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SOIL, GEOLOGY, & GEOLOGIC HAZARD STUDY
STERLING RANCH EAST – PRELIMINARY PLAN NO. 1
PARCEL NOS. 17, 18, 22, 23, 24, 26, 37, & 38
EL PASO COUNTY, COLORADO

Prepared for

Classic SRJ
2138 Flying Horse Club Drive
Colorado Springs, Colorado 80921

Attn: Loren Moreland

April 19, 2022

Respectfully Submitted,

ENTECH ENGINEERING, INC.

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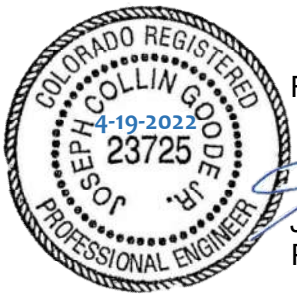

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1.0 SUMMARY

Project Location

The project lies in portions of the SW¼ of Section 27, SE¼ Section 28, SW¼ of Section 24, SE¼ of the SW¼ and E½ of Section 33, and the NW¼ of the NW¼, 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 Preliminary Plan No. 1 at Sterling Ranch East is approximately 487 acres, and seven hundred and sixty-one (761) lots are proposed for Parcel Nos. 17, 18, 22, 23, 24, 26, 37, and 38. The proposed development is to consist of single-family residential, two potential school sites, park and open space areas, drainage easements, and regional detention ponds. The development 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, erosion, hydrocompaction, potentially unstable slopes, seasonal and potentially seasonal shallow groundwater areas, floodplains, flowing/ponded water, and radon. 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.

2.0 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in portions of the SW¼ of Section 27, SE¼ Section 28, SW¼ of Section 24, SE¼ of the SW¼ and E½ of Section 33, and the NW¼ of the NW¼, 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, east of Sand Creek. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is generally gradually sloping to the south, with moderate to steep slopes along long portions of Sand Creek, and cut slopes through the central portion of the site. The central portion of the site has been used a borrow area for fill used in other portions of Sterling Ranch. Sand Creek and other minor drainages, and several existing ponds were observed on the site. Water was observed in portions of Sand Creek, and the ponds located along Sand Creek. The minor drainages were dry at the time of our site investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included a sand quarry/fill borrow areas, grazing and pasture land. The fill borrow areas are primarily free of vegetation, and the undisturbed areas of the site contain primarily field grasses, cacti, yucca, and weeds. Site photographs, taken March 14, 2022, are included in Appendix A.

Total acreage involved in Preliminary Plan No. 1 at Sterling Ranch East is approximately 487 acres. Seven hundred and sixty-one (761) single-family residential lots are proposed for Parcel Nos. 17, 18, 22, 23, 24, 26, 37, and 38. The proposed development is to consist of single-family residential, two potential school sites, park and open space areas, drainage easements, and regional detention ponds. Final grading plans were not available at the time of this report. The proposed housing has will potentially utilize crawlspaces, garden level basements, or full basements. The Development Plan is presented in Figure 3, and the Site Plan/Test Boring Location Map is presented in Figure 4.

3.0 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.

4.0 FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Natural Resources Conservation Service (Reference 1), previously the Soil Conservation Service (Reference 2) survey, was 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 March 14, 2022.

Geologic Hazard Studies were previously performed by Entech Engineering, Inc. for the entire Sterling Ranch development, October 31, 2006 (Reference 3, Appendix D), January 20, 2009 (Reference 4), and Sterling Ranch Phase 3, January 28, 2021 (Reference 5, Appendix E). Information from these reports was used in evaluating the site. A total of twenty-eight test borings were drilled across the site. Three additional Test Borings were drilled as part of this investigation to determine general soil and bedrock characteristics. The locations of the test borings are indicated on the Development Plan/Test Boring Location Map, Figure 4. 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, 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 1. Summaries of the Laboratory Testing and Test Boring Logs from the previous investigations are included in Appendices D and E.

5.0 SOIL, GEOLOGY AND ENGINEERING GEOLOGY

5.1 General Geology

Physiographically, the site lies in the western portion of the Great Plains Physiographic Province. Approximately 12 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 6). 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-made fill, eolian, 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-made soils exist as fill piles located in the southwestern portion of the site and earthen dams associated with the ponds located along Sand Creek. 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 1), previously the Soil Conservation Service (Reference 2) has mapped three soil types on the site (Figure 5). In general, the soils classify as coarse sandy loam. The soils are described as follows:

Type	Description
8	Blakeland Loamy Sand, 1 to 9% slopes
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 F. The soils have generally been described to have rapid to very rapid permeabilities. Limitations to development are

varied on the different soil types and include frost action potential. The hazard of flooding exists in floodplain areas in Soil Type 19. Possible hazards with soil erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards.

5.3 Site Stratigraphy

The Falcon NW Quadrangle Geologic Map showing the site is presented in Figure 6 (Reference 6). The Geology Map prepared for the site is presented in Figure 7. Six mappable units were identified on this site, which are described as follows:

Qaf **Artificial Fill of Quaternary Age:** These are man-made fill deposits associated with a fill pile in the southwestern portion of the site and earthen dams for the ponds located along Sand Creek in the western portions of the site. Other areas of fill may be encountered that are not indicated on the map.

Qal **Recent Alluvium of Quaternary Age:** These are recent stream deposits that have been deposited in the drainage along the western boundary of the site. These materials consist of silty to clayey sands and sandy clays. Some of these alluviums may contain highly organic soils.

Qam **Middle Alluvium of Pleistocene Age:** These materials consist of stream terrace deposits. The Middle Alluvium typically consists of silty to clayey gravelly sands. This deposit is usually highly stratified and may contain lenses of silt, clay or cobbles. This unit correlates to the Broadway Alluvium in the Denver area.

Qao_1 **Old Alluvium One of Late-Middle Pleistocene 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 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.

Qes **Eolian Sand of Quaternary Age:** These deposits are fine to medium grained soil deposited on the site by the action of the prevailing winds from the west and northeast.

They typically occur as large dune deposits or narrow ridges. These soil types are typically tan to brown in color and tend to have very uniform or well-sorted gradation. These materials tend to have a relatively high permeability and low density.

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 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 7), the *Geologic Map of the Colorado Springs-Castle Rock Area*, distributed by the US Geological Survey in 1978 (Reference 8), and the *Geologic Map of the Pueblo 1^0 x 2^0 Quadrangle*, distributed by the US Geological Survey in 1981 (Reference 6). 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 7.

5.4 Soil Conditions

Five soil and rock types were encountered in the test borings drilled on the site: Type 1A: slightly silty sand fill (SM-SW), Type 1: silty to slightly silty native sand (SM, SM-SW), Type 2: very sandy clay (CL), Type 3: very clayey to clayey and slightly silty to silty sandstone (SC, SM-SW, SM), and Type 4: sandy to very sandy claystone and sandy to very sandy, clayey siltstone (CL, CH, ML). Each material type was classified using the results of the laboratory testing and the Unified Soil Classification System (USCS).

Soil Type 1A was classified as a silty sand fill (SM). The sand fill was encountered in Test Boring No. 13 (Reference 5, Appendix E) at the existing ground surface and extending to 6 feet below the ground surface (bgs). Standard Penetration Testing on the fill resulted in N-Values of 24 and 31 bpf, indicating medium dense to dense states. Water content and grain size testing resulted in water contents of 6 and 7 percent, with approximately 11 percent of the soil size particles passing the No 200 severe. Atterberg limits testing indicated non-plastic results.

Soil Type 1 slightly silty to silty sand, and clayey sand (SM-SW, SM, SC), was encountered in twenty-five of the test borings at the existing ground surface extending to depths ranging from 3 to 12 feet bgs. These soils were encountered at loose to dense states and at moist conditions. Samples tested had 6 to 36 percent of the soil sized particles passing the No. 200 Sieve. Atterberg Limits Testing resulted in non-plastic results. Swell/Consolidation Testing resulted in a consolidation of 1.7 percent, indicated a low to moderate consolidation potential. Sulfate testing resulted in less than 0.01 percent sulfate by weight indicating the sand exhibits negligible potential for below grade concrete degradation.

Soil Type 2 very sandy to sandy clay (CL), encountered in six of the test borings at depths ranging from the existing surface grade to 9 and extending to depths ranging from 2 to 10 feet bgs. These soils were encountered at stiff consistencies and moist conditions. Samples tested had 53 to 55 percent of the soil sized particles passing the No. 200 Sieve. Atterberg Limits Testing resulted in a liquid limit of 39 and a plastic index of 21. FHA Swell Testing resulted in expansion pressures of 455 to 2300 psf, indicating a low to moderate expansion potential. Swell/Consolidation Testing resulted in volume changes of -0.1 to 1.0, indicating a low consolidation and expansion potentials. Sulfate testing resulted in less than 0.01 percent sulfate by weight indicating the clay exhibits negligible potential for below grade concrete degradation.

Soil Type 3 silty to slightly silty sandstone, clayey sandstone (SC), encountered in all of the test borings at depths ranging from 3 to 19 feet bgs and extending to depths ranging from 13 feet the termination of the test borings (15 to 20 feet). The sandstone was encountered at dense to very dense states and at moist to wet conditions. Samples tested had 27 percent of the soil sized particles passing the No. 200 Sieve. Atterberg Limits Testing resulted in liquid limits of 25 to 35 and plastic indexes of 10 to 18, and non-plastic results. Sulfate testing resulted in 0.00 to less than 0.01 percent sulfate by weight indicating the sandstone exhibits negligible potential for below grade concrete degradation.

Soil Type 4 sandy to very sandy claystone, and sandy to very sandy-clayey siltstone (CL, CH, ML), encountered in five of the test borings at depths ranging from 7 to 17 feet bgs and extending to depths ranging from 9.5 to 19 feet and to the termination of the test borings (15 to 20 feet). The claystone and siltstone were encountered at very stiff hard consistencies and at

moist conditions. Samples tested had 58 to 63 percent of the soil sized particles passing the No. 200 Sieve. Atterberg Limits Testing resulted in liquid limits of 32 to 41 and plastic indexes of 7 to 18. Swell/Consolidation Testing resulted in volume changes of 1.9 to 2.0 percent, which indicates a low to moderate expansion potentials. Highly expansive claystone is common in the area. Sulfate testing resulted in 0.02 percent sulfate by weight indicating the claystone exhibits negligible potential for below grade concrete degradation.

The Test Boring Logs are presented in Appendix B. Laboratory Test Results are presented in Appendix C. A Summary of Laboratory Test Results is presented in Table 1.

5.5 Groundwater

Groundwater was encountered in nine of the test borings at depths of 3 to 19 feet. The majority of the test borings were dry. 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.

6.0 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

As mentioned previously, 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

Areas of artificial fill were observed in areas of the site. The majority of these areas are associated with recent grading and fill stockpiling.

Mitigation: It is anticipated the fill piles will be removed prior to construction during site grading. In the areas of site grading, fill records should be obtained to determine if the fill was placed in a controlled manner. 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.

Hydrocompaction – Constraint

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

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

Areas of loose or collapsible soils may also be encountered in these areas. Should loose or collapsible soils be encountered beneath foundations, removal and recompaction of the upper 2 to 3 feet with thorough moisture conditioning at a minimum of 95 percent of its maximum

Modified Proctor Dry Density, ASTM D-1557 will be necessary. Specific recommendations should be made after additional investigation of each building site.

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.

Areas of Erosion – Constraint

These are areas that are undergoing erosion by water and sheetwash producing gullies and rill erosion. The areas significant erosion observed on the site are located in the former borrow areas where most of the vegetation had been removed.

Mitigation: Due to the nature of the soils on this site, virtually all the soils are subject to erosion by wind and water. Other minor areas of erosion were observed on site other than those mapped, particularly where some rill erosion has occurred. 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 8.0 "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).

Slope Stability and Landslide Hazard

The majority of the slopes on-site are gently sloping and do not exhibit any past or potential unstable slopes or landslides. Some of the steeper slopes along Sand Creek west of the site, and the cut slopes from fill borrow areas in the central portion of the site have been identified as potentially unstable slopes. The mitigation recommendation for these areas is as follows:

Potentially Unstable Slope Areas – Hazard

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. The steeper slopes along portions of Sand Creek which area located within open-space or park areas and will be avoided by the planned development. Other areas of potentially unstable slopes are associated with cut slopes in the fill borrow areas in the central portion of the site will likely be regraded during the development of the site.

Mitigation: According to the development plan shown on Figure 3, the majority of these areas are to be avoided. Building should be avoided on the potentially unstable slopes unless stabilized. A setback of 20 feet from the crest of these slopes is recommended unless stabilized. Stabilization could involve regrading to slope angles no steeper than 3:1 or the use of engineer-designed retaining walls, tiebacks, or buttresses. Where retaining walls are not used, erosion protection may be necessary to prevent undercutting by the creek during periods of high water. It is our understanding the project will include drainage improvements and the construction of a regional trail along the Sand Creek drainage and stabilization of the slopes will be a part of the improvements. Specific slope stabilization recommendations are beyond the scope of this report.

Based on the prepared development plan it appears the potentially instable slopes can be regraded or avoided. These areas are minor and there is sufficient distance for proposed setbacks for any remaining slopes.

Subsidence Area – Hazard

Based on a review of a Subsidence Investigation Report for the Colorado Springs area by Dames and Moore, 1985 (Reference 10) and the mining report for the Colorado Springs coalfield (Reference 11), the site is not undermined. The closest underground mines in the area

are approximately 7 miles to the southwest and the site is not mapped within any potential subsidence zones.

