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SOIL, GEOLOGY, AND GEOLOGIC HAZARD STUDY
CATHEDRAL COMMONS
STRUTHERS ROAD AND SPANISH BIT DRIVE
EL PASO COUNTY, COLORADO

Prepared for:

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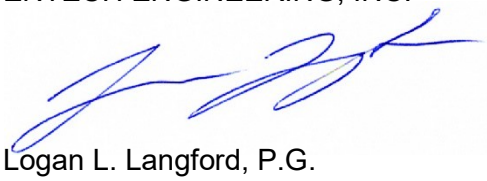
December 23, 2021

Respectfully Submitted,

ENTECH ENGINEERING, INC.



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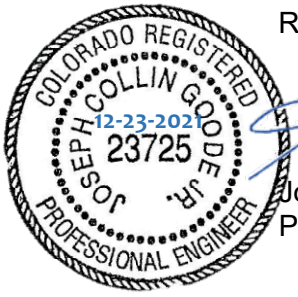

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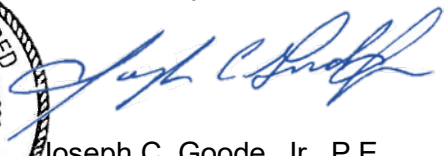

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Entech Job No. 210536
AAprojects/2021/210536 county soil/geo

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1.0 SUMMARY

Project Location

The project lies in portions of the SW¼ of Section 36, Township 11 South, Range 67 West of the 6th Principal Meridian in El Paso County, Colorado. The site is southeast of the town of Monument, Colorado, located east of the intersection of Struthers Road and Spanish Bit Drive. The location of the site is as shown on the Vicinity Map, Figure 1.

Project Description

Total acreage involved in the project is approximately 11 acres. The site is currently zoned as CC (Commercial Community) and R-4 (Planned Development), and the proposed rezoning of the southern parcel to RM-30 (Residential Multi-Dwelling). The proposed mixed-use development consisting of commercial retail on the northern side of Spanish Bit Drive, and a Daycare Facility and Apartment Buildings southern side of Spanish Bit Drive, with associated site improvements. The development will utilize municipal sewer and water.

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 minor constraints on development and land use. These include areas of potentially collapsible soils, potentially expansive soils, potential seasonal shallow groundwater, and seasonal shallow groundwater areas. Based on the proposed sketch plan, it appears that these areas will have minor constraints 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 can be properly mitigated with site grading and engineering design. All recommendations are subject to the limitations discussed in the report.

2.0 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is in portions of the SW¼ of Section 36, Township 11 South, Range 67 West of the 6th Principal Meridian in El Paso County, Colorado. The site is southeast of the town of Monument, Colorado, located east of the intersection of Struthers Road and Spanish Bit Drive. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is generally gradually sloping to the southwest. An existing detention pond is located in the northwest portion of the site north of Spanish Bit Drive, and a minor drainage swale is located in the southwestern portion of the site south of Spanish Bit Drive. The drainage swale flows in a southwesterly direction. Water was not observed in the detention pond or minor drainage swale at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included agricultural grazing and undeveloped land. The site contains primarily field grasses, weeds, cacti and yuccas. Site photographs, taken May 6, 2021, and November 4, 2021, are included in Appendix A.

Total acreage involved in the proposed development is approximately 11 acres. The proposed development consists of mixed commercial retail on the northern side of Spanish Bit Drive, and a Daycare Facility and Apartment Buildings south of Spanish Bit Drive, with associated site improvements. A new detention pond is proposed in the southwestern portion of the site south of Spanish Bit Drive. Twenty-three (23) Test Borings were performed on the site as part of the Subsurface Soils Investigation to determine general soil and bedrock characteristics (Reference 1). The locations of the test borings are indicated on the Site Plan/Test Boring Location Map, Figure 3.

3.0 SCOPE OF THE REPORT

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

4.0 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 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 air photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on August 4, 2021.

A Subsurface Soil Investigation was previously performed by Entech Engineering, Inc. for the proposed development, August 18, 2021 (Reference 1). Twenty-three (23) Test Borings were performed on the site to determine general soil and bedrock characteristics. The borings were drilled to depths of 5 to 20 feet below the existing surface grade. The locations of the test borings are indicated on the Site Map/Test Boring Location Map, Figure 3. The Test Boring Logs are presented in Appendix B. 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. Swell/Consolidation and FHA Swell Testing to evaluate expansion potential. Sulfate testing was performed on selected samples to evaluate potential for below grade concrete degradation due to sulfate attack. A Summary of Laboratory Test Results is included in Appendix B.

5.0 SOIL, GEOLOGY AND ENGINEERING GEOLOGY

5.1 General Geology

Physiographically, the site lies in the western portion of the Great Plains Physiographic Province. Approximately 4 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 gently dipping in a northeasterly direction (Reference 2). The rocks in the area of the site are sedimentary in nature and typically Tertiary to Cretaceous in age. The bedrock underlying the site consists of the Dawson Formation. Overlying this formation are unconsolidated deposits of artificial fill and residual soils of Quaternary Age. 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 3), previously the Soil Conservation Service (Reference 4) has mapped one soil types on the site Figure 4. In general, the soils classify as sandy loams. The soils are described as follows:

Type	Description
56	Nelson-Tassel Fine Sandy Loams, 3 to 18% slopes

Complete descriptions of each soil type are presented in Appendix C. The soils have generally been described to have rapid to moderate permeabilities. 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 moderate erosion hazards.

5.3 Site Stratigraphy

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

Qas_1 Younger Alluvial-Slope Deposits of Holocene to Late Pleistocene Age: These are sheetwash and fluvial deposited sands that exists in the northern portions of the site. These materials typically consist of silty to clayey sands.

TKda Dawson Arkose Formation of Tertiary to Cretaceous Age: The bedrock underlying the site is the Dawson Formation. This formation consists of arkosic sandstone with interbedded lenses on fine grained sandstone, claystone or siltstone. Typically, it is buff to light brown and light gray in color. Overlying the Dawson is a variable layer of residual soil derived from the in-situ weathering of the bedrock materials

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Monument Quadrangle* distributed by the Colorado Geological Survey in 2003 (Reference 5), the *Geologic Map of the Colorado Springs-Castle Rock Area*, distributed by the US Geological Survey in 1979 (Reference 6), and the *Geologic Map of the Denver 1^0 x 2^0 Quadrangle*, distributed by the US Geological Survey in 1981 (Reference 7). The Test Borings 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

Two soil types and two bedrock types were encountered in the test borings drilled for the subsurface investigation: Type 1: slightly silty to very silty sand (SM-SW, SM), Type 2: sandy clay and sandy to clayey silt (CL, CH, ML), Type 3: silty to very silty sandstone and silty, clayey sandstone (SM, SM-SC), and Type 4: sandy claystone, sandy claystone-siltstone, and sandy siltstone (CL, CL-ML, ML). Each soil and bedrock type were classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results and the observations made during drilling.

Soil Type 1 classified as slightly silty to very silty sand (SM-SW, SM). The sand was encountered in all the test borings at the existing ground surface and extending to depths ranging from 6 to 14 feet bgs and to the termination of Test Boring Nos. 3, 6, 13, 21 and 22 (5 feet). Standard Penetration Testing conducted on the sand resulted in N-values ranging from 3 to 41 bpf, indicating loose to dense states. Water content and grain size testing of sand samples resulted in water contents of approximately 1 to 11 percent, with approximately 7 to 23 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing indicated the silty sands are non-plastic. Sulfate testing performed on samples of the sand resulted in 0.00 percent and less than 0.01 percent sulfate by weight, indicating the sand exhibits a negligible potential for concrete degradation due to below grade sulfate attack.

