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SOILS AND GEOLOGY STUDY
STERLING RANCH EAST – SKETCH PLAN
PARCEL NOS. 52270-00-005 AND 52270-00-006
COLORADO SPRINGS, COLORADO

Prepared for:
Classic SRJ
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Attn: Loren Moreland

August 25, 2023

Respectfully Submitted,

ENTECH ENGINEERING, INC.

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Geologist

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Reviewed by:

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8-25-2023

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

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1 SUMMARY

Project Location

The project lies in portions of the SE¼ of Section 33 and SE¼ of Section 34, Township 12 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately one-mile northeast of Colorado Springs, Colorado.

Project Description

Total acreage involved in the Sterling Ranch East Sketch Plan is approximately 224 acres. Rural residential 2.5 acre lots, and single family residential lots 0.5 acres or less are proposed with and open space area along the eastern side of the site. The proposed rural residential lots will be serviced by individual on-site wastewater treatment systems and individual water wells. The single-family residential lots will be serviced by Sterling Ranch Metropolitan District.

Scope of Report

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

Land Use and Engineering Geology

This site was found to be suitable for the proposed development. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include areas of artificial fill, expansive soils, shallow bedrock, and seasonally shallow groundwater, potential seasonally shallow groundwater, and areas flowing water. Based on the proposed development plan, it appears that these areas will have some impact on the development. These conditions will be discussed in greater detail in the report.

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

2 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in portions of the SE¼ of Section 33 and SE¼ of Section 34, Township 12 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately one-mile northeast of Colorado Springs, Colorado, at the southeast corner of future Sterling Ranch Road and Oak Park Drive. The location of the site is as shown on the Vicinity Map, Figure 1.

Generally, the topography of the site is gradually sloping to the south with moderate slopes along portions of the drainages on the site. There are water tanks and a well located at the northern side of the site, and previous/current land use is agricultural grazing. A drainage is located in the east-central portion of the site with several minor drainage swales. At the time of our site observations areas of standing and flowing water were observed in the drainage, primarily in the eastern and southeastern portion of the site. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included equipment storage, a fill borrow area, and grazing and pasture land. The site contains primarily field grasses, cacti, yucca, and weeds. Site photographs, taken August 9, 2023, are included in Appendix A.

Total acreage involved in the Sterling Ranch East Sketch Plan is approximately 224 acres. Rural residential 2.5 acre lots, and single family residential lots 0.5 acres or less are anticipated with and open space area along the eastern side of the site. Grading plans were not available at the time of this report. The proposed Sketch Plan is shown on Figure 3, and the Site and Exploration Plan is presented in Figure 4.

3 SCOPE OF THE REPORT

The scope of the report will include 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.

4 FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS), previously the Soil Conservation Service (SCS) survey 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 9, 2023.

Geologic Hazard Studies were previously performed by Entech Engineering, Inc. for the entire Sterling Ranch development, October 31, 2006 (Reference 1) and January 20, 2009 (Reference 4). Two of the test borings from the previous investigations was located on the subject site (Test Boring Nos. 28 – 29, and 33 – 39). The location of the test borings is indicated on Figures 4 and 7. The Test Boring Logs are included in Appendix D. Information from these reports was used in evaluating the site.

Six additional Test Borings were drilled as part of this investigation to determine general soil and bedrock characteristics. Three temporary piezometers were placed at the locations of Test Boring Nos. 1, 2, and 5. The locations of the test borings are indicated on the Site and Exploration Plan, Figure 4. The Test Boring Logs are presented in Appendix B, and Summarized on Table B-1. Results of this testing will be discussed later in this report.

Laboratory testing was also performed on some of the soils to classify and determine the soils engineering characteristics. Laboratory tests included grain-size analysis ASTM D-422, Atterberg Limits ASTM D-4318, volume change testing using Swell/Consolidation test. Sulfate testing was performed on select samples to evaluate potential for below grade concrete degradation due to sulfate attack. Results of the laboratory testing are included in Appendix C. A Summary of Laboratory Test Results is presented in Table C-1.

5 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

5.1 General Geology

Physiographically, the site lies in the western portion of the Great Plains Physiographic Province. Approximately 13 miles to the west is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southeastern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northeasterly direction (Reference 2). The rocks in the area of the site are sedimentary in

nature and typically Upper Cretaceous in age. The bedrock underlying the site consists of the Dawson Formation. Overlying this formation are unconsolidated deposits of man-placed fill and alluvial soils of Quaternary Age. The alluvial soils were deposited by water on site and as stream terraces along Sand Creek and the drainages located on the site. Man-placed soils exist as fill associated with the water main through the central portion of the site. 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 two soil types on the site (Figure 4). In general, the soils classify as coarse sandy loam. The soils are described as follows:

Type	Description
19	Columbine gravelly sandy loam, 0 to 3% slopes
71	Pring coarse sandy loam, 3 to 8% slopes

Complete descriptions of each soil type are presented in Appendix E. The soils have generally been described to have moderate to moderately rapid 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 Falcon NW Quadrangle Geology Map showing the site is presented in Figure 5 (Reference 5). The Geology Map prepared for the site is presented in Figure 6. Three mappable units were identified on this site which are described as follows:

Qaf **Artificial Fill of Quaternary Age:** These recent man-placed fill deposits associated with the existing water main in the central portion of the site.

Qao_1 **Old alluvium two of Holocene Age:** These materials consist of stream-deposited alluvium, typically classified as a silty to well-graded sand, brown to dark brown in color and of moderate density occurring as terrace deposits. Old Alluvium One can sometimes be very highly stratified containing thing layers of very silty and clayey soil. This unit correlates to the Louviers Alluvium in the Denver area.

Tkd **Dawson Formation of Tertiary to Cretaceous Age:** The Dawson formation typically consists of arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone. Overlying this formation is a variable layer of residual and/or colluvial soils. The residual soils were derived from the in-situ weathering of the bedrock materials on-site. The colluvial soils have been transported by the action of sheetwash and gravity. These soils consisted of silty to clayey sands and sandy clays

The bedrock underlying the site consists of the Dawson Formation of Tertiary to Cretaceous Age. The Dawson Formation typically consists of arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone. Overlying this formation are variable layers of alluvial deposits, and residual soil. The residual soils were derived from the in-situ weathering of the bedrock materials on-site. These soils consisted of silty to clayey sands and sandy clays.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Falcon NW 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 1978 (Reference 6), and the *Geologic Map of the Pueblo 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

The soils encountered in the Test Borings can be grouped into three general soil types. The soils were classified using the Unified Soil Classification System (USCS).

Soil Type 1 classified as slightly silty sand with gravel, and silty sand (SW-SM, SM). The sand was encountered in the test borings at the ground surface extending to depths ranging from 3 to 9 feet bgs, and to the termination of TB-2 (20 feet). The sand was encountered at loose to dense states. The majority of the samples indicated medium dense states.

Soil Type 2 classified as sandstone with silt and silty sandstone (SM-SW, SM). The sandstone was encountered in the test borings at depths of 3 to 9 feet bgs extending to depths of 19 feet to the termination of the borings (20 feet). The sandstone was encountered at very dense states.

Soil Type 3 classified as claystone (CL). The claystone was encountered in TB-4 at 19 feet bgs extending to the termination of the test boring (20 feet). The claystone was encountered at hard consistencies. The claystone is typically moderately to highly expansive in the area.

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

5.5 Groundwater

Groundwater was encountered in three of the recent test borings at depths of 2 to 9 feet, and the remaining borings were dry. The borings were drilled to depths ranging from 16 to 20 feet bgs. Areas of standing and flowing water were observed in the areas of TB-1 and TB-2 during our site mapping. Three temporary piezometers were installed at TB-1 (P1), TB-2 (P2), and TB-3 (P3). Groundwater was measured at depths of 10 to 16 feet in the piezometers on August 8, 2023. These areas are discussed in the following section. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time. It should be noted that in the sandy materials on-site, 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 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

Detailed mapping has been performed on this site to produce an Engineering Geology Map Figure 7. This map shows the location of various geologic conditions of which the developers should be cognizant during the planning, design and construction stages of the project. These hazards and the recommended mitigation techniques are as follows:

Artificial Fill – Constraint

These are areas of man-made fill associated with existing water main in the central portion of the site.

Mitigation: The earthen berm is located in the area of the proposed pond and will be removed during site grading. The fill on this site is considered uncontrolled for construction purposes. Any

uncontrolled fill encountered beneath foundations will require removal and recompaction at a minimum of 95% of its maximum Modified Procter Dry Density, ASTM D-1557.

Collapsible Soils – Constraint

The majority of the soils encountered on-site do not exhibit collapsible characteristics, however, areas of loose soils were encountered in the test borings drilled on site.

Mitigation: Should loose or collapsible soils be encountered beneath foundations, recompaction and moisture conditioning of the upper 2 feet of soil at 95% of its maximum Modified Proctor Dry Density ASTM D-1557 will be required. Exterior flatwork and parking areas may also experience movement. Proofrolling and recompaction of soft areas should be performed during site work.

Expansive Soils – Constraint

Expansive soils were encountered in the test borings drilled on site. These occurrences are typically sporadic; therefore, none have been indicated on the maps. The clays and claystone, if encountered at foundation grade, can cause differential movement in structures. These occurrences should be identified and dealt with on an individual basis.

Mitigation Should expansive soils be encountered beneath foundations; mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation 3 to 5 feet 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. The use of structural floors should be considered for basement construction on highly expansive clays. Final recommendations should be determined after additional investigation of each building site.

Shallow Bedrock – Constraint

Bedrock was encountered in five the test borings at depths ranging from 3 to 9 feet. A Summary of the Depth to Bedrock is included in Table B-1. Shallow bedrock will be encountered in some areas of this site. Where claystone or sandstone are encountered, excavation/grading may be difficult requiring track-mounted excavators. Bedrock will likely be encountered cuts for utility excavations.

Areas of Erosion – Constraint

These are areas that are undergoing erosion by water and sheetwash producing gullies and rill erosion and primarily located along portions of the drainage in the central portion of the site. These areas are within proposed no-build areas and will be avoided by future site development.

Mitigation: Due to the nature of the soils on this site, virtually all the soils are subject to erosion by wind and water. Areas of erosion can occur across the entire site, particularly if the soils are disturbed during construction. Vegetation reduces the potential for erosion. The areas identified where erosion is actually taking place may require check dams, regrading and revegetation using channel lining mats to anchor vegetation. Further recommendations for erosion control are discussed under Section "Erosion Control" of this report. Recommendations pertaining to revegetation may require input from a qualified landscape architect and/or the Natural Resource Conservation Service (previously Soil Conservation Service).

Groundwater and Floodplain Areas – Constraint

The site is not mapped within floodplain zones according to the FEMA Map No. 08041CO535G, Figure 8 (Reference 8). However, water was observed flowing in the drainages in the central and southeastern portions of the site. These areas are discussed as follows:

Potential Seasonally Shallow and Seasonally Shallow Groundwater Area – Constraint

In these areas, we would anticipate the potential for periodically high subsurface moisture conditions, frost heave potential and highly organic soils. These areas are associated with the drainages on the site. Grading plans were not available at the time of this investigation, however, it is anticipated these areas will likely be filled during site grading or avoided by development. Additionally, groundwater was encountered in three of the test borings ranging at depths of 2 to 9 feet. Areas of standing and flowing water were observed in the areas of TB-1 and TB-2 during our site mapping. The shallow groundwater areas are in or near the drainages. Entech installed a temporary piezometer at this location and will continue to periodically monitor the groundwater level. The temporary piezometers were installed at TB-1 (P1), TB-2 (P2), and TB-3 (P3). These piezometers will continue to be monitored periodically. A minimum separation of 3 feet between foundation components and groundwater levels are recommended.

