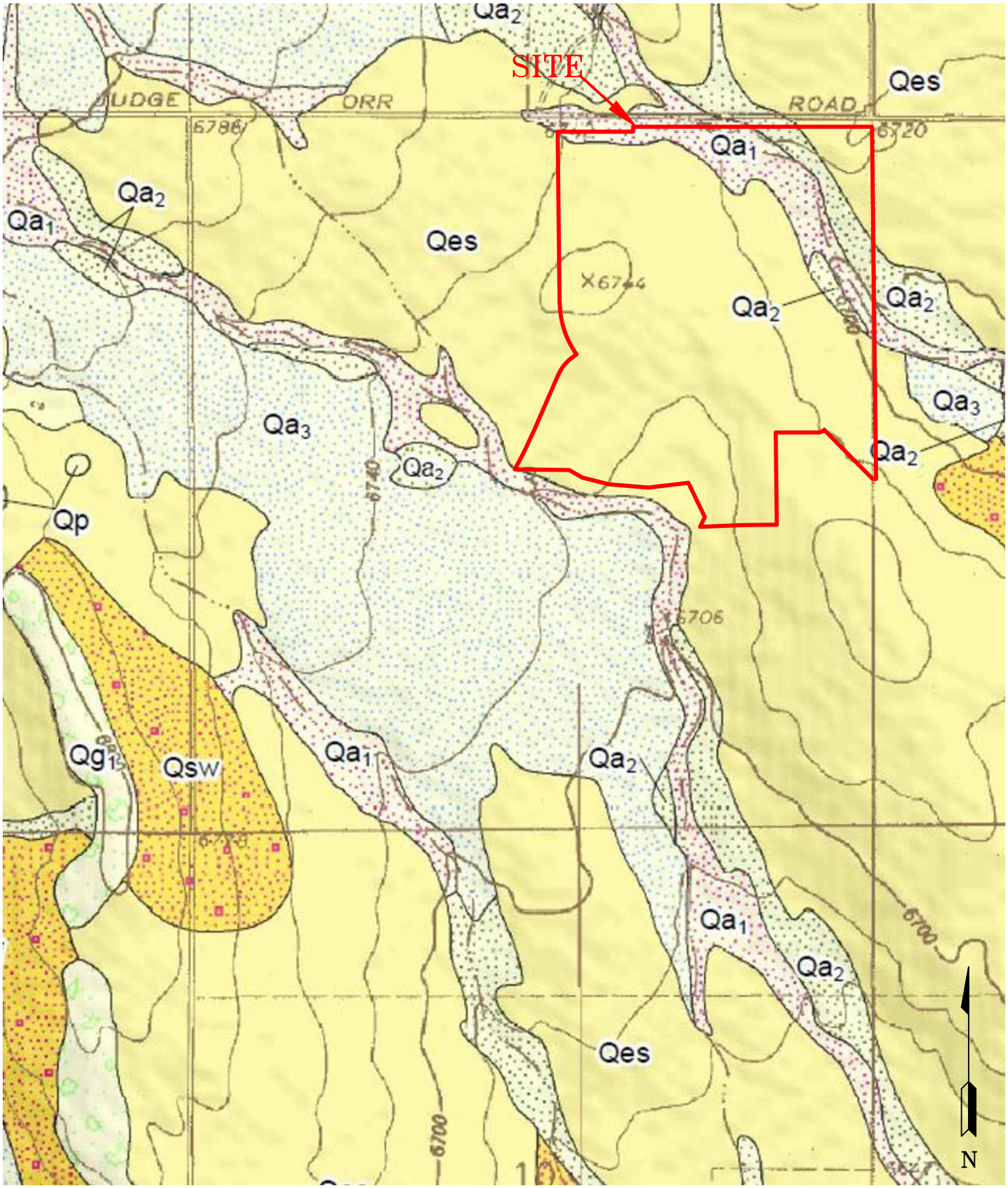
JOB NO.: 230509

FIG. NO.: 4



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FALCON QUADRANGLE GEOLOGIC MAP
SADDLEHORN RANCH FILING NO. 4
CURTIS ROAD AND JUDGE ORR ROAD
EL PASO COUNTY, CO
FOR: GORILLA CAPITAL

DRAWN BY:	DATE:	DESIGNED BY:	CHECKED BY:
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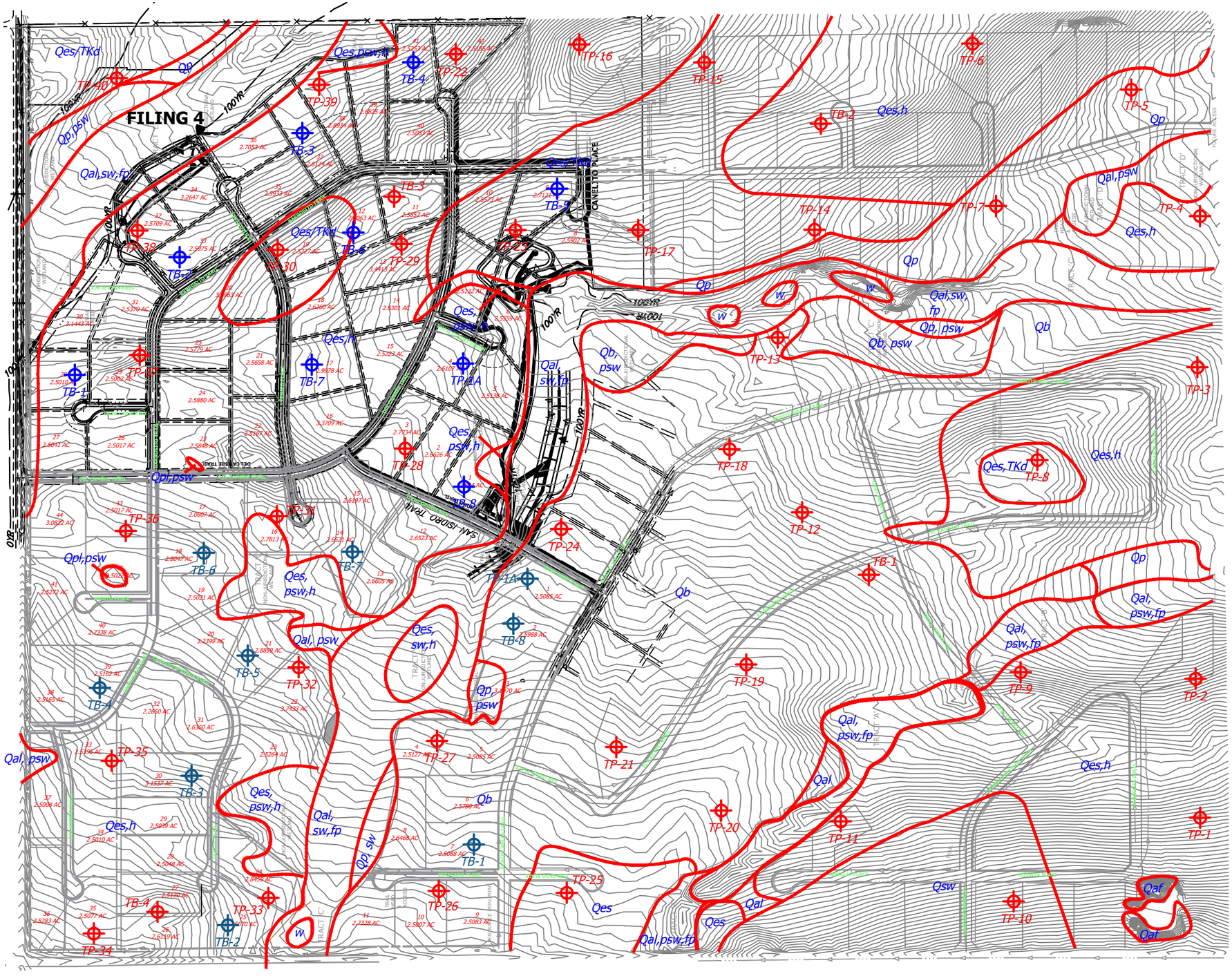
JOB NO.: 230509

FIG. NO.: 5



LEGEND:

Qaf - Artificial Fill of Holocene Age:
man made fill deposits

Qal - Post Piney Creek (Alluvium One)-Recent Alluvium of Late Holocene

(Qa_1) Age:
recent stream desposits

Qpl - Playa Deposits of Holocene Age:
blowouts in eolian sand that form seasonal ponds

Qp - Piney Creek Alluvium (Alluvium Two) of Early Holocene Age:

(Qa_2) low stream terrace deposits above current stream channels

Qb - Broadway Alluvium (Alluvium Three) of Late Pleistocene Age:

(Qa_3) stream terrace deposited sands

Qes - Eolian Sand of Holocene to Late Pleistocene Age:
wind blown sand deposits

Qsw - Sheetwash of Holocene to Late Pleistocene Age:
silty to clayey sand sheetwash deposits

Qes/TKd - Sand Deposits of Quaternary Age Overlying Dawson Arkose Formation of Tertiary to Cretaceous Age:
windblown sands and residual soil deposits overlying arkosic sandstone with interbedded siltstone and claystone

h - hydrocompaction

fp - floodplain

psw - potentially seasonal shallow groundwater area

sw - seasonal shallow groundwater area

w - flowing / ponded water

TB- APPROXIMATE TEST BORING LOCATION AND NUMBER

TP- APPROXIMATE TEST PIT LOCATION AND NUMBER

TB- APPROXIMATE TEST BORING LOCATION AND NUMBER (EEI JOB NO. 181823)

TP- APPROXIMATE TEST PIT LOCATION AND NUMBER (EEI JOB NO. 181823)

Revisions:

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GEOLOGY/ ENGINEERING GEOLOGY MAP
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EL PASO COUNTY, CO
FOR: GORILLA CAPITAL

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CHECKED BY:	-
DATE:	9/27/23
SCALE:	AS SHOWN
JOB NO.:	230509
SHEET NO.:	6

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A No Base Flood Elevations determined.

