November 30, 2022

ENTECH
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Joan Hathcock
12420 North Meridian Road
El Paso County, CO 80106

Re: Soil, Geology, and Geologic Hazard Study
Double Spur Ranch
12420 North Meridian Road
Parcel No. 52130-00-007
El Paso County, Colorado
Entech Job No. 222160

Dear Ms. Hathcock:

The project consists of subdividing 40-acres; three rural residential lots are proposed as part of the subdivision. Two existing homes and several outbuildings on Lots 1 and 2 will remain, and one new lot is proposed along the southwestern side of the property. The site is located north and west of the intersection of Ayers Road and North Meridian Road, in El Paso County.

GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in a portion of the NE¼ of the NE¼ of Section 13, Township 12 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 5 miles north of Falcon, north and west of the intersection of Ayers Road and North Meridian Road, in El Paso County, Colorado. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is generally gradually to moderately sloping to the east with steeper slopes along Black Squirrel Creek and Snipe Creek in the central and northeastern portions of the site. The drainages on-site flow in an easterly direction, and were dry at the time of our site observations. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included undeveloped agricultural and rural residential. The site contains field grasses, weeds, yucca, cacti, and ponderosa pines. Site photographs were taken and site mapping was completed on November 8, 2022. The photographs are included in appendix A. Test Borings were drilled on November 9, 2022.

Total acreage involved in the proposed subdivision is 40-acres. Three rural residential lots are proposed as part of the subdivision. Two existing homes and several outbuildings on Lots 1 and 2 will remain, and one new lot is proposed along the southwestern side of the property. The new lot will be serviced by an individual well and on-site wastewater treatment system. The Site Plan/Test Boring Location Map is presented in Figure 3.

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 artificial fill, potentially unstable slopes, floodplain, seasonally shallow groundwater, potentially seasonal shallow groundwater, and shallow bedrock. Based on the

proposed development plan, it appears that these areas will have minor impacts 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.

SCOPE OF THE REPORT

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.

FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of 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 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 November 8, 2022.

Two test borings were drilled on the site to determine general suitability of the soil characteristics for residential construction. The locations of the test borings are indicated on the Site Plan/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. Results of the laboratory testing are included in Appendix C.

SOIL AND GEOLOGIC CONDITIONS

Soil Survey
The Natural Resource Conservation Service (NRCS) (Reference 1, Figure 4), previously the Soil Conservation Service (Reference 2) has mapped two soil types on the site. Complete description of the soil types is presented in Appendix D. In general, the soils consist of gravelly loamy sand. The soils are described as follows:

Type	Description
40	Kettle gravelly loamy sand, 3 – 8% Slopes
41	Kettle gravelly loamy sand, 8 – 40% Slopes

The soils have been described to have moderate to rapid permeabilities. The soils are described as well suited for use as home sites. Possible hazards with soils erosion are present

on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards (Reference 2).

Soils

The soils encountered in the Test Borings can be grouped into one general soil type: Type 1 silty to slightly silty sandstone (SM-SW, SM). Bedrock was encountered at the surface in the test borings drilled on Lot 3. The soils were classified using the Unified Soil Classification System (USCS).

Soil Type 1 is a silty sandstone (SM). The sandstone was encountered at the existing surface grade in both of the test borings and extending to the termination of the test borings (11 to 17 feet). These soils were encountered at very dense states and moist conditions. Samples tested had approximately 13 to 33 percent of the soil sized particles passing the No. 200 Sieve.

The Test Boring are presented in Appendix B, and the Laboratory Test results are presented in Appendix C. A Summary of Test Boring Results is presented in Table 1.

Groundwater

Groundwater was not encountered in the test borings which were drilled to depths of 11 and 17 feet. Groundwater is not anticipated to affect shallow foundations on the majority of the site. Seasonally shallow and potentially seasonal shallow groundwater areas were observed on the site and will be further discussed in the following section. Fluctuations in groundwater conditions may occur due to variations in rainfall or other factors not readily apparent at this time. Isolated sand layers within the soil profile can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of subsurface water features during construction.

Geology

Approximately 16 miles west of the site 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 a large structural feature known as the Denver Basin. Bedrock in the area is typically gently dipping in a northerly direction (Reference 3). The bedrock underlying the site consists of the Dawson Formation of Tertiary to Cretaceous Age. The Dawson Formation typically consists of coarse-grained arkosic sandstone with interbedded layers of expansive claystone and siltstone.

The geology of the site was evaluated using the *Geologic Map of the Black Forest Quadrangle,* by Thorson and Madole in 2003, (Reference 4, Figure 5). The Geology Map for the site is presented in Figure 6. Five mappable units were identified on this site which are described as follows:

Qaf **Artificial Fill of Holocene Age:** These are recent man-made deposits associated with the gravel road roadway embankment over Black Squirrel Creek in the west-central portion of the site.

Qp **Piney Creek Alluvium of Holocene Age:** This material is a water-deposited alluvium, typically classified as a silty to well-graded sand, brown to dark brown in color and of moderate density. The Piney Creek Alluvium can sometimes be very highly stratified containing thin layers of very silty and clayey soil.

Qb **Broadway Alluvium of Pleistocene Age:** These materials consist of lower stream terrace deposits. The Broadway Alluvium typically consists of silty to clayey gravelly sands. This deposit is usually highly stratified and may contain lenses of silt, clay or cobbles.

Qlo **Louviers Alluvium of Pleistocene Age:** These deposits are light brown silty sands which contain an abundance of gravels. They commonly occur as stream terrace deposits above the valley floors.

Tkd **Dawson Formation of Tertiary to Cretaceous Age:** The materials consist of a thin layer of residual soils overlying the bedrock materials on-site. The residual soils were derived from the in-situ weathering of the bedrock on site. These materials typically consist of silty to clayey sand with potential areas of sandy clays. The bedrock consists of the Dawson Formation. The Dawson Formation typically consists of coarse-grained, arkosic sandstone with interbedded lenses of fine-grained sandstone, siltstone and claystone.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Black Forest Quadrangle* distributed by the Colorado Geologic Survey in 2003 (Reference 4, Figure 5), The *Geologic Map of the Colorado Springs-Castle Rock Area,* distributed by the US Geological Survey in 1979 (Reference 5), and the *Geologic Map of the Denver 1° x 2° Quadrangle,* distributed by the US Geological Survey in 1981 (Reference 6). The test borings were used in evaluating the site and are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

ENGINEERING GEOLOGIC HAZARDS

Mapping has been performed on this site to identify areas where various geologic conditions exist of which developers should be cognizant during the planning, design and construction stages where new construction is proposed. The engineering geologic constraints/hazards identified on this site include artificial fill, potentially unstable slopes, floodplain, seasonally shallow groundwater, potentially seasonal shallow groundwater, and shallow bedrock. These constraints/hazards and recommended mitigation techniques are discussed as follows:

Artificial Fill – Constraint

Areas of artificial fill were observed along the gravel road for an embankment crossing Black Squirrel Creek and are indicated on the Geology Map presented on Figure 6. Additional areas of artificial fill other than those mapped may be present on the site.