Soil Type 2 classified as sandy clay and sandy to clayey silt (CL, CH, ML). The clay/silt was encountered in six test borings, underlying Soil Type 1, at depths ranging from 9 to 14 feet and extending to depths of 11 to 19 feet bgs. Standard Penetration Testing conducted in the clay/silt resulted in N-values of 15 to 33 bpf, indicating stiff to very stiff consistencies. Water

content and grain size testing resulted in water contents of 12 to 22 percent, with approximately 66 to 94 percent of the soil size particles passing the No. 200 Sieve. Atterberg Limits Testing resulted in liquid limit of 50 to no value and plastic indexes of 25 to non-plastic. A FHA Swell Test conducted on a sample of sandy clay resulted in a swell pressure of 1110 psf, indicating moderate expansion potential. Swell/Consolidation Testing conducted on a clay/silt samples resulted in consolidations of 0.3 to 3.5 percent, indicating low to high consolidation potentials. Highly expansive clays have been encountered in the area. Sulfate testing on the clay/silt resulted in less than 0.01 percent sulfate by weight indicating a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 3 classified as silty to very silty sandstone and clayey, silty sandstone (SM, SM-SC). The sandstone was encountered in thirteen of the test borings at depths ranging from 6 to 18 feet bgs, and extending to 14 feet and the termination of the borings (20 feet). Standard Penetration Testing conducted on the sandstone resulted in N-values greater than 50 bpf, indicating very dense states. Water content and grain size testing resulted in water contents of 2 to 18 percent, with approximately 14 to 49 percent of the soil size particles passing the No. 200 Sieve. Atterberg Limits Testing indicated the silty sandstone is non-plastic. Sulfate testing on the sandstone resulted in 0.00 percent sulfate by weight indicating the sandstone exhibits a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 4 classified as sandy claystone, sandy claystone-siltstone, and sandy siltstone (CL, CL-ML, ML). The claystone/siltstone was encountered in seven of the test borings at depths ranging from 7 to 19 feet bgs, and extending to depths ranging from 18 feet to the termination of the test borings (10 to 20 feet). Standard Penetration Testing conducted in the claystone/siltstone resulted in N-values greater than 50 bpf, indicating hard consistencies. Water content and grain size testing resulted in water contents of 11 to 18 percent, with approximately 71 to 91 percent of the soil size particles passing the No. 200 Sieve. Atterberg Limits Testing resulted in liquid limits of 27 and 39, with corresponding plastic indexes of 6 and 13. Swell/Consolidation Test conducted on a sandy siltstone resulted in a volume change of 2.2 to 3.9 percent, indicating moderate to high expansion potential. The claystone in the area is known to be highly expansive.

A Summary of Laboratory Test Results is presented on Table 1, and the Test Boring Logs are presented in Appendix B.

5.5 Groundwater

Depth to groundwater was measured in each of the borings at the conclusion and subsequent to drilling. Groundwater was encountered in Test Boring Nos. 4, 16, and 17 at depths of 10, 15.5, and 14 feet bgs, respectively. Water levels are indicated on Table 2, and the Test Boring Logs in Appendix B. It is anticipated that groundwater will not affect shallow foundations for the slab-on-grade structures or shallow buried utilities proposed on this site. Groundwater may affect areas depending upon grading cuts and within deeper excavations for installation of utilities. It should be noted that groundwater levels, other than those observed at the time of the subsurface investigation, could change due to season variations, changes in land runoff characteristics and future development of nearby areas.

It should be noted that in granular lenses, some groundwater conditions might be encountered due to the variability in the soil profile. Isolated sand and gravel layers within the soils, sometimes only a few feet in thickness and width, can carry water in the subsurface. Groundwater may also flow on top of the underlying 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.

6.0 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

Detailed mapping has been performed on this site to produce a Geology Map/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. Cosntraints/Hazards include potentially collapsible/expansive soils, potential seasonal shallow groundwater, and seasonal shallow groundwater areas. These constraints/hazards and the recommended mitigation techniques are as follows:

<u>Potentially Collapsible/Expansive Soils – Constraint</u>

Potentially Collapsible/Expansive soils were encountered in some of the test borings drilled on site. Consolidations ranged from low to moderately high, and swells ranged from low to

moderately high in the soils tested. The clay, claystone, and siltstone if encountered beneath foundations, can cause differential movement in the structure foundation. These occurrences should be identified and dealt with on an individual building basis or possibly mitigated during site grading if necessary.

Mitigation Collapsible or expansive soils encountered beneath foundations will require mitigation. Mitigation of expansive soils may require special foundation design. Overexcavation and replacement with non-expansive soils at a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. Overexcavation depths of 4 feet are anticipated for the site.

Groundwater and Floodplain Areas – Constraint

A detention pond is located in the northwestern portion of the site north of Spanish Bit Drive, and a minor drainage swale is located in the southwestern portion of the site south of Spanish Bit Drive. These areas have been potential seasonally shallow groundwater areas. Water was in the detention pond or minor drainage swale at the time of this investigation. The site is not mapped within floodplain zones according to the FEMA Map No. 08041CO956G, (Figure 7, Reference 8). These areas are discussed as follows:

- Potentially Seasonal Shallow Groundwater - Constraint

The area mapped with this hazard is the minor drainage swale located in the southwestern portion of the site. In this area, we would anticipate the potential for periodically high subsurface moisture conditions and possible frost heave potential, depending on the soil conditions. A new detention pond is located in the southwestern portion of the site, and it is anticipated that site grading will mitigate the hazard.

Mitigation In these locations, foundations in areas subject to severe frost heave potential should penetrate sufficient depth so as to discourage the formation of ice lenses beneath foundations. At this location and elevation, a foundation depth for frost protection of 2.5 feet is recommended. In areas where high subsurface moisture conditions are anticipated periodically, a subsurface perimeter drain will be necessary to help prevent the intrusion of water into areas

located below grade. A typical perimeter drain detail is presented in Figure 8. Additionally, swales should be created to intercept surface runoff and carry it safely around and away from structures. It is anticipated that the site grading will likely mitigate potentially seasonal shallow groundwater area on the site. Prior to placing any fill all organic soils should be removed.

- Seasonal Shallow Groundwater - Constraint

The area mapped with this hazard is the existing detention pond located in the northwestern portion of the site. In this area, we would anticipate the potential for high subsurface moisture conditions and possible frost heave potential, depending on the soil conditions. This area is will be avoided by the proposed development.

6.1 Relevance of Geologic Conditions to Land Use Planning

The proposed development will consist of residential and commercial development. 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 potentially collapsible/expansive soils, potentially seasonal shallow groundwater, and shallow groundwater areas on-site that can be mitigated with special designs or avoidance. The hazards on site may be satisfactorily mitigated through proper engineering design and construction practices.

Subsurface soils encountered at anticipated foundation depths in the test borings generally consist of loose to medium dense silty to very silty sands. The loose soils were primarily encountered on the southern parcel in the apartment area. The loose soils will require recompaction. Very dense sandstone was encountered at depths ranging from 7 to 18 feet. Clays, silts, claystone and siltstone were also encountered at depths that will likely not affect the construction of shallow foundation systems; however, these soils may be encountered in deep utility excavations. Excavation of sandstone is anticipated for a portion of the foundation utilities, and track-mounted equipment is likely required. Rubber-tired equipment should be capable of excavating the overburden soils. Expansive soils, if encountered, will require special foundation design and/or overexcavation. These soils will not prohibit development.

