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SOIL, GEOLOGY, GEOLOGIC HAZARD STUDY
THE RESERVE AT CORRAL BLUFFS
EL PASO COUNTY, COLORADO

Prepared for

Corral Ranches Development Company
1830 Coyote Point Drive
Colorado Springs, Colorado 80904

Attn: Howard Kunstle

December 11, 2019

Respectfully Submitted,

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KAH/kah

Encl.

Entech Job No. 192142 (previously 83691)
AAProjects/2019/192142 county soil geo

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1.0 SUMMARY

Project Location

The project lies in portions of Sections 31 and 32, Township 13 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 5 miles east of Colorado Springs, Colorado.

Project Description

Total acreage involved in the project is approximately 186 acres. The proposed development consists of 31 single-family rural residential lots. The development will utilize individual wells and on site wastewater treatment systems.

Scope of Report

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

Land Use and Engineering Geology

This site was found to be suitable for the proposed development. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include areas of potentially seasonal shallow groundwater areas, areas of ponded water, artificial fill, hydrocompaction, expansive soils, potentially collapsible soils, and potentially unstable slopes. 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 Sections 31 and 32, Township 13 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 5 miles east of Colorado Springs, Colorado, south of Blaney Road South and east of Meridian Road. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site varies from gently to moderately sloping generally to the north with steeper slopes in the southern portions of the site that slope to the south. Minor drainages on site flow north on the main portion of the property. No water was observed flowing in any of these drainages at the time of this investigation however, minor areas of ponded water were observed behind an earthen dam in the northern central portion of the site. The site boundaries are indicated on the USGS Map, Figure 2. An aerial photograph of the area of the site is presented in Figure 3. Previous land uses have included grazing and pasture land. The site contains primarily field grasses and weeds with areas of yucca. Site photographs, taken December 19, 2011, are included in Appendix A.

Total acreage involved in the proposed development is approximately 183 acres. Thirty-one single-family rural residential lots are proposed with areas of open space in the southern portion of the site. Lot sizes range from 5.0 acres to 6.1 acres. The area will be serviced by individual wells and on site wastewater treatment systems. The wastewater study will be provided in a separate report. The proposed Development Plan by Land Resource Associates, dated January 4, 2012, is presented in Figure 4. It is our understanding no significant changes have been made to the development plan.

3.0 SCOPE OF THE REPORT

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

4.0 FIELD INVESTIGATION

Our field investigation on this site 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 December 19, 2011. The site was revisited by personnel of Entech Engineering, Inc. on December 4, 2019. The conditions observed on the site have not significantly changed from the original mapping.

4.1 Previous Investigations

The site was previously investigated by Entech Engineering, Inc. as a part of a Soil, Geology, Geologic Hazard and Wastewater Study, January 30, 2012 (Reference 1). Nine (9) percolation tests were performed on the site to determine general suitability of the site for the use of individual wastewater treatment systems. The profile borings were used to evaluate soil conditions. The locations of these percolation tests are indicated on the Development Plan/Percolation Test Location Map, Figure 4. The Test Boring Logs from the Profile Holes 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 include grain-size analysis, ASTM D-422, and Atterberg Limits, ASTM D-4318. Swell testing included both FHA Swell Tests and Swell/Consolidation Tests. Results of the laboratory testing are included in Appendix C. A Summary of Laboratory Test Results is presented in Table 1.

Additional Test Borings and Percolation Testing were performed by Entech Engineering, Inc., August 30, 2012 (Reference 2). The additional testing consisted of drilling an additional 6 test borings and performing an additional 3 percolation tests. The locations of the additional tests are indicated on Figure 4. The test boring logs and laboratory test results from the additional testing are included in Appendix D and summarized in Table1.

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 14 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 northerly direction (Reference 3). The rocks in the area of the site are sedimentary in nature, and typically Tertiary to Upper Cretaceous in age. The bedrock underlying the site consists of the Dawson Arkose Formation. Overlying this formation are unconsolidated deposits of residual, colluvial, man-made, eolian and alluvial soils of the Quaternary Age. The residual soils are produced by the in-situ action of weathering of the bedrock on site. Some colluvial soils exist which are deposited by gravity and sheetwash. The alluvial soils were deposited by water in the minor drainage areas on site and as stream deposits. The eolian materials were deposited by wind. Fill material exist as earthen dams and erosion berms. 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 4), previously the Soil Conservation Service (Reference 5) has mapped four soil types on the site (Figure 5). In general, they vary from sandy loam and clay loam to areas of sandstone. The soils are described as follows:

Type	Description
3	Ascalon Sandy Loam, 3-9% Slopes
4	Badland
13	Bresser Sandy loam, 5-9% Slopes
85	Stapleton – Bernal Sandy Loams, 3-20% Slopes

Complete descriptions of each soil type are presented in Appendix E. The soils have generally been described to have rapid to moderate permeabilities. Soil Type 4 (Badland) exists on the steeper slopes in the southern portion of the site where no development is proposed. Soil Types 3 and 13 have been described as having good potential for home sites. Limitations on soil Type 85 include steep slopes, and depth to bedrock. 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 with high erosion hazards on Soil Type 4 (Badland) due to the potential for gullying.

5.3 Site Stratigraphy

The Colorado Geology Map showing the site is presented in Figure 6 (Reference 6). The Corral Bluff/Falcon Geology Map, showing the site, is presented in Figure 7 (References 7 and 8). The Geology Map prepared for the site is presented in Figure 8. Five mappable units were identified on this site which are described as follows:

Artificial Fill of Holocene Age: These are man-made fill deposits associated with erosion berms and earthen dams on-site.

Recent Alluvium of Holocene Age: These are recent stream deposits associated with the drainages on-site. These materials generally consist of silty to clayey sands and may contain clay lenses.

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

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 northwest. 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.

Colluvium of Quaternary Age overlying Dawson Arkose of Tertiary to Cretaceous Age: These materials consist of silty to clayey sands and sandy clays, deposited by the action of sheetwash and gravity. Some areas contain residual soils derived from the in-situ weathering of the bedrock materials. These soils are overlying the Dawson Formation. The Dawson Formation typically consists of coarse-grained, arkosic sandstone with interbedded lenses of fine-grained sandstone, siltstone and claystone.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Pueblo 1°x 2° Quadrangle* distributed by the US Geological Survey in 1978 (Reference 6), the *Geologic Map of the Falcon Quadrangle* distributed by the Colorado Geologic Survey in 2012 (Reference 7), the *Geologic Map of the Corral Bluff Quadrangle* distributed by the US Geological Survey in 1968 (Reference 8), and the Geologic Map of the Corral Bluffs and Falcon Quadrangles by Charles S. Robinson and Associates, Inc. in 1977 (Reference 9). The Test Borings from the the previous investigations (Refernces 1 and 2) were also used in evaluating the site and are included in Appendes B and D. The Geology Map prepared for the site is presented in Figure 8.

5.4 Soil Conditions

The soils encountered in the Profile Holes and Test Borings (References 1 and 2) can be grouped into four general soil and rock types. The soils were classified using the Unified Soil Classification System (USCS).

Soil Type 1 is a silty to very silty sand (SM), encountered in the upper soil profile in all but one of the profile holes. These soils were encountered at medium dense to dense states and at moist conditions. Samples tested had 27 to 49 percent passing the No. 200 Sieve. A consolidation of 0.6% was measured in the Swell/Consolidation Test. This consolidation is in the low range.

Soil Type 2 consists of sandy to very sandy clay and clay-silt (CL, CL-ML). The clays were encountered in two of the profile holes at depths ranging from the surface to 9 feet below the surface. These soils were encountered at stiff to very stiff consistencies and moist conditions. Samples tested had 57 to 74 percent passing the No. 200 sieve. A swell of 3.3 percent was measured on the clays in the Swell/Consolidation Test. This swell is in the moderate to high expansion range. A consolidation of 0.2 percent was measured on the soils in the Swell/Consolidation Test indicating low potential for consolidation.

Soil Type 3 consists of sandy to very sandy silt (ML). This material was encountered in two of the test borings at the surface and extending to the depths explored. The silt was encountered at stiff to very stiff consistencies and at moist conditions. The samples tested had 52 to 64 percent passing the No. 200 sieve. A swell pressure of 850 psf was measured in the FHA Swell Test. This swell is in the low expansion range.

Soil Type 4 consists of very clayey to silty sandstone bedrock (SM, SC, SC-SM). This material was encountered in 4 of the test borings at 7 to 13 feet below the surface. The sandstone was encountered at very dense states and moist conditions. The samples tested had 40 to 44 percent passing the No. 200 sieve. A FHA swell pressure of 1330 psf was measured on the very clayey sandstone. This swell is in the moderate expansion range.