Groundwater and Floodplain Areas – Constraint

The Sand Creek drainage lies west of the site and has been mapped as a floodplain zone according to the FEMA Map Nos. 08041CO533G and 08041CO535G, Figure 8 (Reference 12). Additionally, areas of ponded water exist along Sand Creek. Other areas of standing water were observed on the site to the south of the site at the northwest corner of future Briargate Parkway and Sterling Ranch Road, within the central portion of the site south west of the middle school site. Groundwater was encountered in nine of the test borings at depths of 3 to 19 feet, the remaining borings were dry. A minimum separation of 3 feet between foundation components and groundwater levels are recommended. These areas are discussed as follows:

Seasonal Shallow Groundwater: In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and possible frost heave potential, depending on the soil conditions. These areas are located within the drainage swale/trench that exists in the proposed school area of the site. Shallow groundwater was encountered in the test boring drilled adjacent to the trench. It is anticipated this area would be regraded and filled prior to construction. Areas of shallow groundwater may exhibit unstable subgrade conditions in terms of bearing support of construction equipment during overlot grading. Areas immediately adjacent to drainage may also experience higher subsurface moisture conditions during periods of higher flows.

Mitigation: In these locations, foundations 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 30 inches is recommended. In areas where high subsurface moisture conditions are anticipated periodically, a subsurface perimeter drain will be necessary to help prevent the intrusion of water into areas located below grade. A typical perimeter drain detail is presented in Figure 9. Structures should not block drainages. Swales should be created to intercept surface runoff and carry it safely around and away from structures.

Potentially Seasonal Shallow Groundwater: Areas along drainage swales that exist in the southern portions of the site have been identified as potentially seasonal shallow

groundwater. It is anticipated these areas would be regraded and filled as a part of the proposed site plan. 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 9. Where shallow groundwater is encountered, underslab drains or interceptor drains may be necessary. Typical drain details are presented in Figure 10 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.

Floodplain

The Sand Creek drainage lies west of the site and has been mapped as a floodplain zone according to the FEMA Map Nos. 08041CO533G and 08041CO535G, Figure 8 (Reference 12). The building areas of the site do not lie within the floodplain zone as indicated in Figure 8. Any construction considered in a floodplain area will require approval of the drainage plan. Lots immediately adjacent to the floodplain may experience higher groundwater levels during peak flows. Subsurface perimeter drains are recommended for structures adjacent to the floodplain to help prevent the intrusion of water into areas below grade. Typical drain details are presented in Figure 9. Finished floor levels must be a minimum of one floor above the floodplain level. Exact floodplain locations by drainage studies are beyond the scope of this report.

Areas of Ponded Water

An area of ponded water exists behind earthen dams on site. The ponds and dam areas exist in the area proposed as the community park and will be avoided by structures. Should construction or regrading of the pond site be considered, all organic matter and soft, wet soils should be completely removed before filling. Any drainage into these areas should be rerouted in a non-erosive manner off of the site where it does not create areas of ponded water around proposed structures.

Radon – Hazard

Radon levels for the area have been reported by the Colorado Geologic Survey in the open file, Report No. 91-4 (Reference 14). 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 single-family residential, two potential school sites, park and open space areas, drainage easements, and regional detention ponds. Final grading plans were not available at the time of this report. It is our opinion that the existing geologic and engineering geologic conditions will impose some constraints on the proposed development and construction. The most significant problems affecting development will be those associated with the potentially unstable slopes on site that will primarily be mitigated by avoidance or the site grading. Other hazards on site can be satisfactorily mitigated through proper engineering design and construction practices.

The upper materials are typically at medium dense 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 possibly in conjunction with overexcavation in areas of expansive soils or recompaction in areas of loose soils. 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 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".

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

Potentially unstable slope areas were observed along Sand Creek and in the central portion of the site along a cut of the former borrow area. The steeper slopes along Sand Creek will be avoided by the development, and the areas within the former borrow area will likely be regarded during site development. Any fill placed along the slopes should be properly benched into the slope. Any retaining walls proposed should be designed for the global slope stability by a qualified professional engineer. This includes cuts made for terracing in backyards. Proper control of drainage at both the surface and subsurface is important. Saturation of materials should be avoided that may create unstable conditions.

The Sand Creek drainage lies west of the site and has been mapped as a floodplain zone according to the FEMA Map Nos. 08041CO533G and 08041CO535G. Exact locations of floodplain and specific drainage studies are beyond the scope of this report. Groundwater was encountered in nine of the test borings at depths of 3 to 19 feet. A minimum separation of 3 feet between foundation components and groundwater levels are recommended.

Areas of seasonal and potential seasonal shallow groundwater have been mapped on the site. A drainage swale/trench area exists around the proposed school site. This area can be regraded and surface drainage piped to storm sewers; however, structures immediately adjacent to the drainage area may experience higher water levels during periods of high

moisture. Additionally, a potentially seasonal shallow groundwater area has been mapped in the southern portions of the site. It is anticipated this area will be filled and regraded. All soft or organic soils should be removed prior to fill placement. Unstable soils may be encountered where excavations approach the groundwater level. Shallow groundwater areas may also affect utility installation. Geo-grids or shotrock may be necessary to stabilize excavations. Foundations should be kept as high as possible. Foundations in or adjacent to seasonal shallow groundwater areas may require drains to control seepage within the foundation zone. Typical drain details are presented in Figures 9 through 11. Where basements are proposed, significant interceptor and underslab drains may be necessary. Additional investigation is recommended after grading and the storm sewer is installed to evaluate groundwater conditions.

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. Investigation on each lot is recommended prior to construction.

7.0 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 15), portions of the site are mapped as upland and floodplain deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 16), portions of the site are mapped as U3 – Upland deposits: sand, and V3: valley fill deposits: sand. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 17), tracts in the area of the site have been mapped as "Good" for industrial minerals. Quarries exist on the site and in the area of the site for sand and gravel, particularly in the Eolian Sand and Alluvial deposits. Based on the depth of bedrock encountered in the test borings, it appears the majority of the thicker deposits have been excavated from the site.

According to *the Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 17), the tracts in the area of the site have been mapped as "Poor" for coal resources and "Little or no Potential" metallic mineral resources. The site has been mapped as "Fair" for oil and gas resources (Reference 17). 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.

8.0 EROSION CONTROL

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

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

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

9.0 ROADWAY AND EMBANKMENT CONSTRUCTION RECOMMENDATIONS

In general, the site soils are suitable for the proposed roadways and embankments. Groundwater 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.

10.0 CLOSURE

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

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

This report has been prepared for 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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TABLES

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

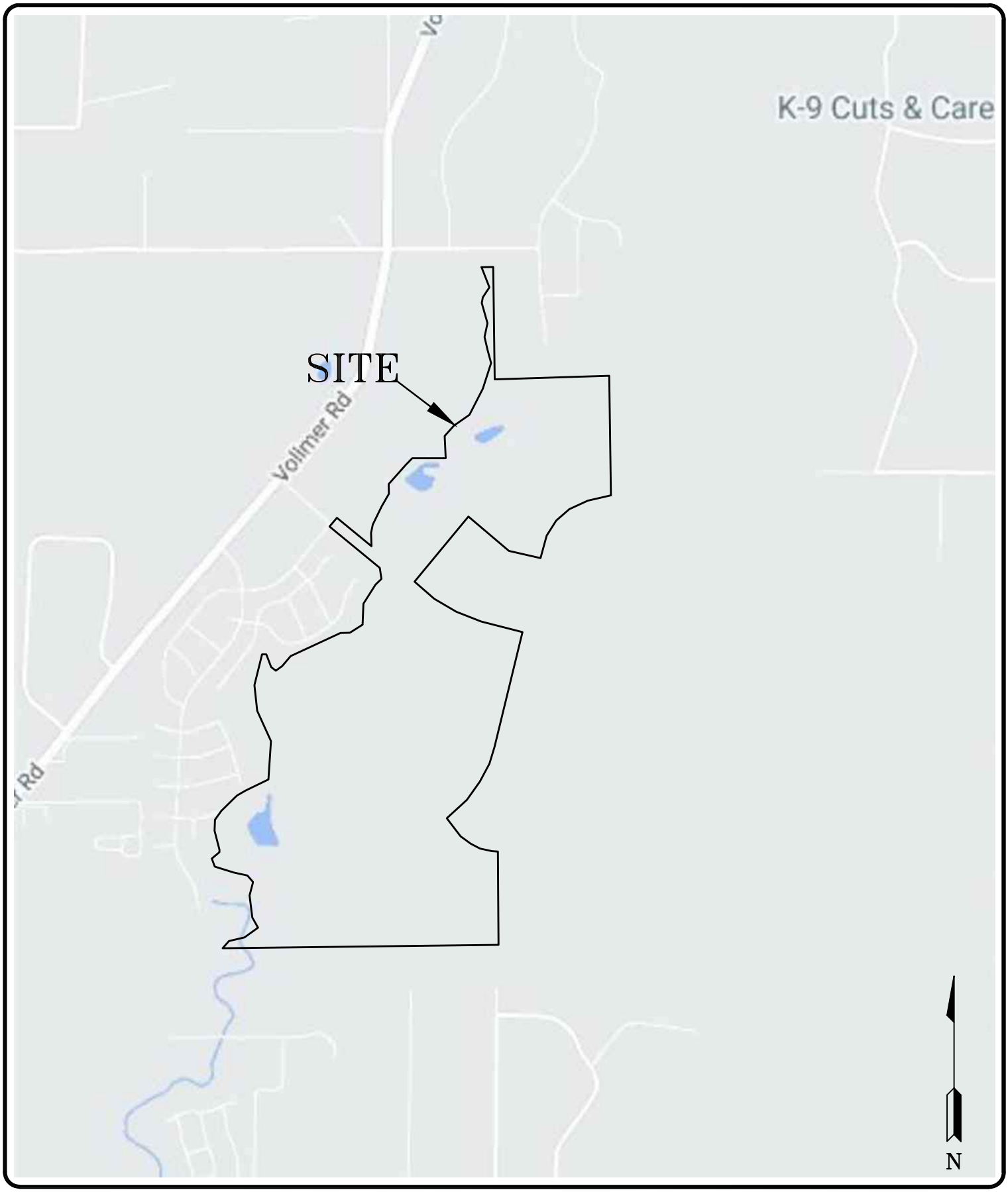
CLIENT CLASSIC SRJ
PROJECT STERLING RANCH, PLAN 1
JOB NO. 220571

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3	8.2	104.8	16.2					-1.7	SM	SAND, SILTY
2	2	2-3	16.2	113.2	53.5	39	21	<0.01		-0.1	CL	CLAY, VERY SANDY
3	1	10			17.3						SM	SANDSTONE, SILTY
3	2	15	14.1	96.1	23.7			0.00		-0.1	SM	SANDSTONE, SILTY
3	3	5			11.1	NV	NP	<0.01			SM-SW	SANDSTONE, SLIGHTLY SILTY

TABLE 2: Summary of Depth of Bedrock and Groundwater

Test Boring No.	Depth of Bedrock (ft.)	Depth of Groundwater (ft.)
1	3	>20
2	3	>20
3	3	>20
Previous Job No. 82556		
3	7	>15
4	6	>15
11	9	14
12	14	13.5
14	4	>15
15	4	>15
22	4	3.5
26	14	19
27	10	>15
30	6	11
Previous Job No. 202403		
1	9	18
2	9	>20
3	9	>20
4	7	>20
5	4	>20
6	8	>20
7	8	>20
8	8	>20
9	8	16
10	12	>20
11	9	>20
12	12	>20
13	6	18
14	4	>20
15	7	3

FIGURES



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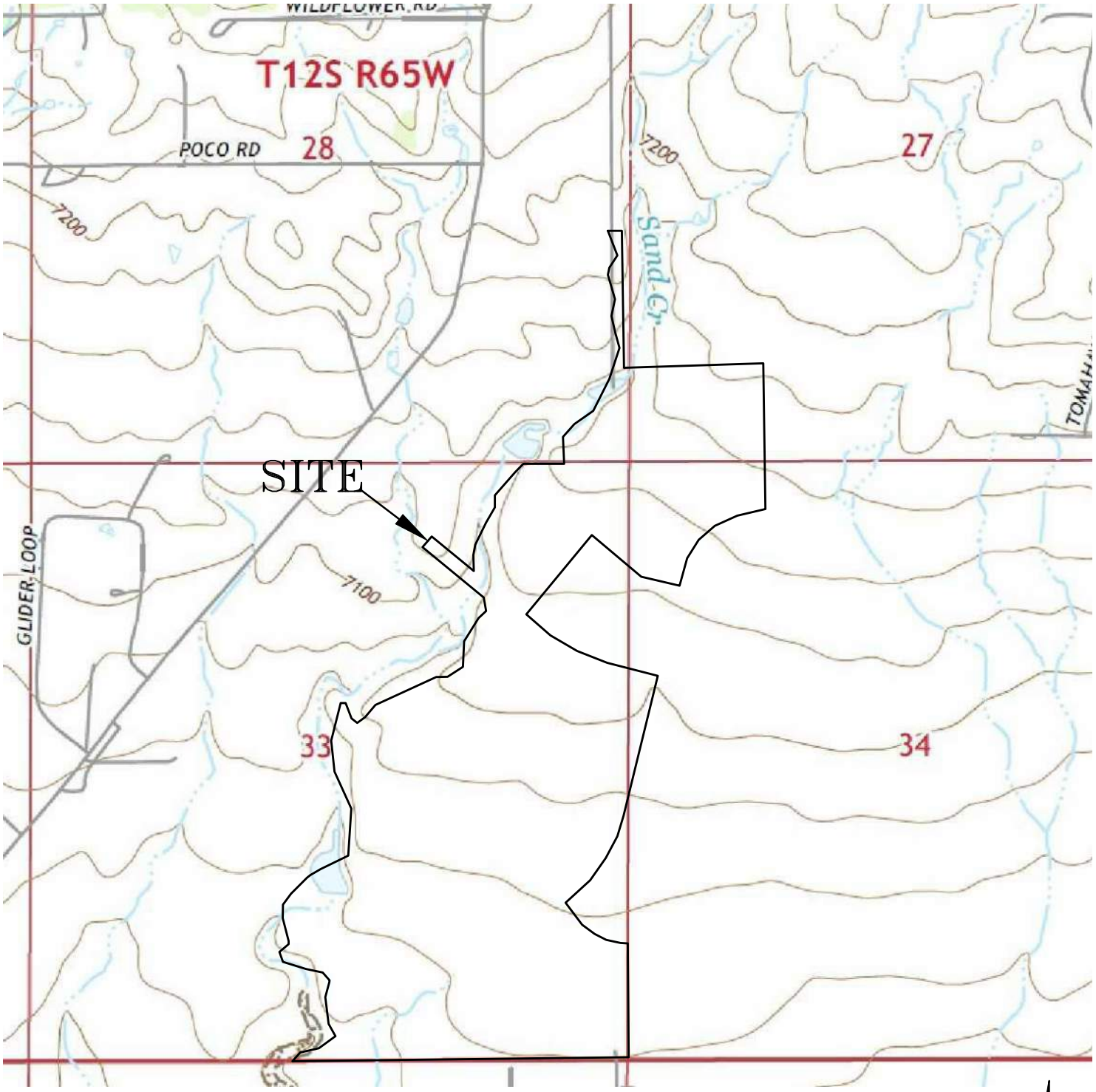
VICINITY MAP
STERLING RANCH EAST
PRELIMINARY PLAN NO. 1
COLORADO SPRINGS, CO.
FOR: CLASSIC SRJ