Mitigation: Foundations must have a minimum 30-inch depth for frost protection. In areas where high subsurface moisture conditions are anticipated periodically, subsurface perimeter drains are recommended to help prevent the intrusion of water into areas below grade. Fill added to these areas further raise foundations above groundwater levels. Foundations should be kept as high as

possible. Areas may experience higher groundwater levels during period of higher precipitation where water can flow through permeable sands on top of less permeable bedrock materials. Subsurface perimeter drains may be necessary to prevent the intrusion of water into areas below grade. Typical drain details are presented in Figure 8. Where shallow groundwater is encountered, underslab drains or interceptor drains may be necessary. Typical drain details are presented in Figures 9 and 11. It is anticipated that the shallow water areas will be mitigated with site grading and the installation of sewer underdrains. Specific recommendations should be made after additional investigation and site grading has been completed.

Radon – Hazard

Radon levels for the area have been reported by the Colorado Geologic Survey in the open file, Report No. 91-4 (Reference 10). Average Radon levels for the 80908-zip code is 3.40 pCi/l. The following is a table of radon levels in this area:

	80908
0 < 4 pCi/l	50.00%
4 < 10 pCi/l	50.00%
10 < 20 pCi/l	0.00%
> 20 pCi/l	0.00%

Mitigation:

The potential for high radon levels is present for the site. Build-up of radon gas can usually be mitigated by providing increased ventilation of basement and crawlspace and sealing joints. Specific requirements for mitigation should be based on site specific testing.

6.1 Relevance of Geologic Conditions to Land Use Planning

We understand that the development will be rural residential 2.5 acre lots on the north side transitioning to 0.5 acre lots with higher density lots proposed for the majority of the site south of the large lots with an open space area along the eastern side of the site, and other associated site improvements. It is our opinion that the existing geologic and engineering geologic conditions will impose some constraints on the proposed development and construction. The constraints affecting development will be those associated with the potential for expansive soils, and the seasonally wet areas on the site that can be satisfactorily mitigated through proper engineering design and construction practices.

The upper materials are typically at loose to dense states. The granular soils encountered in the upper soil profiles of the test borings should provide good support for foundations. Loose soils if encountered at foundation depth will require mitigation. Foundations anticipated for the site are standard spread footings. Shallow foundations with overexcavation in areas of expansive soils or recompaction in areas of loose soils should also be anticipated. Excavation is anticipated to be moderate with rubber-tired equipment for the site sand materials, and will require track mounted equipment for the dense sandstone. Expansive layers may also be encountered in the soil and bedrock on this site. Areas of expansive soils encountered on site are sporadic; therefore, none have been indicated on the maps. Expansive soils, if encountered, will require special foundation design and/or overexcavation. These soils will not prohibit development.

Areas of potential seasonally and seasonally high groundwater were observed on site. These areas will likely be mitigated with site grading. Drains may be necessary for structures adjacent to these areas to help prevent the intrusion of water into areas below grade. Typical drain details are presented in Figures 9 to 11. The site does not lie within any floodplain zones according to the FEMA Map No. 08041CO535G, dated December 7, 2108 (Figure 8, Reference 8). Exact locations of floodplain and specific drainage studies are beyond the scope of this report.

Grading plans were not available at the time of this investigation, however, it is anticipated these areas will likely be filled during site grading. Additionally, groundwater was encountered in three of the test borings ranging at depths of 2 to 9 feet. Areas of standing and flowing water were observed in the areas of TB-1 and TB-2 during our site mapping. The shallow water was adjacent to the eastern drainages. Entech installed a temporary piezometer at this location and will continue to periodically monitor the groundwater level. The temporary piezometers were installed at TB-1 (P1), TB-2 (P2), and TB-3 (P3). These piezometers will continue to be monitored periodically. A minimum separation of 3 feet between foundation components and groundwater levels are recommended.

Areas of erosion and gullying may require the construction of check dams and revegetation of the site soils after construction. General recommendations for erosion control are discussed under Section 8.0 "Erosion Control".

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 investigation is recommended as grading and development plans are prepared.

7 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 11), the area is not mapped with any aggregate deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 12), areas of the site are not mapped with any resources. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 13), the area of the site has been mapped as "Fair" for industrial minerals. However, considering the silty nature of much of these materials and abundance of similar materials through the region and the close proximity to developed land, they would be considered to have little significance as an economic resource.

According to *the Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 13), 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-site (Reference 13).

The site has been mapped as "Fair" for oil and gas resources (Reference 13). 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.

8 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 ROADWAY AND EMBANKMENT CONSTRUCTION RECOMMENDATIONS

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

Any areas to receive fill should have all topsoil, organic material or debris removed. Prior to fill placement Entech should observe the subgrade. Fill must be properly benched and compacted to minimize potentially unstable conditions in slope areas. Fill slopes should be 3:1. The subgrade should be scarified and moisture conditioned to within 2% of optimum moisture content and

compacted to a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557, prior to placing new fill. Areas receiving fill may require stabilization with rock or fabric if shallow groundwater conditions are encountered.

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

10 CLOSURE

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

It should be pointed out that because of the nature of data obtained by random sampling of such variable and non-homogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Construction and design personnel should be made familiar with the contents of this report. Additional investigation is recommended as plans (grading and development) are prepared.

This report has been prepared for Classic SRJ. 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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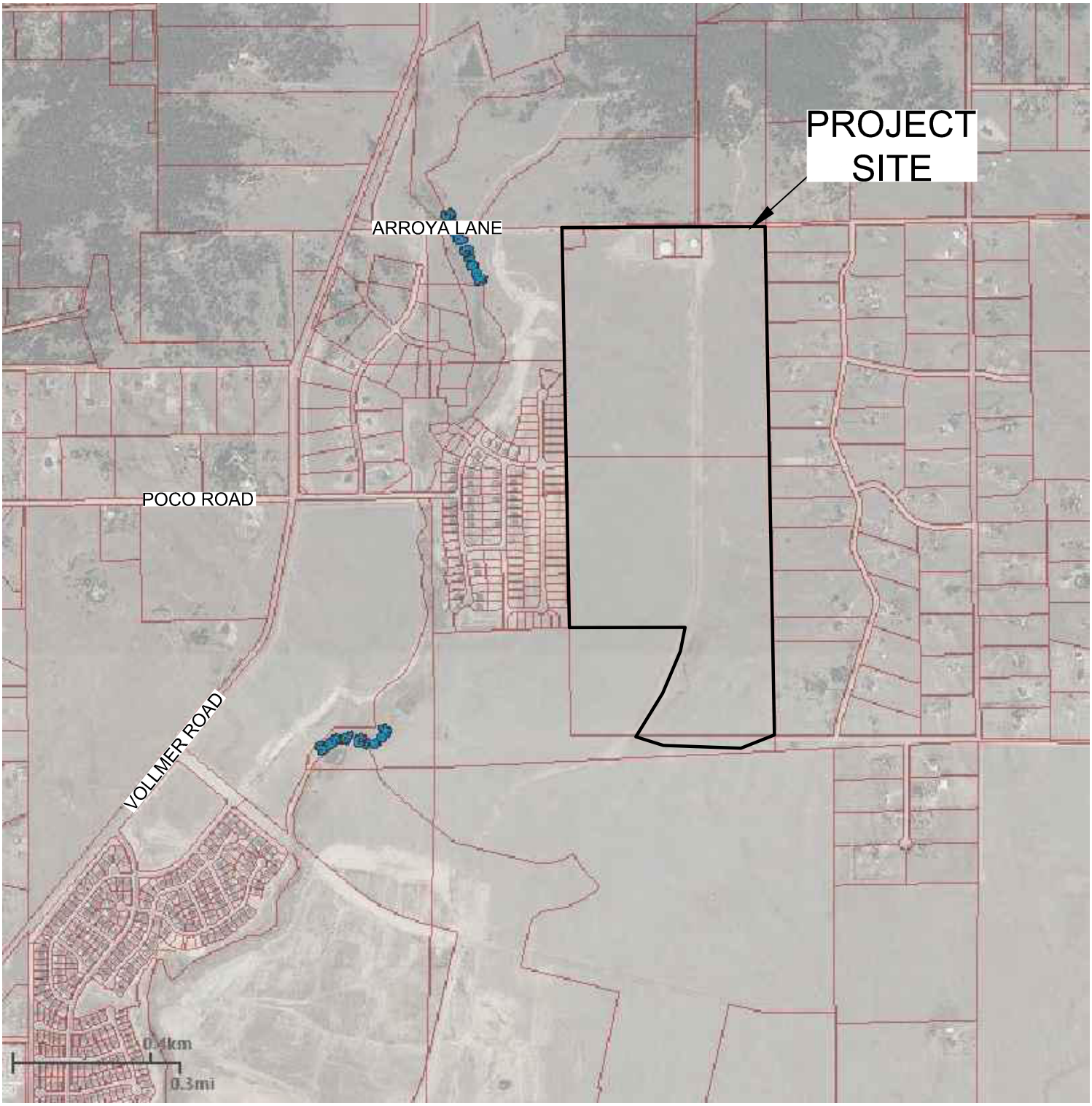
FIGURES



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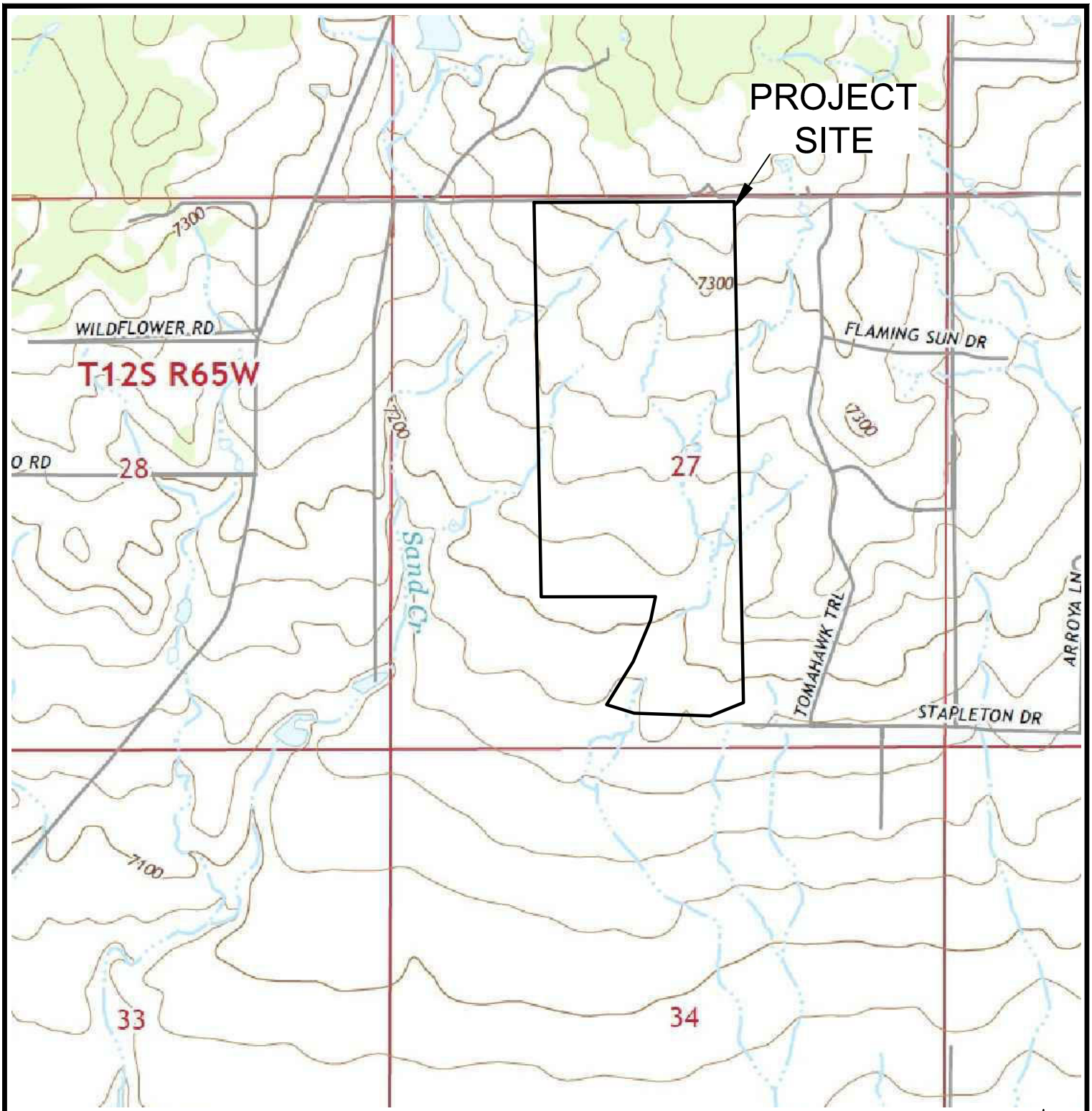
ENTECH ENGINEERING, INC.