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 (References 1 and 2).

5.5 Groundwater

Groundwater was not encountered in any of the profile holes which were drilled to 10 and 15 feet. Areas of potentially seasonal shallow groundwater and ponded water have been mapped in the drainages on-site. These areas are discussed in the following section. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time.

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 or clays. 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

Mapping has been performed on this site to produce an Engineering Geology Map (Figure 8). 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

Fill associated with erosion berms and an earthern dam was observed on site. Additionally, other areas of artificial fill may be encountered in areas other than those mapped. These berms and dam are considered uncontrolled for construction purposes.

Mitigation: These areas are limited and it is anticipated they could be avoided by construction. Smaller erosion berms can be regraded or penetrated by foundations. Any uncontrolled fill encountered beneath foundation will require removal and recompaction at a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557.

Collapsible soils

Collapsible soils were encountered in some of the profile holes of the percolation test drilled on-site. Consolidations ranging from 0.2 to 0.6 percent were measured on samples tested in the Swell/Consolidation Test. These soils are highly sporadic, therefore, none have been indicated on the map. Should loose or collapsible soils be encountered beneath foundations, mitigation will be necessary.

Mitigation: Mitigation for collapsible soils typically involves overexcavation and recompaction of the material to a minimum of 95 percent of its maximum Proctor Dry Density, ASTM D-1557. Overexcavation depths vary from 2 to 4 feet depending upon the materials present and proposed loads. Where collapsible clays are encountered, overexcavation and replacement with non-expansive structural fill compacted at a minimum of 95 percent of its maximum Proctor Dry Density, ASTM D-1557 may be necessary. Final recommendations should be determined after additional investigation on each building site.

Expansive Soils

Expansive soils were encountered in some of the test borings drilled on–site. These occurrences are typically sporadic; therefore, none have been indicated on the maps. These clays, if encountered beneath foundations, can cause differential movement in the structure foundation. These occurrences should be identified and mitigated on an individual basis.

Mitigation: Should expansive soils be encountered beneath the foundation, mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation and replacement with non-expansive soils at a minimum of 95 percent of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Another alternative in areas of highly expansive soils is the use of drilled pier foundation

systems. Typical minimum pier depths are on the order of 25 feet or more and require penetration into the bedrock material a minimum of 4 to 6 feet, depending on building loads. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. The use of structural floors should be considered for basement construction on highly expansive clays. Final recommendations should be determined after additional investigation of each building site.

Potentially Seasonal Shallow Groundwater Area

In these areas, we would anticipate the potential for periodically high subsurface moisture conditions, frost heave potential and highly organic soils. The majority of these areas lie within minor drainage areas which can be avoided by the proposed development. Construction in any portions of these areas, if required, should follow these precautions.

Mitigation: Due to lot sizes, it is anticipated these areas can be avoided by structures. Should structures encroach on these areas, foundations should penetrate to a 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. Any grading in these areas should be done in a manner that directs surface flow around construction to avoid areas of ponded water. Areas of organic material will require removal before fill placement. The site does not lie within any floodplain zones according to the FEMA Map Nos. 08041CO563G, 08041CO564G, and 08041CO780G dated December 7, 2018 (Figure 9, Reference 10). Exact locations of floodplain and specific drainage studies are beyond the scope of this report. Finished floor levels must be located a minimum of one foot above floodplain levels.

Areas of Ponded Water

These are areas of standing water behind an earth dam on site. We would not expect development in this area. Either the dam can be avoided by construction or the area may be completely regraded. Should complete regrading of the 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.

Hydrocompaction

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

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.

Slope Stability and Landslide Hazard

The majority of the slopes on-site are gently to moderately sloping and do not exhibit any past or potential unstable slopes or landslides. The steeply sloping areas in the southern portions of the site have been identified as potentially unstable slopes. These areas are designated as open space and non-build zones. The recommendations for these areas are as follows:

- Potentially Unstable Slopes:

  Considerable care must be exercised in these areas not to create a condition which would tend to activate instability.

  Mitigation: Building should be avoided in these areas. A building setback of 50 feet from the crest of these slopes is recommended. The building setback line is indicated on Figure 8. Proper control of drainage at both the surface and in the subsurface is extremely important. Areas of ponded water at the surface should be avoided above these slopes. Utility trenches, basement excavations and other subsurface features

should not be permitted to become water traps which may promote saturation of the subsurface materials.