ZONE AE Base Flood Elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.

ZONE AO Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.

ZONE AR Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.

ZONE A99 Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.

ZONE V Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.

ZONE VE Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

- 1% annual chance floodplain boundary
- 0.2% annual chance floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
- 513 Base Flood Elevation line and value; elevation in feet*
- (EL. 987) Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the National Geodetic Vertical Datum of 1929

- A—A Cross section line
- 23—23 Transect line
- 97° 07' 30", 32° 22' 30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
- 4276000 M 1000-meter Universal Transverse Mercator grid tick values, zone 4
- 600000 FT 5000-foot grid tick values: Hawaii State Plane coordinate system, zone 3 (FIPSZONE 5103), Transverse Mercator projection
- DX5510 X Bench mark (see explanation in Notes to Users section of this FIRM panel)
- M 2 Coastal Mile marker

MAP REPOSITORY

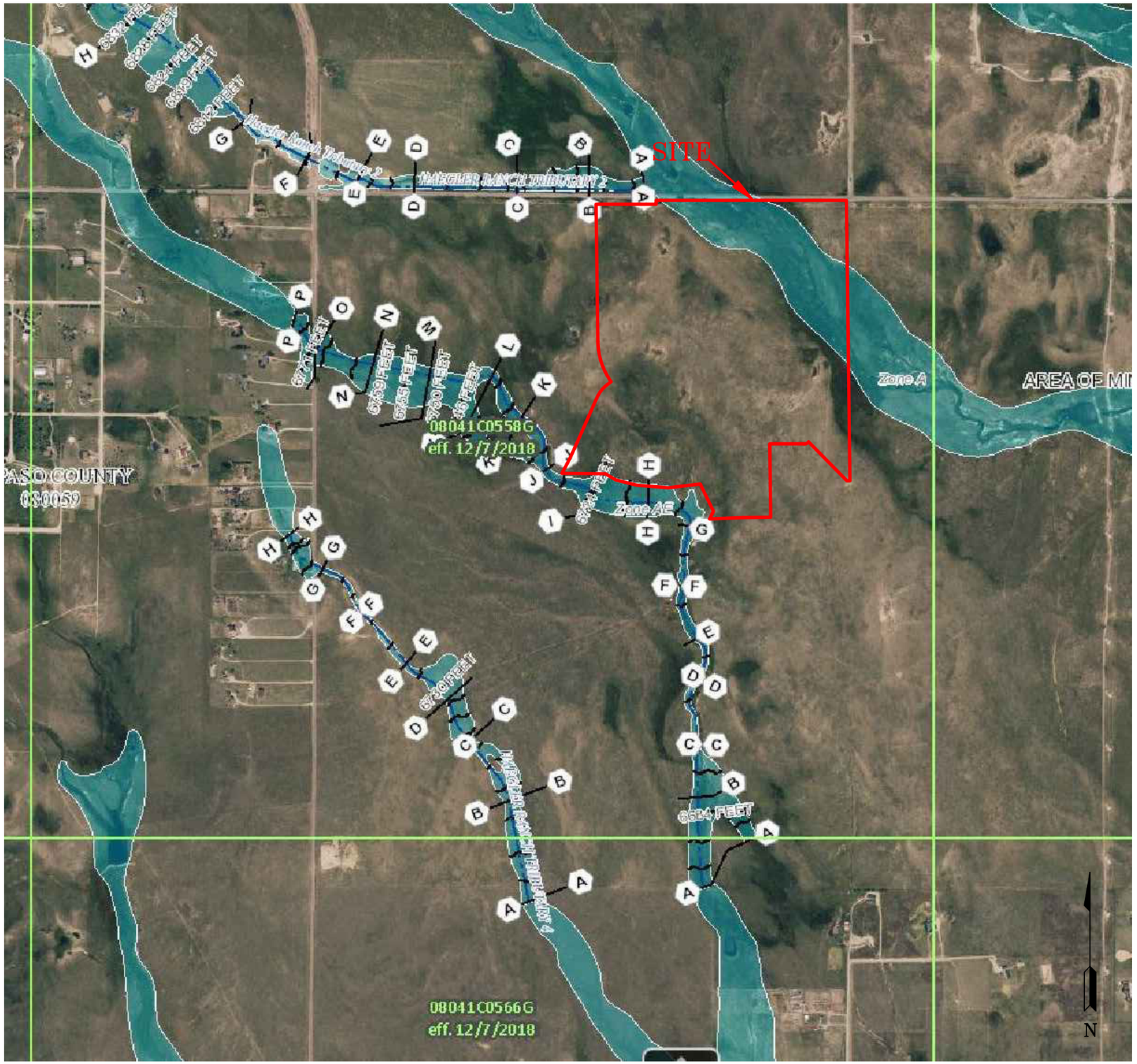
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

November 20, 2000

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 30, 2004 – to change Special Flood Hazard Areas, to update map format, to reflect revised shoreline and to incorporate previously issued Letters of Map Revision.



Revisions:

No.	Description	By	Date

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FLOODPLAIN MAP
SADDLEHORN RANCH FILING NO. 4
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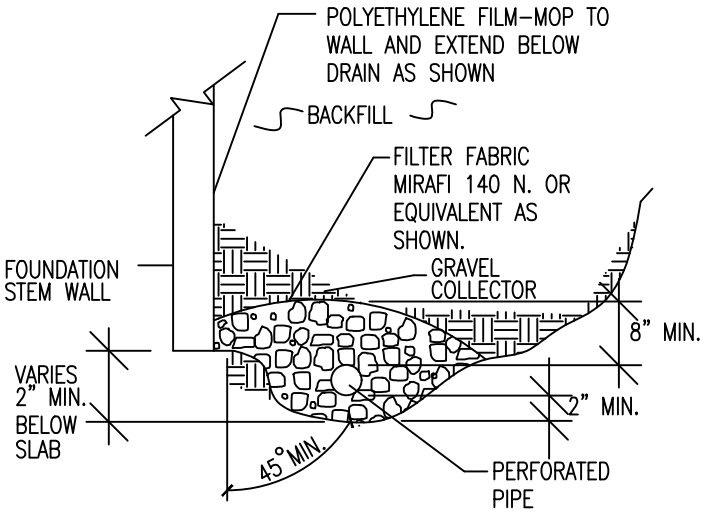
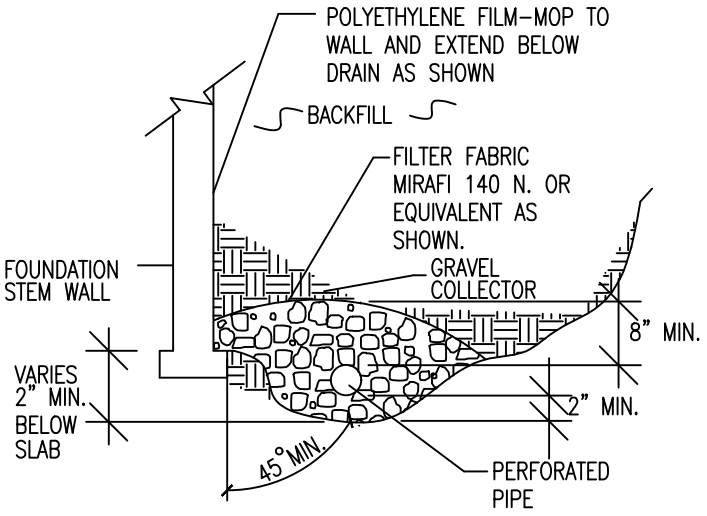
FOR: GORILLA CAPITAL

DRAWN BY:	LLL
DESIGNED BY:	-
CHECKED BY:	-
DATE:	9/27/23
SCALE:	AS SHOWN
JOB NO.:	230509
SHEET NO.:	7





NOTES:

–GRAVEL SIZE IS RELATED TO DIAMETER OF PIPE PERFORATIONS–85% GRAVEL GREATER THAN 2x PERFORATION DIAMETER.