DRAWN:	DATE:	CHECKED:	DATE:
LLL	4/15/22		

JOB NO.: 220571

FIG NO.: 1



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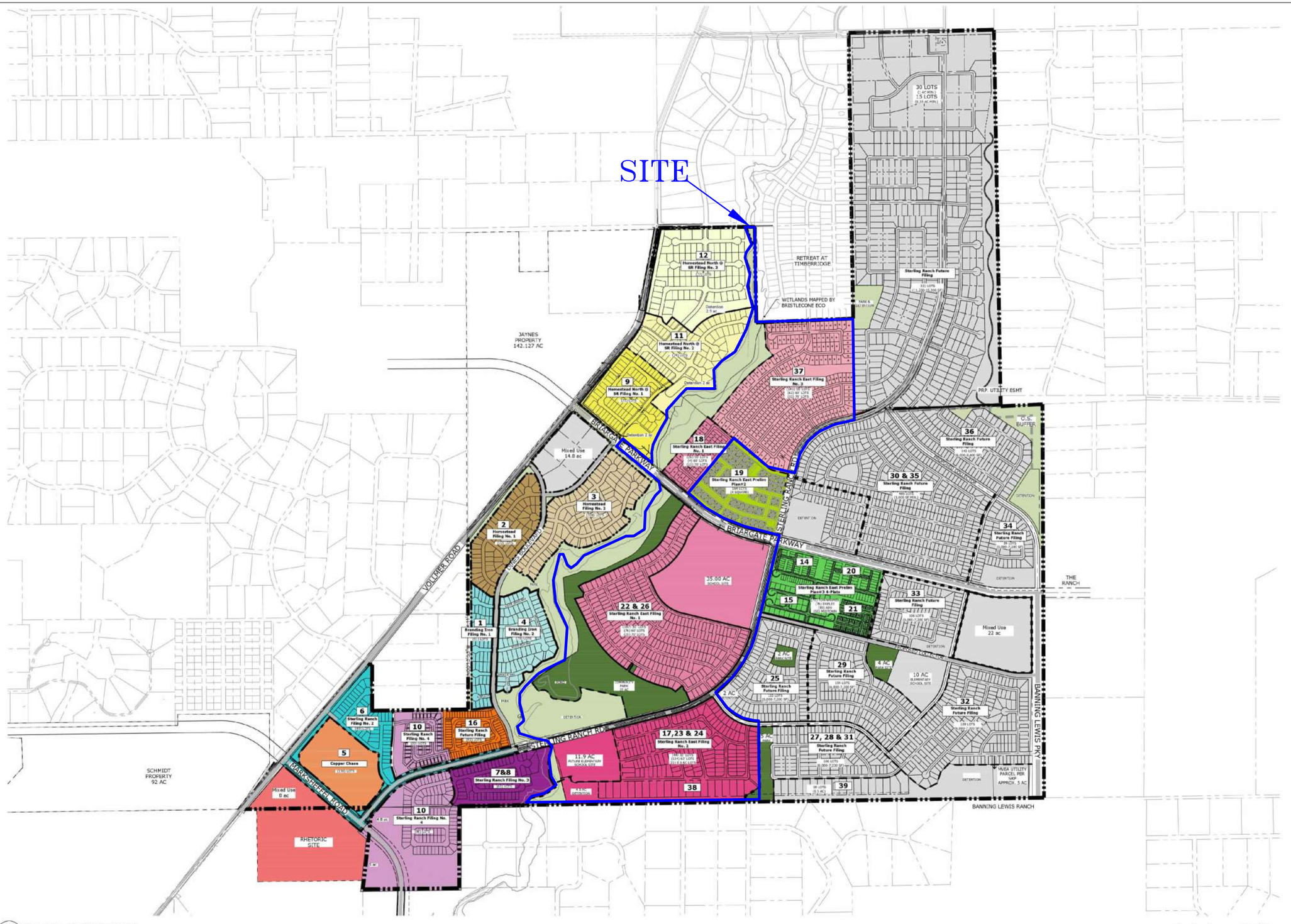
USGS MAP
STERLING RANCH EAST
PRELIMINARY PLAN NO. 1
COLORADO SPRINGS, CO.
FOR: CLASSIC SRJ

DRAWN:	DATE:	CHECKED:	DATE:
LLL	4/15/22		

JOB NO.: 220571

FIG NO.: 2



1 OVERALL CONTEXT PLAN
03.11.2022 - SUBJECT TO CHANGE
ACREAGE SHOWN IS APPROXIMATE

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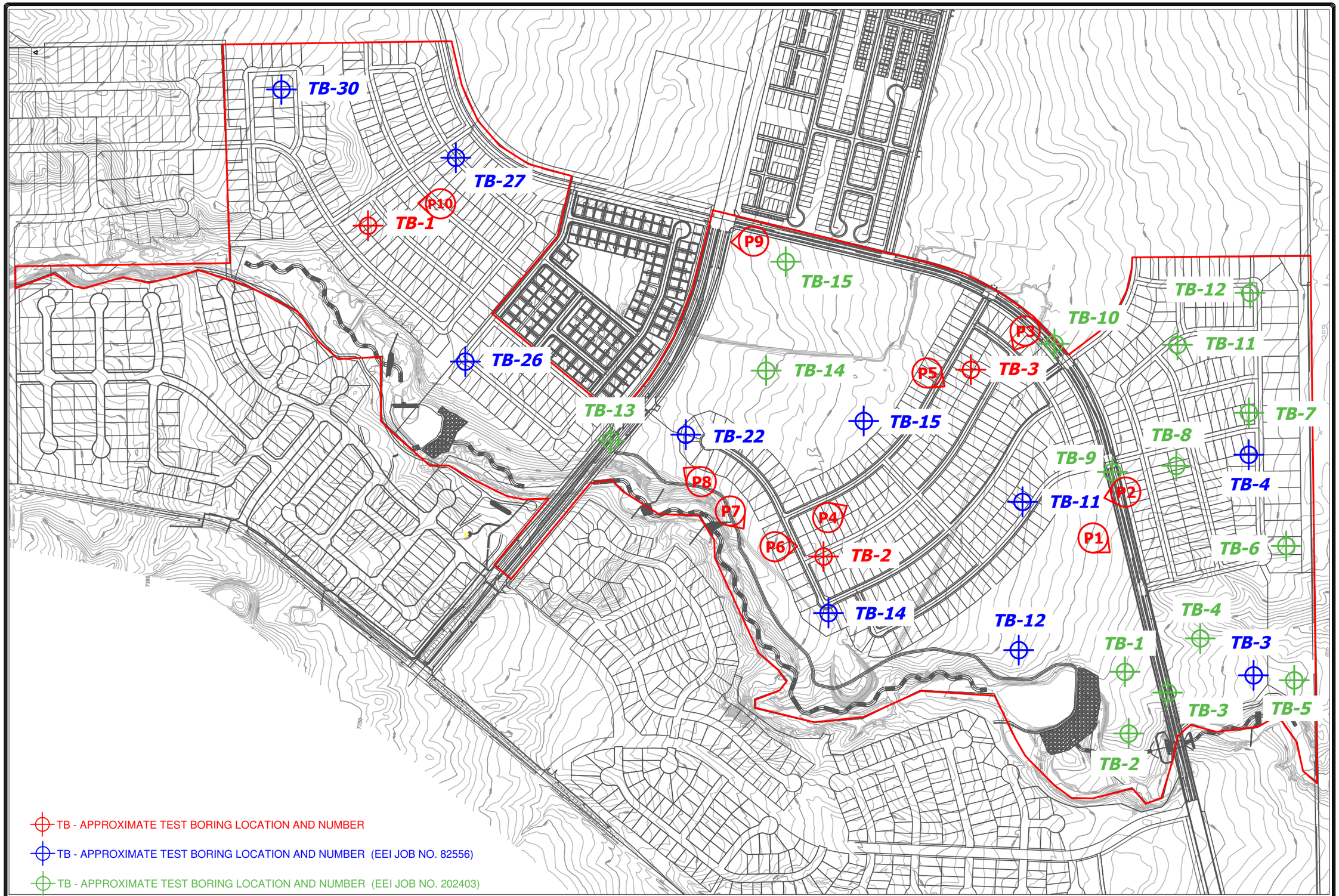
DEVELOPMENT PLAN
STERLING RANCH EAST
PRELIMINARY PLAN NO. 1
COLORADO SPRINGS, CO.
FOR: CLASSIC SRJ

DRAWN	LLL
CHECKED	
DATE	4/15/22
SCALE	AS SHOWN
JOB NO.	220571
FIGURE No.	3



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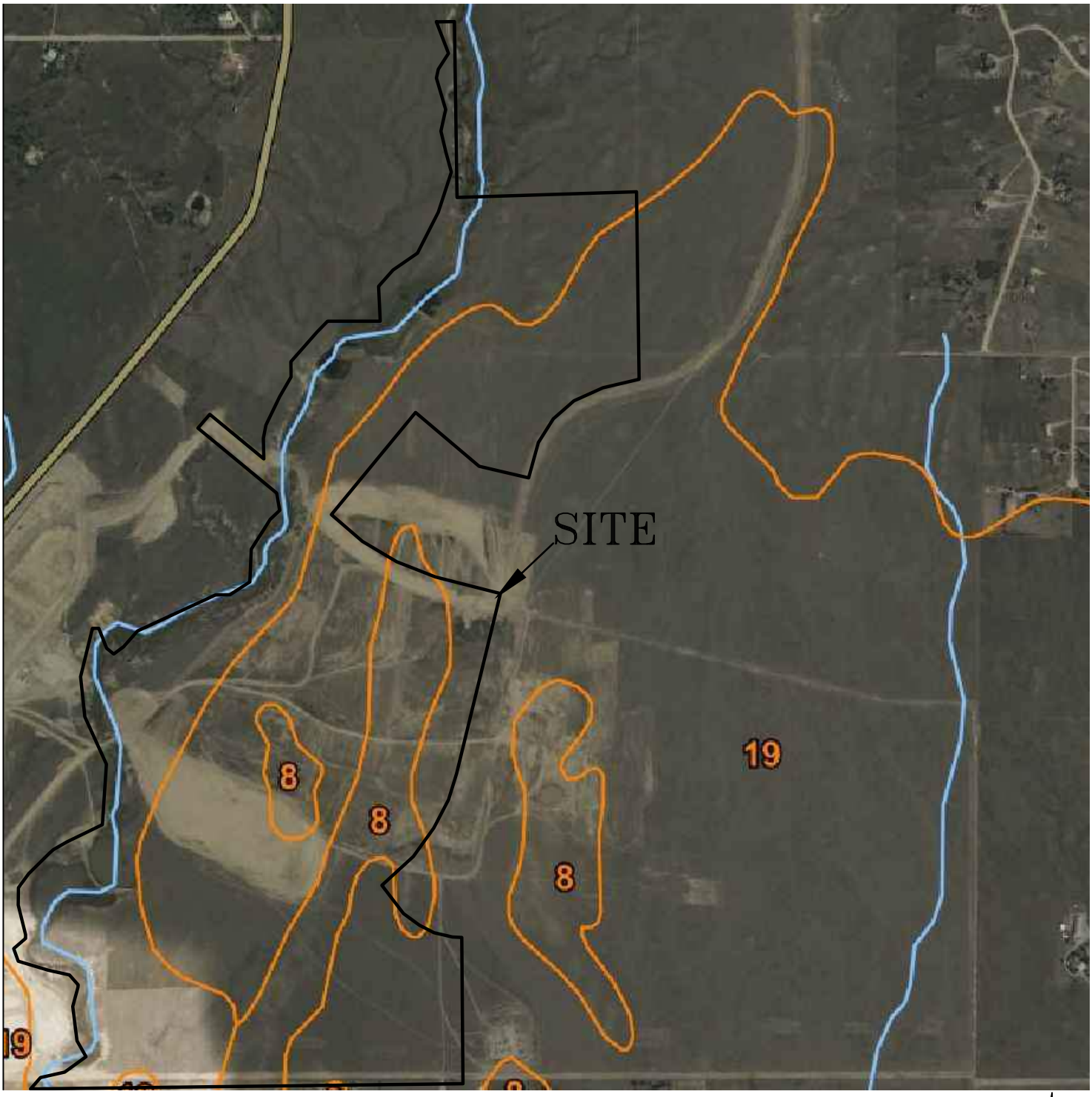
SITE PLAN/TEST BORING LOCATION MAP
STERLING RANCH EAST
PRELIMINARY PLAN NO. 1
COLORADO SPRINGS, CO.
FOR: CLASSIC SRJ