VICINITY MAP
STERLING RANCH EAST SKETCH PLAN
PARCEL NOS. 52270-00-005 AND 52270-00-006
CLASSIC SRJ

JOB NO.
231065

FIG. 1



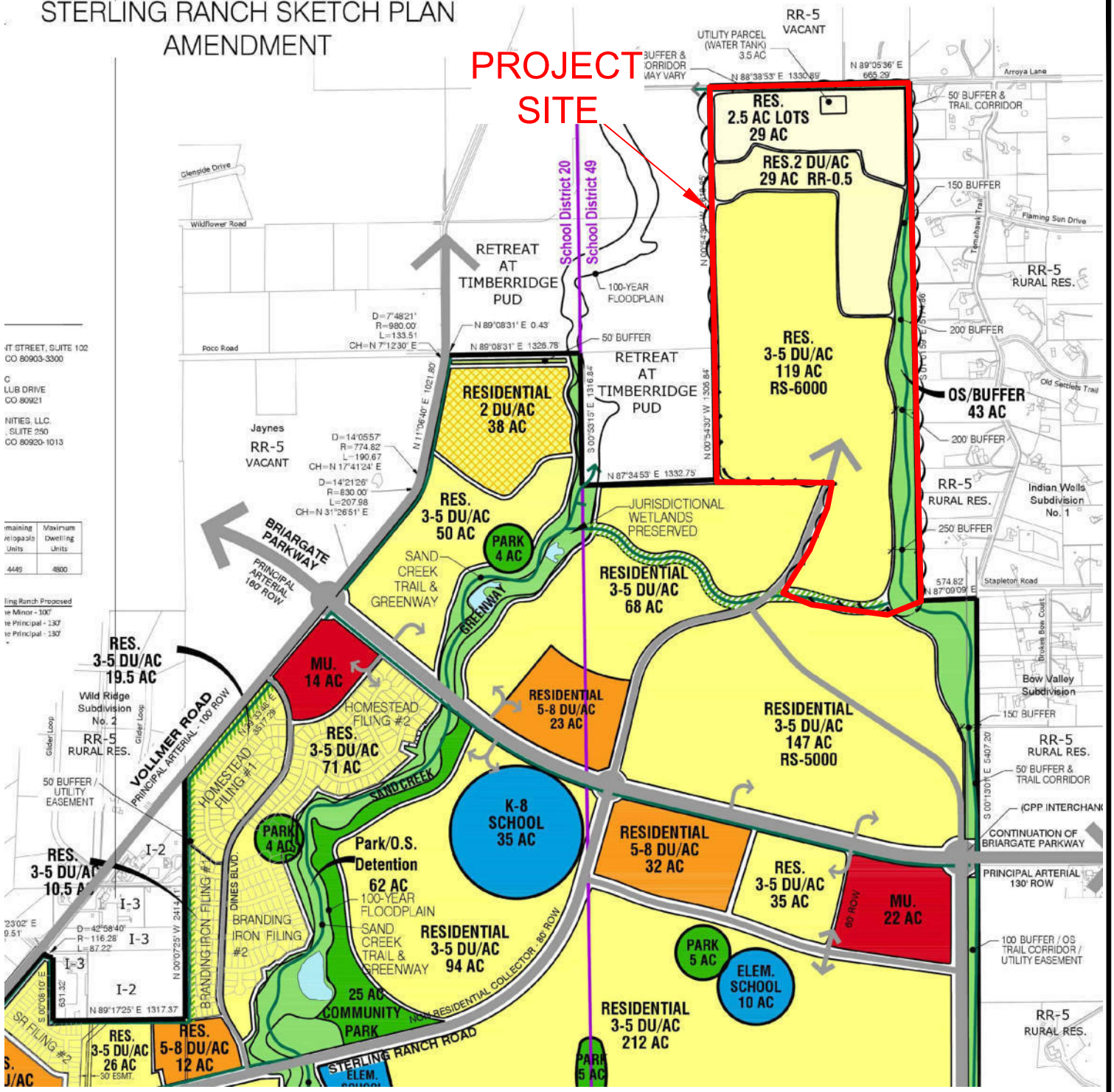
ENTECH ENGINEERING, INC.

USGS TOPOGRAPHY MAP
STERLING RANCH EAST SKETCH PLAN
PARCEL NOS. 52270-00-005 AND 52270-00-006
CLASSIC SRJ

JOB NO. 231065

FIG. 2

STERLING RANCH SKETCH PLAN AMENDMENT

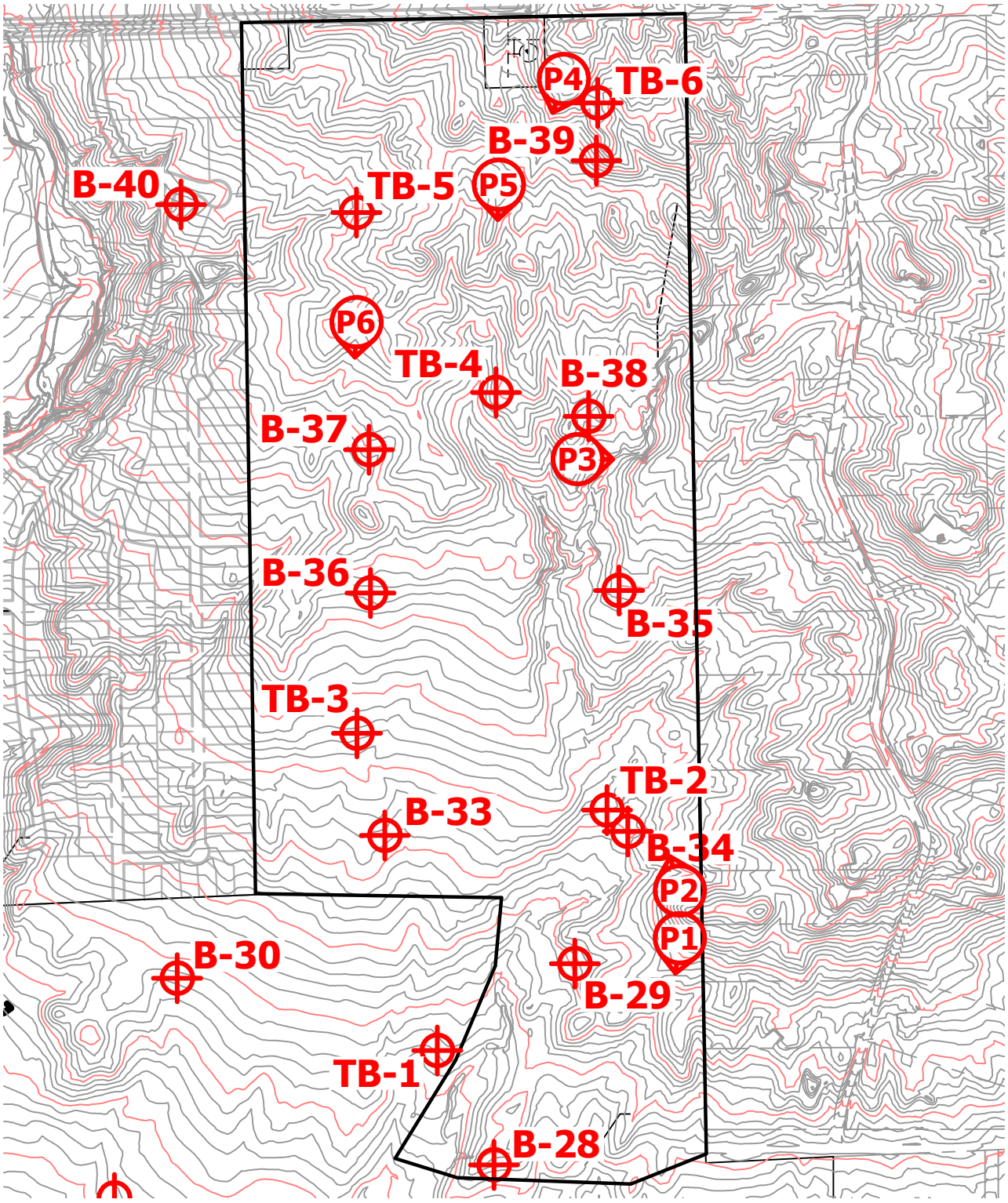


ENTECH ENGINEERING, INC.