–PIPE DIAMETER DEPENDS UPON EXPECTED SEEPAGE. 4–INCH DIAMETER IS MOST OFTEN USED.

–ALL PIPE SHALL BE PERFORATED PLASTIC. THE DISCHARGE PORTION OF THE PIPE SHOULD BE NON–PERFORATED PIPE.

–FLEXIBLE PIPE MAY BE USED UP TO 8 FEET IN DEPTH, IF SUCH PIPE IS DESIGNED TO WITHSTAND THE PRESSURES. RIGID PLASTIC PIPE WOULD OTHERWISE BE REQUIRED.

–MINIMUM GRADE FOR DRAIN PIPE TO BE 1% OR 3 INCHES OF FALL IN 25 FEET.

–DRAIN TO BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. A SUMP AND PUMP MAY BE USED IF GRAVITY OUT FALL IS NOT AVAILABLE.

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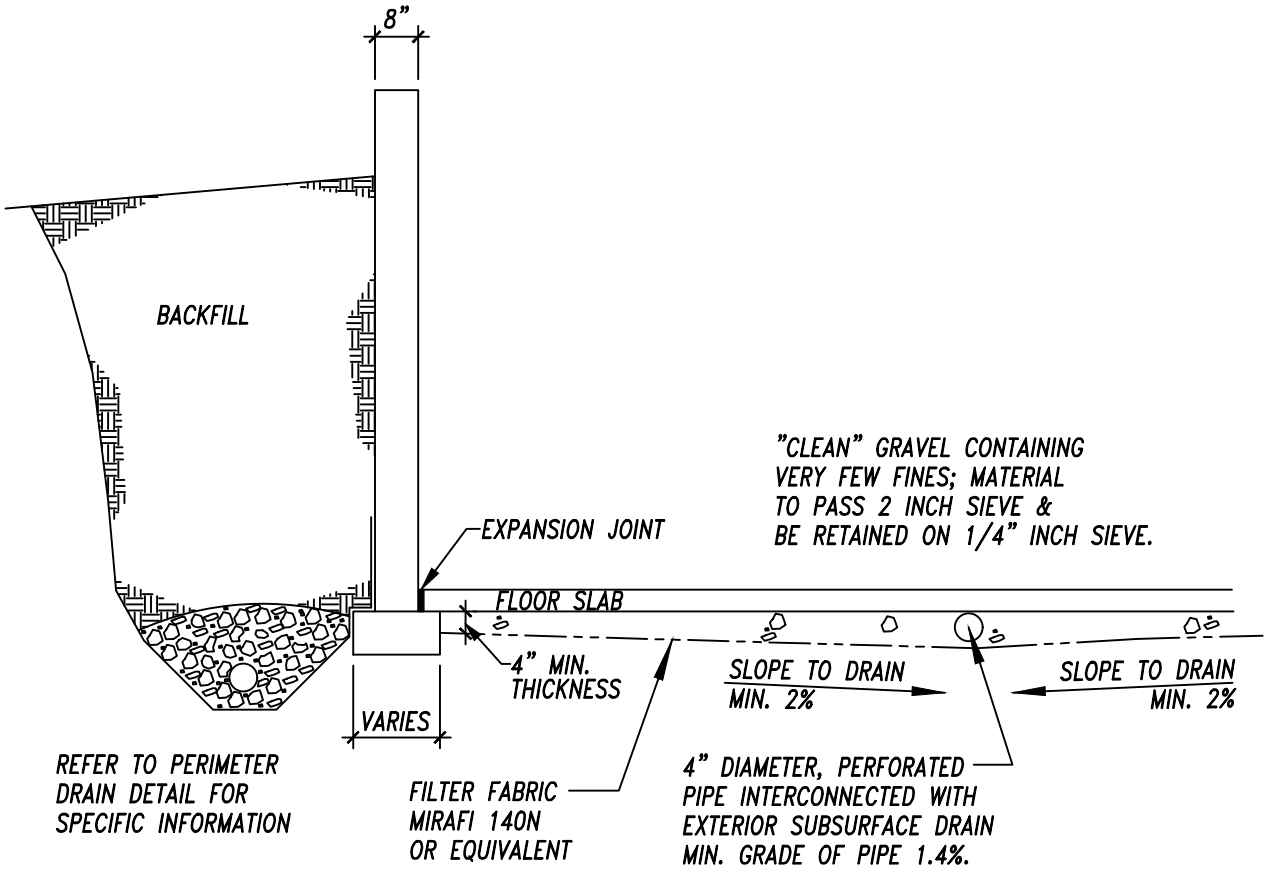
PERIMETER DRAIN DETAIL

DRAWN:	DATE:	DESIGNED:	CHECKED:

JOB NO.: 222006

FIG NO.: 8



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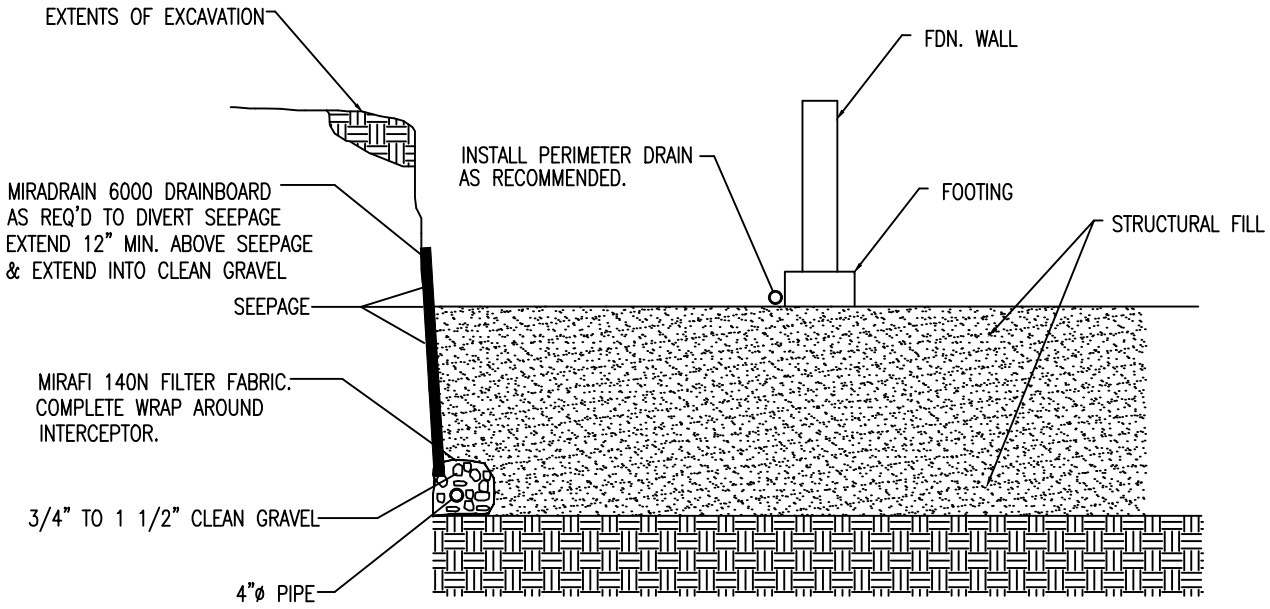
TYP. UNDERSLAB DRAINAGE
LAYER (CAPILLARY BREAK)

DRAWN BY:	DATE DRAWN:	DESIGNED BY:	CHECKED:

JOB NO.: 222006

FIG NO.: 9



NOTE:
EXTEND INTERCEPTOR DRAIN TO UNDERDRAIN OR TO SUMP.
BENCH DRAIN INTO NATIVE SOILS 12 INCHES MINIMUM.

INTERCEPTOR DRAIN DETAIL

N.T.S.

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505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

INTERCEPTOR DRAIN DETAIL

DRAWN BY:	DATE DRAWN:	DATE	CHECKED:
DPS			DPS

JOB NO.: 222006

FIG. NO.: 10

APPENDIX A: Site Photographs

1

Looking west from the northern portion of Filing No. 4.

September 28, 2022

2

Looking southeast from the northern portion of Filing No. 4.

September 28, 2022

Job No. 222006

3

Looking east from the northern portion of Filing No. 4.

September 28, 2022

4

Looking southeast from the northeastern portion of Filing No. 4.

September 28, 2022

Job No. 222006

5

Looking north from the southeastern portion of Filing No. 4.

September 28, 2022

6

Looking northwest from the southeastern portion of Filing No. 4.