DRAWN	LLL
CHECKED	
DATE	4/18/22
SCALE	AS SHOWN
JOB NO.	220571
FIGURE No.	4



N

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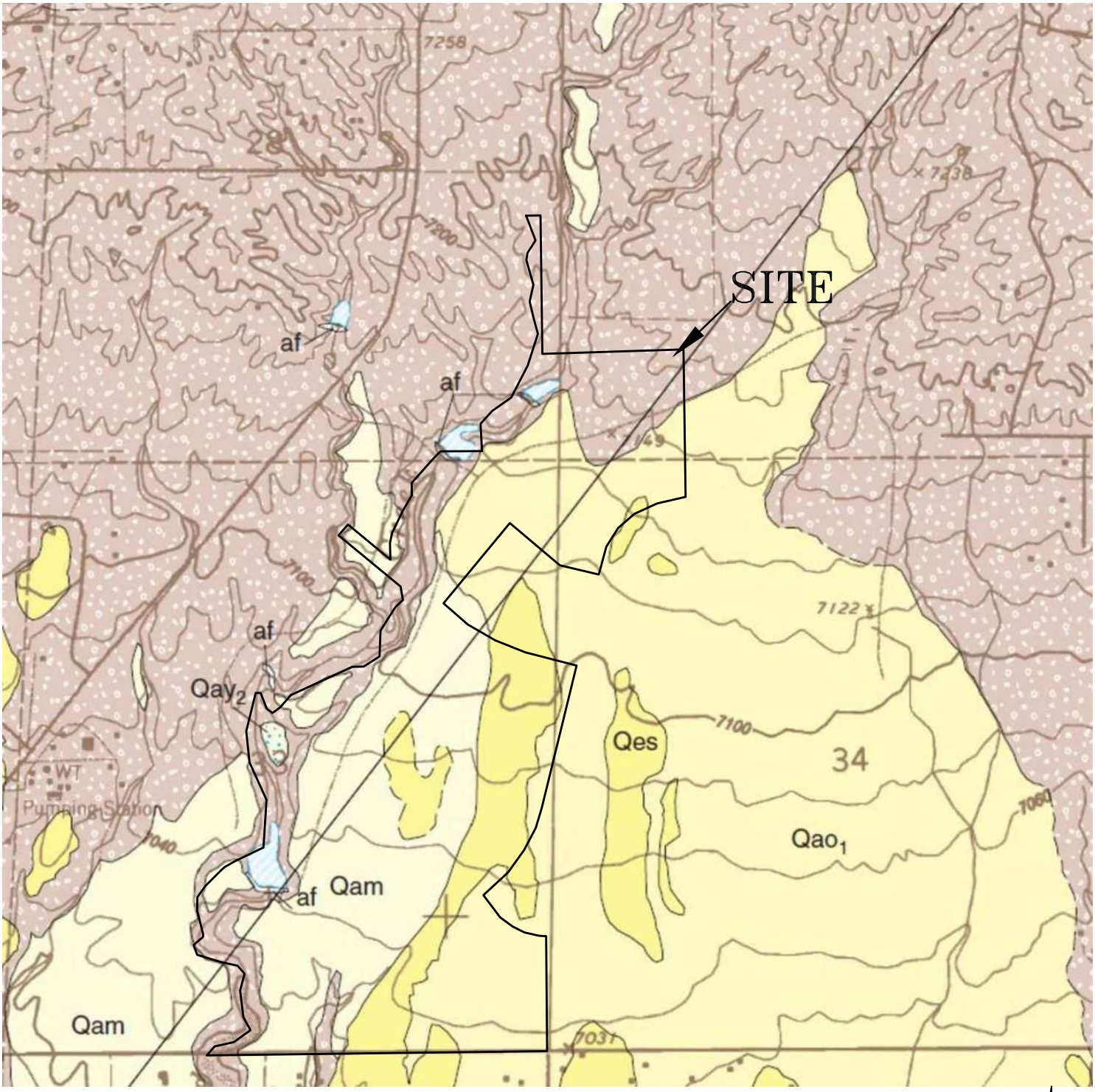
SOIL SURVEY MAP
STERLING RANCH EAST
PRELIMINARY PLAN NO. 1
COLORADO SPRINGS, CO.
FOR: CLASSIC SRJ

DRAWN:	DATE:	CHECKED:	DATE:
LLL	4/15/22		

JOB NO.: 220571

FIG NO.: 5



N

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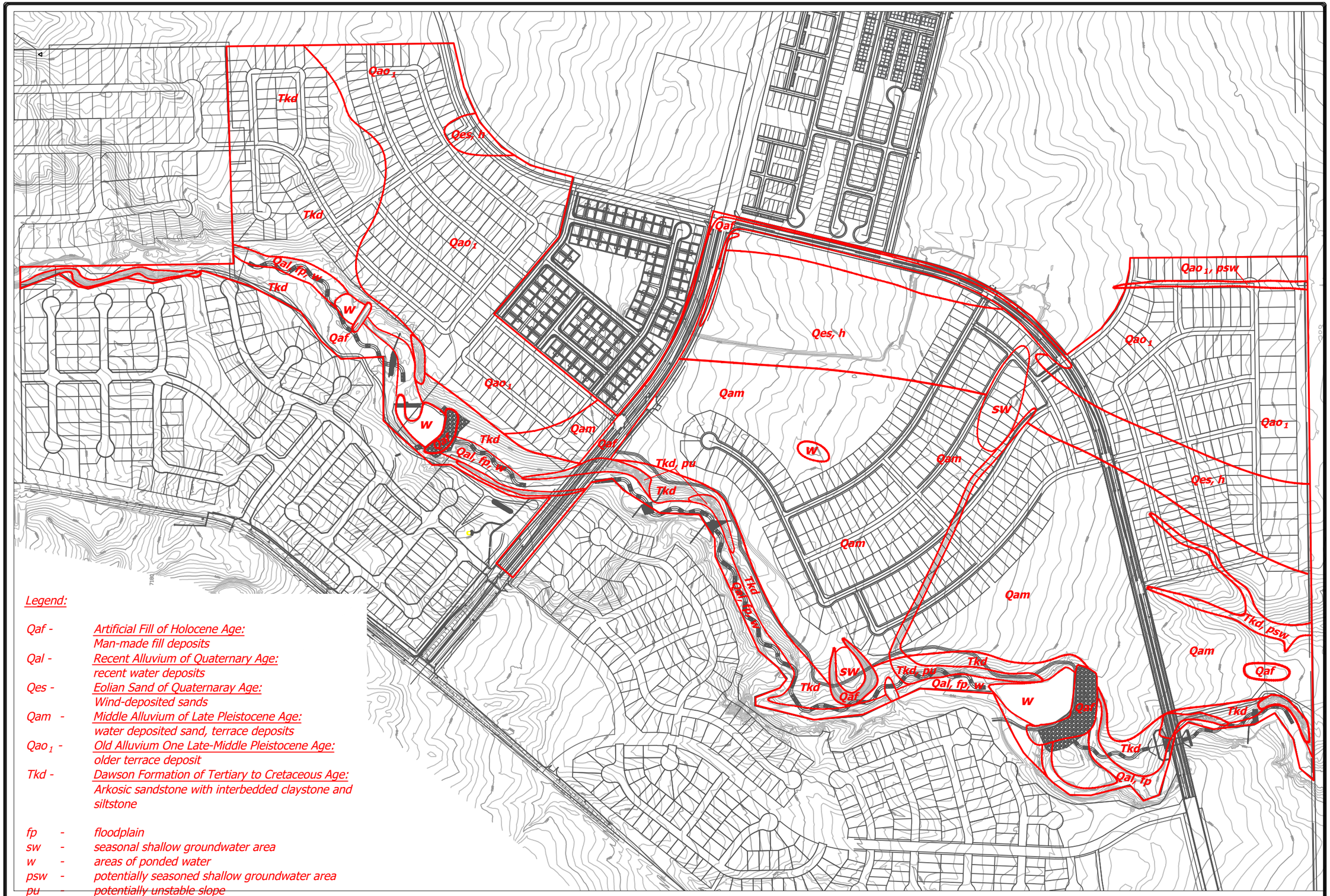
FALCON NW QUADRANGLE GEOLOGIC MAP
STERLING RANCH EAST
PRELIMINARY PLAN NO. 1
COLORADO SPRINGS, CO.
FOR: CLASSIC SRJ

DRAWN:	DATE:	CHECKED:	DATE:
LLL	4/15/22		

JOB NO.: 220571

FIG NO.: 6



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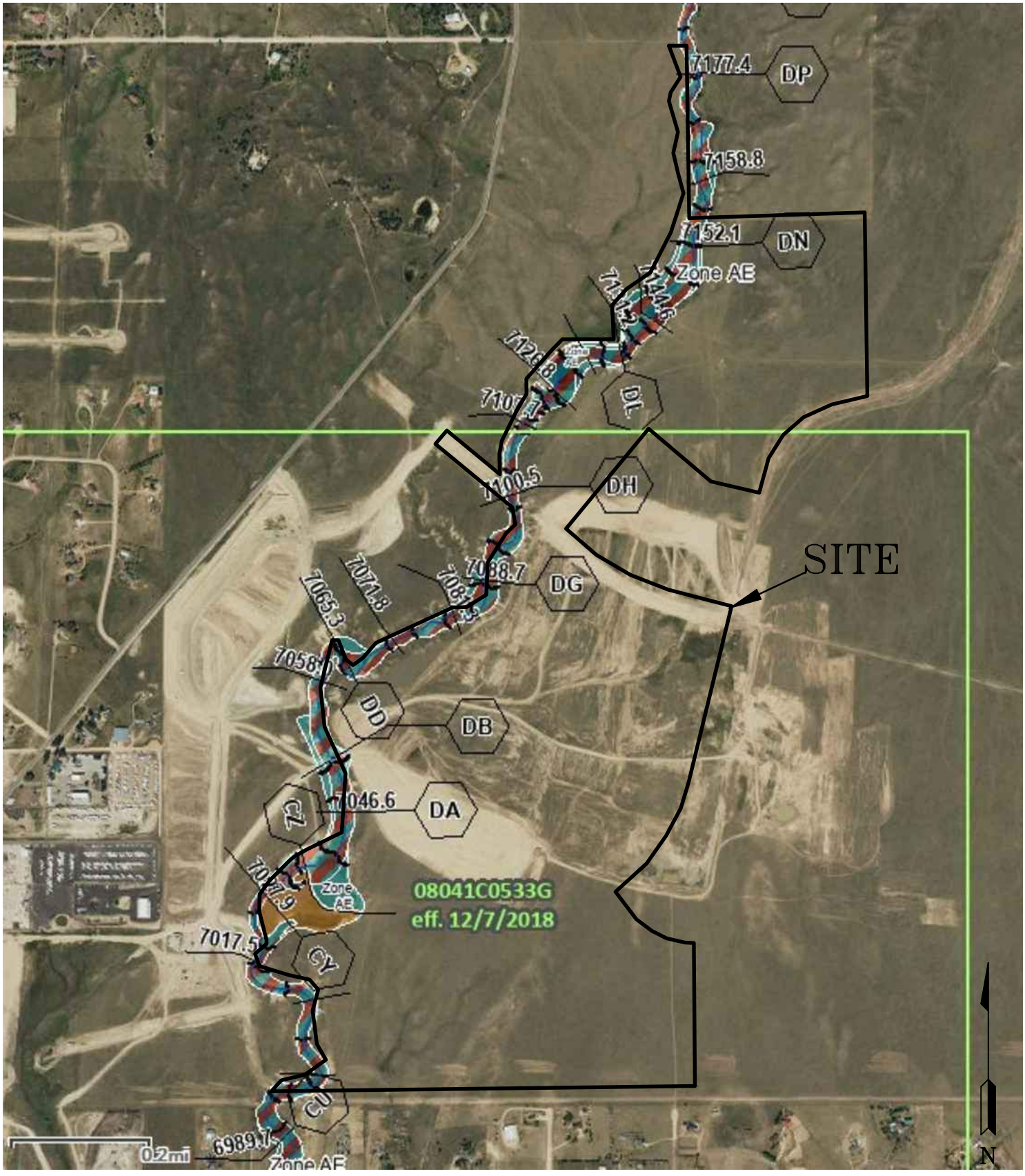
GEOLOGY/ENGINEERING GEOLOGY MAP
STERLING RANCH EAST
PRELIMINARY PLAN NO. 1
COLORADO SPRINGS, CO.
FOR: CLASSIC SRJ

DRAWN	LLL
CHECKED	
DATE	4/19/22
SCALE	AS SHOWN
JOB NO.	220571
FIGURE No.	7



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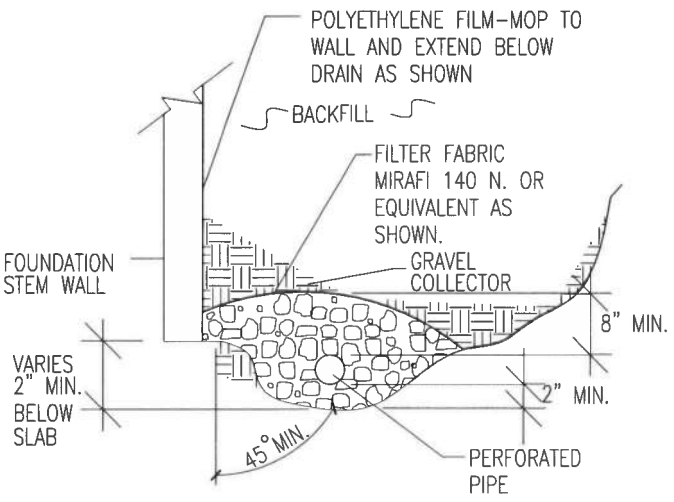
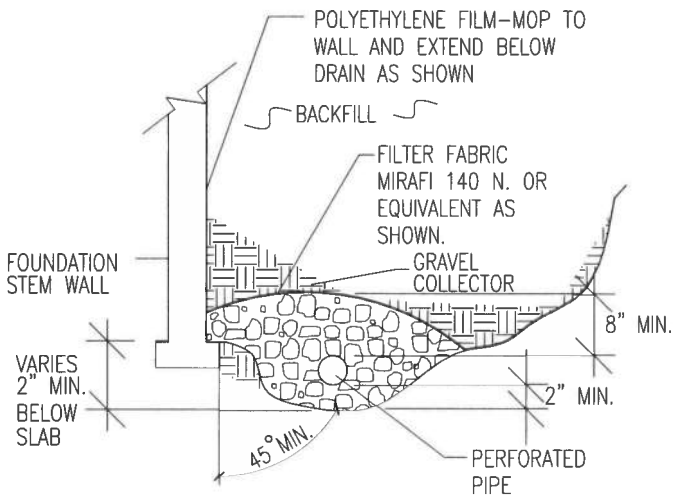
FLOODPLAIN MAP
STERLING RANCH EAST
PRELIMINARY PLAN NO. 1
COLORADO SPRINGS, CO.
FOR: CLASSIC SRJ

DRAWN:	DATE:	CHECKED:	DATE:
LLL	4/15/22		

JOB NO.: 220571

FIG NO.: 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.