Any fill required for overexcavation or overlot grading should be approved by Entech Engineering and be compacted according to the “Structural Fill” paragraph. Loose sands

encountered in the building areas should be recompacted. Overexcavation of sandstone, if encountered, may be required to provide uniform building pads. A minimum layer of 2 feet of suitable soils below and beyond the building foundation is recommended where sandy soils and sandstone exist at footing grade. Any expansive or collapsible soils (clay, silt, claystone or siltstone) in building areas should be removed and replaced with non-expansive structural fill. On-site granular soils may be used as structural fill, as approved by Entech. All overexcavations should be observed by Entech prior to placing fill. Final depth of overexcavation, if needed, should be determined for each building at the time of the excavation observation. Prior to placing structural fill, the subgrade should be scarified, moisture-conditioned and compacted.

Groundwater was encountered in three of the test borings at depths ranging from 10 to 15.5 feet bgs. Groundwater will likely not affect the construction of shallow foundation systems on this site. Deep utility excavations may encounter water. Unstable soil conditions should be anticipated if excavations approach water levels. Stabilization with shotrock or geofabric may be required. Personnel of Entech should be contacted if groundwater is encountered in excavations on this site to determine corrective actions.

Areas of potential seasonally shallow were observed along the minor drainage swale in the southwestern portion of the site, and an area of seasonal shallow groundwater was observed in the northwestern portion of the site associated with the existing detention pond. These areas will likely be mitigated with the proposed site grading or avoided by the proposed development.

In summary, development of the site can be achieved, if the items mentioned above are mitigated. These items can be mitigated through proper design and construction or through avoidance. Additional subsurface soil investigation is recommended prior to construction, after site grading is completed.

7.0 ECONOMIC MINERAL RESOURCES

According to the *El Paso County Aggregate Resource Evaluation Map* (Reference 12), the area is mapped as upland deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 13), the site is not mapped as a probable aggregate resource. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 14), the area of the site has been mapped as "Good" for industrial minerals. The sands associated with the alluvial deposits are considered a sand resource. Considering the silty to clayey nature of much of these materials and abundance of similar materials through the region and 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 14), 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. The *El Paso County Aggregate Resource Map* (Reference 13) has mapped coal resources in the Rockrimmon area approximately 8 miles south of the site (Reference 8). At this depth, mining the coal would not be economical at this time. No metallic mineral resources have been mapped on the site (Reference 14).

The site has been mapped as "Fair" for oil and gas resources (Reference 14). 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 would not be considered a significant resource. Hydraulic fracturing is a new method that is being used 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.

8.0 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.

9.0 ROADWAY AND EMBANKMENT CONSTRUCTION RECOMMENDATIONS

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

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 or flatter. The subgrade should be scarified and moisture conditioned to within 2 percent of optimum moisture content and compacted to a minimum of 95 percent of its maximum Standard Proctor Dry Density, ASTM D-698, 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 percent of its maximum Modified Proctor Dry Density, ASTM D-1557 for sandy soils, and clay soils should be compacted to a minimum of 95 percent of its maximum Standard Proctor Dry Density, ASTM D-698 at 0 to 3 percent of optimum moisture content. These materials should be placed at a moisture content conducive to compaction, usually 0 to ±2 percent 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.

10.0 CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose minor 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 Cathedral Rock Investments, 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.

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TABLES

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT CATHEDRAL ROCK INVEST.
PROJECT STRUTHERS AND SPANISH BIT
JOB NO. 210536

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, CBR	3	0-3			15.5	NV	NP				SM	SAND, SILTY
1	1	2-3			10.0	NV	NP	0.00			SM-SW	SAND, SLIGHTLY SILTY
1	3	1-2			9.4	NV	NP	<0.01			SM-SW	SAND, SLIGHTLY SILTY
1	4	10			9.9						SM-SW	SAND, SLIGHTLY SILTY
1	6	1-2			17.0	NV	NP				SM	SAND, SILTY
1	8	2-3			16.8						SM	SAND, SILTY
1	10	5			6.5						SM-SW	SAND, SLIGHTLY SILTY
1	13	1-2			11.2	NV	NP				SM-SW	SAND, SLIGHTLY SILTY
1	14	2-3			13.6						SM	SAND, SILTY
1	16	2-3			13.2						SM	SAND, SILTY
1	18	1-2			12.1	NV	NP				SM	SAND, SILTY
1	19	5			20.8						SM	SAND, SILTY
1	21	1-2			16.8	NV	NP				SM	SAND, SILTY
1	22	1-2			23.2	NV	NP				SM	SAND, SILTY
2	5	15	14.4	111.9	66.4	NV	NP	<0.01		-0.4	ML	SILT, SANDY
2	7	10	13.5	98.9	71.0					-3.5	CL	CLAY, SANDY
2	11	10	12.1	100.7	80.6				1110	-0.3	CL	CLAY, SANDY
2	14	15			94.3	50	25				CH	CLAY, SANDY
3	2	15			48.6	NV	NP	0.00			SM	SANDSTONE, VERY SILTY
3	9	10			26.2						SM	SANDSTONE, SILTY
3	12	15			14.4						SM	SANDSTONE, SILTY
3	15	10			19.6						SM	SANDSTONE, SILTY
3	20	10			14.5						SM	SANDSTONE, SILTY
4	23	15	13.9	119.5	71.1					2.2	ML	SILTSTONE, SANDY
4	8	20			91.3	27	6				CL-ML	CLAYSTONE-SILTSTONE, SANDY
4	17	15	14.4	120.6	71.7	39	13			3.9	ML	SILTSTONE, SANDY

Table 2: Summary of Depth to Bedrock and Groundwater

Test Boring No.	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)
1	19	>20
2	13	>20
3	>5	>5
4	17	10
5	18	>20
6	>5	>5
7	12	>20
8	12	>20
9	7	>20
10	11	>20
11	11	>20
12	11	>20
13	>5	>5
14	16	>20
15	9	>20
16	8	15.5
17	8	14
18	7	>10
19	12	>20
20	8	>20
21	>5	>5
22	>5	>5
23	6	>20

FIGURES

N

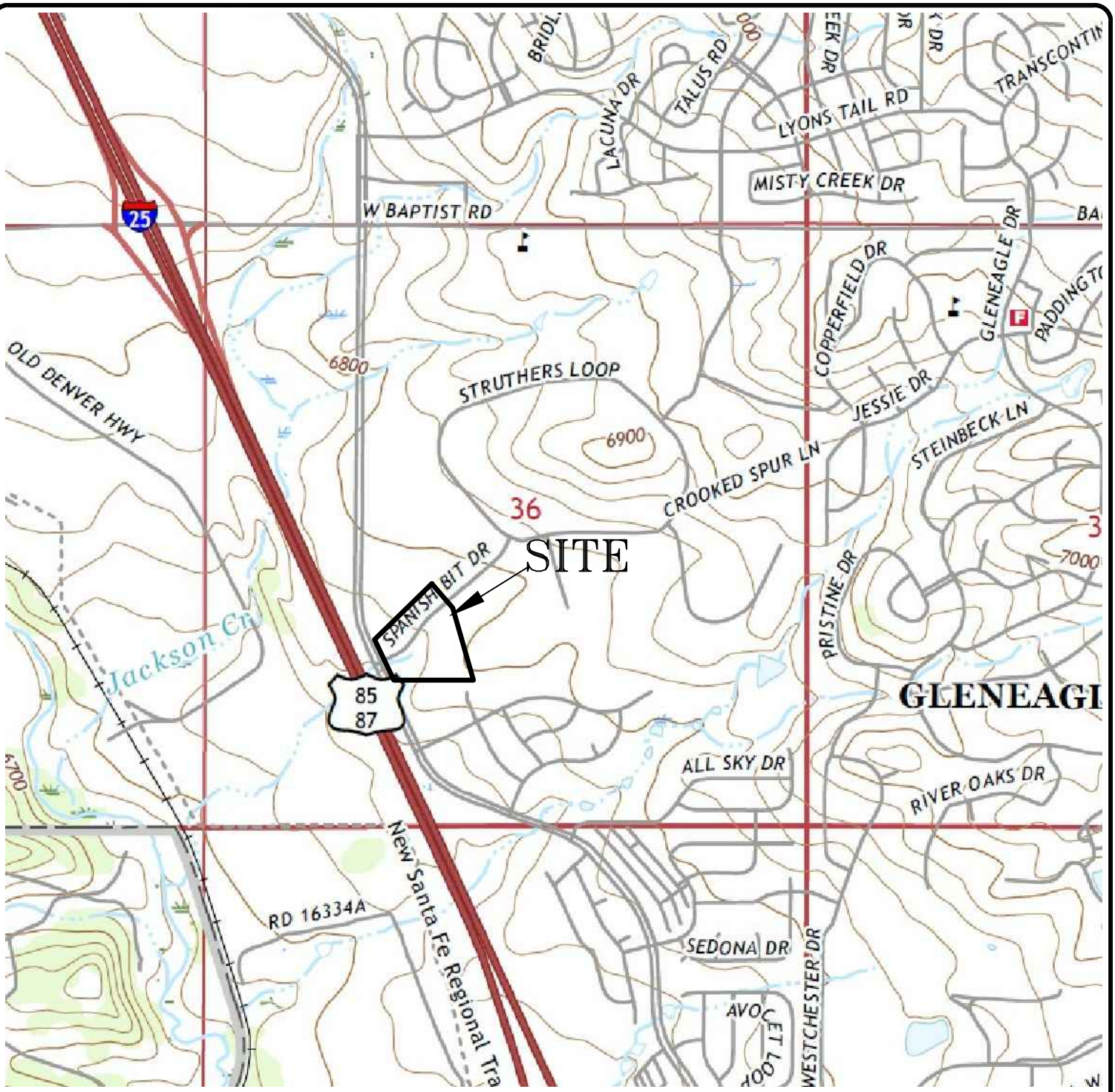
ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO. 80907 (719) 531-5599