SKETCH PLAN
STERLING RANCH EAST SKETCH PLAN
PARCEL NOS. 52270-00-005 AND 52270-00-006
CLASSIC SRJ

JOB NO. 231065

FIG. 3



- APPROXIMATE TEST BORING LOCATION AND NUMBER

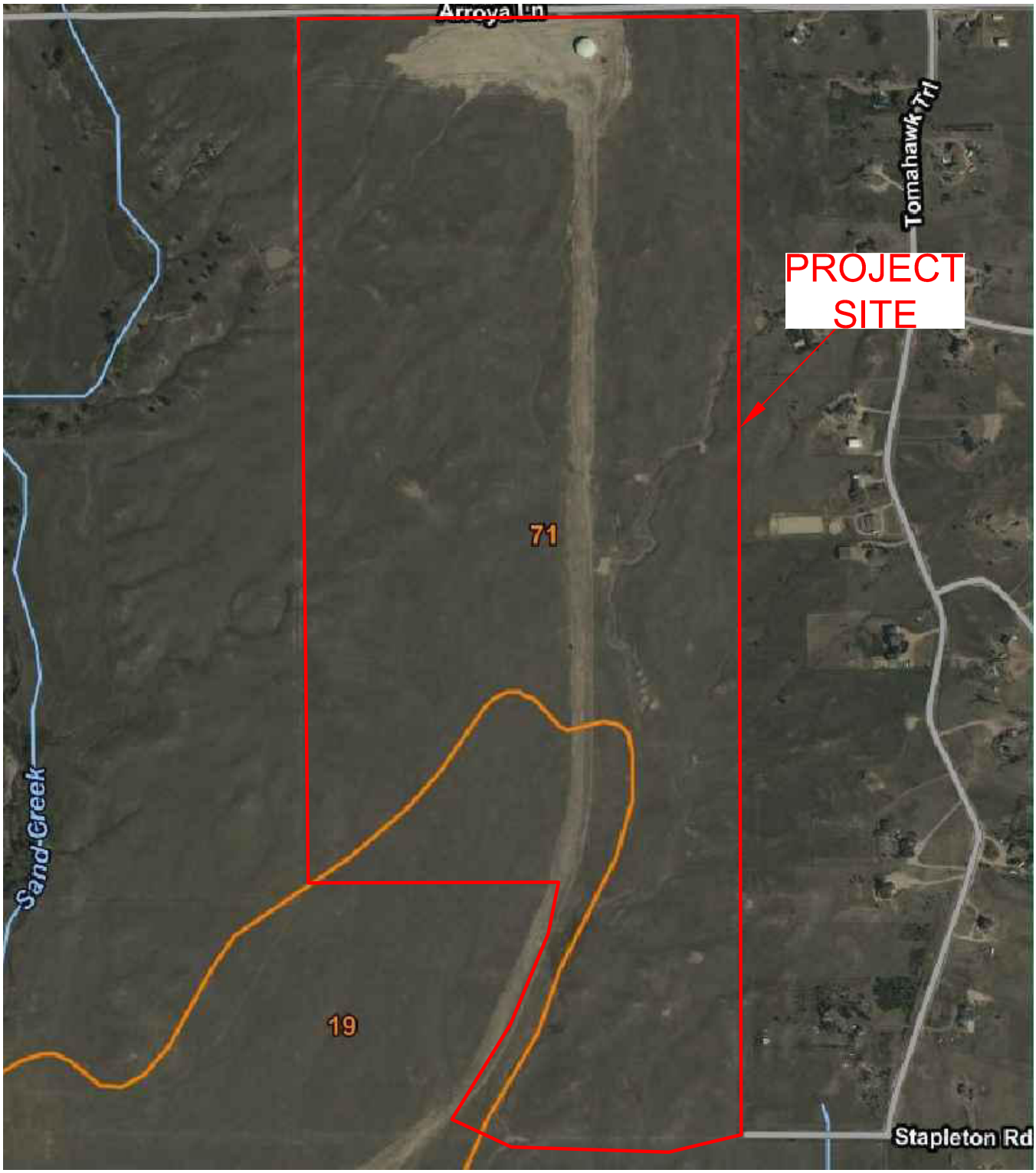
P1 - APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER

ENTECH ENGINEERING, INC.

SITE AND EXPLORATION PLAN
STERLING RANCH EAST SKETCH PLAN
PARCEL NOS. 52270-00-005 AND 52270-00-006
CLASSIC SRJ

JOB NO.
231065

FIG. 4



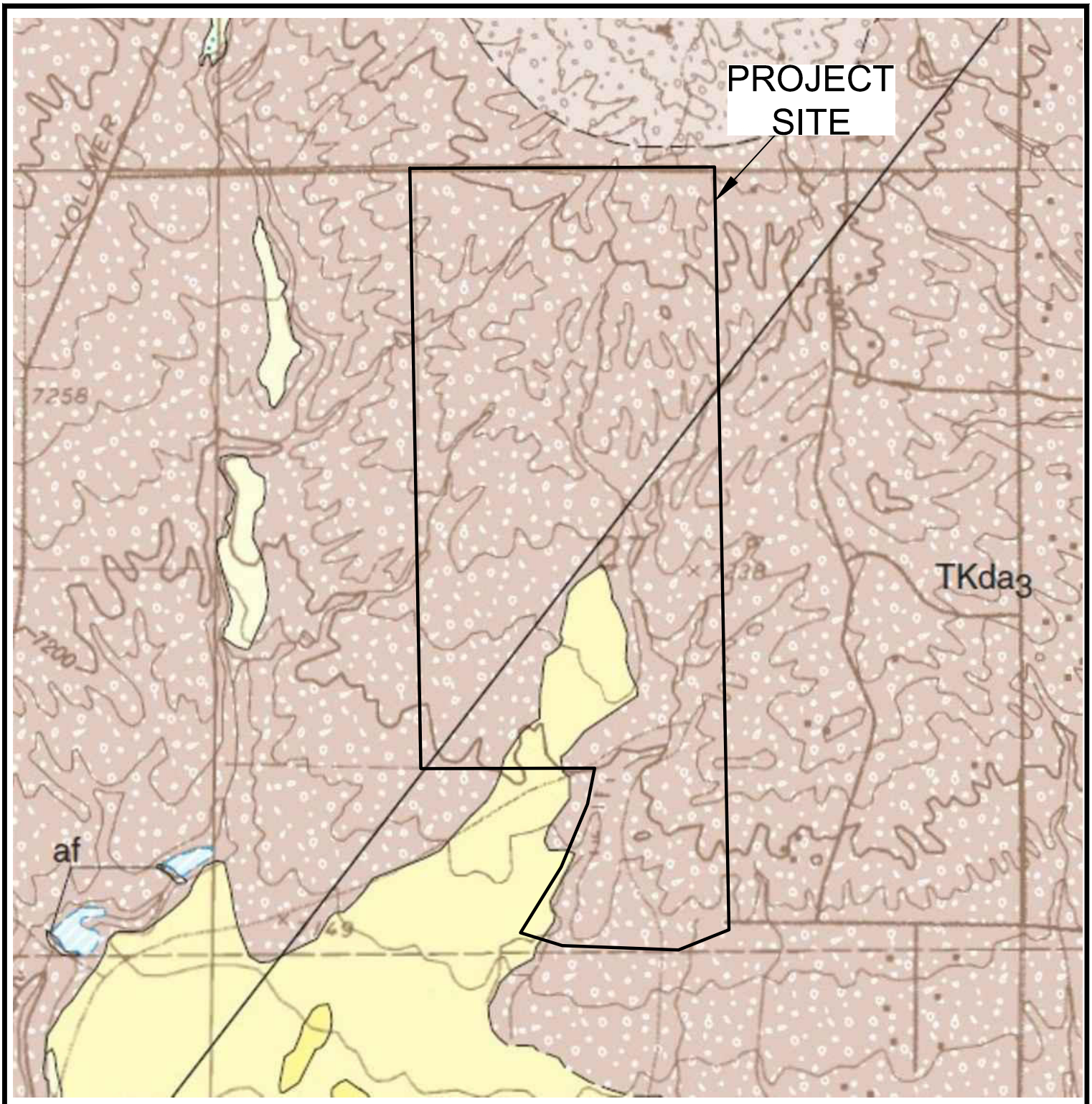
N

ENTECH ENGINEERING, INC.

SOIL SURVEY MAP
45 EAST WOODMEN ROAD
LOT 3, HAWKWOODS SUBDIVISION
SANDRO ODZELLI

JOB NO. 230781

FIG. 5



N

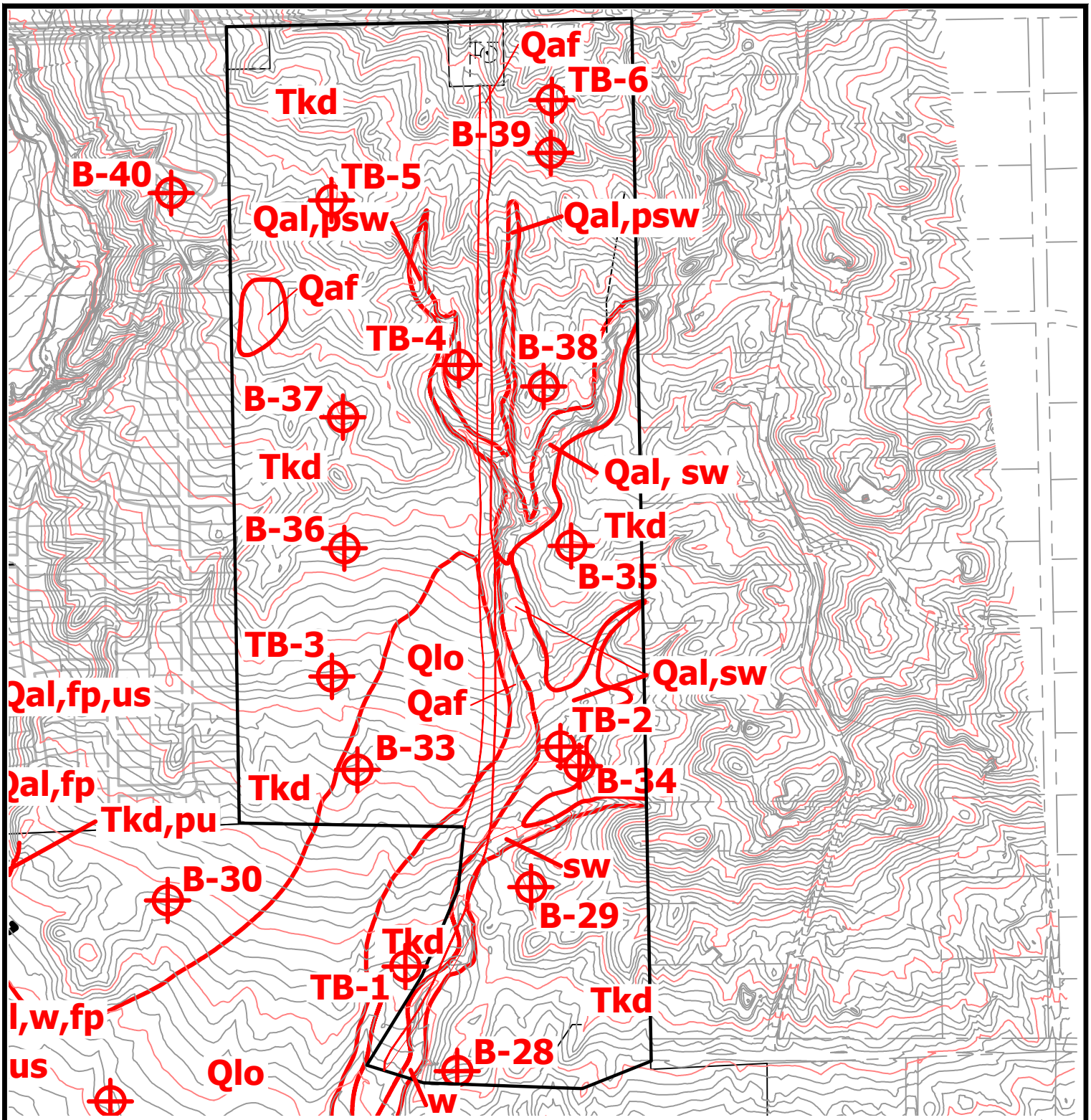
ENTECH ENGINEERING, INC.