September 28, 2022

Job No. 222006

APPENDIX B: Test Boring & Test Pit Logs

TABLE B-1

DEPTH TO GROUNDWATER & BEDROCK

TEST BORING	DEPTH TO GROUNDWATER (ft.)	DEPTH TO BEDROCK (ft.)
1	12	9
2	8.5	9
3	7	4
4	16	9
5	7.5	7
6	6	11
7	7	9
8	9	9

TEST BORING 1
DATE DRILLED 10/10/2022

REMARKS

WATER @ 12', 10/11/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, TAN, MEDIUM DENSE, MOIST		11	6.1	1
5			10	7.3	1
10	SANDSTONE, WEAK, GRAY, MODERATELY WEATHERED, (SAND, SILTY, VERY DENSE, MOIST)		50/8"	13.3	3
15			50/11"	14.5	3
20			50/6"	16.0	3

TEST BORING 2
DATE DRILLED 10/10/2022

REMARKS

WATER @ 8.5', 10/11/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, TAN, LOOSE to MEDIUM DENSE, DRY to MOIST		8	2.0	1
5			16	4.9	1
10	SANDSTONE, WEAK, GRAY, MODERATELY WEATHERED, (SAND, WITH SILT, VERY DENSE, MOIST)		50/8"	11.9	3
15			50/11"	13.2	3
20			50/6"	14.3	3

ENTECH ENGINEERING, INC.

TEST BORING LOGS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. B-1

TEST BORING 3
DATE DRILLED 10/10/2022

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 7', 10/11/22						
SAND, SILTY, TAN, MEDIUM DENSE, DRY				17	1.6	1
SANDSTONE, WEAK, TAN to GRAY, MODERATELY WEATHERED, (SAND, SILTY, VERY DENSE to DENSE, MOIST)	5			50/10"	6.6	3
	10			50/7"	8.4	3
	15			50	13.0	3
	20			45	12.9	3

TEST BORING 4
DATE DRILLED 10/10/2022

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 16', 10/11/22						
SAND, SILTY, TAN, LOOSE, DRY				9	1.4	1
	5			*	1.4	1
SANDSTONE, WEAK, TAN, MODERATELY WEATHERED, (SAND, SILTY, VERY DENSE,	10			50/11"	7.3	3
	15			50/11"	13.4	3
* - BULK SAMPLE TAKEN						
SILTSTONE, WEAK, GRAY, MODERATELY WEATHERED, (SILT, SANDY, VERY STIFF, MOIST)	20			28	28.2	4

ENTECH ENGINEERING, INC.

TEST BORING LOGS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. B-2

TEST BORING 5
DATE DRILLED 10/10/2022

REMARKS

WATER @ 7.5', 10/11/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, TAN, MEDIUM DENSE, DRY to MOIST		22	2.9	1
5			24	12.5	1
	SANDSTONE, WEAK, TAN to GRAY, MODERATELY WEATHERED, (SAND, SILTY, VERY DENSE, MOIST)		50/9"	11.9	3
10					
15			50/10"	13.8	3
20			50/7"	18.4	3

TEST BORING 6
DATE DRILLED 10/10/2022

REMARKS

WATER @ 6', 10/11/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, TAN, MEDIUM DENSE to DENSE, DRY to VERY MOIST		25	1.2	1
5			*	1.0	1
10			42	11.2	1
	SANDSTONE, WEAK, GRAY, MODERATELY WEATHERED, (SAND, SILTY, VERY DENSE, MOIST)				
15			50/7"	12.8	3
20	* - BULK SAMPLE TAKEN		50/6"	22.4	3

ENTECH ENGINEERING, INC.

TEST BORING LOGS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. B-3

TEST BORING 7
DATE DRILLED 10/10/2022

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 7', 10/10/22						
SILT, SANDY, TAN, VERY STIFF, MOIST				20	11.5	2
	5			*	25.9	2
SANDSTONE, WEAK, TAN, MODERATELY WEATHERD, (SAND, SILTY, VERY DENSE, MOIST	10			50/10"	10.2	3
	15			*	13.5	3
* - BULK SAMPLE TAKEN	20			*	21.5	3

TEST BORING 8
DATE DRILLED 10/10/2022

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 9', 10/10/22						
SAND, SILTY, TAN, DENSE, DRY to MOIST				31	2.8	1
	5			30	13.3	1
SANDSTONE, WEAK, TAN, MODERATELY WEATHERED, (SAND, WITH SILT, VERY DENSE, MOIST)	10			50/9"	17.4	3
	15			50/7"	16.0	3
* - BULK SAMPLE TAKEN	20			*	18.2	3

ENTECH ENGINEERING, INC.

TEST BORING LOGS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. B-4

TEST PIT NO. 1A
DATE EXCAVATED 10/13/2022
Job # 230509

CLIENT GORILLA CAPITAL
LOCATION SADDLEHORN, FILING 4

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
redoximorphic features encountered at 5'-0"						
topsoil, sandy clay loam, brown, moist	1					
	2					
sandy clay loam, fine to coarse grained, brown, moist	3			gr	w	3A
sandy clay, fine to medium grained, grayish brown, moist	4			ma		4A
	5					
sandy clay loam, fine to coarse grained, brownish grey, moist	6			gr	w	3A
	7					
	8					
	9					
	10					

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
	1					
	2					
	3					
	4					
	5					
	6					
	7					
	8					
	9					
	10					

Soil Structure Shape
granular - gr
platy - pl
blocky - bl
prismatic - pr
single grain - sg
massive - ma

Soil Structure Grade
weak - w
moderate - m
strong - s
loose - l

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
jhr	10/19/22		

JOB NO.: 230509
FIG NO.:

APPENDIX C: Laboratory Test Results

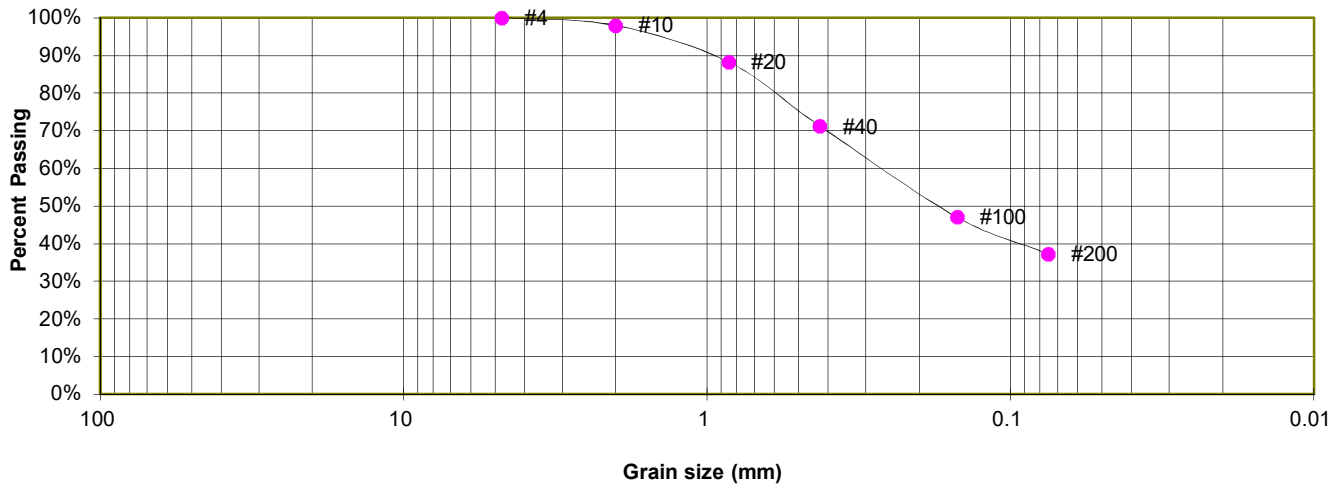
ENTECH ENGINEERING, INC.

TABLE C-1
SUMMARY OF LABORATORY TEST RESULTS

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	USCS	SOIL DESCRIPTION
1	1	5			37.3	21	17	4	<0.01			SM	SAND, SILTY
1	5	5			20.0					30		SM	SAND, SILTY
1	6	2-3			12.5							SM	SAND, SILTY
2	7	5			60.9					170		ML	SILT, SANDY
3	2	15			9.1	NV	NP	NP	0.02			SW-SM	SANDSTONE, (SAND, WITH SILT)
3	3	15			28.1							SM	SANDSTONE, (SAND, SILTY)
3	8	10			8.4							SW-SM	SANDSTONE, (SAND, WITH SILT)
4	4	20	31.1	77.4	58.9	41	36	5			1.4	ML	SILTSTONE, (SILT, SANDY)

Project: Saddlehorn, Filing 4
Client: Gorilla Capital
Job No: 230509

TEST BORING	1	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	5	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.0%
20	88.3%
40	71.3%
100	47.0%
200	37.3%