Mitigation: Where uncontrolled fill is encountered beneath foundations, mitigation will be necessary. Mitigation typically involves removal and recompaction at a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557. Any new fill added to the site should be placed on native or controlled fill soils, compacted as recommended above.

Slope Stability and Landslide Hazards

The majority of the slopes in the proposed building area and around the existing structures on site are generally gradually to moderately sloping and do not exhibit any past or potential unstable slopes or landslides. Areas along Black Squirrel Creek and Snipe Creek in the central and northeastern portions of the site have steep slopes along portions of the drainages that been identified as potentially unstable slopes. These areas are identified on the Engineering Geology Map, Figure 6. The recommendations for these areas are as follows:

- Potentially Unstable Slopes – Constraint

  The areas identified with this hazard include the steep slopes along the main drainages on the site have been mapped as potentially unstable. These slopes are considered stable in their present condition; however, considerable care must be exercised in these areas not to create a condition which would tend to activate instability. Due to the lot sizes these areas will be avoided by the proposed structures.

  Mitigation: Should any future building be considered near these potentially unstable slopes a minimum 30-foot setback is recommended from the crest of the potentially unstable slopes. Building should be avoided in these areas. Proper control of drainage at both the surface and the subsurface is extremely important. Areas of ponded water at the surface should be avoided. Utility trenches, basement excavations and other subsurface features should not be permitted to become water traps which may promote saturation of the subsurface materials. Drainage should not be permitted over the potentially unstable slope but directed in a non-erosive manner away from the slope. Irrigation above these slopes should be kept to a minimum to prevent saturation of the subsurface soils.

Drainage and Floodplain Areas

Portions of the site along Black Squirrel Creek and Snipe Creek are mapped within floodplains according to the FEMA Map No. 08041CO340G, dated December 7, 2018 (Figure 8, Reference 7). The existing structures and proposed residence are located outside of the mapped floodplain. Additionally, areas of seasonal and potentially seasonal shallow groundwater were mapped on the site (Figure 6). In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. These areas lie within low-lying areas and along the minor drainage swales and creeks located across the site. Water was not observed in the drainages at the time of our site investigation. These areas can likely be avoided or properly mitigated by development. The potential exists for high groundwater levels during high moisture periods and should structures encroach on these areas the following precautions should be followed. Exact locations of floodplain and specific drainage studies are beyond the scope of this report.

Seasonally Wet Area – Constraint
The seasonally wet area has been mapped in the low-lying areas located along the main drainages on the site. Construction is not recommended in these areas which can likely be avoided. Mitigation for seasonally wet areas is discussed in the following section.

Potentially Seasonally Wet Areas – Constraint
Several minor drainage swales are located across the site. Water was not observed in these drainage swales at the time of this investigation; however, these areas have the potential for seasonal shallow groundwater. These areas are indicated in the Geology/Engineering Geology Map (Figure 6). Due to the size of the proposed lots these areas can either be avoided or regraded and redirected around proposed structures or proposed soil treatment areas.

Mitigation: In these locations, foundations are 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 may mitigate the drainages in some areas. The water table may be of sufficient depth to minimize the effects on buildings in some areas.

Shallow Bedrock – Constraint
Bedrock was encountered in both the test borings at the existing surface and was encountered at very dense states. A Summary of the Depth to Bedrock is included in Table 1. Where shallow bedrock is encountered, excavation/grading may be difficult requiring track-mounted excavators. Bedrock may be encountered cuts for roadways and utility excavations.

RELEVANCE OF GEOLOGIC CONDITIONS TO LAND USE PLANNING

Total acreage of the proposed site is 40-acres. The existing geologic and engineering geologic conditions will impose constraints on development and construction. The geologic constraints/hazards identified on this site include artificial fill, potentially unstable slopes, floodplain, seasonally shallow groundwater, potentially seasonal shallow groundwater, and shallow bedrock, which can be satisfactorily mitigated through avoidance or proper engineering design and construction practices.

The sandstone bedrock encountered in the test borings on the site was encountered at very dense states and moist conditions. Bedrock was encountered at the existing surface grade in the test borings drilled at the location of the proposed structure. High allowable bearing capacities should be expected in areas of shallow bedrock. Difficult excavation of the very dense bedrock should be expected.

The sandstone encountered in the test borings is considered to have low expansion potential. Highly expansive clays and claystone (interbedded in the Dawson Formation) are known to be common in the area. Mitigation of expansive soils if encountered at or near foundation grade will

be required. 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. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. These soils will not prohibit development.

Black Squirrel Creek and Snipe Creek are located in the central and northeastern portions of the site, and several minor drainage swales were observed across the site. The drainages on the site flow in an easterly direction, water was not observed in any of the drainages at the time of our site investigation. A floodplain has been mapped along Black Squirrel Creek and Snipe Creek. These areas are indicated in the Geology/Engineering Geology Map (Figure 6). Due to the size of the lots these areas can either be avoided, or regraded and redirected around proposed structures or proposed soil treatment areas.

The majority of the slopes in the building area on site are gently to moderately sloping and do not exhibit any past or potential unstable slopes or landslides. However, the steeply sloping areas along the main drainages located in the central and northeastern portions of the site have been mapped as potentially unstable. These slopes are considered stable in their present condition; however, considerable care must be exercised in these areas not to create a condition which would tend to activate instability. Should any future building be considered near these potentially unstable slopes a minimum 30-foot setback is recommended from the crest of the potentially unstable slopes. Due to the lot size this area can be avoided.

In summary, the granular soils/sandstone will likely provide suitable support for shallow foundations. The geologic conditions encountered on site can be mitigated with avoidance or proper engineering and construction practices.

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), of the area of the site is not mapped with any potential aggregate resources. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 9), the site is not mapped with any resources. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 10), the area of the site has been mapped as “little or no potential” for industrial minerals.