6.1 Relevance of Geologic Conditions to Land Use Planning

We understand that the development will be rural residential lots. 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 steeper slopes in the southern portion of the site that can be avoided. Other hazards on site may be satisfactorily mitigated through proper engineering design and construction practices.

The upper residual soils are typically at medium to dense states and stiff to very stiff consistencies. The granular soils encountered in the upper soil profiles of the test borings should provide good support for foundations. Expansive soils were encountered on portions of the site that will require mitigation. Additionally, collapsible soils could be encountered that will require mitigation. Foundations anticipated for the site are standard spread footings possibly in conjunction with overexcavation in areas of expansive or collapsible soils. Areas containing arkosic sandstone will have high allowable bearing conditions. Difficult excavation should be anticipated in areas of shallow bedrock. Expansive or collapsible layers may also be encountered in the soil and bedrock on this site. Areas of expansive and collapsible soils encountered on site are sporadic; therefore, none have been indicated on the maps. Expansive or collapsible soils, if encountered, will require special foundation design and/or overexcavation. These soils will not prohibit development.

Areas of fill were encountered on the site associated with an earthen dam and erosion berms. Due to lot sizes, it is anticipated these areas could be avoided by construction. Any uncontrolled fill encountered beneath foundations will require recompaction to 95 percent of it Modified Proctor Dry Density ASTM D-1557.

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 is 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.

Areas of potentially seasonal high groundwater and ponded water were encountered on site. Due to the size of the lots and the proposed development, these areas can be avoided by construction. Structures should not block drainages. Septic fields should not be located in these areas due to the potential for periodic high groundwater conditions.

Potentially unstable slopes exist along the southern portion of the site. These areas are in the open space and no-build areas of the site. Buildings should be located a minimum of 50 feet from the crest of the potentially unstable slopes. Based on the proposed Development Plan, it appears there is sufficient room on all the lots for the setback.

In summary, development of the site can be achieved if the conditions 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 11), the area is mapped as upland deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 12), areas of the site are mapped with U3: upland deposits-sand. 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. Some of the sands encountered on site could be considered an aggregate resource, however, considering the silty to clayey nature of much of these materials, 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. The

area of the site has been mapped as "Moderate" for coal resources. No active or inactive mines have been mapped in the area of the site. No metallic mineral resources have been mapped on the site (Reference 13).

The site has been mapped at "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.

8.0 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 and weathered bedrock materials become increasingly less susceptible to water erosion. For the typical soils observed on site, allowable velocities or unvegetated and unlined earth channels would be on the order of 3 to 4 feet/second, depending upon the sediment load carried by the water. Permissible velocities may be increased through the use of vegetation to something on the order of 4 to 7 feet/second, depending upon the type of vegetation established. Should the anticipated velocities exceed these values, some form of channel lining material may be required to reduce erosion potential. These might consist of some of the synthetic channel lining materials on the market or conventional riprap. In cases where ditch-lining materials are still insufficient to control erosion, small check dams or sediment

traps may be required. The check dams will serve to reduce flow velocities, as well as provide small traps for containing sediment. The determination of the amount, location and placement of ditch linings, check dams and of the special erosion control features should be performed by or in conjunction with the drainage engineer who is more familiar with the flow quantities and velocities.

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

9.0 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 avoided by construction. Others can be mitigated through proper engineering design and construction practices. The proposed development and use is 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 and septic systems will be required prior to construction. Construction and design personnel should be made familiar with the contents of this report. Discrepancies should be reported to Entech Engineering, Inc. soon after they are discovered so that the evaluation and recommendations presented can be reviewed and revised if necessary. Additional investigation for the building sites is recommended prior to site grading or construction. Planning and design personnel should be made familiar with the contents of this report.