ATTERBERG LIMITS

Plastic Limit	17
Liquid Limit	21
Plastic Index	4

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

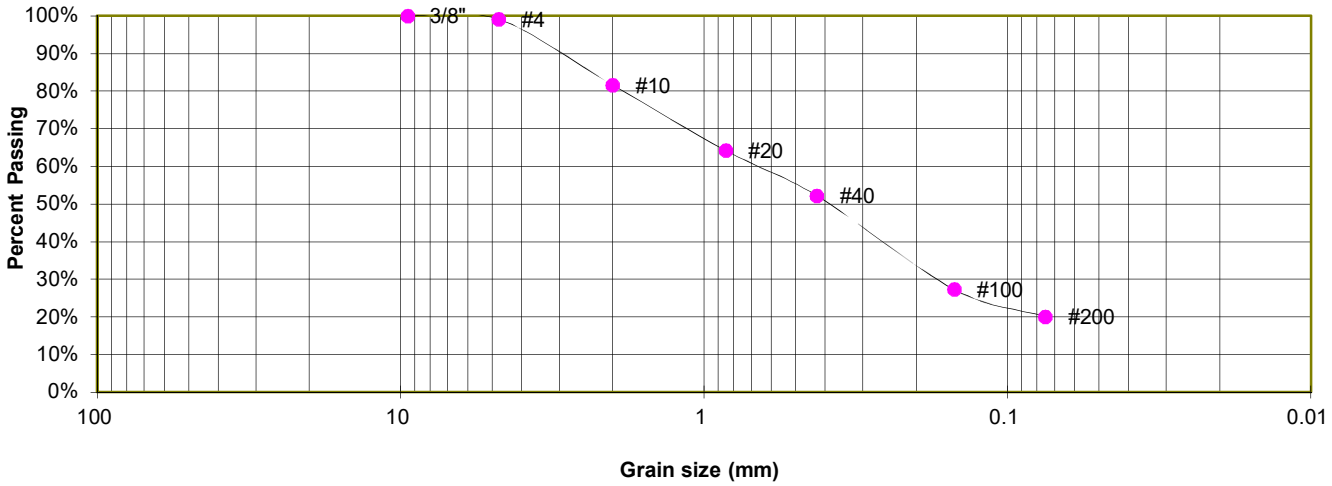
LABORATORY TEST RESULTS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. C-1

TEST BORING	5	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	5	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.1%
10	81.6%
20	64.2%
40	52.2%
100	27.3%
200	20.0%

FHA SWELL

Moisture at start	18.1%
Moisture at finish	20.2%
Moisture increase	2.1%
Initial dry density (pcf)	87
Swell (psf)	30

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

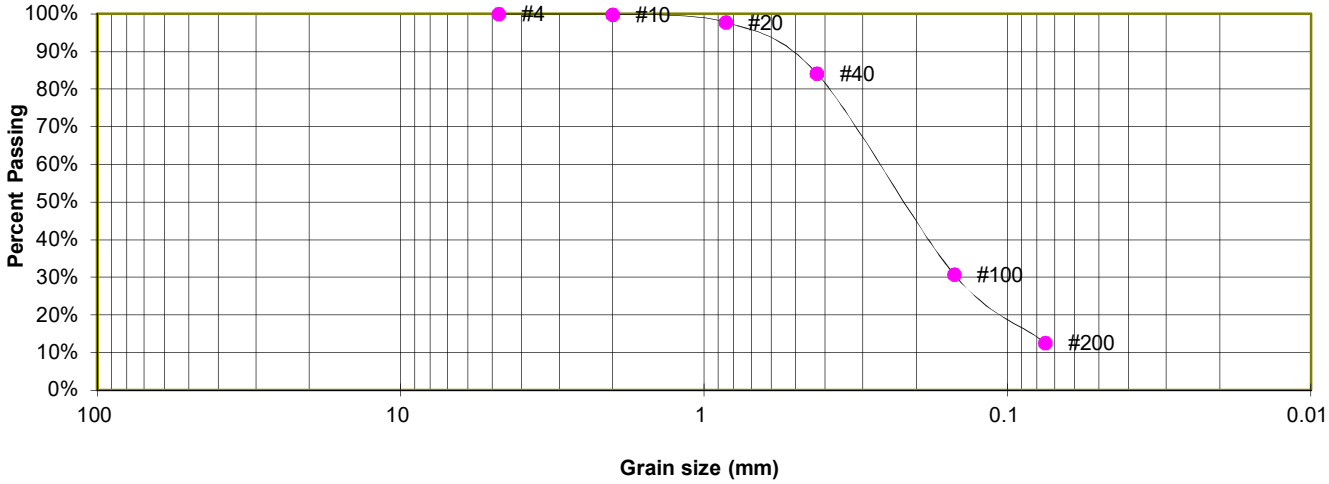
LABORATORY TEST RESULTS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. C-2

TEST BORING	6	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	2-3	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.8%
20	97.8%
40	84.2%
100	30.8%
200	12.5%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

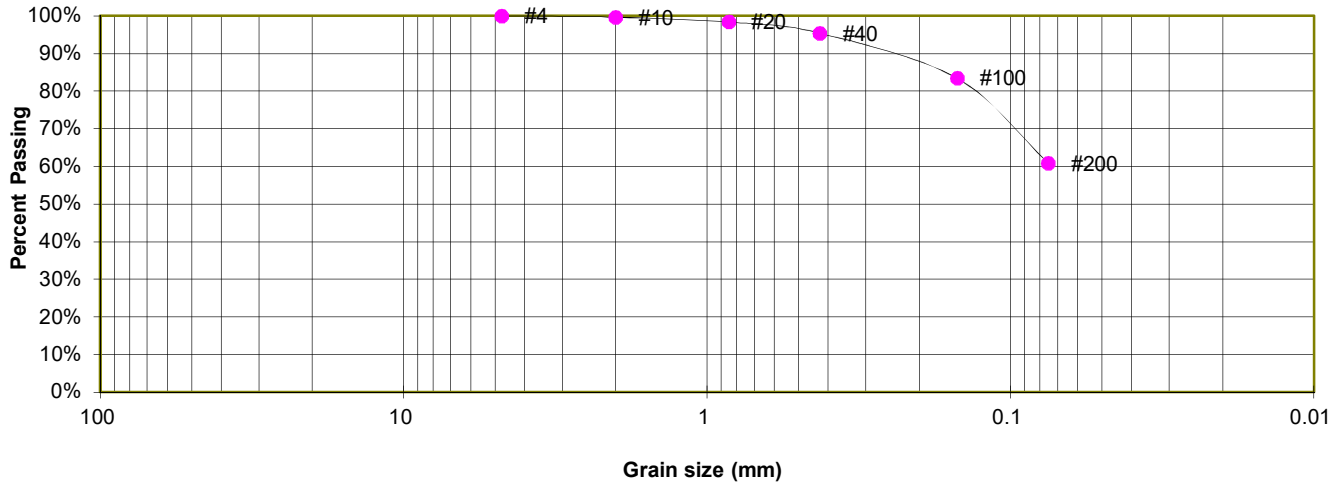
LABORATORY TEST RESULTS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. C-3

TEST BORING	7	SOIL DESCRIPTION	SILT, SANDY
DEPTH (FT)	5	SOIL TYPE	2



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.7%
20	98.4%
40	95.4%
100	83.4%
200	60.9%

FHA SWELL

Moisture at start	17.6%
Moisture at finish	21.9%
Moisture increase	4.3%
Initial dry density (pcf)	95
Swell (psf)	170

SOIL CLASSIFICATION

USCS CLASSIFICATION: ML

ENTECH ENGINEERING, INC.

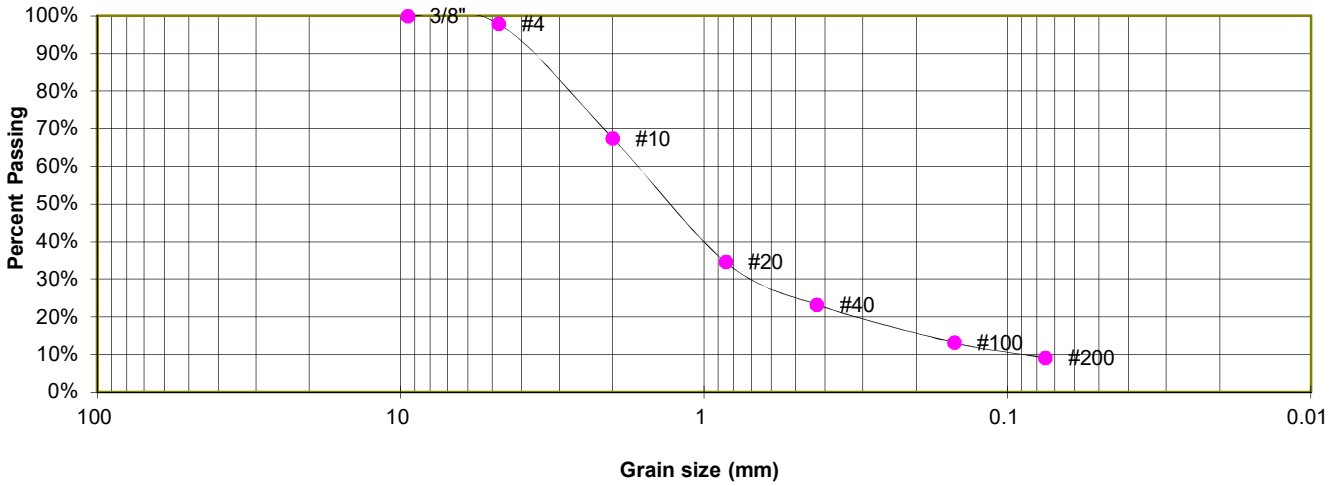
LABORATORY TEST RESULTS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. C-4

TEST BORING	2	SOIL DESCRIPTION	SANDSTONE, (SAND, WITH SILT)
DEPTH (FT)	15	SOIL TYPE	3



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.9%
10	67.5%
20	34.6%
40	23.3%
100	13.2%
200	9.1%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SW-SM

ENTECH ENGINEERING, INC.