According to *the Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 10), 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 10).

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.

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 and weathered bedrock materials 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.

CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose some minor constraints on development and construction of the site. The majority of these conditions can be avoided by construction. Others 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 new building sites and septic systems 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.

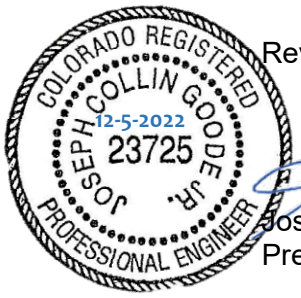
This report has been prepared for Joan Hathcock, for application to the proposed project in accordance with generally accepted geologic soil and engineering practices. No other warranty expressed or implied is made.

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.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.
Geologist



Reviewed by:

Joseph C. Goode, Jr., P.E.
President

LLL

Encl.

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AAprojects/2022/222160 sgs

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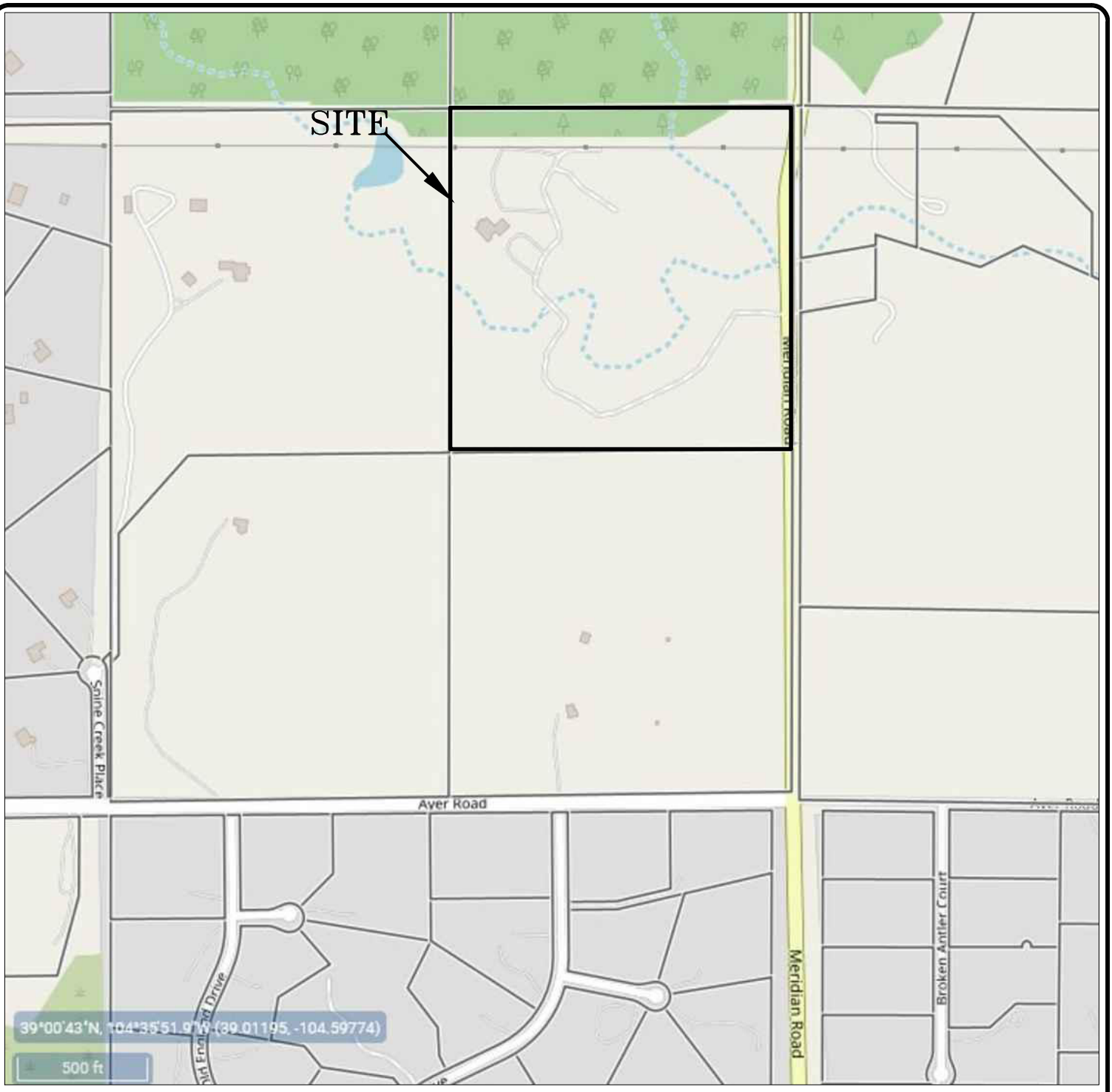
TABLE

Table 1: Summary Test Boring Results

Test Boring No.	Depth to Bedrock (ft.)	Depth to Groundwater (ft.)
1	Surface	>11
2	Surface	>12.5