VICINITY MAP
CATHEDRAL ROCK COMMONS
STRUTHERS ROAD & SPANISH BIT DRIVE
EL PASO COUNTY, CO
FOR: CATHEDRAL ROCK INVESTMENTS, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	12/22/21		

JOB NO.: 210536

FIG NO.: 1



ENTECH ENGINEERING, INC.
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COLORADO SPRINGS, CO. 80907 (719) 531-5599

USGS MAP
CATHEDRAL ROCK COMMONS
STRUTHERS ROAD & SPANISH BIT DRIVE
EL PASO COUNTY, CO
FOR: CATHEDRAL ROCK INVESTMENTS, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	12/22/21		

JOB NO.: 210536

FIG NO.: 2

REVISION	BY

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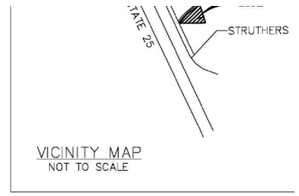
505 ELKTON DRIVE (719) 531-5599
COLORADO SPRINGS, CO. 80907

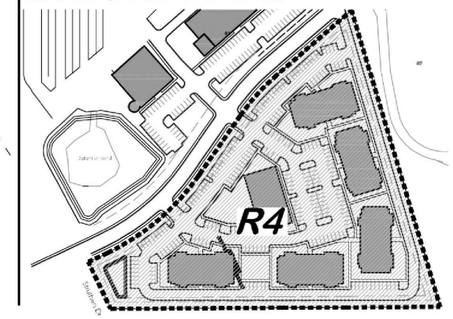
SITE PLAN/TEST BORING LOCATION MAP
CATHEDRAL ROCK COMMONS
STRUTHERS ROAD & SPANISH BIT DRIVE
EL PASO COUNTY, CO
FOR: CATHEDRAL ROCK INVESTMENTS, LLC