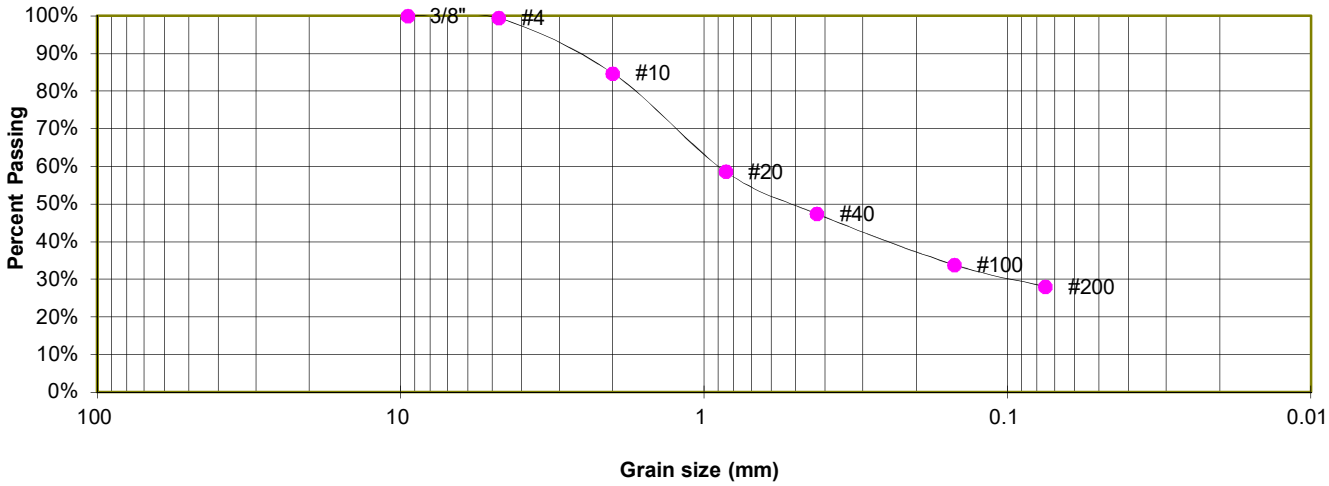
LABORATORY TEST RESULTS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. C-5

TEST BORING	3	SOIL DESCRIPTION	SANDSTONE, (SAND, SILTY)
DEPTH (FT)	15	SOIL TYPE	3



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.4%
10	84.8%
20	58.6%
40	47.4%
100	33.9%
200	28.1%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

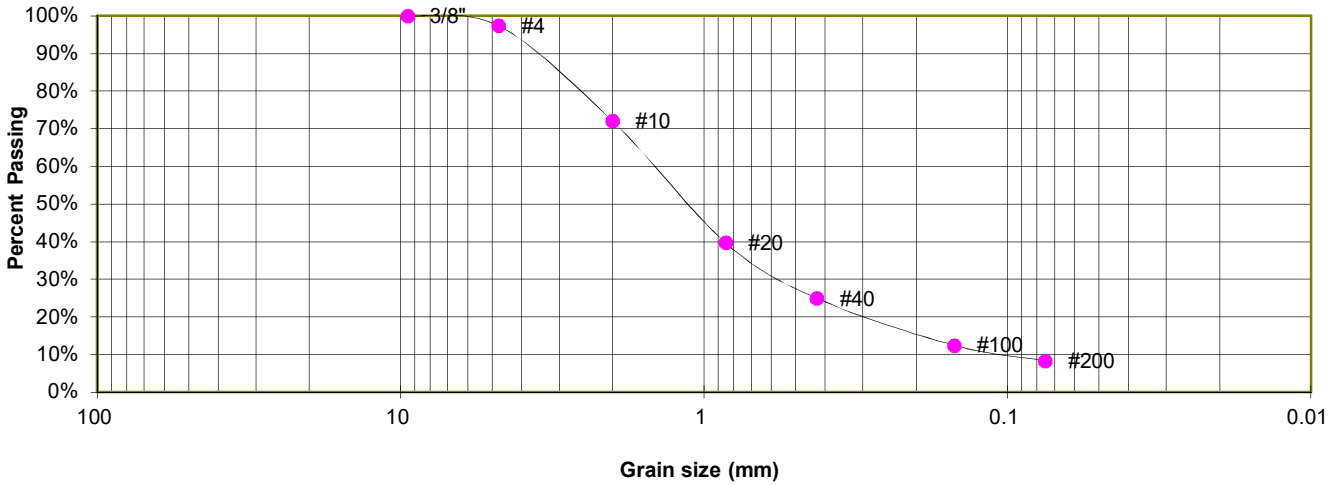
LABORATORY TEST RESULTS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. C-6

TEST BORING	8	SOIL DESCRIPTION	SANDSTONE, (SAND, WITH SILT)
DEPTH (FT)	10	SOIL TYPE	3



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.4%
10	72.0%
20	39.7%
40	24.9%
100	12.5%
200	8.4%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SW-SM

ENTECH ENGINEERING, INC.

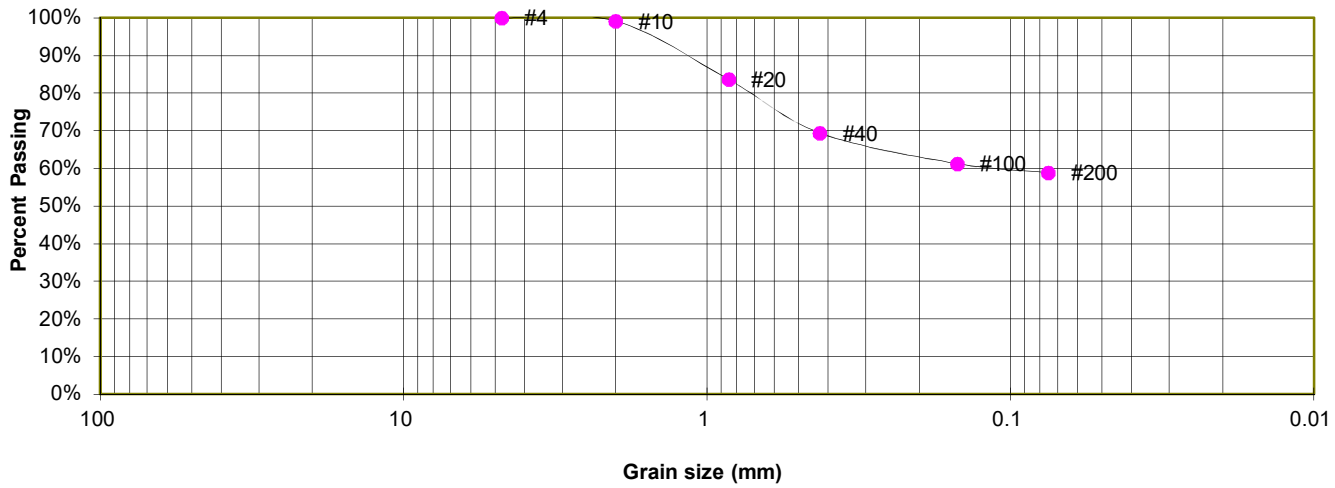
LABORATORY TEST RESULTS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. C-7

TEST BORING	4	SOIL DESCRIPTION	SILTSTONE, (SILT, SANDY)
DEPTH (FT)	20	SOIL TYPE	4



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.2%
20	83.7%
40	69.4%
100	61.3%
200	58.9%

ATTERBERG LIMITS

Plastic Limit	36
Liquid Limit	41
Plastic Index	5

SOIL CLASSIFICATION

USCS CLASSIFICATION: ML

ENTECH ENGINEERING, INC.