FIGURES



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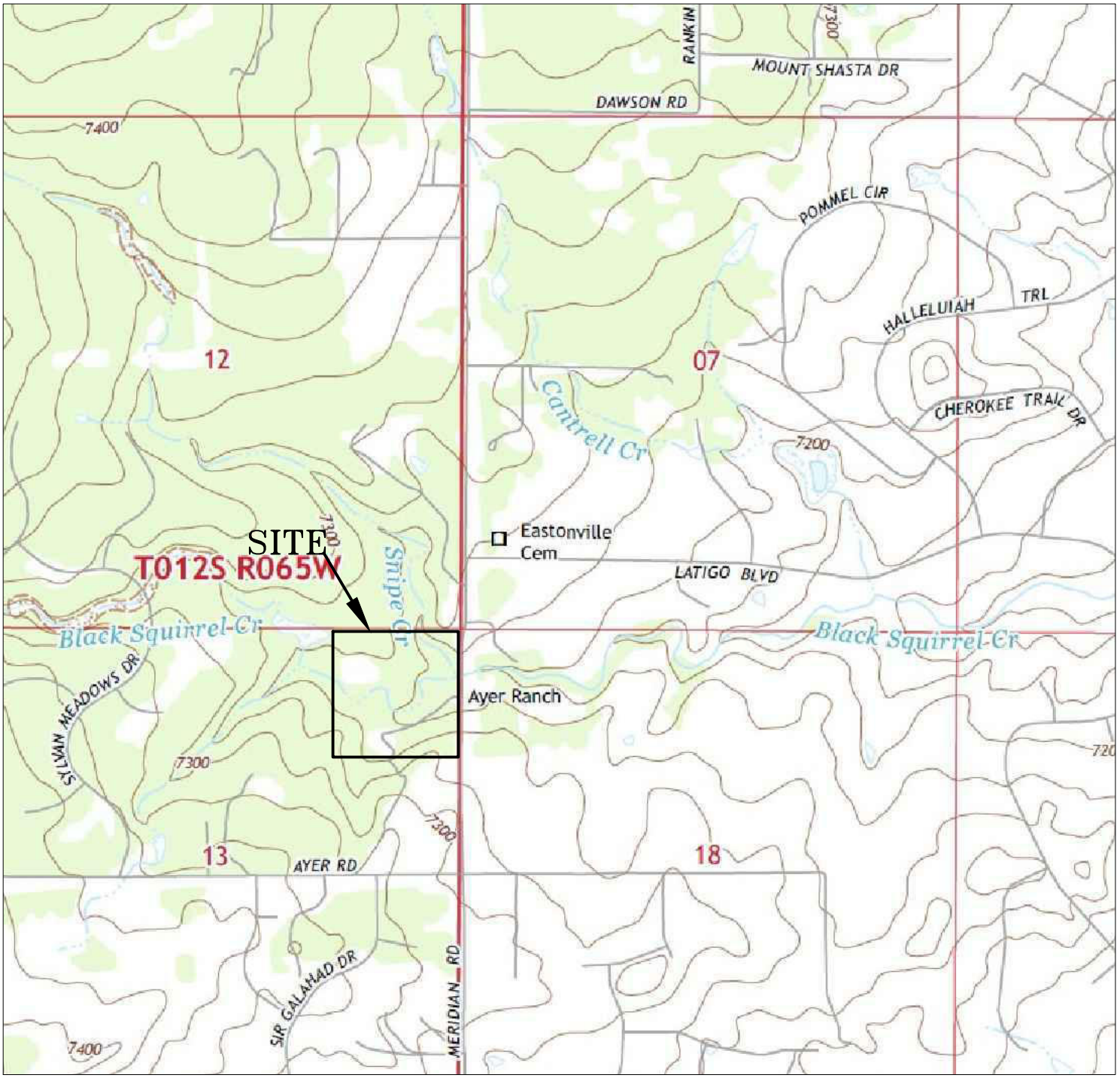
VICINITY MAP
DOUBLE SPUR RANCH MINOR SUBDIVISION
12420 N MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: JOAN HATHCOCK

DRAWN:	DATE:	CHECKED:	DATE:
LLL	11/21/22		

JOB NO.: 222160

FIG NO.: 1



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USGS MAP
DOUBLE SPUR RANCH MINOR SUBDIVISION
12420 N MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: JOAN HATHCOCK

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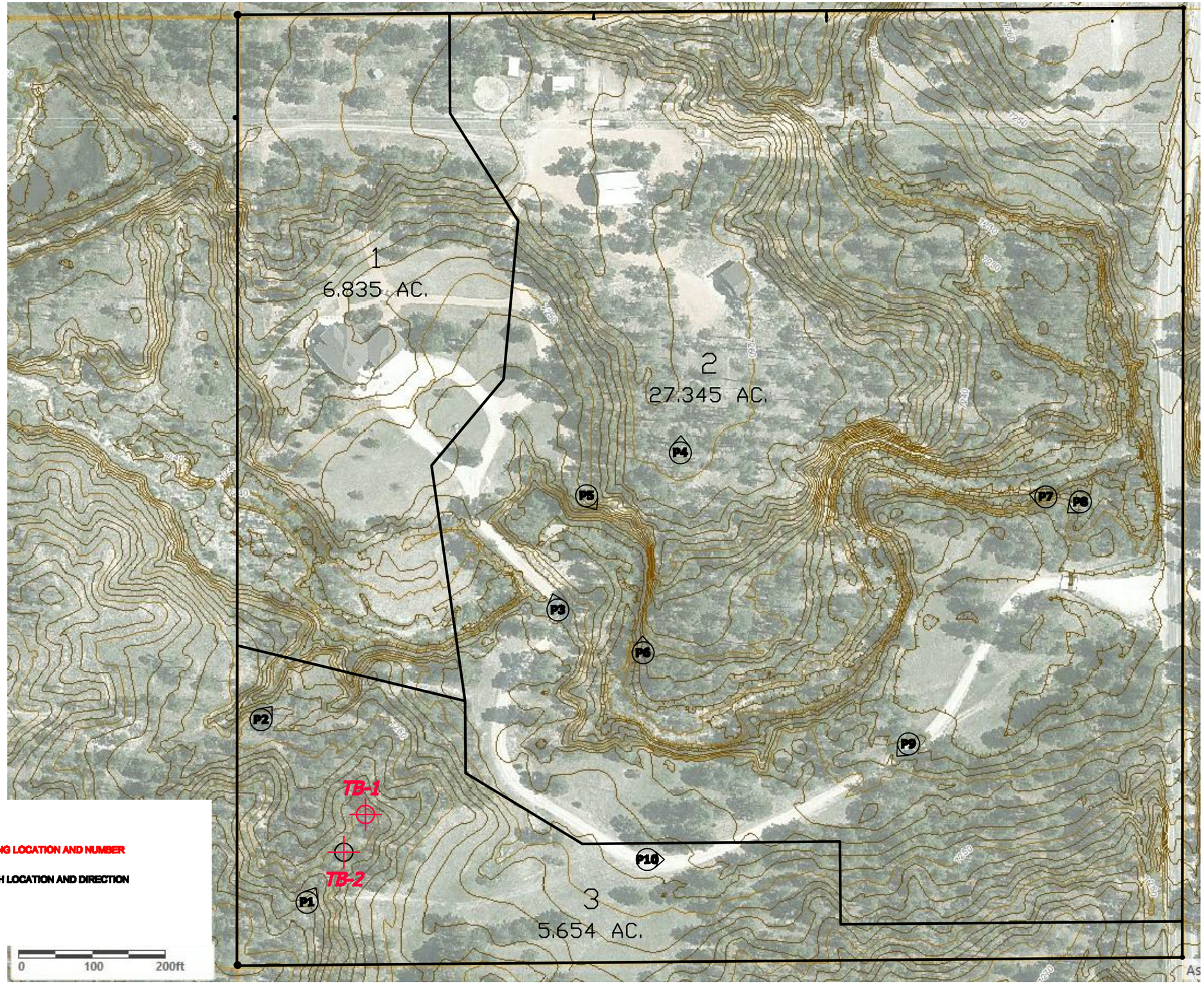
FIG NO.: 2