This report has been prepared for Corral Ranches Development Company 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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TABLE

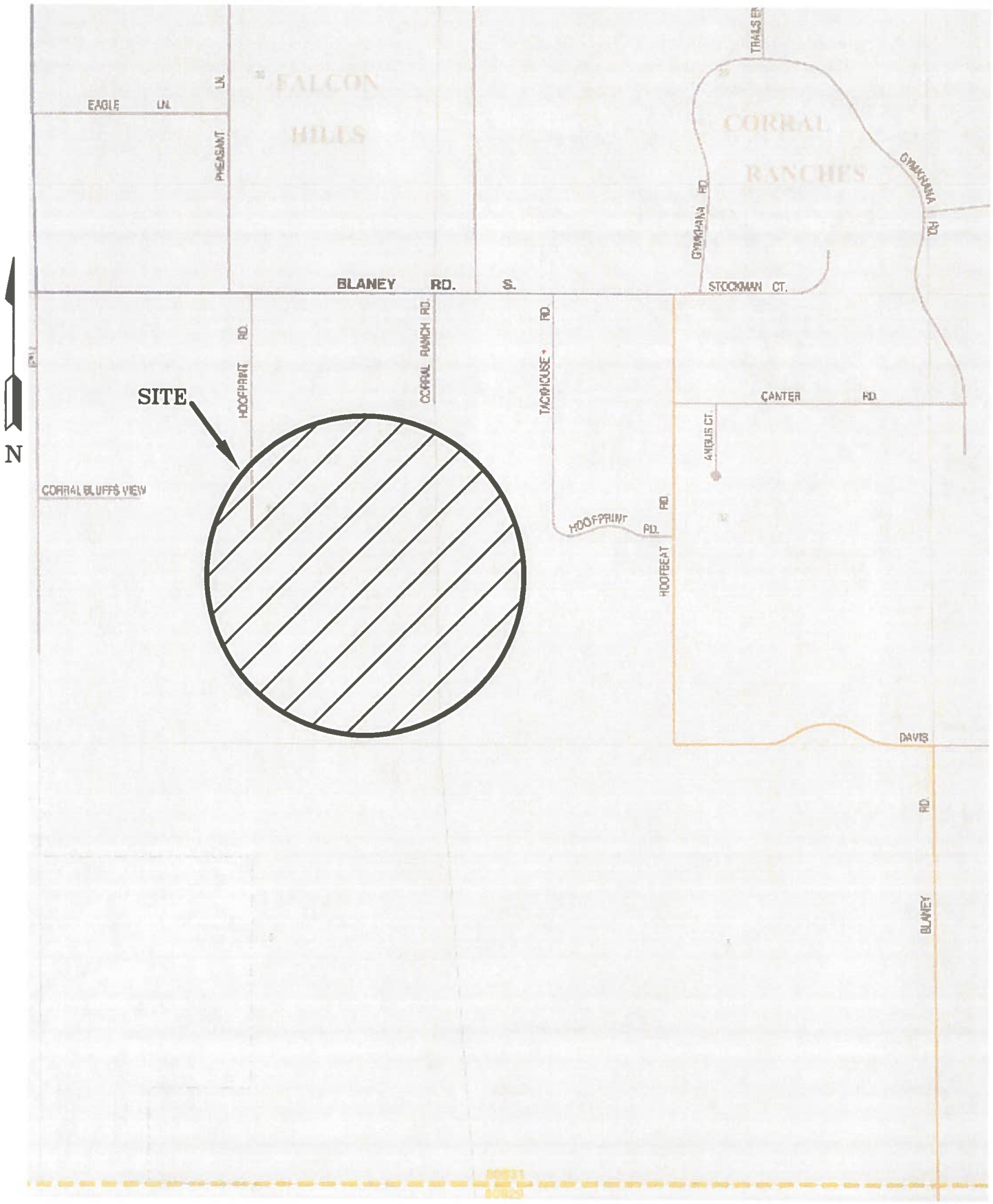
TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT CORRAL RANCH DEVELOPMENT
PROJECT RESERVE AT CORRAL BLUFFS
JOB NO. 83691

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	6.3	106.5	45.3					-0.6	SM	SAND, VERY SILTY
1	5	2-3			26.9						SM	SAND, SILTY
1	6	2-3			41.7						SM	SAND, VERY SILTY
1	7	2-3			45.5						SM	SAND, VERY SILTY
1	8	2-3			49.0						SM	SAND, VERY SILTY
1	9	2-3			28.0						SM	SAND, SILTY
1	11	5			40.0						SM	SAND, VERY SILTY
1	12	5			30.5						SM	SAND, SILTY
1	15	5			38.3						SM	SAND, VERY SILTY
2	1	10			57.0	18	7				CL-ML	CLAY-SILT, VERY SANDY
2	4	2-3	16.7	109.3	73.2	21	8			-0.2	CL	CLAY, SANDY
2	4	5	11.0	109.5	74.3	20	6			3.3	CL-ML	CLAY-SILT, SANDY
3	2	2-3			52.7						ML	SILT, VERY SANDY
3	2	10							850		ML	SILT, VERY SANDY
3	3	2-3			64.4						ML	SILT, SANDY
4	4	15			39.6	17	6				SC-SM	SANDSTONE, VERY CLAYEY, SILTY
4	6	10			43.8	28	16		1330		SC	SANDSTONE, VERY CLAYEY