FALCON NW QUADRANGLE GEOLOGIC MAP

45 EAST WOODMEN ROAD
LOT 3, HAWKWOODS SUBDIVISION
SANDRO ODZELLI

JOB NO. 230781

FIG. 6



Legend:

Qaf -	Artificial Fill of Holocene Age: man-placed fill deposits associated with stock piles in the northwestern portion of the site, and fill associated with the existing water main
Qc/Tkd -	Colluvium of Quaternary Age overlying the Dawson Formation of Tertiary to Cretaceous Age: sheetwash and residual soils overlying arkosic sandstone with interbedded siltstone and claystone
sw -	seasonally shallow groundwater
psw -	potential seasonally shallow groundwater
w -	flowing/standing water

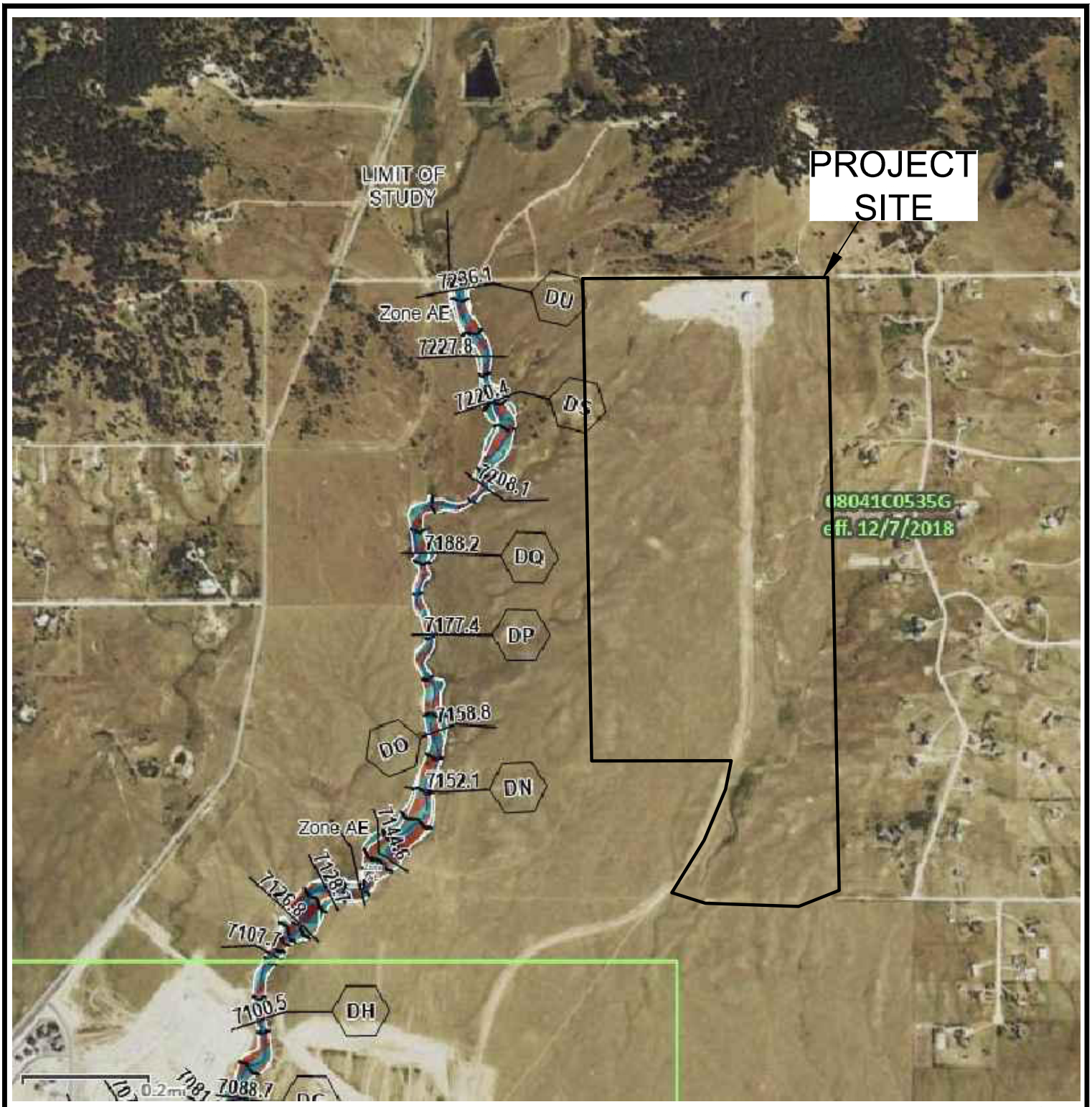
N

ENTECH ENGINEERING, INC.

GEOLOGY/ENGINEERING GEOLOGY MAP
STERLING RANCH EAST SKETCH PLAN
PARCEL NOS. 52270-00-005 AND 52270-00-006
CLASSIC SRJ

JOB NO. 231065

FIG. 7



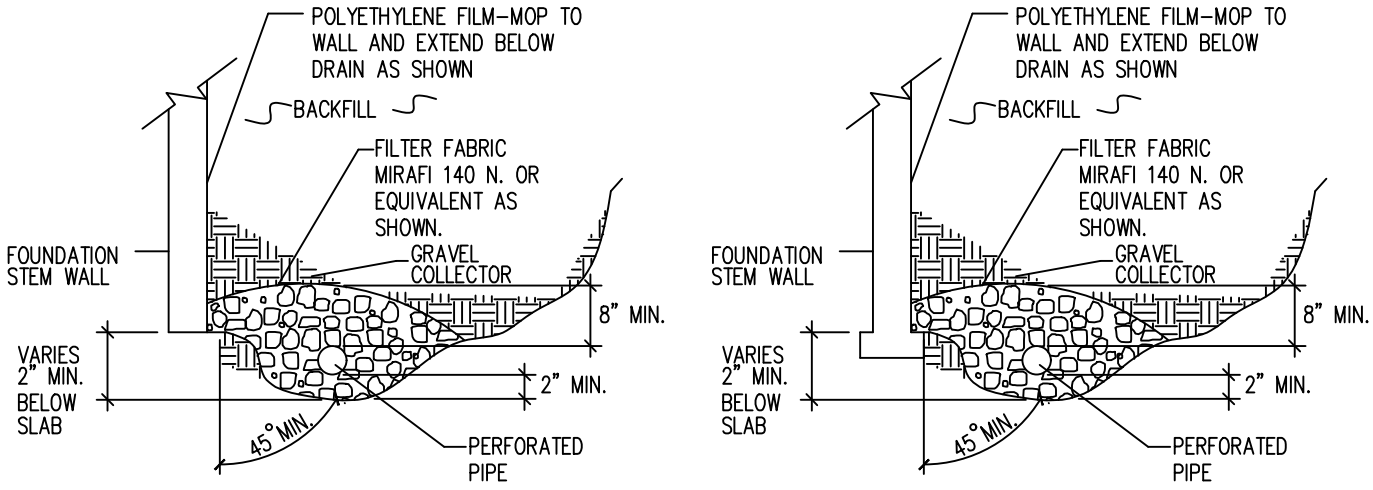
N

ENTECH ENGINEERING, INC.

FEMA FLOODPLAIN MAP
STERLING RANCH EAST SKETCH PLAN
PARCEL NOS. 52270-00-005 AND 52270-00-006
CLASSIC SRJ

JOB NO. 231065

FIG. 8



NOTES:

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

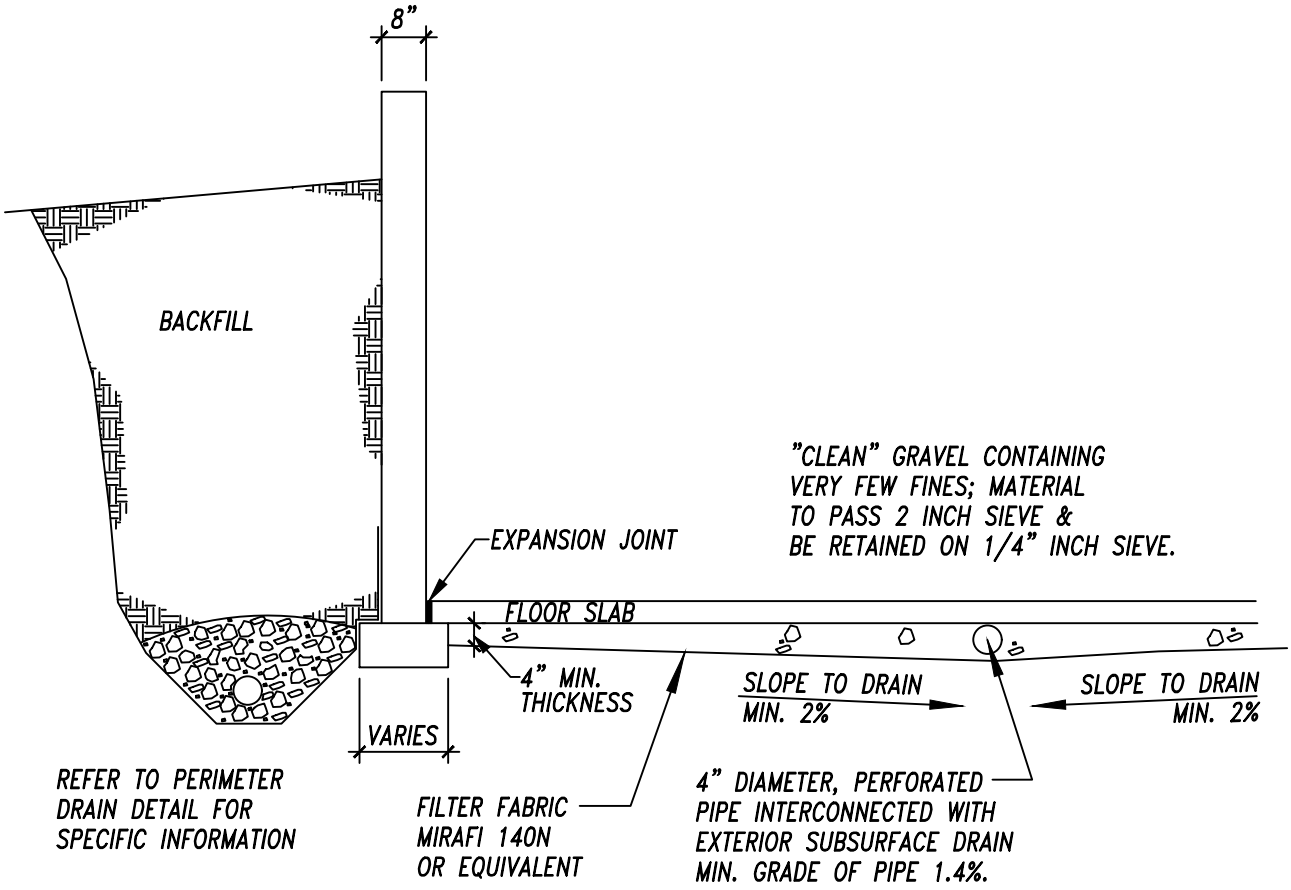
–PIPE DIAMETER DEPENDS UPON EXPECTED SEEPAGE. 4–INCH DIAMETER IS MOST OFTEN USED.

–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.



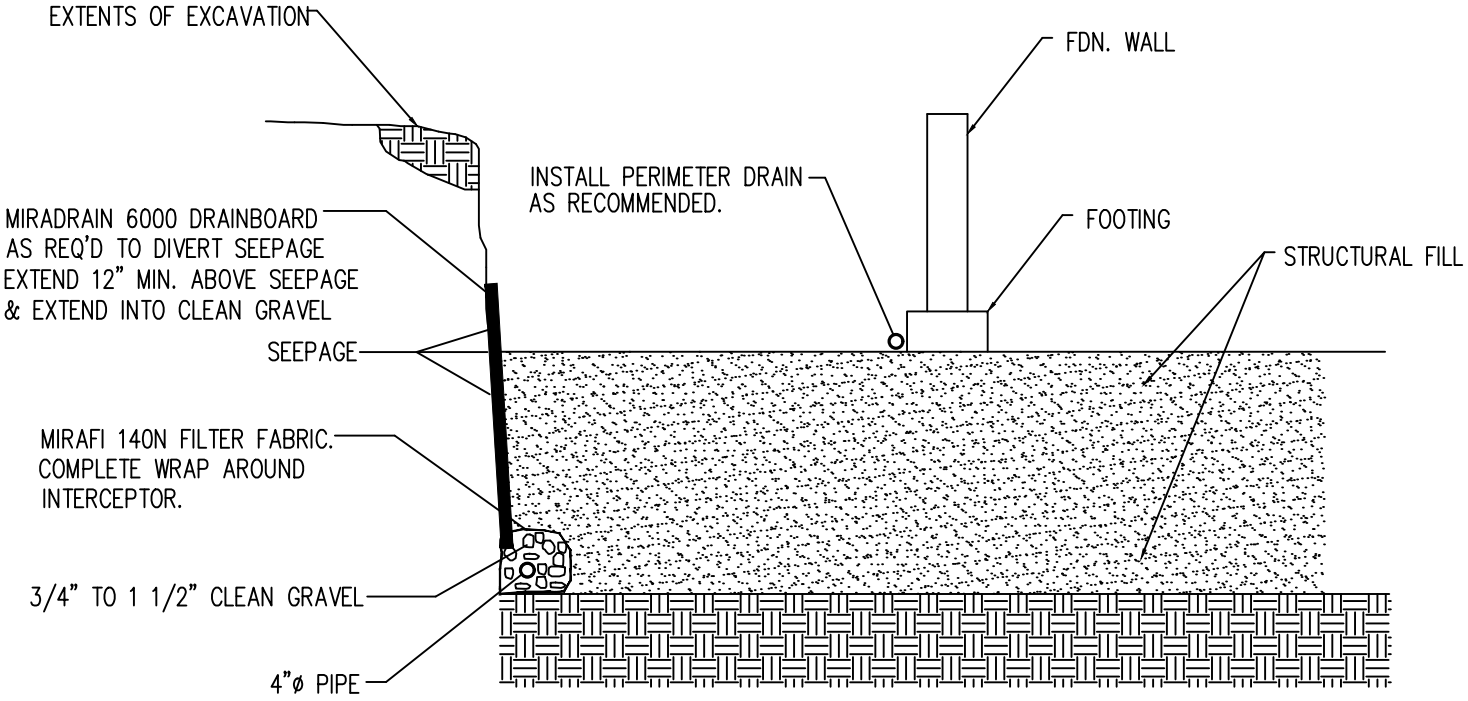
ENTECH ENGINEERING, INC.