LEGEND

TB- APPROXIMATE TEST BORING LOCATION AND NUMBER

P1 - APPROXIMATE PHOTOGRAPH LOCATION AND DIRECTION

REVISION	BY

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COLORADO SPRINGS, CO. 80907

SITE PLAN/TEST BORING LOCATION MAP
DOUBLE SPUR RANCH MINOR SUBDIVISION
12420 N MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: JOAN HATHCOCK

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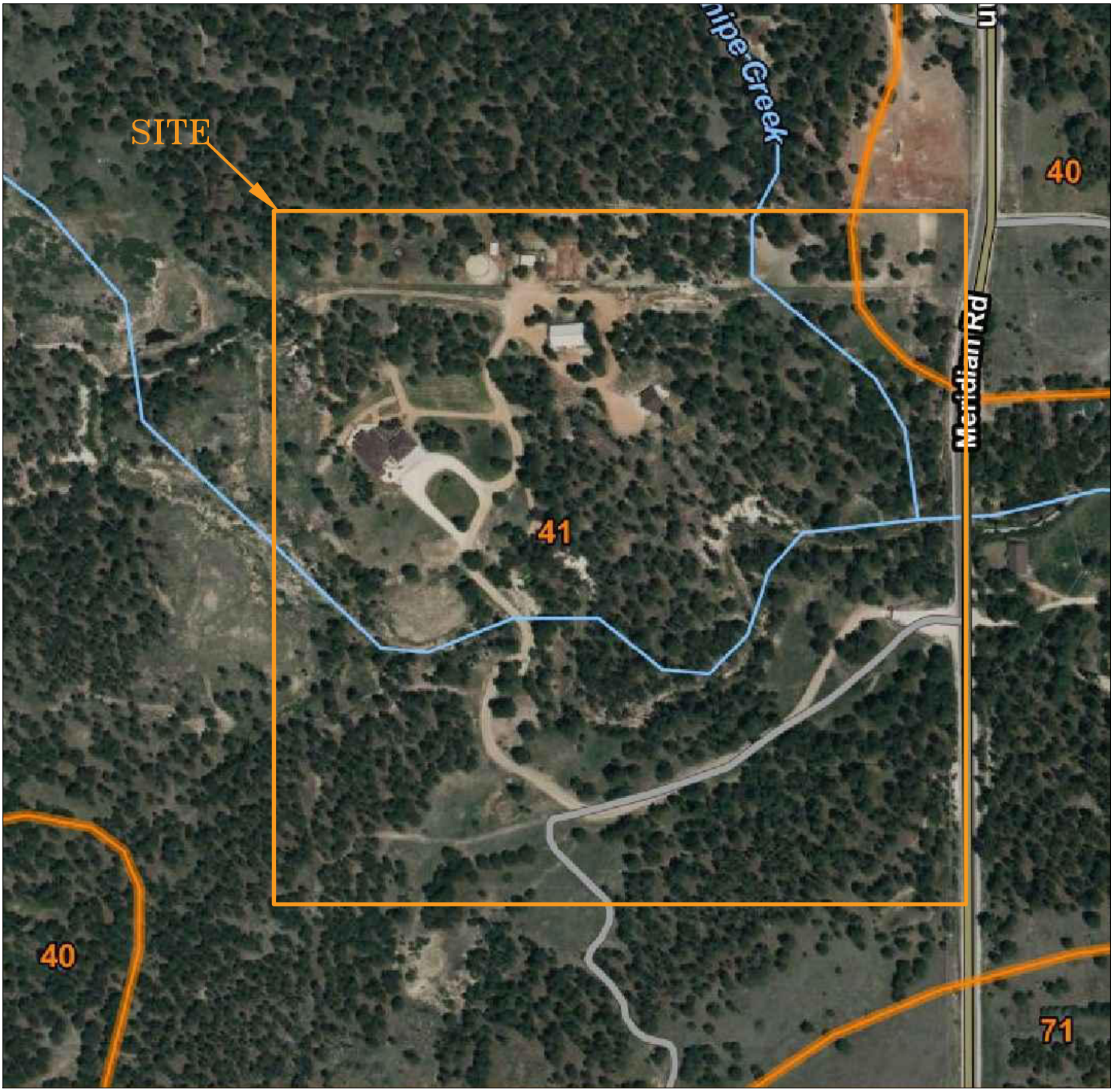
DATE	11/30/22
SCALE	AS SHOWN
JOB NO.	222160
FIGURE No.	3



ENTECH ENGINEERING, INC.
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SOIL SURVEY MAP
DOUBLE SPUR RANCH MINOR SUBDIVISION
12420 N MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: JOAN HATHCOCK