FIGURES



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

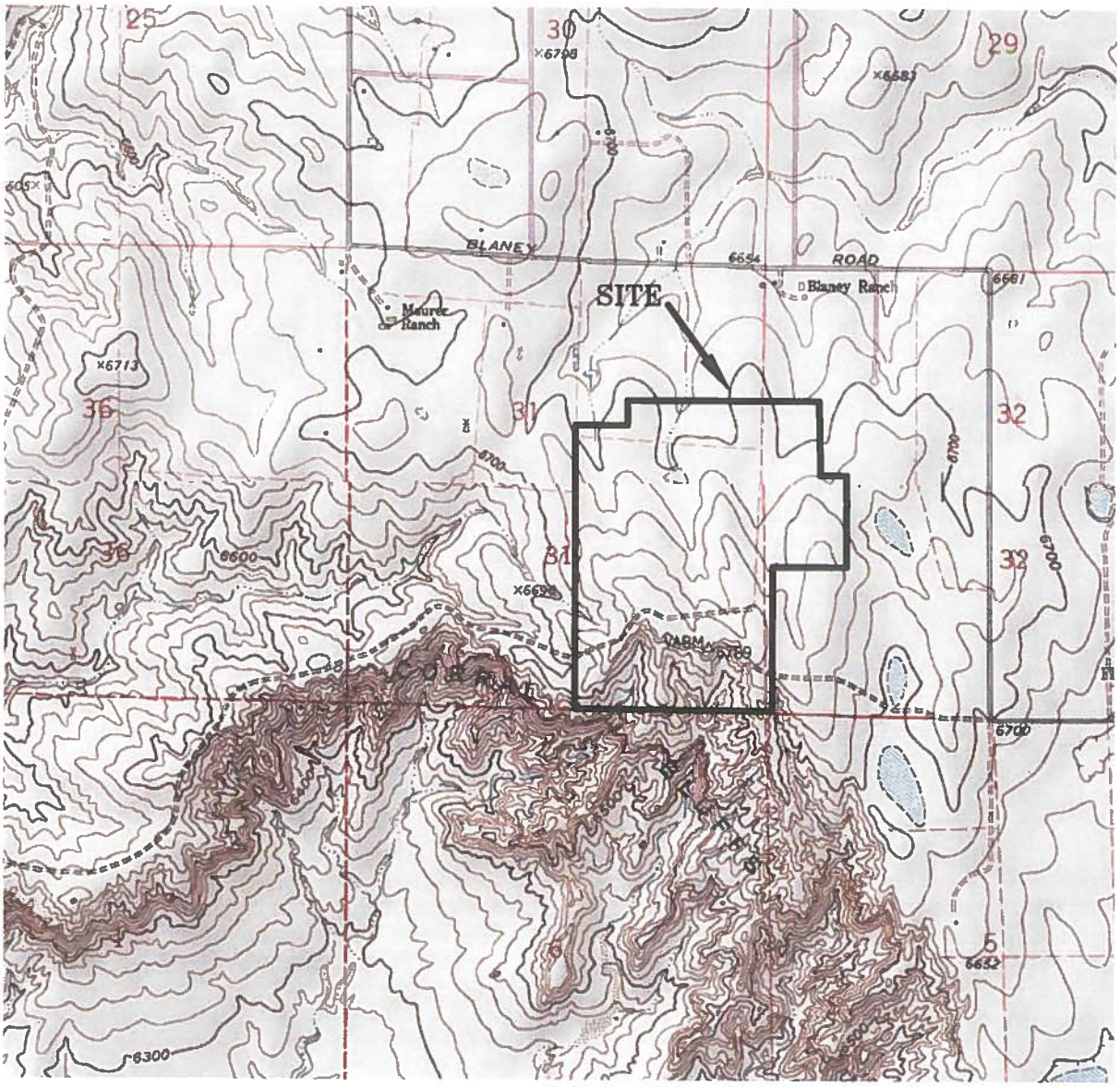
Vicinity Map
The Reserve at Corral Bluffs
El Paso County, CO.
For: Corral Ranch Development Co.