TYP. UNDERSLAB DRAINAGE LAYER (CAPILLARY BREAK)

STERLING RANCH EAST SKETCH PLAN
PARCEL NOS. 52270-00-005 AND 52270-00-006
CLASSIC SRJ

JOB NO.
231065

FIG. 10



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

INTERCEPTOR DRAIN DETAIL

N.T.S.

ENTECH ENGINEERING, INC.

INTERCEPTOR DRAIN DETAIL
11745 OWL PLACE
DOUBLETREE VENTURES

JOB NO. 230804

FIG. 11

APPENDIX A: Site Photographs

1

Looking south from the eastern side of the site.

August 9, 2023

2

Looking north from the eastern side of the site.

August 9, 2023

Job No. 231065

3

Looking east towards erosion feature eastern side of site.

August 9, 2023

4

Looking south from the northeastern portion of the site.

August 9, 2023

Job No. 231065

5

Looking south from the northern portion of the site.

August 9, 2023

6

Looking south from the northwestern portion of the site.

August 9, 2023

Job No. 231065

APPENDIX B: Test Boring Logs

TABLE B-1

DEPTH TO BEDROCK AND GROUNDWATER

TEST BORING	DEPTH TO BEDROCK (ft.)	DEPTH TO GROUNDWATER (ft.)
1	9	7
2	>20	2
3	4	>16
4	3	>20
5	3	9
6	6	>20

TEST BORING 1
DATE DRILLED 7/6/2023

REMARKS

WATER @ 7', 7/6/23

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SLIGHTLY SILTY, WITH GRAVEL, BROWN, MEDIUM DENSE, MOIST			12	4.3	1
5			19	9.8	1
SANDSTONE, VERY WEAK, BROWN to GRAY BROWN, HIGHLY WEATHERED. (SAND, SILTY, VERY DENSE, MOIST)			50/9"	9.3	2
15			*	25.1	2
* - BULK SAMPLE TAKEN					
20			*	29.0	2

TEST BORING 2
DATE DRILLED 7/11/2023

REMARKS

WATER @ 2', 7/11/23

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
6" TOPSOIL					
SAND, SILTY, BROWN, MEDIUM DENSE to LOOSE, MOIST to WET			15	13.1	1
5			6	15.3	1
10			*	23.4	1
15			*	23.3	1
20					

ENTECH ENGINEERING, INC.

TEST BORING LOGS

STERLING RANCH EAST
CLASSIC SRJ

JOB NO. 231065

FIG. B-1

TEST BORING 3
DATE DRILLED 7/6/2023

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 16', 7/6/23						
SAND, SILTY, BROWN, MEDIUM DENSE, MOIST				23	8.7	1
SANDSTONE, VERY WEAK, BROWN to GRAY BROWN, HIGHLY WEATHERED. (SAND, SILTY, VERY DENSE, MOIST)	5			50	10.1	2
	10			50/7"	8.4	2
	15			50/6"	10.0	2
AUGER REFUSAL AT 16'						
	20					

TEST BORING 4
DATE DRILLED 7/11/2023

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 7/11/23						
24" TOPSOIL SAND, SILTY, BROWN, MEDIUM DENSE, MOIST				20	8.9	1
SANDSTONE, VERY WEAK, BROWN, COMPLETELY WEATHERED. (SAND, WITH SILT, VERY DENSE, MOIST)	5			50/9"	6.8	2
	10			50/7"	8.1	2
	15			50/4"	5.3	2
CLAYSTONE, VERY WEAK, BROWN, HIGHLY WEATHERED. (CLAY, SANDY, HARD, MOIST)	20			50/10"	13.1	3

ENTECH ENGINEERING, INC.

TEST BORING LOGS

STERLING RANCH EAST
CLASSIC SRJ

JOB NO. 231065

FIG. B-2

TEST BORING 5
DATE DRILLED 7/11/2023

REMARKS

WATER @ 9', 7/11/23

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			25	7.2	1
5			50/11"	6.8	2
10			50/9"	10.3	2
15			50/7"	9.1	2
20			50/7"	8.5	2

12" TOPSOIL
SAND, SILTY, GRAY BROWN, MEDIUM DENSE, MOIST
SANDSTONE, VERY WEAK, BROWN, HIGHLY WEATHERED. (SAND, SILTY, VERY DENSE, MOIST to WET)

TEST BORING 6
DATE DRILLED 7/11/2023

REMARKS

DRY TO 20', 7/11/23

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			29	4.8	1
5			44	9.2	1
10			50/6"	7.5	2
15			50/6"	9.0	2
20			50/8"	9.0	2

4" TOPSOIL
SAND, SILTY, GRAY BROWN, MEDIUM DENSE to DENSE, MOIST

SANDSTONE, WEAK to VERY WEAK, GRAY BROWN, HIGHLY WEATHERED. (SAND, SILTY, VERY DENSE, MOIST)

ENTECH ENGINEERING, INC.

TEST BORING LOGS

STERLING RANCH EAST
CLASSIC SRJ

JOB NO. 231065

FIG. B-3

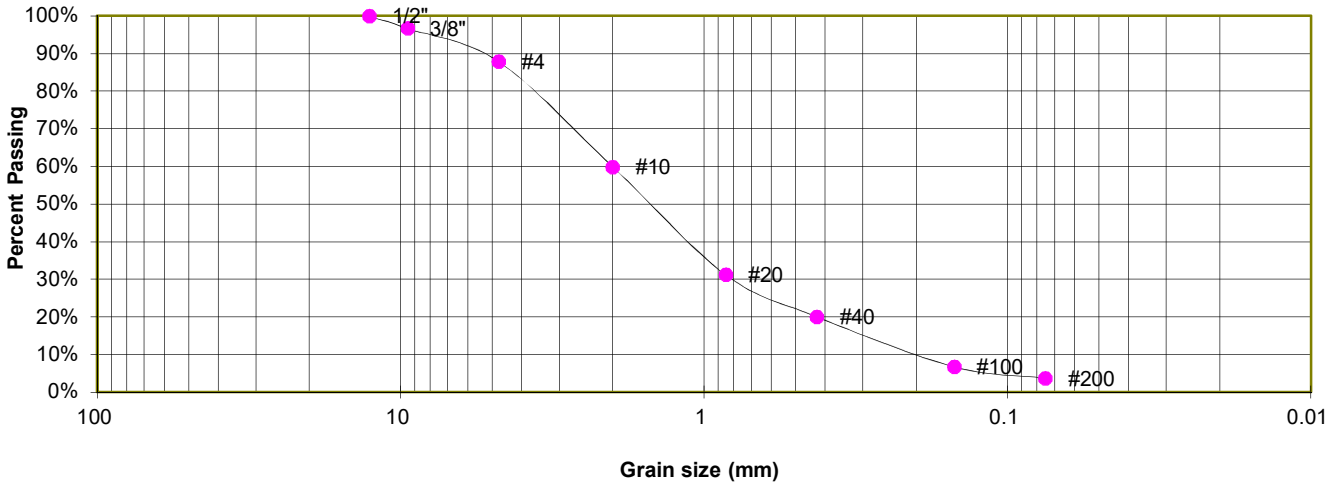
APPENDIX C: Laboratory Test Results

TABLE C-1
SUMMARY OF LABORATORY TEST RESULTS

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	SULFATE (WT %)	USCS	SOIL DESCRIPTION
1	1	5	3.8					SW	SAND, SLIGHTLY SILTY
1	3	2-3	15.4					SM	SAND, SILTY
1	2	10	17.2	NV	NP	NP	<0.01	SM	SAND, SILTY
1	5	2-3	15.5					SM	SAND, SILTY
2	1	15	12.2					SM	SANDSTONE. (SAND, SILTY)
2	6	10	20.2	NV	NP	NP	<0.01	SM	SANDSTONE. (SAND, SILTY)
3	4	20	53.2	38	18	20	0.00	CL	CLAYSTONE. (CLAY, SANDY)

Project: Sterling Ranch East
Client: Classic SRJ
Job No: 231065

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



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.7%
4	87.8%
10	59.9%
20	31.2%
40	20.1%
100	6.7%
200	3.8%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SW

ENTECH ENGINEERING, INC.

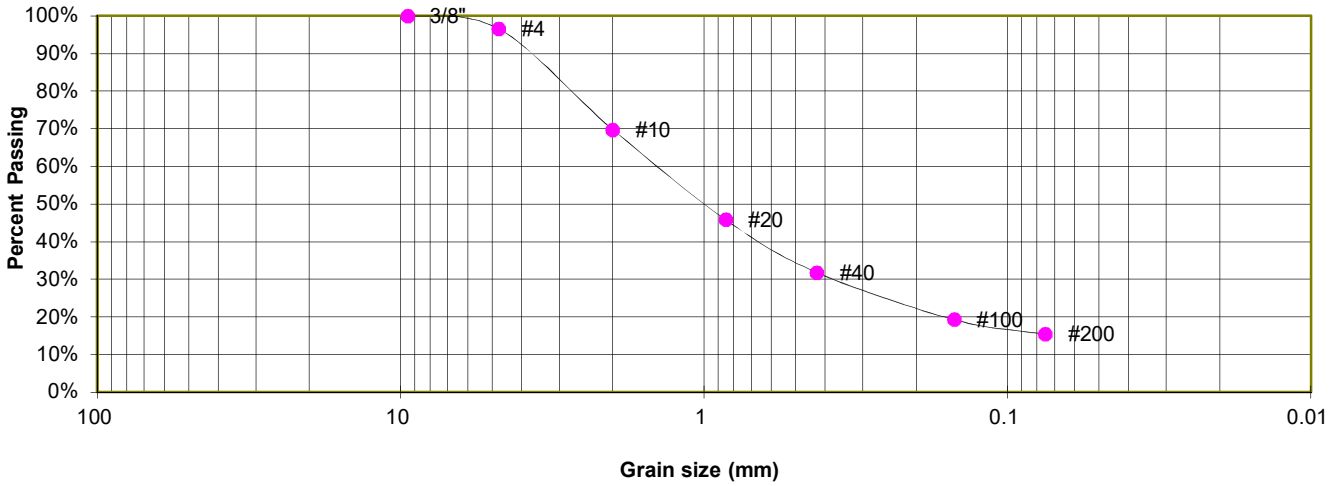
LABORATORY TEST RESULTS

STERLING RANCH EAST
CLASSIC SRJ

JOB NO.
231065

FIG. C-1

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



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.6%
10	69.8%
20	45.9%
40	31.8%
100	19.3%
200	15.4%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