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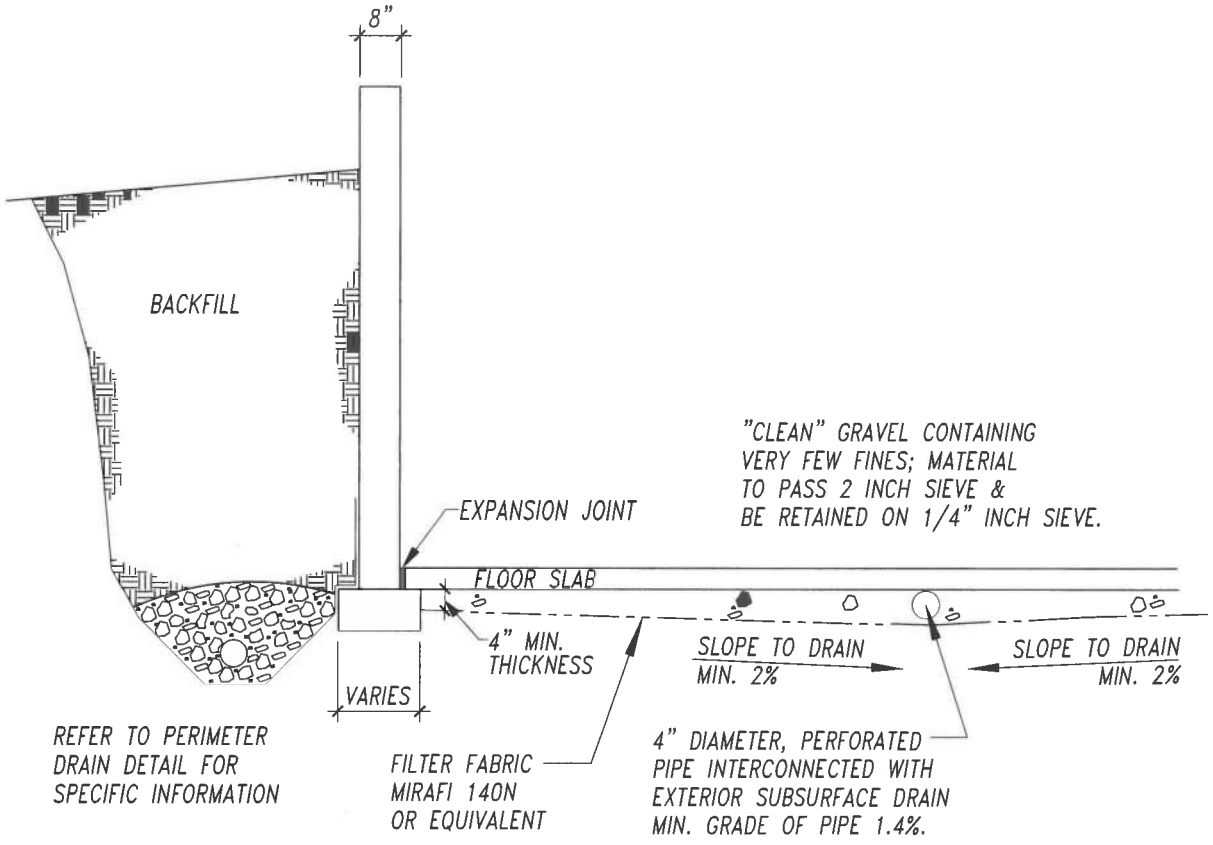
PERIMETER DRAIN DETAIL

DRAWN:	DATE:	DESIGNED:	CHECKED:

JOB NO.: 220571

FIG NO.: 9



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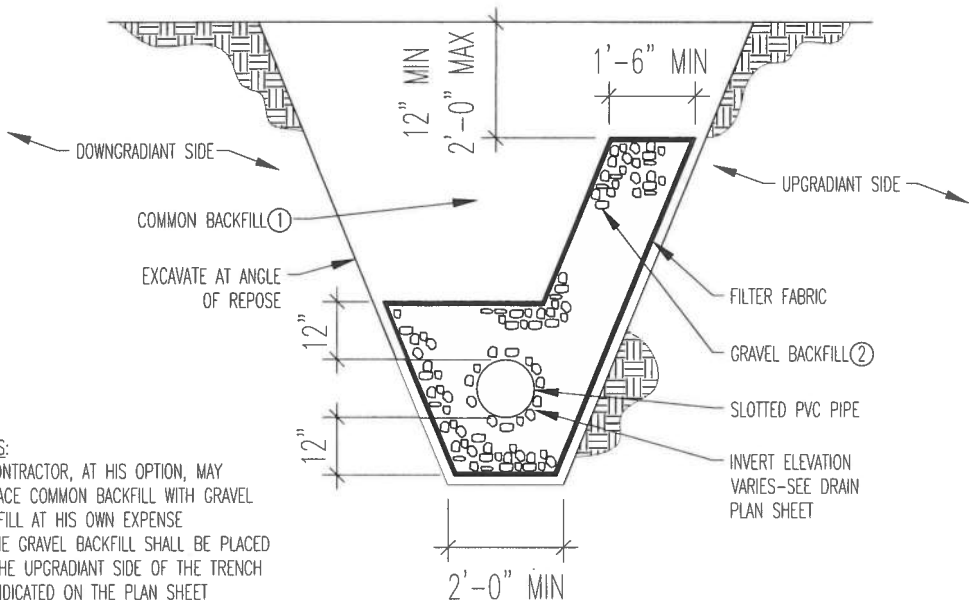
TYP. UNDERSLAB DRAINAGE
LAYER (CAPILLARY BREAK)

DRAWN BY:	DATE:	DESIGNED BY:	CHECKED:

JOB NO.: 220571

FIG NO.: 10

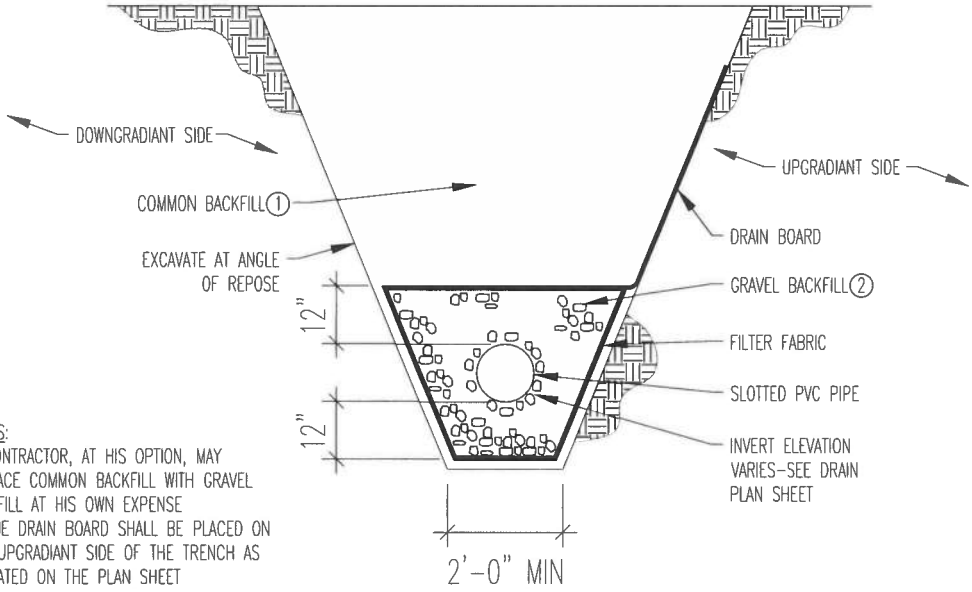


NOTES:
1. CONTRACTOR, AT HIS OPTION, MAY REPLACE COMMON BACKFILL WITH GRAVEL BACKFILL AT HIS OWN EXPENSE
2. THE GRAVEL BACKFILL SHALL BE PLACED ON THE UPGRADIANT SIDE OF THE TRENCH AS INDICATED ON THE PLAN SHEET

EXTEND PIPE TO DAYLIGHT

INTERCEPTOR DRAIN DETAIL

N.T.S.



NOTES:
1. CONTRACTOR, AT HIS OPTION, MAY REPLACE COMMON BACKFILL WITH GRAVEL BACKFILL AT HIS OWN EXPENSE
2. THE DRAIN BOARD SHALL BE PLACED ON THE UPGRADIANT SIDE OF THE TRENCH AS INDICATED ON THE PLAN SHEET

EXTEND PIPE TO DAYLIGHT

INTERCEPTOR DRAIN DETAIL

N.T.S.

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

INTERCEPTOR DRAIN DETAIL			
DRAWN BY:	DATE:	DESIGNED:	CHECKED:

JOB NO.: 220571

FIG. NO.: 11

APPENDIX A: Site Photographs

1

Looking southwest from the southwestern portion of the site.

March 14, 2022

2

Looking northwest from the southwestern portion of the site.

March 14, 2022

Job No. 220571

3

Looking northwest from the southeastern portion of the site towards low-lying seasonal wet area.

March 14, 2022

4

Looking south from the central portion of the site.

March 14, 2022

Job No. 220571

5

Looking southwest towards erosion feature in the central portion of the site west of future Sterling Ranch Road.

March 28, 2022

6

Looking south from the central portion of the site.

March 14, 2022

Job No. 220571

7

Looking southwest along Sand Creek from the west central portion of the site.

March 14, 2022

8

Looking north along Sand Creek Drainage along the west central portion of the site.

March 14, 2022

Job No. 220571

9

Looking north at area of standing water on the south side of future Briargate Parkway.

March 14, 2022

10

Looking north from the north-central portion of the site.

March 14, 2022

Job No. 220571

APPENDIX B: Test Boring Logs

TEST BORING NO. 1
DATE DRILLED 3/21/2022
Job # 220571

REMARKS

DRY TO 20', 3/28/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			8	13.7	1
5			50/10"	6.8	3
10			50/8"	8.6	3
15			50/6"	8.3	3
20			50/8"	9.7	3

SAND, SILTY, FINE TO COARSE GRAINED, TAN, LOOSE, MOIST

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

TEST BORING NO. 2
DATE DRILLED 3/24/2022
CLIENT CLASSIC SRJ
LOCATION STERLING RANCH, PLAN 1

REMARKS

DRY TO 20', 3/28/22

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			16	14.1	2
5			50	9.4	3
10			50/3"	7.4	3
15			50/5"	11.5	3
20			50/6"	10.2	3

CLAY, SANDY, TAN, STIFF, MOIST

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

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

TEST BORING LOG

DRAWN:	DATE:	CHECKED: LLL	DATE: 4/14/22

JOB NO.: 220571
FIG NO.: B- 1

TEST BORING NO. 3
DATE DRILLED 3/24/2022
Job # 220571

TEST BORING NO.
DATE DRILLED
CLIENT CLASSIC SRJ
LOCATION STERLING RANCH, PLAN 1

REMARKS

DRY TO 20', 3/28/22

REMARKS

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Description
			33	10.0	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, DENSE, MOIST
5			50/8"	8.3	3	SANDSTONE, SLIGHTLY SILTY TO SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
10			50/6"	7.6	3	
15			50/6"	8.9	3	
20			50/7"	10.2	3	