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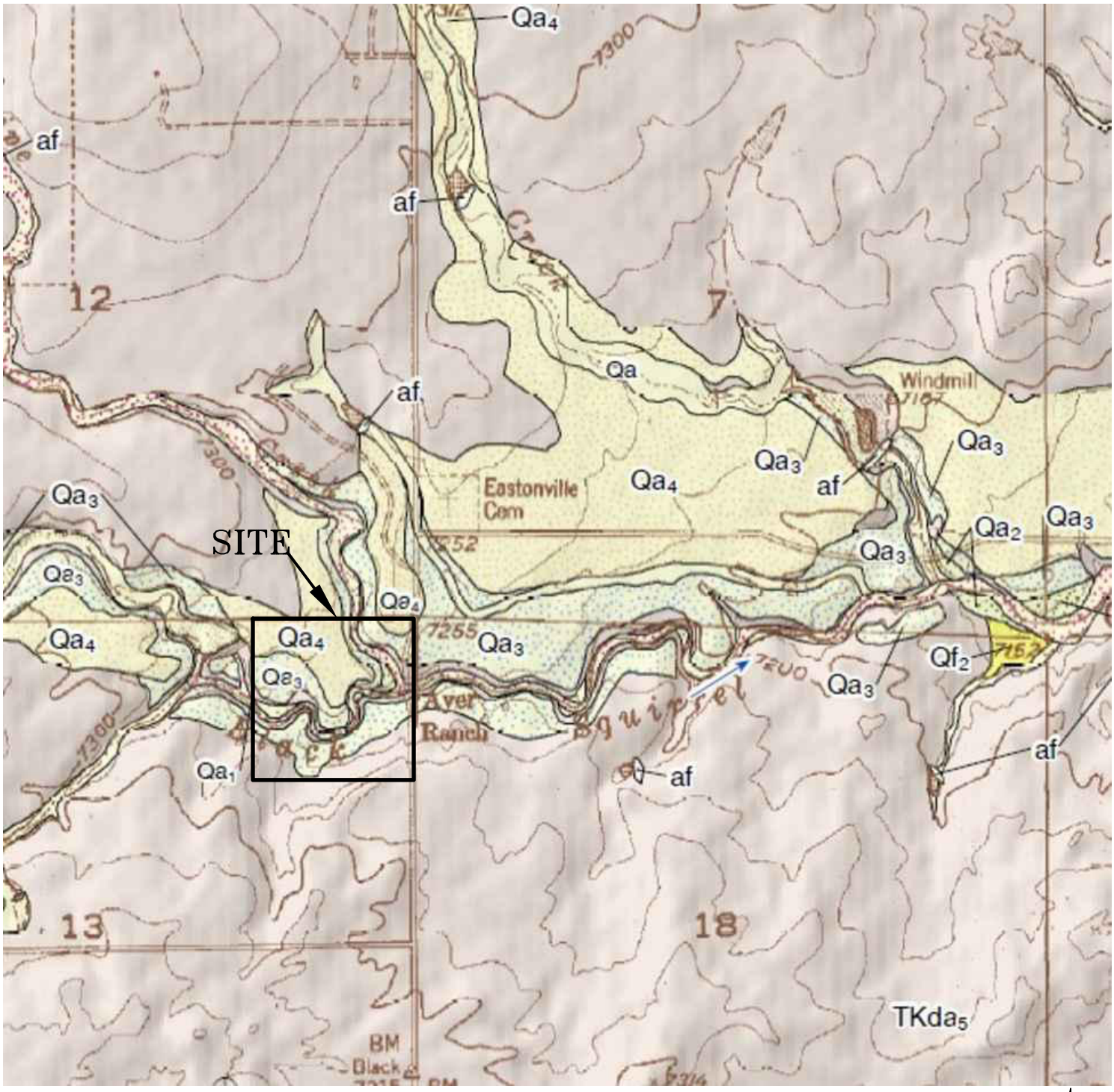
FIG NO.: 4



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EASTONVILLE QUADRANGLE GEOLOGIC MAP
DOUBLE SPUR RANCH MINOR SUBDIVISION
12420 N MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: JOAN HATHCOCK

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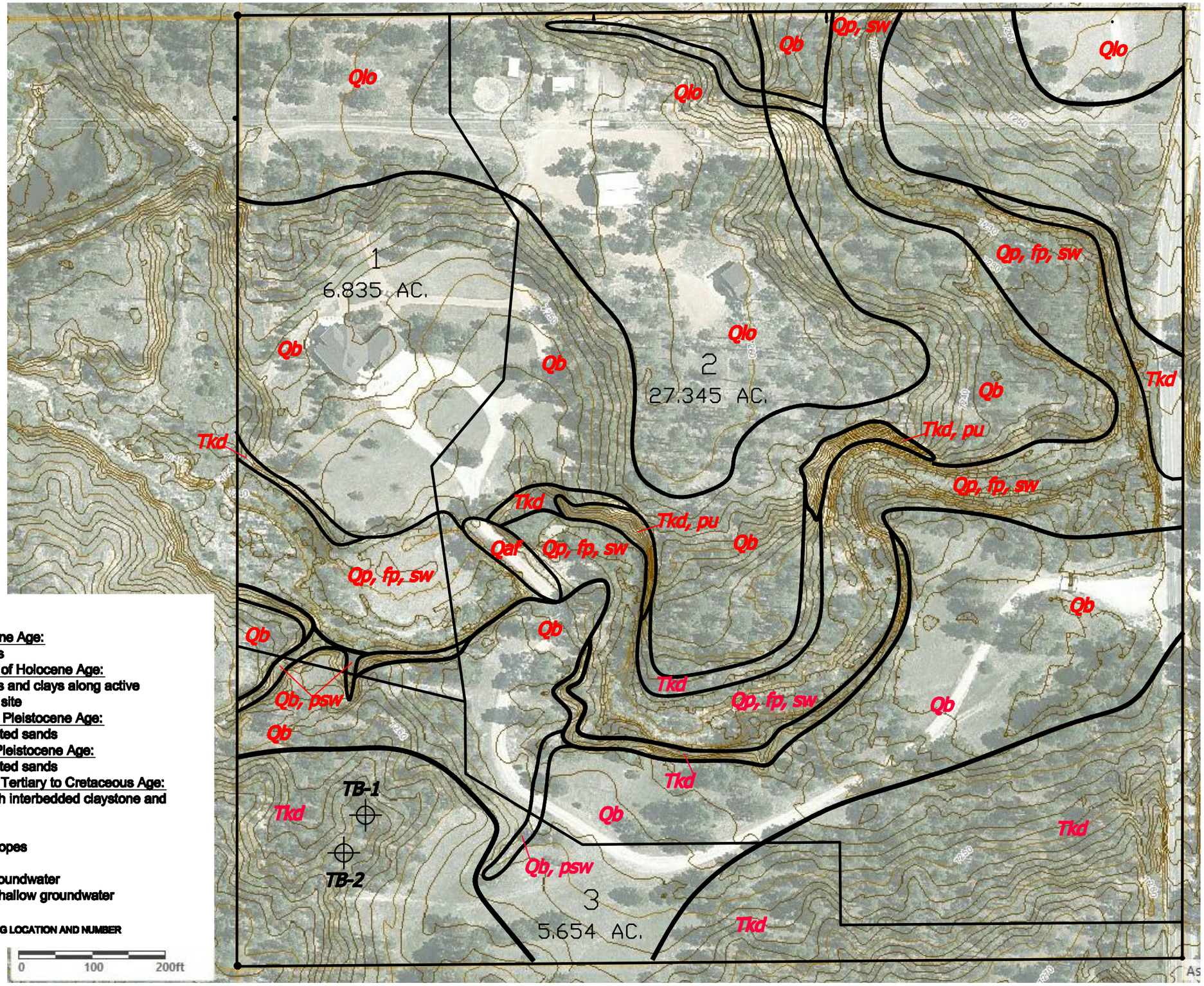
FIG NO.: 5