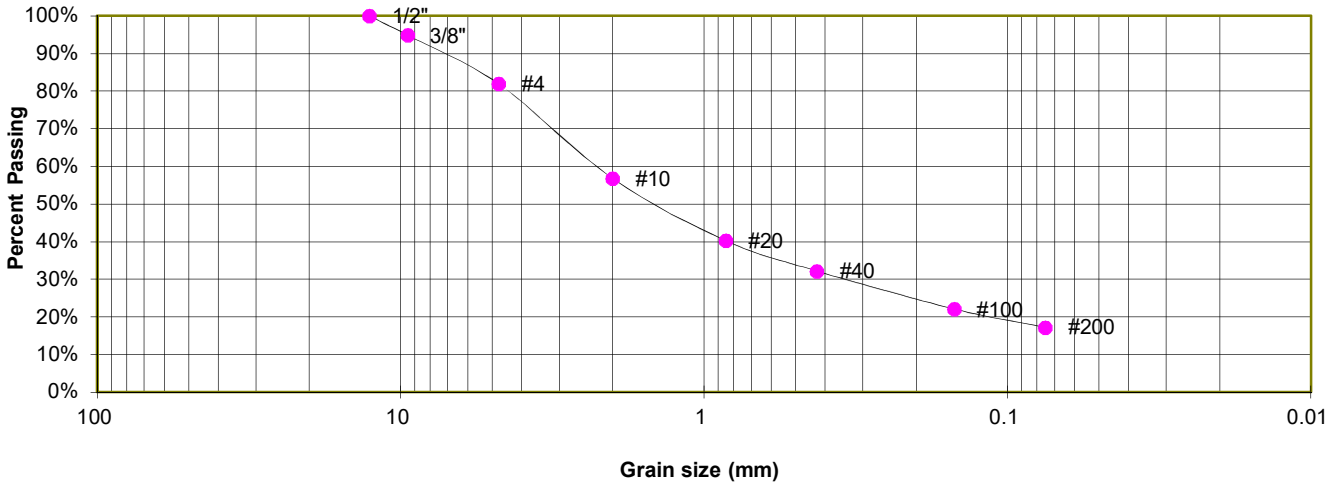
LABORATORY TEST RESULTS

STERLING RANCH EAST
CLASSIC SRJ

JOB NO.
231065

FIG. C-2

TEST BORING	2	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	10	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	94.9%
4	81.9%
10	56.8%
20	40.3%
40	32.2%
100	22.1%
200	17.2%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

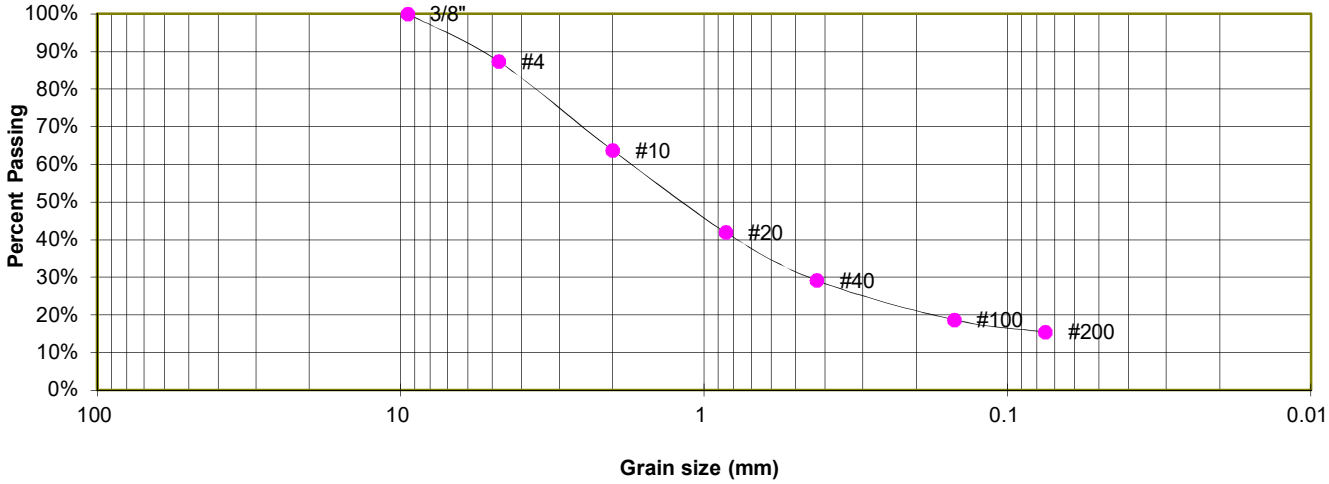
LABORATORY TEST RESULTS

STERLING RANCH EAST
CLASSIC SRJ

JOB NO.
231065

FIG. C-3

TEST BORING	5	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	2-3	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	87.3%
10	63.7%
20	42.0%
40	29.2%
100	18.7%
200	15.5%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

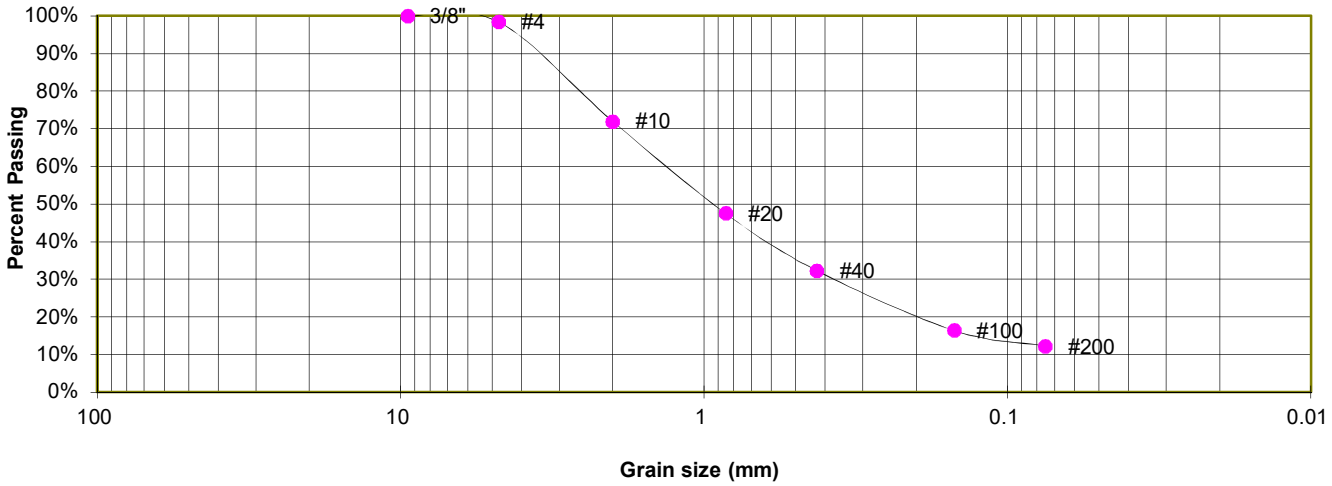
LABORATORY TEST RESULTS

STERLING RANCH EAST
CLASSIC SRJ

JOB NO.
231065

FIG. C-4

TEST BORING	1	SOIL DESCRIPTION	SANDSTONE. (SAND, SILTY)
DEPTH (FT)	15	SOIL TYPE	2



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.4%
10	72.0%
20	47.5%
40	32.3%
100	16.4%
200	12.2%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

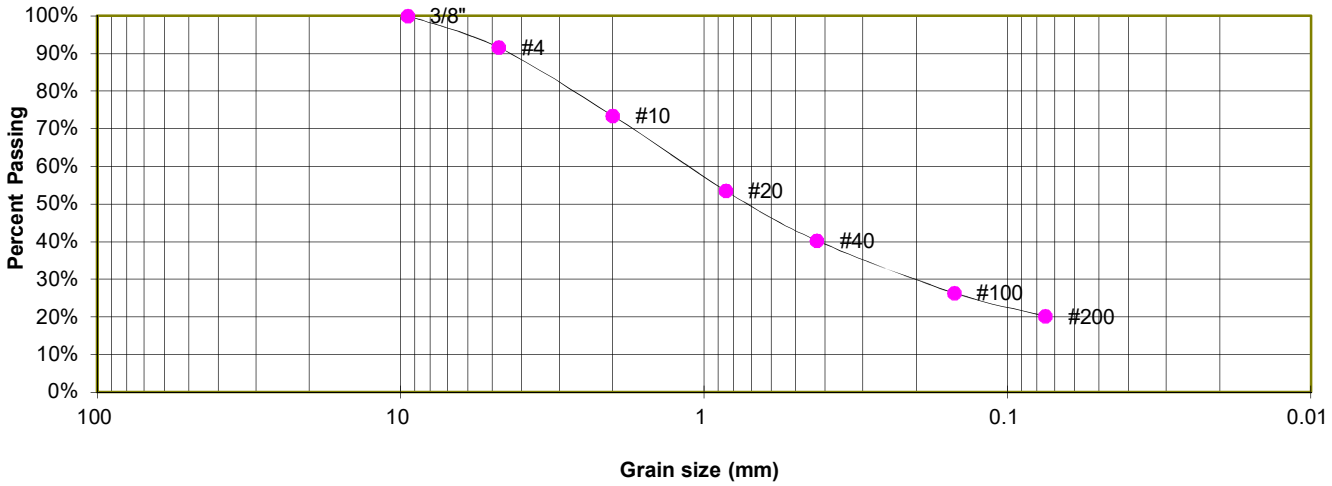
LABORATORY TEST RESULTS

STERLING RANCH EAST
CLASSIC SRJ

JOB NO.
231065

FIG. C-5

TEST BORING	6	SOIL DESCRIPTION	SANDSTONE. (SAND, SILTY)
DEPTH (FT)	10	SOIL TYPE	2



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	91.6%
10	73.5%
20	53.6%
40	40.3%
100	26.4%
200	20.2%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

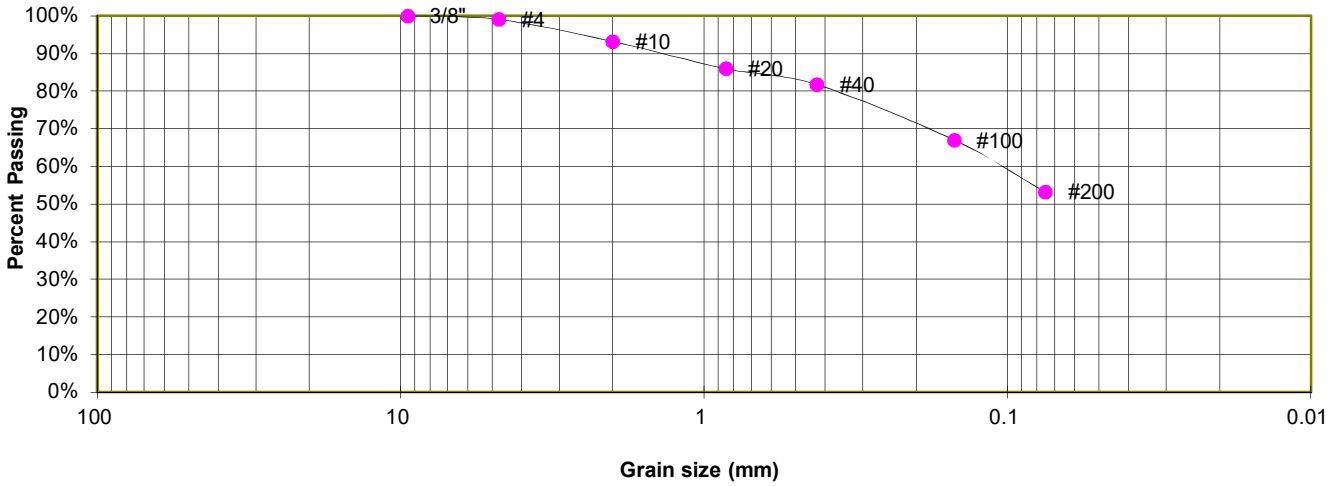
LABORATORY TEST RESULTS

STERLING RANCH EAST
CLASSIC SRJ

JOB NO.
231065

FIG. C-6

TEST BORING	4	SOIL DESCRIPTION	CLAYSTONE. (CLAY, SANDY)
DEPTH (FT)	20	SOIL TYPE	3



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.1%
10	93.2%
20	86.0%
40	81.7%
100	67.0%
200	53.2%

ATTERBERG LIMITS

Plastic Limit	18
Liquid Limit	38
Plastic Index	20

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL

ENTECH ENGINEERING, INC.