DRAWN	LLL
CHECKED	
DATE	12/22/21
SCALE	AS SHOWN
JOB NO.	210536
FIGURE No.	3

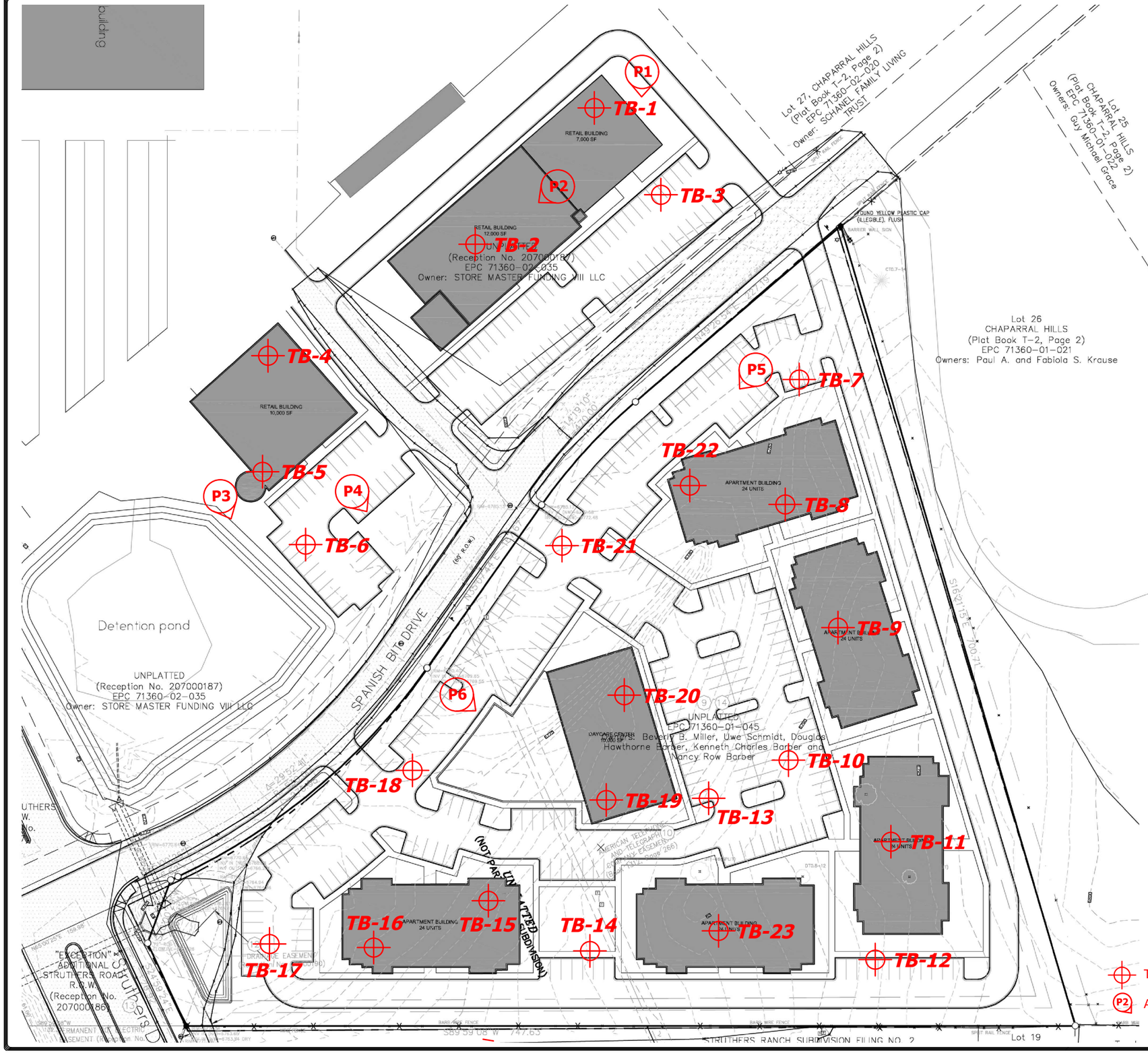
VICINITY MAP
NOT TO SCALE



EX ZONE MAP NTS

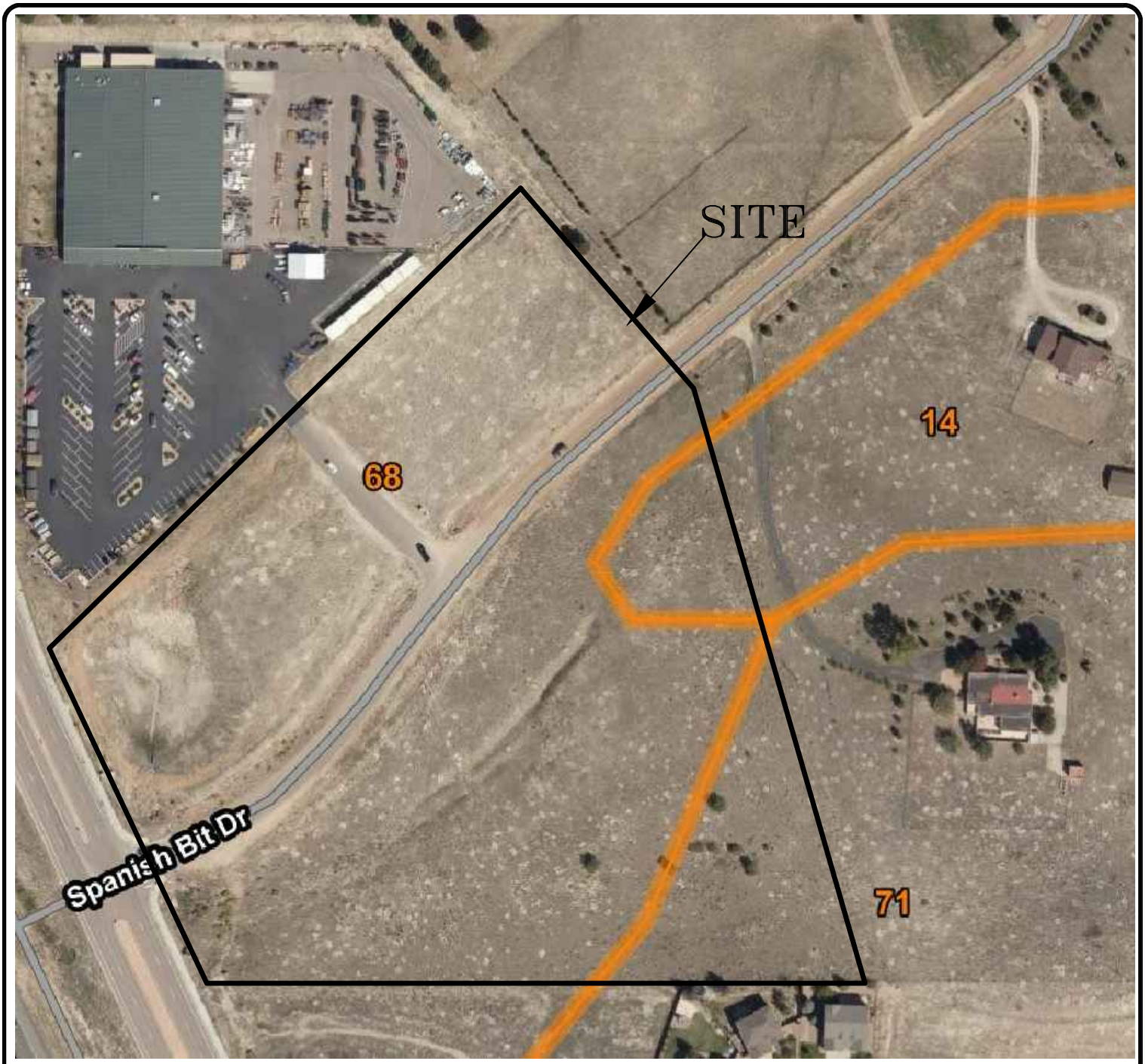


PROPOSED ZONE MAP NTS



TB- APPROXIMATE TEST BORING LOCATION AND NUMBER

P2 APPROXIMATE TEST PIT LOCATION AND NUMBER



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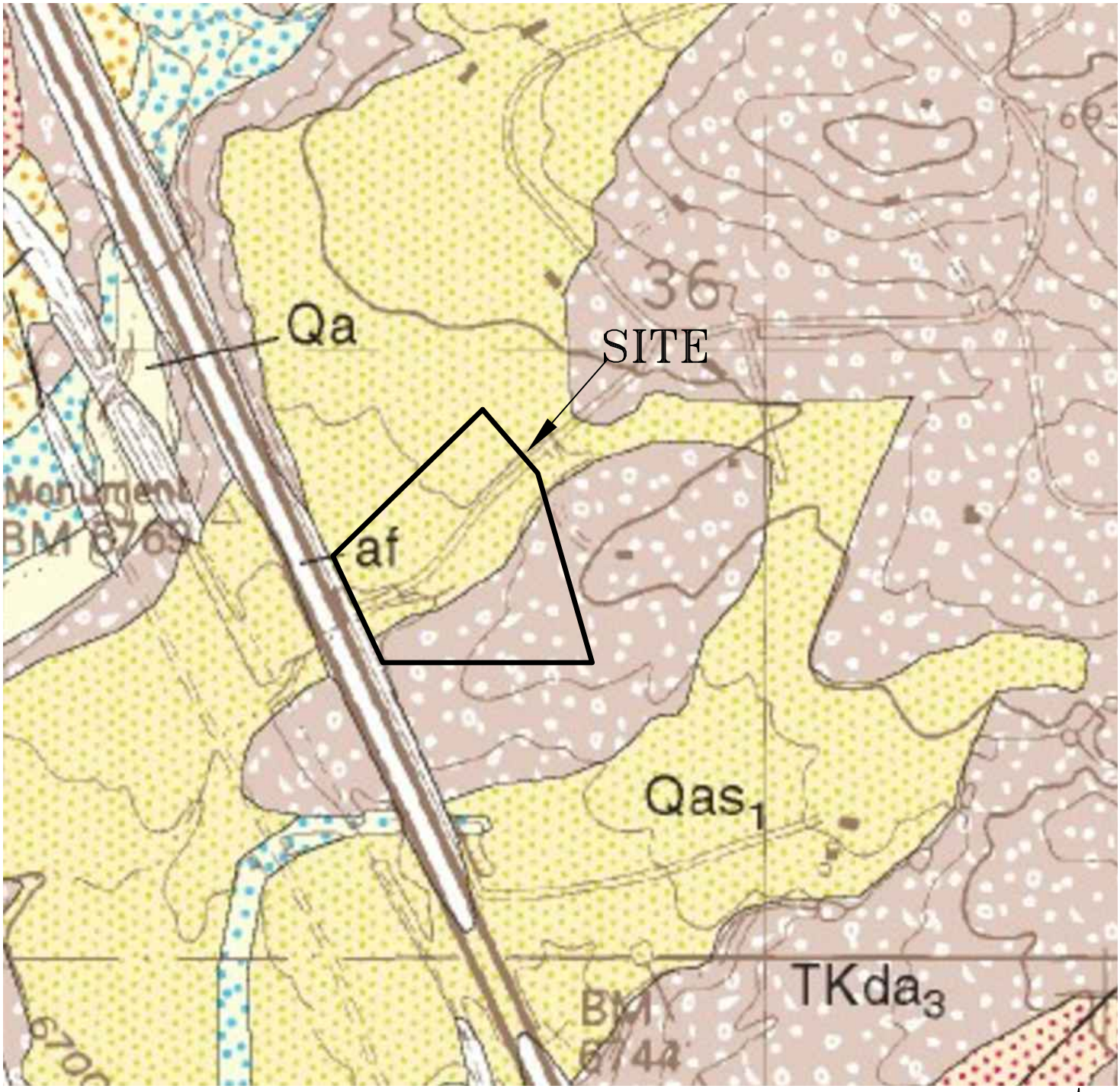
SOIL SURVEY MAP
CATHEDRAL ROCK COMMONS
STRUTHERS ROAD & SPANISH BIT DRIVE
EL PASO COUNTY, CO
FOR: CATHEDRAL ROCK INVESTMENTS, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	12/22/21		