LEGEND

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

Qp - Piney Creek Alluvium of Holocene Age: water deposited sands and clays along active drainage ways on the site

Qb - Broadway Alluvium of Pleistocene Age: stream terrace deposited sands

Qlo - Louviers Alluvium of Pleistocene Age: stream terrace deposited sands

Tkd - Dawson Formtaion of Tertiary to Cretaceous Age: arkosic sandstone with interbedded claystone and siltstone

pu - potentially unstable slopes

fp - floodplain

sw - seasonally shallow groundwater

psw - potentially seasonal shallow groundwater

⊕ TB- APPROXIMATE TEST BORING LOCATION AND NUMBER

REVISION	BY

ENTECH ENGINEERING, INC.
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COLORADO SPRINGS, CO. 80907

GEOLOGY/ENGINEERING GEOLOGY MAP
DOUBLE SPUR RANCH MINOR SUBDIVISION
12420 N MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: JOAN HATHCOCK

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DATE	11/30/22
SCALE	AS SHOWN
JOB NO.	222160
FIGURE No.	6

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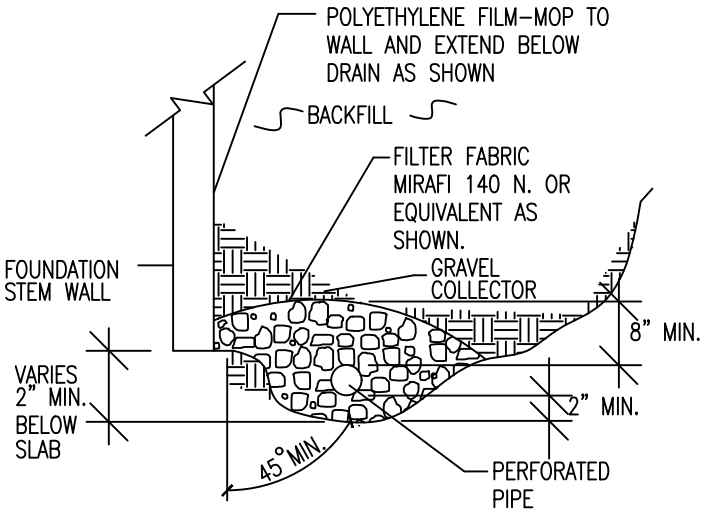
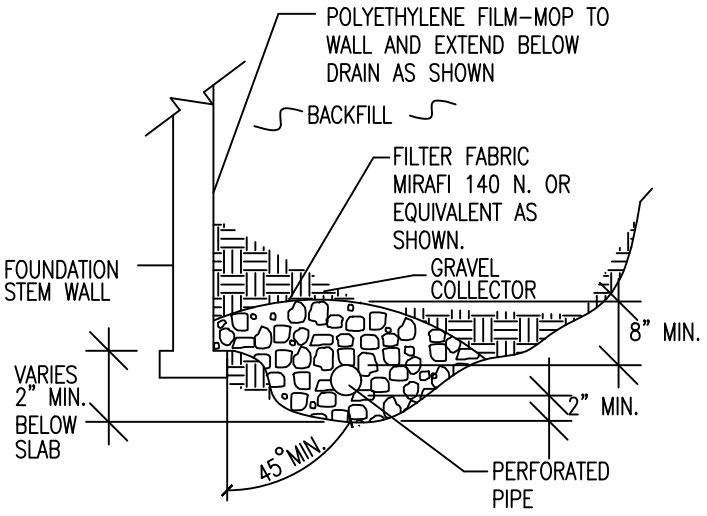
FEMA FLOODPLAIN MAP
DOUBLE SPUR RANCH MINOR SUBDIVISION
12420 N MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: JOAN HATHCOCK

DRAWN:	DATE:	CHECKED:	DATE:
LLL	11/21/22		

JOB NO.: 222160

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

PERIMETER DRAIN DETAIL

DRAWN:	DATE:	DESIGNED:	CHECKED:

JOB NO.: 222160

FIG NO.: 8

APPENDIX A: Site Photographs

1

Looking northeast from the southwest side of the site towards proposed building area on Lot 3.

November 8, 2022

2

Looking northeast from the western side of the site.

November 8, 2022

Job No. 222160

3

Looking north along gravel driveway north-central portion of the site.

November 8, 2022

4

Looking north from the central portion of the site.

November 8, 2022

Job No. 222160

5

Looking southeast from the northwest portion of the site.

October 11, 2022

6

Looking east from the northwest portion of the site.

October 11, 2022

Job No. 222160

7

Looking west along drainage from the eastern portion of the site.

October 11, 2022

8

Looking southwest from the eastern side of the site.

October 11, 2022

Job No. 222160

9

Looking southwest from the southern portion of the site.

October 11, 2022

10

Looking east from the southwest portion of the site.

October 11, 2022

Job No. 222160

APPENDIX B: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 11/9/2022
Job # 222160

REMARKS

DRY TO 10', 11/10/22

SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50/8"	6.7	
			50/8"	6.6	
10			50/8"	11.4	
15					
20					

TEST BORING NO. 2
DATE DRILLED 11/9/2022
CLIENT JOAN HATHCOCK
LOCATION 12420 N. MERIDIAN RANCH

REMARKS

DRY TO 12.5, 11/10/22

SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			50/7"	6.9	
			50/8"	5.6	
10			50/8"	12.1	
15			50/6"	9.5	
20					

N

N.T.S.