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

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

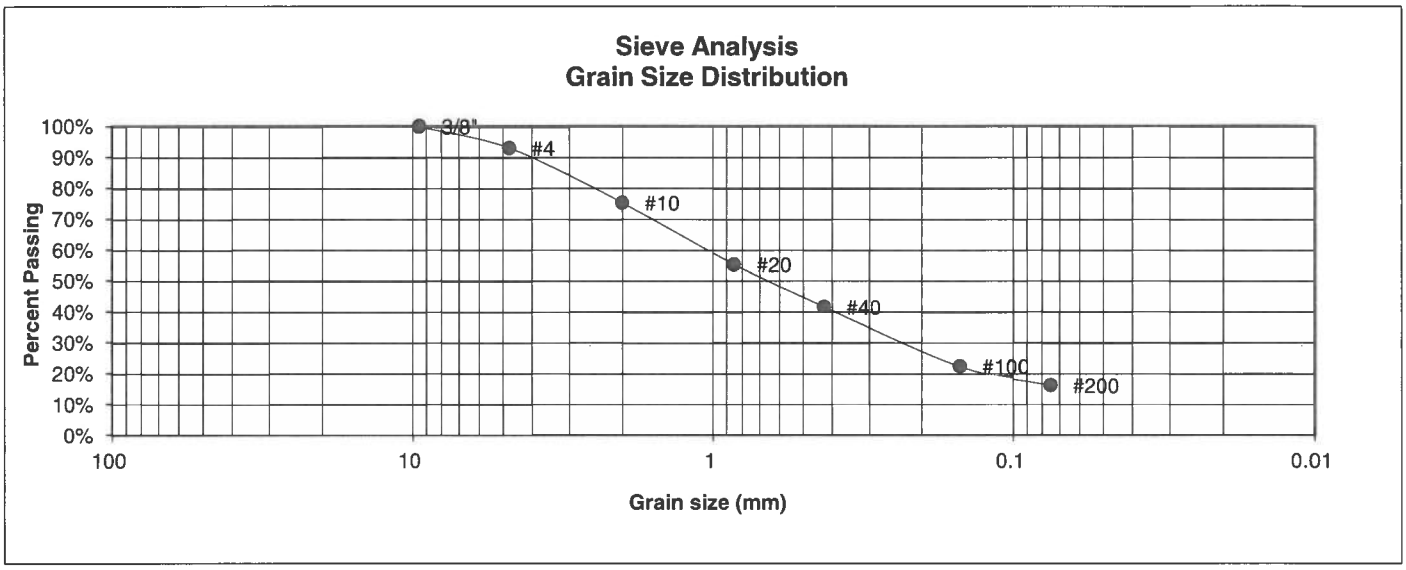
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/22

JOB NO.: 220571

FIG NO.: B- 2

APPENDIX C: Laboratory Test Results

UNIFIED CLASSIFICATION	SM	CLIENT	CLASSIC SRJ
SOIL TYPE #	1	PROJECT	STERLING RANCH, PLAN 1
TEST BORING #	1	JOB NO.	220571
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.1%
10	75.4%
20	55.4%
40	41.6%
100	22.4%
200	16.2%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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

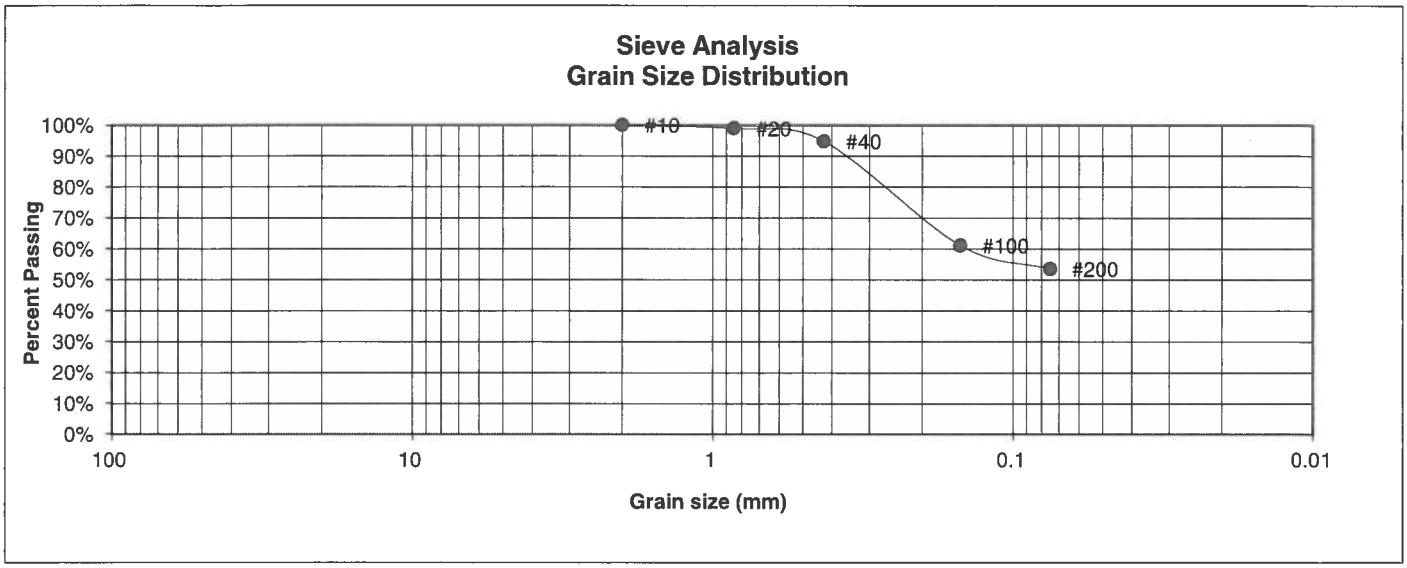
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/22

JOB NO.: 220571

FIG NO.: C-1

UNIFIED CLASSIFICATION	CL	CLIENT	CLASSIC SRJ
SOIL TYPE #	2	PROJECT	STERLING RANCH, PLAN 1
TEST BORING #	2	JOB NO.	220571
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	98.9%
40	94.8%
100	61.1%
200	53.5%

Atterberg Limits	
Plastic Limit	18
Liquid Limit	39
Plastic Index	21

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

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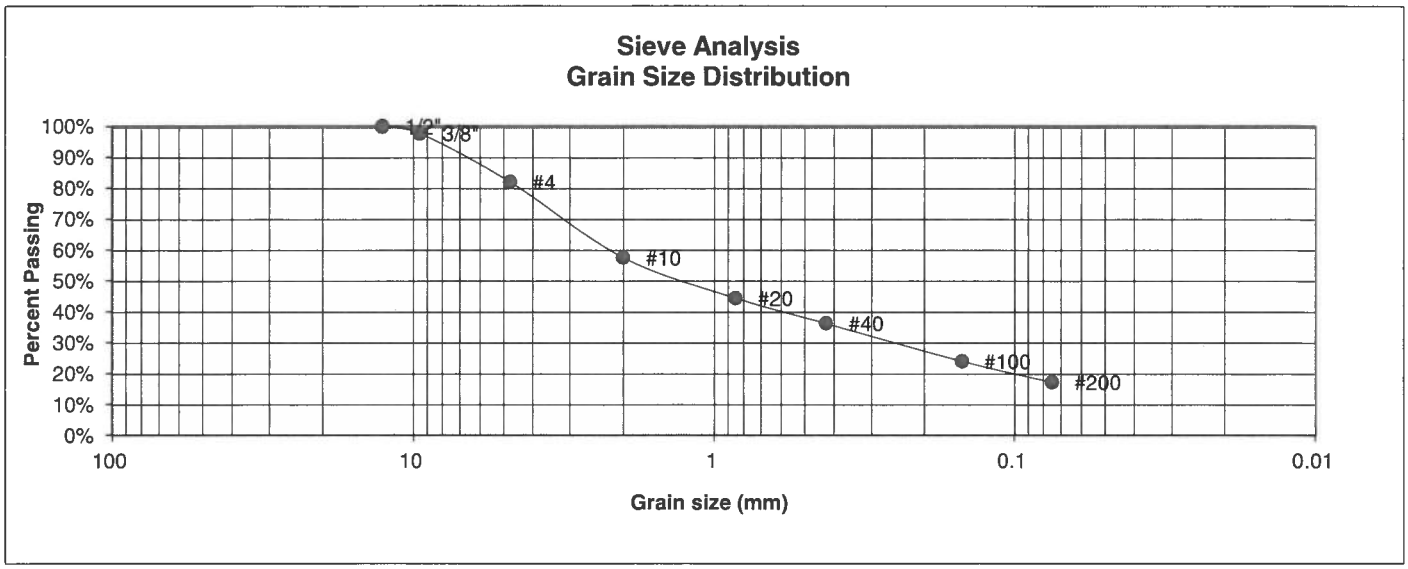
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/22

JOB NO.: 220571

FIG NO.: C-2

UNIFIED CLASSIFICATION	SM	CLIENT	CLASSIC SRJ
SOIL TYPE #	3	PROJECT	STERLING RANCH, PLAN 1
TEST BORING #	1	JOB NO.	220571
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.9%
4	82.2%
10	57.6%
20	44.5%
40	36.4%
100	24.1%
200	17.3%

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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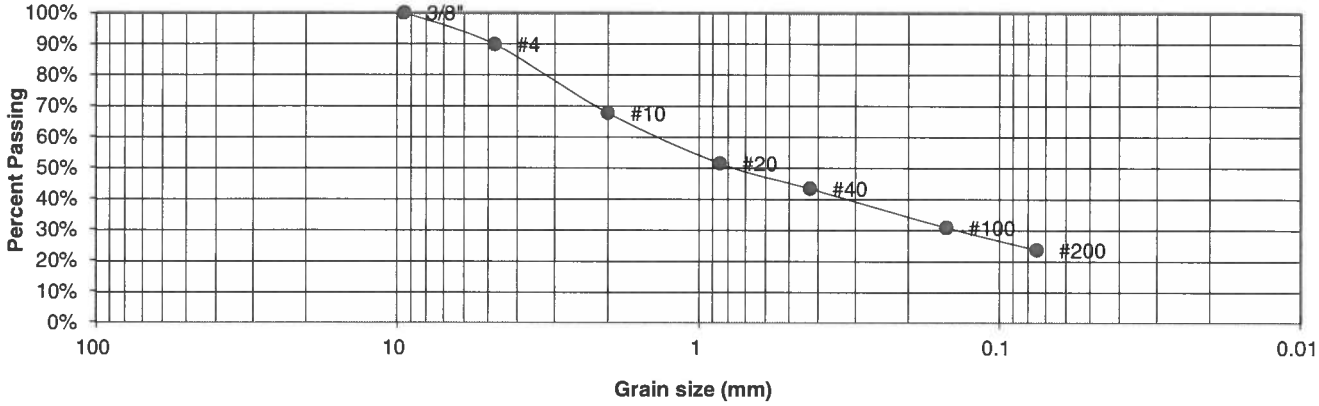
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/22

JOB NO.: 220571

FIG NO.: C-3

UNIFIED CLASSIFICATION	SM	CLIENT	CLASSIC SRJ
SOIL TYPE #	3	PROJECT	STERLING RANCH, PLAN 1
TEST BORING #	2	JOB NO.	220571
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	89.8%
10	67.7%
20	51.5%
40	43.4%
100	30.9%
200	23.7%

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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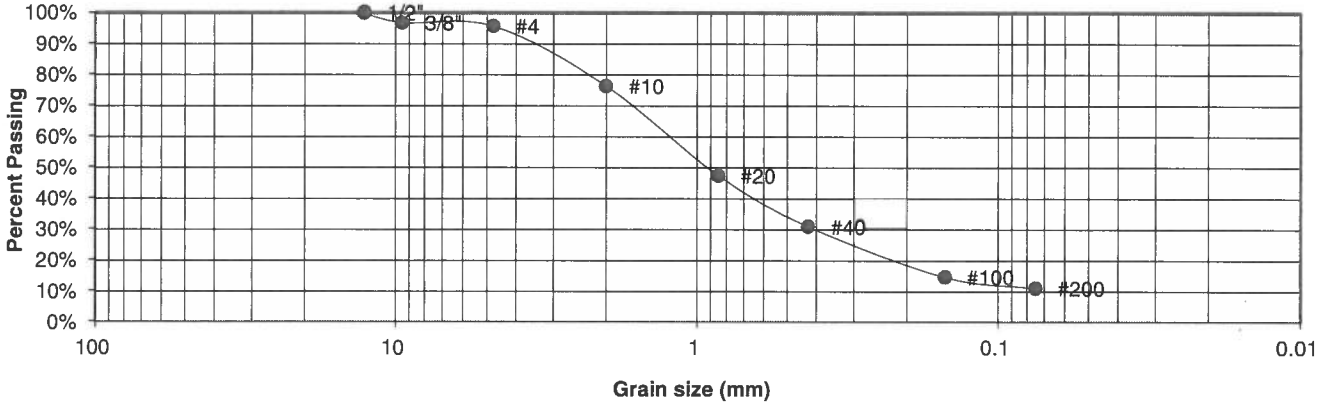
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/22

JOB NO.: 220571

FIG NO.: C-4

UNIFIED CLASSIFICATION	SM-SW	CLIENT	CLASSIC SRJ
SOIL TYPE #	3	PROJECT	STERLING RANCH, PLAN 1
TEST BORING #	3	JOB NO.	220571
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.8%
4	95.7%
10	76.4%
20	47.4%
40	31.0%
100	14.7%
200	11.1%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