LABORATORY TEST RESULTS

STERLING RANCH EAST
CLASSIC SRJ

JOB NO.
231065

FIG. C-7

APPENDIX D: Lab Test Boring Logs from Entech Job No. 82556

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT MORLEY BENTLEY
PROJECT STERLING RANCH
JOB NO. 82556

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	4	2-5			10.0	NV	NP	<0.01			SM-SW	SAND, SLIGHTLY SILTY
1	9	5			22.4						SM	SAND, SILTY
1	12	5			8.6						SM-SW	SAND, SLIGHTLY SILTY
1	17	2-3			11.7						SM-SP	SAND, SLIGHTLY SILTY
1	19	5			15.9						SM	SAND, SILTY
1	20	10			10.7						SM-SW	SAND, SLIGHTLY SILTY
1	25	2-5			8.4						SM-SW	SAND, SLIGHTLY SILTY
1	26	5			17.3						SM	SAND, SILTY
1	41	5			44.1	23	7		574		SC-SM	SAND, VERY CLAYEY-SILTY
1	42	2-3			7.4						SM-SW	SAND, SLIGHTLY SILTY
1	44	5-10			5.7						SM-SW	SAND, SLIGHTLY SILTY
2	7	5	5.6	98.0		29	13			-2.3	CL	CLAY, SANDY
2	13	2-3			54.6				455		CL	CLAY, VERY SANDY
2	21	7						0.10	4179		CL	CLAY, SANDY
2	23	7							1085		CL	CLAY, SANDY
2	27	9							2300		CL	CLAY, SANDY
2	31	5	27.9	95.4	64.2	40	25			1.8	CL	CLAY, SANDY
2	34	2-5			51.6	27	13				CL	CLAY, VERY SANDY
3	5	15	10.4	118.6		24	11			-0.1	SC	SANDSTONE, CLAYEY
3	6	15-20			14.8			0.01			SM	SANDSTONE, SILTY
3	11	10			17.1						SM	SANDSTONE, SILTY
3	13	10			36.0						SM	SANDSTONE, SILTY
3	14	5			20.4						SM	SANDSTONE, SILTY
3	18	15							456		SM	SANDSTONE, SILTY
3	22	5	23.3	100.7	21.1	NV	NP			0.0	SM	SANDSTONE, SILTY
3	28	5-10			17.8						SM	SANDSTONE, SILTY
3	29	7							485		SC	SANDSTONE, CLAYEY
3	30	10			9.1						SM-SW	SANDSTONE, SLIGHTLY SILTY
3	33	5			14.4						SM	SANDSTONE, SILTY
3	35	15			11.1						SM-SW	SANDSTONE, SLIGHTLY SILTY
3	36	2-5			18.7				1014		SC	SANDSTONE, CLAYEY

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
3	38	5			13.3						SM	SANDSTONE, SILTY
3	39	15	11.0	124.3	42.8	33	16			1.0	SC	SANDSTONE, VERY CLAYEY
3	40	2-3							360		SM-SC	SANDSTONE, SILTY, CLAYEY
4	1	5	13.4	117.8	68.1					0.9	CL	CLAYSTONE, SANDY
4	3	7			55.3	32	18		846		CL	CLAYSTONE, VERY SANDY
4	24	2-3							1757		CL	WEATHERED CLAYSTONE, SANDY
4	25	10							1845		CL	CLAYSTONE, SANDY
4	33	15	24.3	100.7	73.0	51	28			2.7	CH	CLAYSTONE, SANDY
4	40	15	14.8	117.6	71.5	38	16	0.00		1.0	CL	CLAYSTONE, SANDY
4	43	20	12.6	121.0						0.3	CL	CLAYSTONE, SANDY

TEST BORING NO. 27
DATE DRILLED 8/9/2006
Job # 82556

REMARKS

DRY TO 15', 8/9/06
CAVED TO 14.5',
8/10/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, MOIST
			19	2.8	1	
5			30	6.6	1	
						CLAY, SANDY, GRAY, STIFF, MOIST
10			29	19.5	2	
			50/9"	10.2	3	SANDSTONE, GRAVELLY, CLAYEY, FINE TO COARSE GAINED, GRAY BROWN, VERY DENSE, MOIST
15			50/5"	10.4	3	
20						

TEST BORING NO. 28
DATE DRILLED 8/10/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS

DRY TO 15',
8/10/06
CAVED TO 14.5',
8/11/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
					1	SAND, SILTY, DARK BROWN
			25	7.1	3	WEATHERED SANDSTONE, SILTY, TAN, MEDIUM DENSE,
5			50/5"	6.8	3	MOIST
						SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
10			50/5"	5.9	3	
15			50/4"	8.1	3	
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/5/06

JOB NO.: 82556
FIG NO.: B-14

TEST BORING NO. 29
DATE DRILLED 8/10/2006
Job # 82556

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 15', 8/10/06						
SAND, SILTY, BROWN						1
SANDSTONE, SILTY, GRAVELLY, FINE TO COARSE GRAINED, LIGHT BROWN, VERY DENSE, MOIST				50/6"	2.3	3
	5			50/5"	6.4	3
SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GREEN BROWN, VERY DENSE, MOIST				*	7.6	3
	10			50/6"	9.0	3
	15			50/4"		3
* - BULK SAMPLE TAKEN	20					

TEST BORING NO. 30
DATE DRILLED 8/14/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER AT 11', 8/16/06						
SAND, SILTY, BROWN						1
CLAY, SANDY, TAN, MOIST				*	13.0	2
SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST				24	3.4	1
	5			34	6.6	1
SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST						
	10			50/5"	9.3	3
CLAYSTONE, SILTY, GREEN BROWN, HARD, MOIST	15			50/5"	17.2	4
* - BULK SAMPLE TAKEN	20					

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/5/06

JOB NO.: 82556
FIG NO.: B-15

TEST BORING NO. 33
DATE DRILLED 8/14/2006
Job # 82556

REMARKS

DRY TO 15', 8/16/06

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			22	3.9	1
5			50/10"	6.6	3
10			50/7"	11.8	3
15			50/9"	24.8	4
20					

SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST

SANDSTONE, SILTY, GRAVELLY, FINE TO COARSE GRAINED, LIGHT BROWN, VERY DENSE, MOIST

CLAYSTONE, SANDY, BROWN, HARD, MOIST

TEST BORING NO. 34
DATE DRILLED 8/10/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS

WATER @ 6', 8/11/06

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			26	4.9	2
5			13	7.0	2
10			50/6"	14.2	3
15			50/5"	7.9	3
20					

CLAY, VERY SANDY, DARK BROWN TO BROWN, STIFF TO FIRM, MOIST

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, WET

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/15/06

JOB NO.: 82556
FIG NO.: B-17

TEST BORING NO. 35
DATE DRILLED 8/10/2006
Job # 82556

REMARKS

DRY TO 15',
8/10/06
CAVED TO 14.5',
8/11/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			29	2.4	1
5			50 / 11"	7.6	3
10			50 / 6"	8.6	3
15			50 / 4"	6.2	3
20					

SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE, MOIST
SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, LIGHT BROWN, VERY DENSE, MOIST

TEST BORING NO. 36
DATE DRILLED 8/14/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS

DRY TO 15',
8/14/06
CAVED TO 14',
8/16/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			50	6.7	3
5			50 / 7"	10.4	3
10			50 / 5"	8.8	3
15			50 / 4"	11.8	3
20					

SAND, SILTY, BROWN SANDSTONE, GRAVELLY, CLAYEY, FINE TO COARSE GRAINED, LIGHT BROWN, VERY DENSE, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KLH	9/5/06

JOB NO.: 82556
FIG NO.: B-18

TEST BORING NO. 37
DATE DRILLED 8/10/2006
Job # 82556

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SILTY, BROWN						1
SANDSTONE, SILTY, FINE TO COARSE GRAINED, LIGHT BROWN, VERY DENSE, MOIST				50/7"	4.1	3
	5			50/5"	5.2	3
CLAYEY LENSES	10			50/7"	10.2	3
	15			50/4"	7.4	3
	20					

DRY TO 15',
8/10/06
CAVED TO 14.5',
8/11/06, DRY

TEST BORING NO. 38
DATE DRILLED 8/10/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SILTY, BROWN						1
SANDSTONE, SILTY, GRAVELLY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST				50/8"	4.3	3
	5			50/6"	5.5	3
	10			50/4"	6.1	3
	15			50/4"	9.3	3
	20					

DRY TO 15',
8/10/06
CAVED TO 14.5',
8/11/06, DRY

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KAH	9/5/06

JOB NO.: 82556
FIG NO.: B-19

TEST BORING NO. 39
DATE DRILLED 8/10/2006
Job # 82556

REMARKS

DRY TO 15',
8/10/06
CAVED TO 14.5',
8/11/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			18	2.2	1	SAND, SILTY, GRAVELLY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
			50			SANDSTONE, GRAVELLY,
5			10"	9.6	3	SILTY, FINE TO COARSE
			*	11.0	3	GRAINED, RED BROWN, VERY DENSE, MOIST
10			50 7"	10.2	3	
						SANDSTONE, VERY CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
15			50 5"	11.1	3	
20						

* - BULK SAMPLE TAKEN

TEST BORING NO. 40
DATE DRILLED 8/10/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS

DRY TO 15',
8/10/06
CAVED TO 14.5',
8/11/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
					1	SAND, SILTY, BROWN
			50 10"	6.7	3	SANDSTONE, SILTY, CLAYEY, GRAVELLY, FINE TO COARSE
5			50 5"	4.4	3	GRAINED, LIGHT BROWN, VERY DENSE, MOIST
10			50 5"	8.8	3	
						CLAYSTONE, SANDY, BROWN, HARD, MOIST
15			50 5"	14.4	4	
20						

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		KHA	9/5/06

JOB NO.: 82556
FIG NO.: B-26

APPENDIX E: Soil Survey Descriptions

El Paso County Area, Colorado

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

Map Unit Setting

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

Map Unit Composition

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

Description of Columbine

Setting

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

Typical profile

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

Properties and qualities

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

Interpretive groups

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

Minor Components

Fluvaquentic haplaquolls

Percent of map unit: 1 percent

Landform: Swales
Hydric soil rating: Yes

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

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

Data Source Information

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

El Paso County Area, Colorado

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 20, Sep 2, 2022