LOCATIONS OF TEST BORINGS ARE APPROXIMATE

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TEST BORING LOG

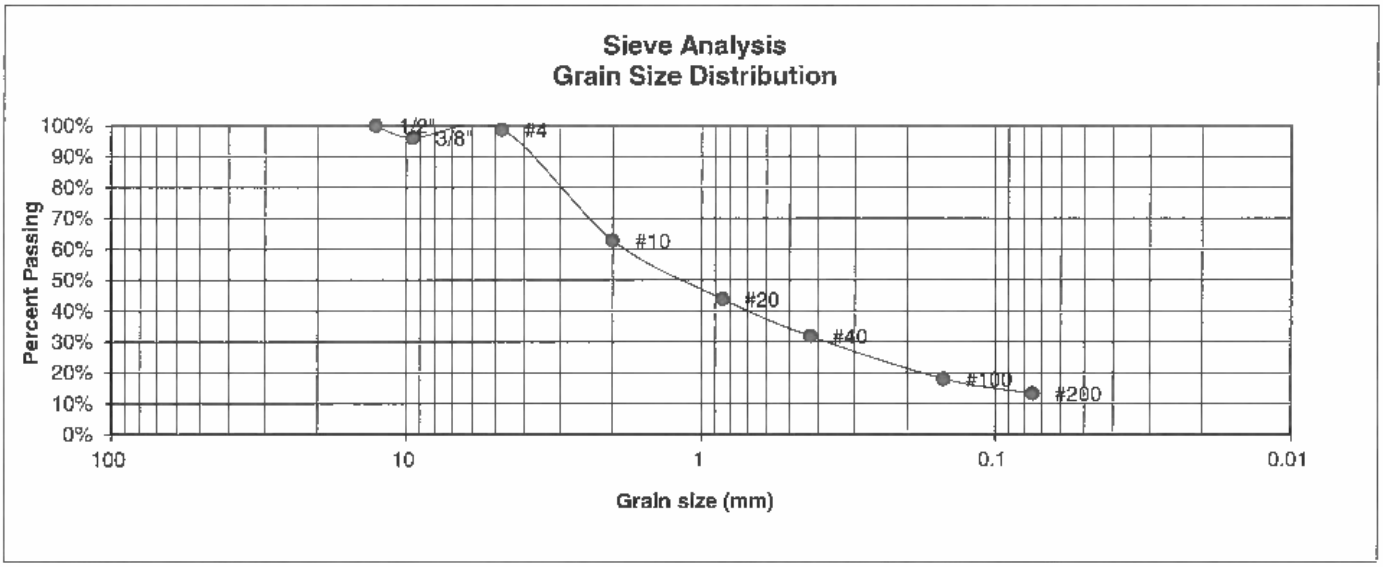
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	11/18/22

JOB NO.: 222160

FIG NO.: B-1

APPENDIX C: Laboratory Test Results

BORING NO.	1	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	5	AASHTO CLASSIFICATION		JOB NO.	222160
CLIENT	JOAN HATHCOCK				
PROJECT	12420 N. MERIDIAN RANCH				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.1%
4	98.7%
10	62.8%
20	43.8%
40	31.8%
100	17.9%
200	13.3%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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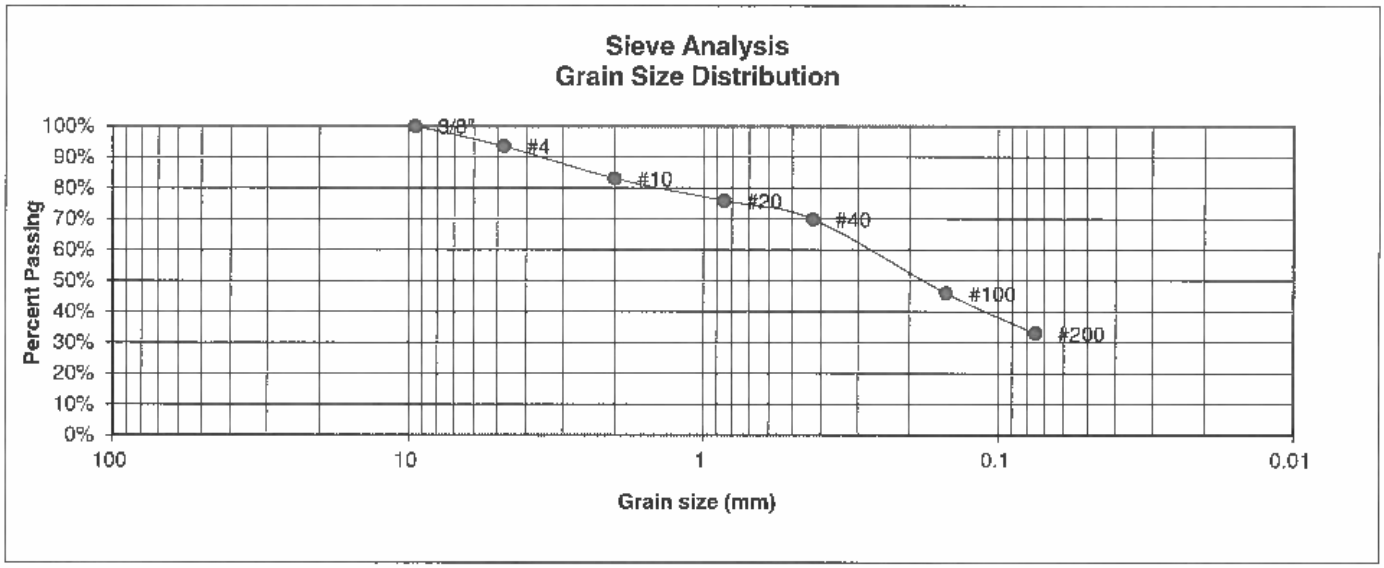
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	11/18/22

JOB NO.: 222160

FIG NO.: C-1

BORING NO.	2	UNIFIED CLASSIFICATION	SM	TEST BY	BL
DEPTH(ft)	10	AASHTO CLASSIFICATION		JOB NO.	222160
CLIENT	JOAN HATHCOCK				
PROJECT	12420 N. MERIDIAN RANCH				



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.4%
10	83.0%
20	75.9%
40	69.8%
100	45.9%
200	32.9%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

Swell
Moisture at start
Moisture at finish
Moisture increase
Initial dry density (pcf)
Swell (psf)

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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	11/18/22

JOB NO.: 222160

FIG NO.: C-2

APPENDIX D: Soil Survey Descriptions

El Paso County Area, Colorado

40—Kettle gravelly loamy sand, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 368g
Elevation: 7,000 to 7,700 feet
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Kettle

Setting

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

Typical profile

E - 0 to 16 inches: gravelly loamy sand
Bt - 16 to 40 inches: gravelly sandy loam
C - 40 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 3 to 8 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 (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 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: F048AY908CO - Mixed Conifer
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 20, Sep 2, 2022

El Paso County Area, Colorado

41—Kettle gravelly loamy sand, 8 to 40 percent slopes

Map Unit Setting

National map unit symbol: 368h
Elevation: 7,000 to 7,700 feet
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Kettle

Setting

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

Typical profile

E - 0 to 16 inches: gravelly loamy sand
Bt - 16 to 40 inches: gravelly sandy loam
C - 40 to 60 inches: extremely gravelly loamy sand

Properties and qualities

Slope: 8 to 40 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Somewhat excessively drained
Runoff class: Medium
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 3.4 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: B
Ecological site: F048AY908CO - Mixed Conifer
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 20, Sep 2, 2022