JOB NO.: 210536

FIG NO.: 4



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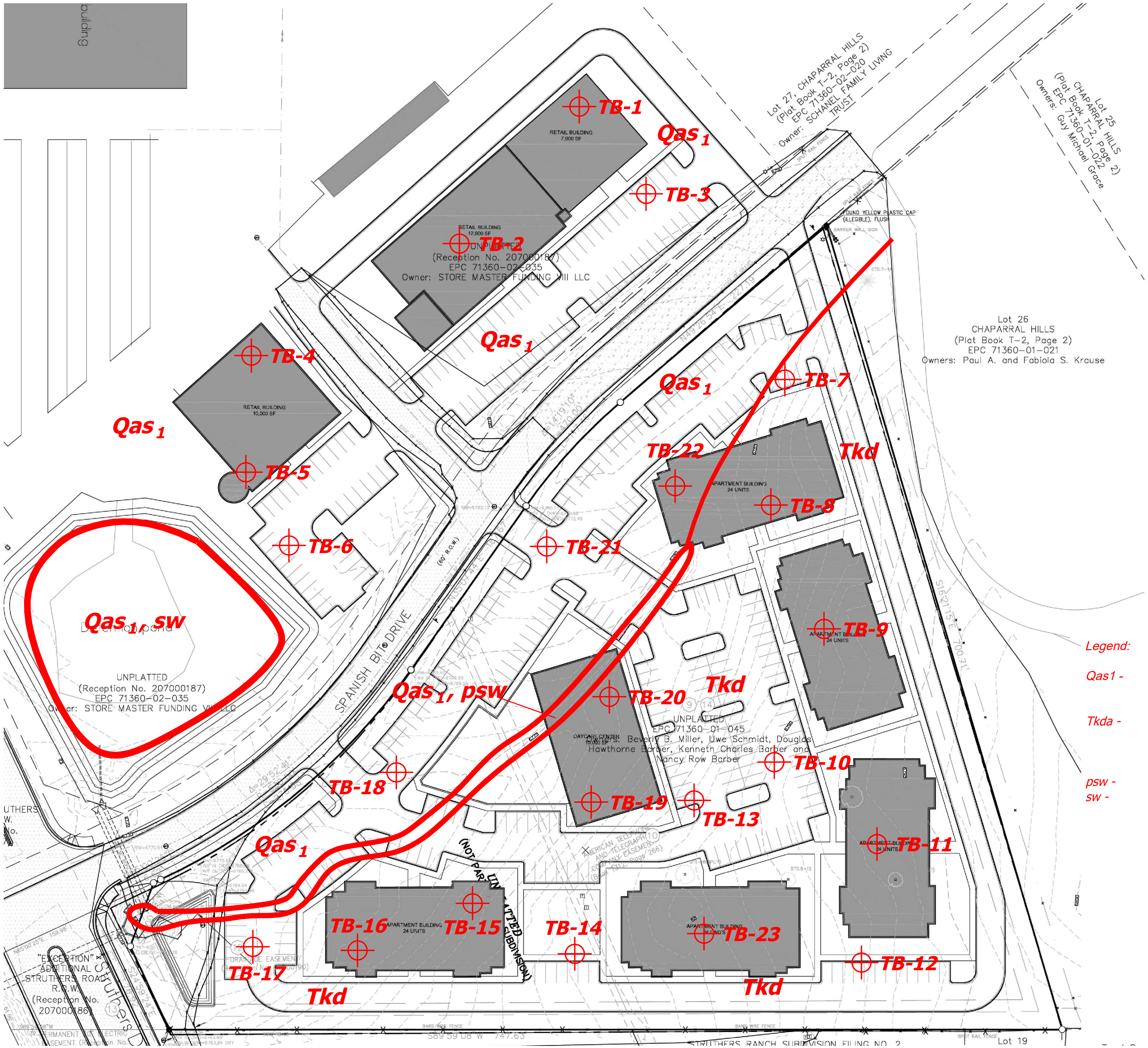
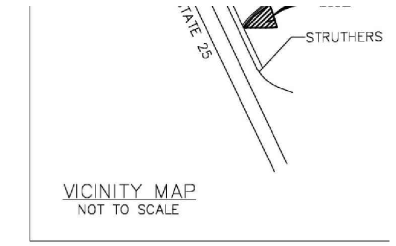
MONUMENT QUADRANGLE GEOLOGY MAP
CATHEDRAL ROCK COMMONS
STRUTHERS ROAD & SPANISH BIT DRIVE
EL PASO COUNTY, CO
FOR: CATHEDRAL ROCK INVESTMENTS, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	12/22/21		

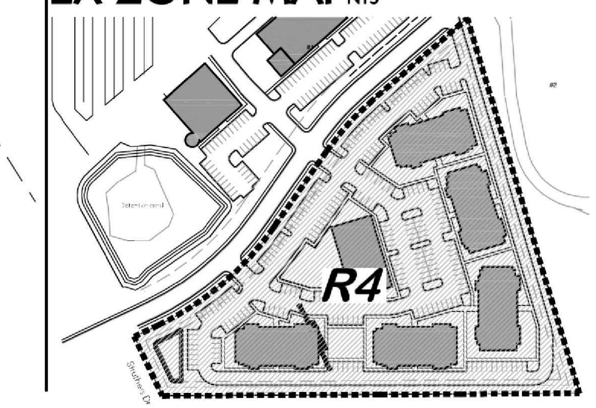
JOB NO.: 210536

FIG NO.: 5

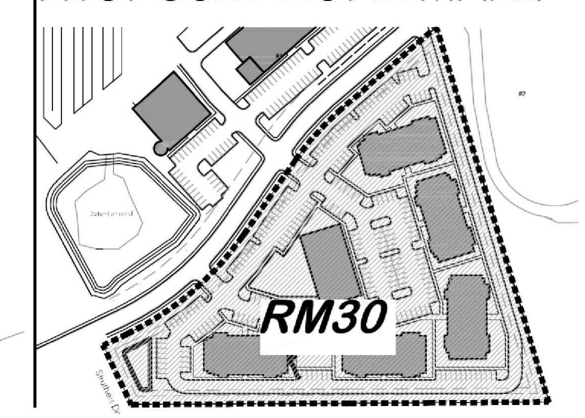




EX ZONE MAP NTS



PROPOSED ZONE MAP NTS



Legend:

Qas1 -	*Younger Alluvial-Slope Deposits of Holocene to Late Pleistocene Age: sheet flow and fluvial sand deposits*
Tkda -	*Dawson Formation of Tertiary to Cretaceou Age: arkosic sandstone, with interbedded claystone and siltstone*
psw -	*potentially seasonal shallow groundwater*
sw -	*seasonally shallow groundwater*

REVISION	BY

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505 ELKTON DRIVE
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GEOLOGY MAP/ENGINEERING GEOLOGY MAP
CATHEDRAL ROCK COMMONS
STRUTHERS ROAD & SPANISH BIT DRIVE
EL PASO COUNTY, CO
FOR: CATHEDRAL ROCK INVESTMENTS, LLC