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	4/19/22

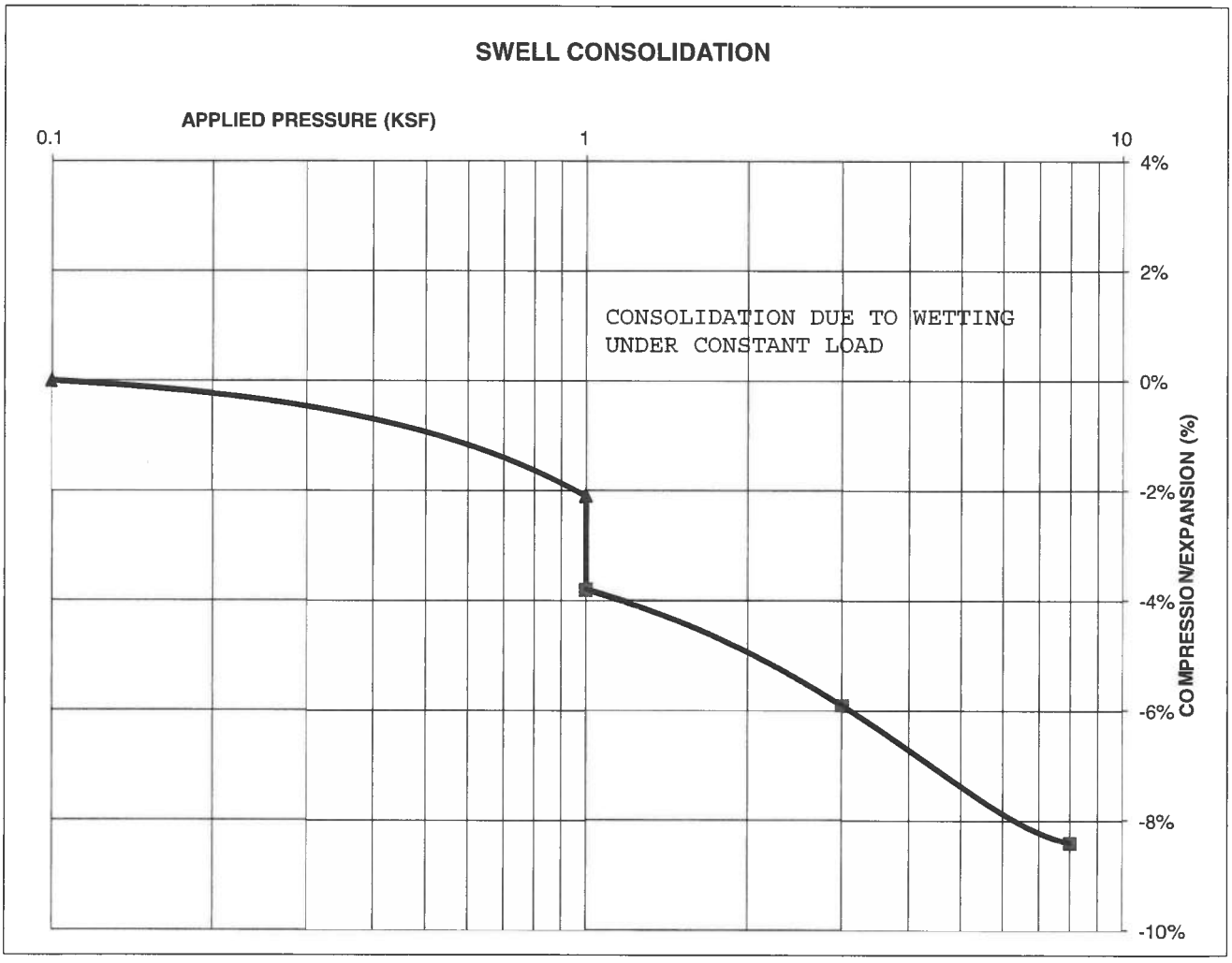
JOB NO.: 220571

FIG NO.: C-5

CONSOLIDATION TEST RESULTS

TEST BORING #	1	DEPTH(ft)	2-3
DESCRIPTION	SM	SOIL TYPE	1
NATURAL UNIT DRY WEIGHT (PCF)			105
NATURAL MOISTURE CONTENT			8.2%
SWELL/CONSOLIDATION (%)			-1.7%

JOB NO. 220571
CLIENT CLASSIC SRJ
PROJECT STERLING RANCH, PLAN 1



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SWELL CONSOLIDATION
TEST RESULTS

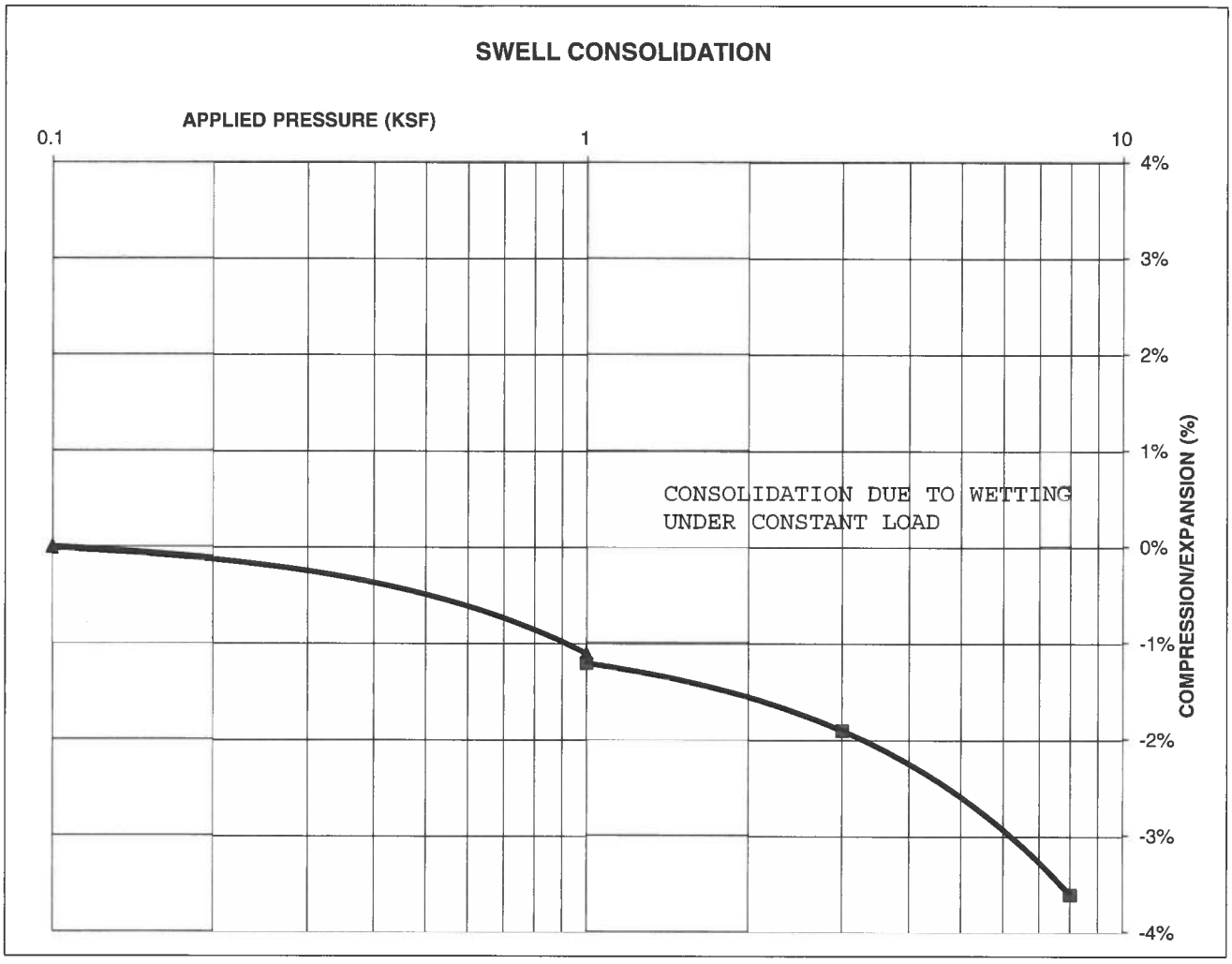
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/22

JOB NO.: 220571
FIG NO.: C-6

CONSOLIDATION TEST RESULTS

TEST BORING #	2	DEPTH(ft)	2-3
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			113
NATURAL MOISTURE CONTENT			16.2%
SWELL/CONSOLIDATION (%)			-0.1%

JOB NO. 220571
CLIENT CLASSIC SRJ
PROJECT STERLING RANCH, PLAN 1



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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

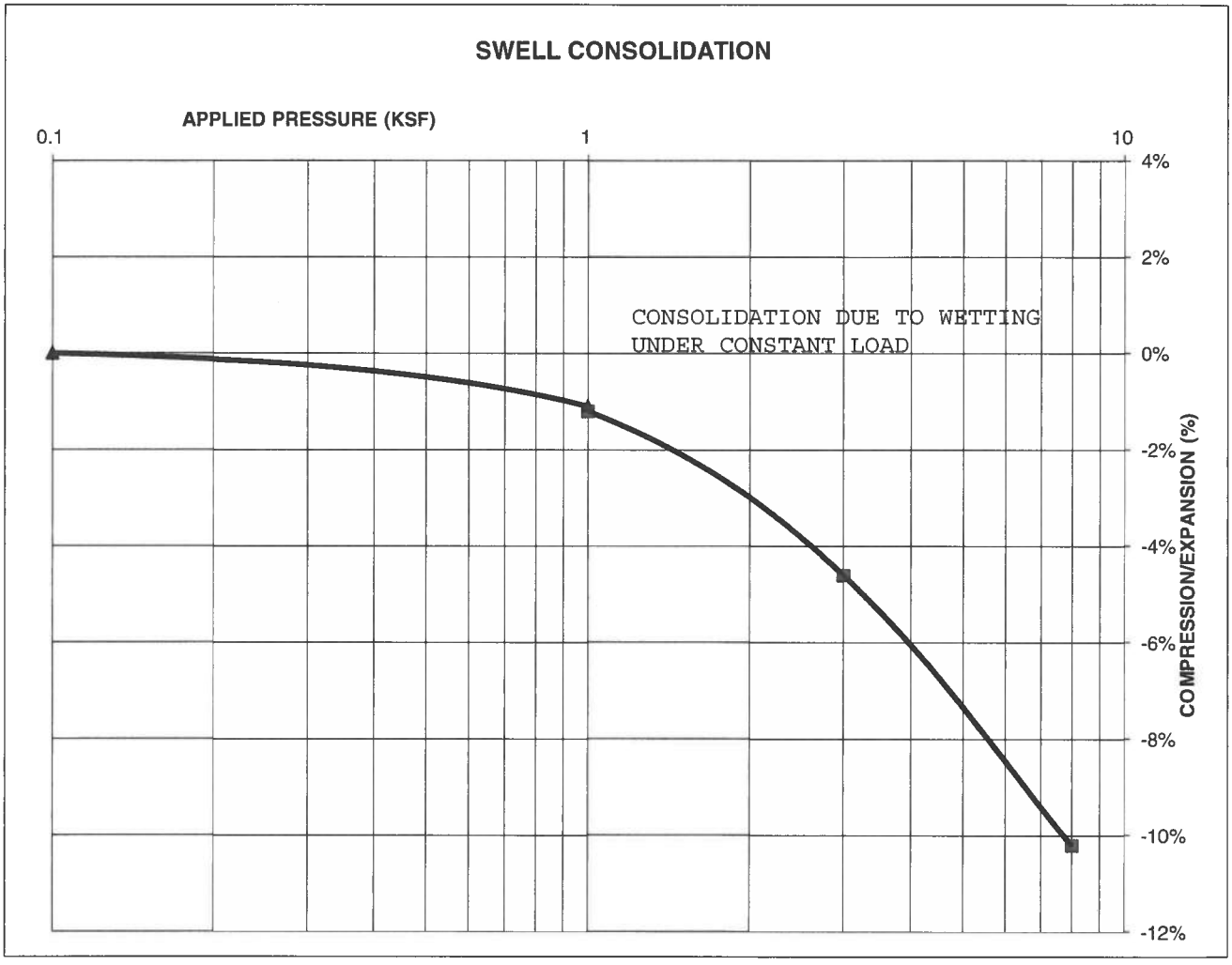
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/22

JOB NO.: 220571
FIG NO.: C-7

CONSOLIDATION TEST RESULTS

TEST BORING #	2	DEPTH(ft)	15
DESCRIPTION	SM	SOIL TYPE	3
NATURAL UNIT DRY WEIGHT (PCF)			96
NATURAL MOISTURE CONTENT			14.1%
SWELL/CONSOLIDATION (%)			-0.1%

JOB NO. 220571
CLIENT CLASSIC SRJ
PROJECT STERLING RANCH, PLAN 1



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SWELL CONSOLIDATION TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/22

JOB NO.: 220571
FIG NO.: C-8

CLIENT	CLASSIC SRJ	JOB NO.	220571
PROJECT	STERLING RANCH, PLAN 1	DATE	4/1/2022
LOCATION	STERLING RANCH, PLAN 1	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-2	2-3	2	CL	<0.01
TB-2	15	3	SM	0.00
TB-3	5	3	SM-SW	<0.01

QC BLANK PASS

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LABORATORY TEST
SULFATE RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/14/22

JOB NO.: 220571

FIG NO.: C-9

APPENDIX D: Laboratory Testing Summary and 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. 3
DATE DRILLED 8/4/2006
Job # 82556

REMARKS

DRY TO 15', 8/7/06

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			17	5.6	1
5			29	8.3	1
			*	12.7	4
10			50/6"	10.5	3
15			50/4"	9.4	3
20					

SAND, SILTY, GRAVELLY, FINE TO COARSE GRAINED, DARK BROWN TO RED BROWN, MEDIUM DENSE, MOIST

CLAYSTONE, VERY SANDY, BROWN, MOIST

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

* - BULK SAMPLE TAKEN

TEST BORING NO. 4
DATE DRILLED 8/4/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS

DRY TO 15', 8/4/06
CAVED TO 14.5', 8/7/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			11	1.9	1
5			37	6.2	1
10			50/5"	8.0	3
15			50/4"	6.2	3
20					

SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, DARK BROWN TO TAN, MEDIUM DENSE TO DENSE, MOIST

SANDSTONE, SILTY, FINE TO COARSE GRAINED, LIGHT GRAY, VERY DENSE, MOIST

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TEST BORING LOG

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

JOB NO.: 82556
FIG NO.: B-2

TEST BORING NO. 11
DATE DRILLED 8/9/2006
Job # 82556

REMARKS

WATER AT 14, 8/10/06

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			16	2.8	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
5			17	2.9	1	
10			50/6"	7.2	3	SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY TO BROWN, VERY DENSE, MOIST TO WET
15			50/4"	10.6	3	
20						

TEST BORING NO. 12
DATE DRILLED 8/4/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS

WATER @ 13.5', 8/7/06

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			15	3.0	1	SAND, GRAVELLY, SLIGHTLY SILTY, FINE TO COARSE GRAINED, DARK BROWN TO TAN, MEDIUM DENSE, MOIST TO WET
5			20	2.5	1	
10			24	13.2	1	
15			50	12.2	2	CLAYSTONE, SANDY, LIGHT GRAY, HARD, MOIST
			*	16.0	2	
20			50/5"	14.2	3	SANDSTONE, SILTY, FINE GRAINED, LIGHT GRAY, VERY DENSE, MOIST