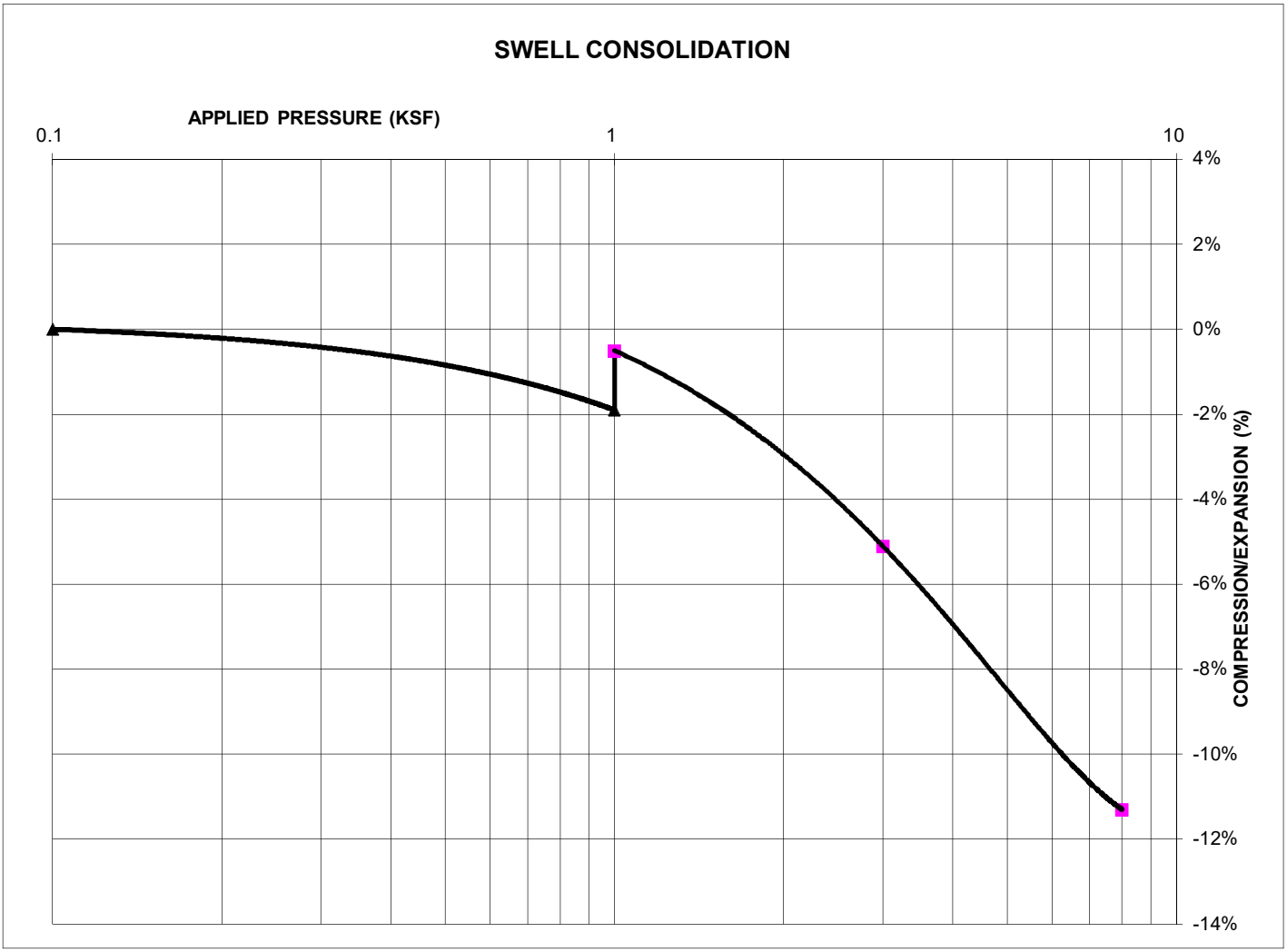
LABORATORY TEST RESULTS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. C-8

TEST BORING	4	SOIL DESCRIPTION	SILTSTONE, (SILT, SANDY)
DEPTH (FT)	20	SOIL TYPE	4



SWELL/CONSOLIDATION TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 77
NATURAL MOISTURE CONTENT: 31.1%
SWELL/CONSOLIDATION (%): 1.4%

ENTECH ENGINEERING, INC.

SWELL/CONSOLIDATION TEST RESULTS

SADDLEHORN, FILING 4
GORILLA CAPITAL

JOB NO. 230509

FIG. C-9

APPENDIX D: Saddlehorn Ranch Subdivision, Test Boring & Test Pit Logs, Laboratory Testing Summary, Entech Job No. 181823

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS FROM TEST BORINGS

CLIENT WILLIAM GUMAN
PROJECT CURTIS AND JUDGE ORR
JOB NO. 181823

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3			12.0	NV	NP	<0.01			SM	SAND, SILTY
1	2	5			13.8						SM	SAND, SILTY
1	4	2-3			3.2						SW	SAND
3	3	10			12.9	NV	NP	<0.01			SM	SANDSTONE, SILTY
4	4	20	21.4	104.2	52.5	NV	NP	<0.01		0.0	ML	SILTSTONE, VERY SANDY

TABLE 2

SUMMARY OF LABORATORY TEST RESULTS FROM TEST PITS

CLIENT GUMAN AND ASSOCIATES
PROJECT CURTIS RD AND JUGRE ORR RD
JOB NO. 181823

SOIL TYPE	TEST PIT NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	2	2-3			7.6						SM-SW	SAND, SLIGHTLY SILTY
1	3	5-6			9.8						SM-SW	SAND, SLIGHTLY SILTY
1	6	4-6			5.5						SM-SW	SAND, SLIGHTLY SILTY
1	9	2-3			26.5	24	9				SC	SAND, CLAYEY
1	11	5-6			10.4						SM-SW	SAND, SLIGHTLY SILTY
1	12	2-3			6.6						SM-SW	SAND, SLIGHTLY SILTY
1	13	5-6			30.3	25	11				SC	SAND, CLAYEY
1	15	2-3			27.5				820		SC	SAND, CLAYEY
1	18	5-6			1.6						SW	SAND
1	21	5-6			23.4						SC	SAND, CLAYEY
1	37	6-7			30.1	19	3		430		SM	SAND, SILTY
1	31	2-3			16.6						SM	SAND, SILTY
1	32	4-5			44.3						SC	SAND, VERY CLAYEY
1	33	2-3			4.3						SW	SAND
1	35	5-6			2.2						SW	SAND
1	36	2-3			8.2						SM-SW	SAND, SLIGHTLY SILTY
1	38	2-3			3.1						SW	SAND
1	39	5-6			12.4						SM	SAND, SILTY
2	1	7-8			70.3	49	31		1360		CL	CLAY, SANDY
2	4	2-3			56.4	26	12				CL	CLAY, VERY SANDY
2	5	7-8			69.6	32	19		880		CL	CLAY, SANDY
2	16	7-8			92.9				4420		CL	CLAY, SANDY
3	8	4-5			44.8	29	13				SC	SANDSTONE, VERY CLAYEY
3	10	5-6			16.6						SM	SANDSTONE, SILTY
3	17	5-6			12.6						SM	SANDSTONE, SILTY
3	34	5-6			16.9						SM	SANDSTONE, SILTY
3	40	5-6			13.9						SM	SANDSTONE, SILTY
4	7	6-7			91.8				2300		CL	CLAYSTONE, SANDY
4	14	4-5			76.1	47	23		3160		CL	CLAYSTONE, SANDY
4	23	5-6			57.0				450		CL	CLAYSTONE, VERY SANDY

TEST BORING NO. 3
DATE DRILLED 4/2/2019
Job # 181823

REMARKS

WATER @ 12', 4/3/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			44	7.3	1
5			41	8.6	1
10			50/9"	11.8	3
15			50/8"	11.7	3
20			50/6"	14.8	3

6" TOPSOIL, SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, MOIST TO WET

SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, WET

TEST BORING NO. 4
DATE DRILLED 4/2/2019
CLIENT WILLIAM GUMAN
LOCATION CURTIS AND JUDGE ORR

REMARKS

WATER @ 14', 4/3/19

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			7	2.6	1
5			10	2.3	1
10			30	4.0	1
15			32	9.6	1
20			50/4"	21.3	4

6" TOPSOIL, SAND, CLEAN TO SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO DENSE, MOIST

SILTSTONE, VERY SANDY, DARK GRAY, HARD, WET

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

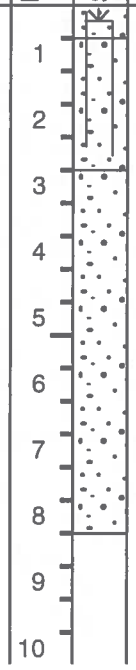
TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/12/19

JOB NO.: 181823
FIG NO.: B-2

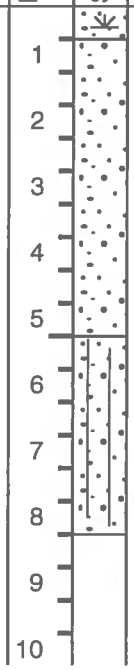
TEST PIT NO. 21
DATE EXCAVATED 1/23/2019
Job # 181823

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to medium grained, tan	2			gr	m	2
loamy sand to sand, fine to coarse grained, tan	3			sg		1
	4					
	5					
	6					
	7					
	8					
	9					
	10					