DRAWN	LLL
CHECKED	
DATE	12/23/21
SCALE	AS SHOWN
JOB NO.	210536
FIGURE No.	6

N

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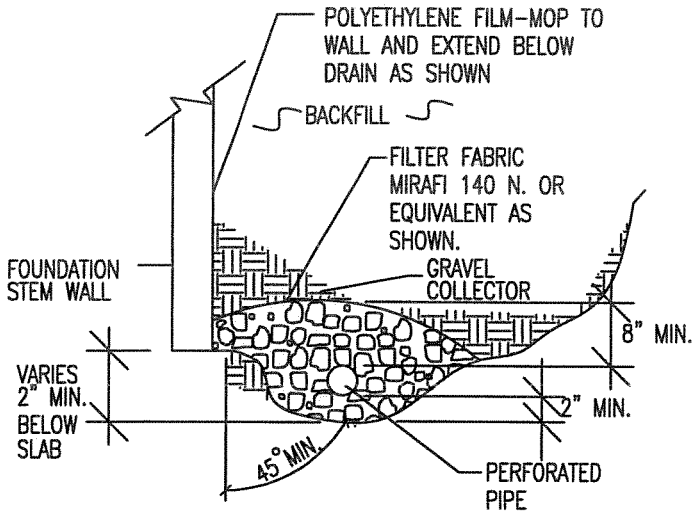
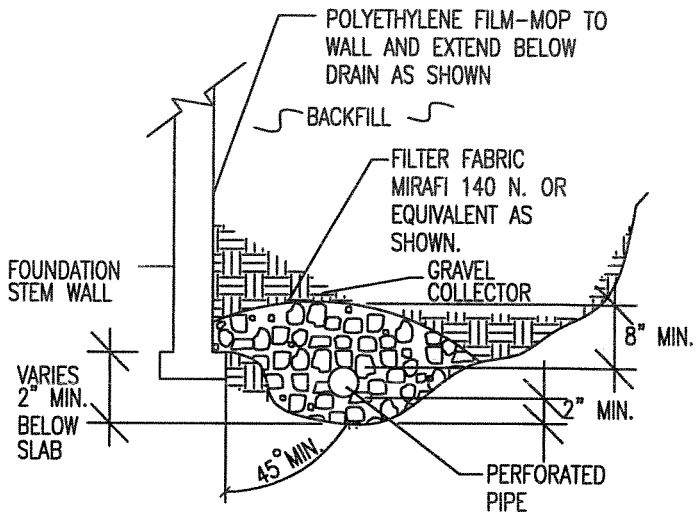
FLOODPLAIN MAP
CATHEDRAL ROCK COMMONS
STRUTHERS ROAD & SPANISH BIT DRIVE
EL PASO COUNTY, CO
FOR: CATHEDRAL ROCK INVESTMENTS, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	12/22/21		

JOB NO.: 210536

FIG 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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505 ELKTON DRIVE
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PERIMETER DRAIN DETAIL

DRAWN:	DATE:	DESIGNED:	CHECKED:

JOB NO.: 210536

FIG NO.: 8

APPENDIX A: Site Photographs

1

Looking south from the northeastern portion of the site.

November 4, 2021

2

Looking southwest from north-central portion of the site.

November 4, 2021

Job No. 210536

3

Looking southwest from northwestern portion of the along the existing detention pond.

November 4, 2021

4

Looking southeast from the northwestern portion of the site.

November 4, 2021

Job No. 210536

5

Looking southwest from the eastern portion of the site.

May 6, 2021

6

Looking southeast from the central portion of the site.

May 6, 2021

Job No. 210536

APPENDIX B: Laboratory Testing Summary and Test Boring Logs, Entech Engineering, Inc., Entech Job No. 210536

TEST BORING NO. 1
DATE DRILLED 3/10/2021
Job # 210536

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 19', 3/15/21						
SAND, SLIGHTLY SILTY TO SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, MOIST				7	3.6	1
	5			13	7.0	1
	10			8	8.0	1
SILT, SANDY, CLAYEY, GRAY BROWN, STIFF, MOIST	15			15	16.7	2
SILTSTONE, SANDY, GRAY BROWN, HARD, MOIST	20			50 8"	17.5	4

TEST BORING NO. 2
DATE DRILLED 3/10/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 19', 3/15/21						
SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST				19	1.9	1
	5			13	3.6	1
	10			14	7.2	1
SANDSTONE, VERY SILTY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST	15			50 10"	13.1	3
	20			50 7"	11.0	3

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

TEST BORING LOG

DRAWN:	DATE	CHECKED:	DATE
			5-3-21

JOB NO.: 210536
FIG NO.: B-1

TEST BORING NO. 3
DATE DRILLED 3/10/2021
Job # 210536

REMARKS

DRY TO 5', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			14	1.7	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST
5			14	6.9	1	
10						
15						
20						

TEST BORING NO. 4
DATE DRILLED 3/10/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS

WATER @ 10', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			10	8.8	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
5			11	7.5	1	
10			12	6.4	1	
15			23	16.0	2	SILT, SANDY, CLAYEY, GRAY BROWN, STIFF, MOIST
20			50 9"	12.1	4	SILTSTONE, SANDY, TAN, HARD, MOIST

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

TEST BORING LOG

DRAWN:	DATE.	CHECKED:	DATE:
			5-3-21

JOB NO. 210536
FIG NO B-2

TEST BORING NO. 5
DATE DRILLED 3/10/2021
Job # 210536

REMARKS

DRY TO 20', 3/10/21
CAVED TO 18.5', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO LOOSE, DRY TO MOIST		12	1.9	1
5			15	6.3	1
10			6	11.4	1
15	SILT, SANDY, GRAY BROWN, VERY STIFF, MOIST		33	14.9	2
20	SANDSTONE, SILTY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST		50/6"	9.6	3

TEST BORING NO. 6
DATE DRILLED 3/10/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS

DRY TO 5', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, MEDIUM DENSE, DRY		11	2.2	1
5			18	1.4	1
10					
15					
20					

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

TEST BORING LOG

DRAWN:	DATE	CHECKED:	DATE: 5-3-21

JOB NO.: 210536
FIG NO.: B-3

TEST BORING NO. 7
DATE DRILLED 3/10/2021
Job # 210536

REMARKS

DRY TO 18', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			3	1.9	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE, DRY TO MOIST
5			8	6.9	1	FINE GRAINED LENSES
10			30	12.6	2	CLAY, SANDY, GRAY BROWN, VERY STIFF, MOIST
15			50/5"	13.4	3	SANDSTONE, VERY SILTY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST
20			50/4"	13.3	3	

TEST BORING NO. 8
DATE DRILLED 3/10/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS

DRY TO 18', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			5	1.7	1	SAND, SILTY, FINE TO COARSE GRAINED, DARK BROWN TO BROWN, LOOSE, DRY
5			6	0.9	1	
10			35	7.6	1	SAND, SILTY, FINE GRAINED, GRAY BROWN, DENSE, MOIST
15			50/7"	11.9	4	CLAYSTONE-SILTSTONE, SANDY, GRAY BROWN, HARD, MOIST
20			50/10"	12.4	4	

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5-3-21

JOB NO.: 210536
FIG NO.: B-4

TEST BORING NO. 9
DATE DRILLED 3/10/2021
Job # 210536

REMARKS

DRY TO 20', 3/10/21
CAVED TO 17', 3/15/21, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			8	1.1	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, DRY
5			20	1.9	1	
						SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
10			50/6"	3.4	3	
15			50/6"	4.8	3	
20			50/5"	7.7	3	

TEST BORING NO. 10
DATE DRILLED 3/11/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS

DRY TO 18.5', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			14	1.0	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST
5			21	2.6	1	
10			38	9.2	1	SAND, VERY SILTY, FINE GRAINED, GRAY BROWN, DENSE, MOIST
						CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST
15			50/10"	12.9	4	
20			50/5"	2.3	3	SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, DRY