* - BULK SAMPLE TAKEN

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

TEST BORING LOG

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

JOB NO.: 82556
FIG NO.: B-6

TEST BORING NO. 13
DATE DRILLED 8/23/2006
Job # 82556

REMARKS

DRY TO 15',
8/23/06
CAVED TO 13.5',
8/25/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			20	5.6	2
5			19	8.0	2
10			50/6"	12.8	3
15			50/5"	8.5	3
20					

SAND, SILTY, BROWN
CLAY, VERY SANDY, BROWN, STIFF, MOIST

SANDSTONE, SILTY, FINE GRAINED, LIGHT GRAY, VERY DENSE, MOIST

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

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

REMARKS

DRY TO 15',
8/14/06
CAVED TO 14.5',
8/16/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					1
			14	4.4	1
5			45	8.8	3
10			50/5"	8.8	3
15			50/5"	10.6	3
20					

SAND, GRAVELLY, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST

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

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

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

TEST BORING LOG

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

JOB NO.: 82556
FIG NO.: B-7

TEST BORING NO. 15
DATE DRILLED 8/14/2006
Job # 82556

REMARKS

DRY TO 15',
8/16/06

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			12	11.6	1
			50/9"	10.4	3
			50/5"	9.0	3
			50/4"	9.6	3

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

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

TEST BORING NO. 16
DATE DRILLED 8/9/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS

DRY TO 20', 8/9/06
CAVED TO 19',
8/10/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			14	5.9	1
			15	9.3	1
			25	5.9	1
			31	13.5	1
			50/3"	6.7	3

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

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

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TEST BORING LOG

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

JOB NO.: 82556
FIG NO.: B-8

TEST BORING NO. 21
DATE DRILLED 8/9/2006
Job # 82556

REMARKS

WATER @ 10', 8/10/06

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			24	1.6	1
5			31	2.7	1
			*	16.9	2
10			50/9"	10.0	3
			*	10.8	3
			*	11.5	4
15			50/6"	10.3	4
20					

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

CLAY, SANDY, GREEN BROWN, MOIST

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, BROWN, VERY DENSE, MOIST

CLAYSTONE, SANDY, GRAYISH BROWN, HARD, MOIST

* - BULK SAMPLE TAKEN

TEST BORING NO. 22
DATE DRILLED 8/9/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS

WATER @ 3.5', 8/10/06

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			25	9.7	1
5			40	29.8	3
10			50/3"		3
15			50/5"		3
20					

SAND, GRAVELLY, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST

WEATHERED SANDSTONE, SILTY, FINE GRAINED, GRAY, DENSE, WET

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

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TEST BORING LOG

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

JOB NO.: 82556
FIG NO.: B-11

TEST BORING NO. 25
DATE DRILLED 8/16/2006
Job # 82556

REMARKS

DRY TO 15',
8/16/06
CAVED TO 13.5',
8/17/06, DRY

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			15	2.2	1
5			16	2.6	1
10			48	15.9	4
			50 10"	15.6	4
15			50 3"	10.1	3
20					

SAND, GRAVELLY, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE, MOIST

WEATHERED TO FORMATIONAL CLAYSTONE, SANDY, GREEN BROWN, VERY STIFF TO HARD, MOIST

SANDSTONE, SILTY, FINE TO COARSE GRAINED, BLUE GRAY, VERY DENSE, MOIST

TEST BORING NO. 26
DATE DRILLED 8/9/2006
CLIENT MORLEY BENTLEY
LOCATION STERLING RANCH

REMARKS

WATER @ 19', 8/10/06

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			11	0.9	1
5			17	2.8	1
10			32	7.9	1
15			50 4"	8.4	3
20			50 4"	9.8	3

SAND, GRAVELLY, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, DRY TO MOIST

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

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TEST BORING LOG

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

JOB NO.: 82556
FIG NO.: B-13

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

APPENDIX E: Laboratory Testing Summary and Test Boring Logs from Entech Job No. 202403

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT SR LAND, LLC
PROJECT STERLING RANCH & BRIARGATE
JOB NO. 202403

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
1A	13	2-3			10.9	NV	NP				SM-SW	FILL, SAND, SLIGHTLY SILTY
1	1	2-3			11.8	NV	NP	<0.01			SM-SW	SAND, SLIGHTLY SILTY
1	4	5			35.7						SM	SAND, SILTY
1	6	2-3			5.7						SM-SW	SAND, SLIGHTLY SILTY
1	8	5			8.3						SM-SW	SAND, SLIGHTLY SILTY
1	10	2-3			6.2						SM-SW	SAND, SLIGHTLY SILTY
1	11	2-3			7.8						SM-SW	SAND, SLIGHTLY SILTY
2	14	2-3	14.1	117.1	52.6	41	23			1.0	CL	CLAY, VERY SANDY
2	15	5			55.3				1210		CL	CLAY, VERY SANDY
3	2	10			43.3	25	10	<0.01	270		SC	SANDSTONE, VERY CLAYEY
3	3	15			26.8	35	18	<0.01			SC	SANDSTONE, CLAYEY
3	5	10			10.0						SM-SW	SANDSTONE, SLIGHTLY SILTY
3	7	15			17.4						SM	SANDSTONE, SILTY
3	9	10			15.4						SM	SANDSTONE, SILTY
3	12	15			7.7						SM-SW	SANDSTONE, SLIGHTLY SILTY
4	15	10	19.9	102.1	62.3	41	10			2.0	ML	SILTSTONE, SANDY
4	13	20	15.1	114.9	58.1	34	7			1.9	ML	SILTSTONE, VERY SANDY, CLAYEY

TEST BORING NO. 1
DATE DRILLED 11/5/2020
Job # 202403

REMARKS

WATER @ 18', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, LOOSE TO MEDIUM DENSE, DRY
			9	0.8	1	
5			13	1.1	1	
						WEATHERED TO FORMATIONAL SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, DENSE TO VERY DENSE, MOIST
10			47	8.2	3	
15			50/8"	7.9	3	
20			50/8"	12.6	3	

TEST BORING NO. 2
DATE DRILLED 11/5/2020
CLIENT SR LAND, LLC
LOCATION STERLING RANCH & BRIARGATE

REMARKS

DRY TO 19', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, DRY
			29	2.3	1	
5			31	2.4	1	
						SANDSTONE, VERY CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST
10			50/7"	10.3	3	
15			50/6"	10.8	3	
20			50/7"	13.7	3	

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TEST BORING LOG

DRAWN:	DATE	CHECKED:	DATE:
			11/12/20

JOB NO. 202403
FIG NO. B-1

TEST BORING NO. 3
DATE DRILLED 11/5/2020
Job # 202403

REMARKS

DRY TO 19', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			9	1.1	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, LOOSE TO MEDIUM DENSE, DRY
5			12	0.4	1	
10			50	7.4	3	SANDSTONE, SILTY, FINE GRAINED, TAN, VERY DENSE, MOIST
15			50/7"	10.3	3	SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST
20			50/6"	11.4	3	

TEST BORING NO. 4
DATE DRILLED 11/5/2020
CLIENT SR LAND, LLC
LOCATION STERLING RANCH & BRIARGATE

REMARKS

DRY TO 19.5', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			8	1.6	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, LOOSE TO MEDIUM DENSE, DRY TO MOIST
5			29	8.7	1	FINE GRAINED LENSES
10			50/7"	9.8	3	SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST
15			50/8"	13.1	3	
20			50/8"	11.9	3	

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 11/12/20

JOB NO.: 202403
FIG NO.: B-2

TEST BORING NO. 5
DATE DRILLED 11/5/2020
Job # 202403

REMARKS

DRY TO 19', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			10	0.7	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY
5			39	8.4	3	WEATHERED SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, DENSE, MOIST
10			50/8"	6.5	3	SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST
15			50/8"	12.7	3	
20			50/8"	13.7	3	

TEST BORING NO. 6
DATE DRILLED 11/5/2020
CLIENT SR LAND, LLC
LOCATION STERLING RANCH & BRIARGATE

REMARKS

DRY TO 19', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			16	1.2	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, DRY TO MOIST
5			30	4.5	1	
10			50	10.5	3	SANDSTONE, CLAYEY TO VERY CLAYEY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST
15			50/9"	20.1	3	
20			50/9"	11.2	3	SANDSTONE, SILTY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			11/12/20

JOB NO. 202403
FIG NO. B-3

TEST BORING NO. 7
DATE DRILLED 11/5/2020
Job # 202403

REMARKS

DRY TO 18', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			15	1.1	1
5			28	3.2	1
10			50/11"	10.1	3
15			50/9"	9.6	3
20			50/7"	7.6	3

SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST

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

TEST BORING NO. 8
DATE DRILLED 11/5/2020
CLIENT SR LAND, LLC
LOCATION STERLING RANCH & BRIARGATE

REMARKS

DRY TO 19', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			16	1.1	1
5			26	3.2	1
10			50/9"	9.1	3
15			50/9"	9.0	3
20			50/6"	7.5	3

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

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

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 11/12/20

JOB NO.: 202403
FIG NO.: B-4

TEST BORING NO. 9
DATE DRILLED 11/5/2020
Job # 202403

REMARKS

WATER @ 16', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			11	1.3	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE, MOIST
5			29	4.2	1	
						SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST
10			50/10"	8.4	3	
15			50/10"	10.1	3	
20			50/8"	8.5	3	

TEST BORING NO. 10
DATE DRILLED 11/5/2020
CLIENT SR LAND, LLC
LOCATION STERLING RANCH & BRIARGATE

REMARKS

DRY TO 19.5', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			14	1.0	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN TO TAN, MEDIUM DENSE TO DENSE, DRY TO MOIST
5			24	2.9	1	
10			33	15.0	1	
						SANDSTONE, SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST
15			50/9"	8.5	3	
20			50/9"	10.3	3	

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TEST BORING LOG

DRAWN	DATE	CHECKED:	DATE:
			11/12/20

JOB NO. 202403
FIG NO. B-5

TEST BORING NO. 11
DATE DRILLED 11/6/2020
Job # 202403

REMARKS

DRY TO 20', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			11	0.7	1	SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY
5			13	1.4	1	
10			39	17.3	3	WEATHERED TO FORMATIONAL SANDSTONE, CLAYEY, FINE GRAINED, GRAY BROWN, VERY DENSE, MOIST
15			50/9"	12.8	3	
20			50/7"	13.1	3	

TEST BORING NO. 12
DATE DRILLED 11/6/2020
CLIENT SR LAND, LLC
LOCATION STERLING RANCH & BRIARGATE

REMARKS

DRY TO 20', 11/6/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			16	1.0	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE TO DENSE, DRY TO MOIST
5			23	8.8	1	
10			30	6.9	1	
15			50/8"	1.4	3	SANDSTONE, SLIGHTLY SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, DRY TO MOIST
20			50/7"	8.8	3	

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 11/12/20

JOB NO.: 202403
FIG NO.: B-6

TEST BORING NO. 13
DATE DRILLED 11/6/2020
Job # 202403

REMARKS

WATER AT 18', 11/9/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			24	5.9	1A
			31	6.7	1A
10			50	9.1	3
15			50/8"	17.8	3
20			50/7"	14.2	4

FILL 0-6', SAND, SLIGHTLY SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO DENSE, MOIST

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST

SILTSTONE, VERY SANDY, CLAYEY, BLUE GRAY, HARD, MOIST

TEST BORING NO. 14
DATE DRILLED 11/6/2020
CLIENT SR LAND, LLC
LOCATION STERLING RANCH & BRIARGATE

REMARKS

DRY TO 19', 11/9/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			20	12.6	2
5			50/11"	8.9	3
10			50/7"	10.7	3
15			50/6"	12.7	3
20			50/6"	10.5	3

CLAY, VERY SANDY, BROWN, STIFF, MOIST

SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST

SANDSTONE, SILTY, CLAYEY, FINE GRAINED, TAN, VERY DENSE, MOIST

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE: 11/12/20

JOB NO. 202403
FIG NO. B-7

TEST BORING NO. 15
DATE DRILLED 11/6/2020
Job # 202403

TEST BORING NO.
DATE DRILLED
CLIENT SR LAND, LLC
LOCATION STERLING RANCH & BRIARGATE

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 3', 11/9/20						
SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST				21	8.7	1
CLAY, VERY SANDY, GRAY BROWN, STIFF, MOIST	5			18	17.6	2
SILTSTONE, SANDY, GRAY BROWN, HARD, MOIST	10			50/11"	20.3	4
SANDSTONE, CLAYEY TO SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST	15			50/6"	11.2	3
	20			50/6"	9.6	3

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

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
			11/12/20

JOB NO. 202403
FIG NO. B-8

APPENDIX F: Soil Survey Descriptions

El Paso County Area, Colorado

8—Blakeland loamy sand, 1 to 9 percent slopes

Map Unit Setting

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

Map Unit Composition

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

Description of Blakeland

Setting

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

Typical profile

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

Properties and qualities

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

Interpretive groups

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

Minor Components

Other soils

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

Pleasant

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

Data Source Information

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

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: Flood plains, fan terraces, fans
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 19, Aug 31, 2021

El Paso County Area, Colorado

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

Map Unit Setting

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

Map Unit Composition

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

Description of Pring

Setting

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

Typical profile

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

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Drainage class: Well drained
Runoff class: Low
Capacity of the most limiting layer to transmit water (Ksat): High (2.00 to 6.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water supply, 0 to 60 inches: Low (about 6.0 inches)

Interpretive groups

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

Minor Components

Pleasant

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

Other soils

Percent of map unit:
Hydric soil rating: No

Data Source Information

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