TEST PIT NO. 22
DATE EXCAVATED 1/4/2019
CLIENT GUMAN AND ASSOCIATES, LTD
LOCATION CURTIS ROAD AND JUDGE ORR ROAD

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
loamy sand, fine to coarse grained, tan	2			sg		1
	3					
	4					
	5					
sandy loam, fine to coarse grained, tan	6			gr	w	2A
	7					
	8					
	9					
	10					



Soil Structure Shape
granular - gr
platy - pl
blocky - bl
prismatic - pr
single grain - sg
massive - ma

Soil Structure Grade
weak - w
moderate - m
strong - s
loose - l

ENTECH
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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	2/16/19

JOB NO.: 181823
FIG NO.: B-13

TEST PIT NO. 23
DATE EXCAVATED 1/4/2019
Job # 181823

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy clay loam, brown	1					
sandy clay loam, light brown	2			gr	w	3A
weathered silty sandstone, fine to coarse grained, grayish tan	3			ma		3A
	4					
	5					
weatherthed sandy claystone, gray brown	6			ma		4A
	7					
	8					
	9					
	10					

TEST PIT NO. 24
DATE EXCAVATED 1/23/2019
CLIENT GUMAN AND ASSOCIATES, LTD
LOCATION CURTIS ROAD AND JUDGE ORR ROAD

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, tan	2			gr	w	2A
loamy sand to sand, fine to coarse grained, tan	3			sg		1
	4					
	5					
	6					
	7					
	8					
	9					
	10					

Soil Structure Shape
granular - gr
platy - pl
blocky - bl
prismatic - pr
single grain - sg
massive - ma

Soil Structure Grade
weak - w
moderate - m
strong - s
loose - l

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	2/14/19

JOB NO.: 181823
FIG NO.: B-14

TEST PIT NO. 27
DATE EXCAVATED 1/23/2019
Job # 181823

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, light brown	2			gr	w	2A
loamy sand to sand, fine to coarse grained, tan	3			sg		1
	4					
	5					
	6					
	7					
	8					
	9					
	10					

TEST PIT NO. 28
DATE EXCAVATED 1/23/2019
CLIENT GUMAN AND ASSOCIATES, LTD
LOCATION CURTIS ROAD AND JUDGE ORR ROAD

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, light brown	2			gr	w	2A
sand, fine to coarse grained, tan	3			sg		1
*-groundwater at 6.5'	4					
	5					
	6					
	7					
	8					
	9					
	10					

Soil Structure Shape
granular - gr
platy - pl
blocky - bl
prismatic - pr
single grain - sg
massive - ma

Soil Structure Grade
weak - w
moderate - m
strong - s
loose - l

ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	2/16/19

JOB NO.: 181823
FIG NO.: B-16

TEST PIT NO. 29
DATE EXCAVATED 1/23/2019
Job # 181823

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, light brown	2			gr	w	2A
loamy sand, fine to coarse grained, tan	3			sg		1
	4					
	5					
	6					
	7					
	8					
	9					
	10					

TEST PIT NO. 30
DATE EXCAVATED 1/23/2019
CLIENT GUMAN AND ASSOCIATES, LTD
LOCATION CURTIS ROAD AND JUDGE ORR ROAD

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, light brown	2			gr	w	2A
loamy sand, fine to coarse grained, tan	3			sg		1
	4					
weathered clayey sandstone fine to coarse grained, grayish tan	5			ma		4A
	6					
*-signs of seasonally occuring groundwater at 6.5'	7					
	8					
	9					
	10					

Soil Structure Shape
granular - gr
platy - pl
blocky - bl
prismatic - pr
single grain - sg
massive - ma

Soil Structure Grade
weak - w
moderate - m
strong - s
loose - l

ENTECH
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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	2/16/19

JOB NO.: 181823
FIG NO.: B-17

TEST PIT NO. 37
DATE EXCAVATED 1/4/2019
Job # 181823

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
loamy sand, fine to coarse grained, tan	2			sg		1
	3					
	4					
	5					
sandy clay loam, gray	6			gr	w	3A
	7					
	8					
	9					
	10					

TEST PIT NO. 38
DATE EXCAVATED 1/4/2019
CLIENT GUMAN AND ASSOCIATES, LTD
LOCATION CURTIS ROAD AND JUDGE ORR ROAD

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, tan	2			gr	w	2A
loamy sand, fine to coarse grained, tan	3			sg		1
	4					
	5					
sandy loam, fine to coarse grained, orangish tan	6			gr	w	2A
	7					
*signs of seasonal occuring groundwater at 6.5'	8					
	9					
	10					

Soil Structure Shape
granular - gr
platy - pl
blocky - bl
prismatic - pr
single grain - sg
massive - ma

Soil Structure Grade
weak - w
moderate - m
strong - s
loose - l

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TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	2/16/19

JOB NO.: 181823
FIG NO.: B-21

TEST PIT NO. 39
DATE EXCAVATED 1/4/2019
Job # 181823

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
loamy sand, fine to coarse grained, tan	2			sg		1
	3					
	4					
	5					
sandy loam, fine to coarse grained, tan	6			gr	w	2A
	7					
	8					
	9					
	10					

TEST PIT NO. 40
DATE EXCAVATED 1/4/2019
CLIENT GUMAN AND ASSOCIATES, LTD
LOCATION CURTIS ROAD AND JUDGE ORR ROAD

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, tan	2			gr	w	2A
weathered to formational clayey sandstone, tan to orangish tan	3			ma		4A
	4					
*-signs of seasonal occuring groundwater at 3.5'	5					
	6					
	7					
	8					
	9					
	10					

Soil Structure Shape
granular - gr
platy - pl
blocky - bl
prismatic - pr
single grain - sg
massive - ma

Soil Structure Grade
weak - w
moderate - m
strong - s
loose - l

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TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	2/16/19

JOB NO.: 181823
FIG NO.: B-22

APPENDIX E: Soil Survey Descriptions

El Paso County Area, Colorado

8—Blakeland loamy sand, 1 to 9 percent slopes

Map Unit Setting

National map unit symbol: 369v
Elevation: 4,600 to 5,800 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Blakeland and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Blakeland

Setting

Landform: Flats, hills
Landform position (three-dimensional): Side slope, talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from sedimentary rock and/or eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 11 inches: loamy sand
AC - 11 to 27 inches: loamy sand
C - 27 to 60 inches: sand

Properties and qualities

Slope: 1 to 9 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Available water supply, 0 to 60 inches: Low (about 4.5 inches)

Interpretive groups

Land capability classification (irrigated): 3e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XB210CO - Sandy Foothill
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant

Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 20, Sep 2, 2022

El Paso County Area, Colorado

19—Columbine gravelly sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367p
Elevation: 6,500 to 7,300 feet
Mean annual precipitation: 14 to 16 inches
Mean annual air temperature: 46 to 50 degrees F
Frost-free period: 125 to 145 days
Farmland classification: Not prime farmland

Map Unit Composition

Columbine and similar soils: 97 percent
Minor components: 3 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Columbine

Setting

Landform: Fans, fan terraces, flood plains
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 14 inches: gravelly sandy loam
C - 14 to 60 inches: very gravelly loamy sand

Properties and qualities

Slope: 0 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Very low
Capacity of the most limiting layer to transmit water (Ksat): High to very high (5.95 to 19.98 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Very low (about 2.5 inches)

Interpretive groups

Land capability classification (irrigated): 4e
Land capability classification (nonirrigated): 6e
Hydrologic Soil Group: A
Ecological site: R049XY214CO - Gravelly Foothill
Hydric soil rating: No

Minor Components

Fluvaquentic haplaquolls

Percent of map unit: 1 percent

Landform: Swales
Hydric soil rating: Yes

Other soils
Percent of map unit: 1 percent
Hydric soil rating: No

Pleasant
Percent of map unit: 1 percent
Landform: Depressions
Hydric soil rating: Yes

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 20, Sep 2, 2022

El Paso County Area, Colorado

29—Fluvaquentic Haplaquolls, nearly level

Map Unit Setting

National map unit symbol: 3681
Elevation: 5,000 to 7,800 feet
Mean annual precipitation: 13 to 15 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 110 to 165 days
Farmland classification: Not prime farmland

Map Unit Composition

Fluvaquentic haplaquolls and similar soils: 98 percent
Minor components: 2 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Fluvaquentic Haplaquolls

Setting

Landform: Marshes, flood plains, swales
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 12 inches: variable
C - 12 to 60 inches: stratified very gravelly sand to loam

Properties and qualities

Slope: 0 to 2 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.20 to 6.00 in/hr)
Depth to water table: About 0 to 24 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Maximum salinity: Nonsaline to slightly saline (0.0 to 4.0 mmhos/cm)
Available water supply, 0 to 60 inches: Moderate (about 6.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: R067BY029CO - Sandy Meadow
Hydric soil rating: Yes

Minor Components

Haplaquolls
Percent of map unit: 1 percent
Landform: Domes
Hydric soil rating: Yes

Other soils
Percent of map unit: 1 percent
Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 20, Sep 2, 2022