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN	DATE	CHECKED	DATE
			5-3-21

JOB NO.: 210536
FIG NO.: B-5

TEST BORING NO. 11
DATE DRILLED 3/11/2021
Job # 210536

REMARKS

DRY TO 19', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			14	1.4	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY
5			15	1.8	1	
10			29	12.2	2	CLAY, SANDY, GRAY BROWN, STIFF, MOIST
						SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
15			50/5"	3.7	3	
20			50/5"	4.5	3	

TEST BORING NO. 12
DATE DRILLED 3/11/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS

DRY TO 18', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			6	1.3	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN, LOOSE TO DENSE, DRY TO MOIST
5			7	1.5	1	
10			41	8.4	1	SAND, SILTY, FINE GRAINED, GRAY BROWN, DENSE, MOIST
						SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
15			50/8"	9.2	3	
20			50/3"	3.9	3	

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COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN	DATE	CHECKED: AW	DATE: 5-3-21

JOB NO. 210536
FIG NO. B-6

TEST BORING NO. 13
DATE DRILLED 3/11/2021
Job # 210536

REMARKS

DRY TO 5', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			10	1.2	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, DRY
5			17	1.2	1	
10						
15						
20						

TEST BORING NO. 14
DATE DRILLED 3/11/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS

DRY TO 18', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			3	1.8	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, DRY TO MOIST
5			3	2.1	1	
10			23	5.9	1	
15			31	21.8	2	CLAY, SANDY, GRAY BROWN, VERY STIFF, MOIST
20			50/4"	8.9	3	SANDSTONE, SILTY, CLAYEY, FINE GRAINED, TAN, VERY DENSE, MOIST

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			5-3-21

JOB NO.: 210536
FIG NO.: B-7

TEST BORING NO. 15
DATE DRILLED 3/11/2021
Job # 210536

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 18.5', 3/15/21						
SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY				13	1.4	1
	5			18	1.9	1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	10			50 11"	6.5	3
	15			50 5"	4.1	3
	20			50 3"	10.3	3

TEST BORING NO. 16
DATE DRILLED 3/11/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 15.5', 3/15/21						
SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, DRY TO MOIST				5	1.4	1
FINE GRAINED LENSES	5			32	8.4	1
SANDSTONE, VERY SILTY, FINE GRAINED, TAN, VERY DENSE, MOIST	10			50 5"	13.6	3
	15			50 6"	15.4	3
	20			50 8"	11.1	3

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COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN	DATE	CHECKED	DATE
			5-3-21

JOB NO: 210536
FIG NO. B-8

TEST BORING NO. 17
DATE DRILLED 3/12/2021
Job # 210536

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 14', 3/15/21						
SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, DRY				6	0.7	1
	5			13	1.7	1
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	10			50/8"	12.6	4
	15			50/9"	16.4	4
VERY SILTY LENSE	20			50/9"	12.1	4

TEST BORING NO. 18
DATE DRILLED 3/12/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 9.5', 3/15/21						
SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE, DRY				10	1.7	1
	5			12	2.4	1
CLAYSTONE, SANDY, SILTY, GRAY BROWN, HARD, MOIST	10			50/10"	12.6	4
	15					
	20					

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN	DATE	CHECKED	DATE
		MW	5-3-21

JOB NO. 210536
FIG NO. B- 9

TEST BORING NO. 19
DATE DRILLED 3/12/2021
Job # 210536

REMARKS

DRY TO 18', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			15	2.3	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO LOOSE, DRY TO MOIST
5			6	2.6	1	
10			22	3.4	1	
15			50/7"	11.3	3	SANDSTONE, SILTY, FINE GRAINED, GRAY BROWN TO TAN, VERY DENSE, MOIST
20			50/5"	17.6	3	

TEST BORING NO. 20
DATE DRILLED 3/12/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS

DRY TO 18.5', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			6	1.4	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, LOOSE, DRY
5			4	2.9	1	
10			50/7"	6.6	3	SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
15			50/5"	5.0	3	
20			50/5"	5.3	3	

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 5-3-21

JOB NO.: 210536
FIG NO. B-10

TEST BORING NO. 21
DATE DRILLED 3/12/2021
Job # 210536

REMARKS

DRY TO 5', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			6	2.1	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN, LOOSE, DRY
5			5	2.1	1	
10						
15						
20						

TEST BORING NO. 22
DATE DRILLED 3/12/2021
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS

DRY TO 5', 3/15/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			13	6.9	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO LOOSE, MOIST
5			9	3.8	1	
10						
15						
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 5-3-21

JOB NO. 210536
FIG NO. B-11

TEST BORING NO. 23
DATE DRILLED 4/22/2021
Job # 210536

TEST BORING NO.
DATE DRILLED
CLIENT CATHEDRAL ROCK INVEST.
LOCATION STRUTHERS AND SPANISH BIT

REMARKS

DRY TO 18', 4/26/21

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Description
			6	5.3	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN, LOOSE TO MEDIUM DENSE, MOIST
5			17	8.6	1	
						SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
10			50/7"	3.6	3	
15			50/7"	10.9	4	SILTSTONE, SANDY, GRAY BROWN, HARD, MOIST
20			*	14.5	4	* - BULK SAMPLE TAKEN

REMARKS

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5					
10					
15					
20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 5-3-21

JOB NO.: 210536
FIG NO.: B-12

APPENDIX C: Soil Survey Descriptions

El Paso County Area, Colorado

14—Brussett loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 367j
Elevation: 7,200 to 7,500 feet
Frost-free period: 115 to 125 days
Farmland classification: Prime farmland if irrigated

Map Unit Composition

Brussett and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Brussett

Setting

Landform: Flats
Landform position (three-dimensional): Talf
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Eolian deposits

Typical profile

A - 0 to 8 inches: loam
BA - 8 to 12 inches: loam
Bt - 12 to 26 inches: clay loam
Bk - 26 to 60 inches: silt loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 5 percent
Maximum salinity: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
Available water supply, 0 to 60 inches: High (about 9.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3c
Hydrologic Soil Group: B
Ecological site: R048AY222CO - Loamy Park
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Data Source Information

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

El Paso County Area, Colorado

68—Peyton-Pring complex, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369f
Elevation: 6,800 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Peyton and similar soils: 40 percent
Pring and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Peyton

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Arkosic alluvium derived from sedimentary rock and/or arkosic residuum weathered from sedimentary rock

Typical profile

A - 0 to 12 inches: sandy loam
Bt - 12 to 25 inches: sandy clay loam
BC - 25 to 35 inches: sandy loam
C - 35 to 60 inches: sandy loam

Properties and qualities

Slope: 3 to 5 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 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: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4c
Hydrologic Soil Group: B
Ecological site: R049XY216CO - Sandy Divide
Hydric soil rating: No

Description of Pring

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Arkosic alluvium derived from sedimentary rock

Typical profile

A - 0 to 14 inches: coarse sandy loam
C - 14 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 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: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R048AY222CO - Loamy Park
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Pleasant

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

Data Source Information

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

El Paso County Area, Colorado

71—Pring coarse sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 369k
Elevation: 6,800 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Pring and similar soils: 85 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Pring

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Arkosic alluvium derived from sedimentary rock

Typical profile

A - 0 to 14 inches: coarse sandy loam
C - 14 to 60 inches: gravelly sandy loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 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: Low (about 6.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 3e
Hydrologic Soil Group: B
Ecological site: R048AY222CO - Loamy Park
Hydric soil rating: No

Minor Components

Pleasant

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

Other soils

Percent of map unit:
Hydric soil rating: No

Data Source Information

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