DRAWN:	DATE:	CHECKED:	DATE:
KAH	12/2/19		

JOB NO.: 192142

FIG NO.: 1

N



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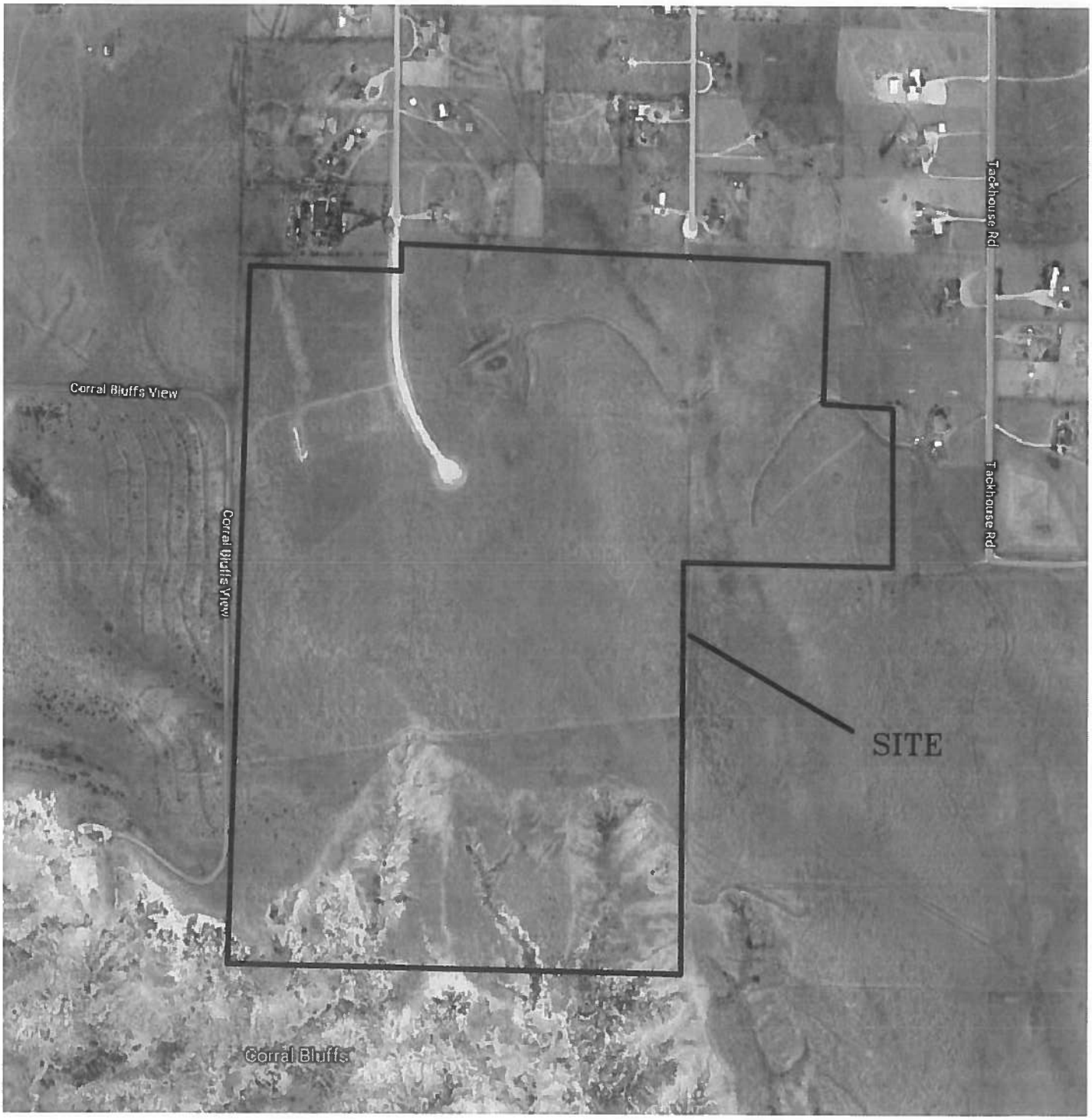
USGS Map
The Reserve at Corral Bluffs
El Paso County, CO.
For: Corral Ranch Development Co.

DRAWN:	DATE:	CHECKED:	DATE:
KAH	12/2/19		

JOB NO.: 192142

FIG NO.: 2



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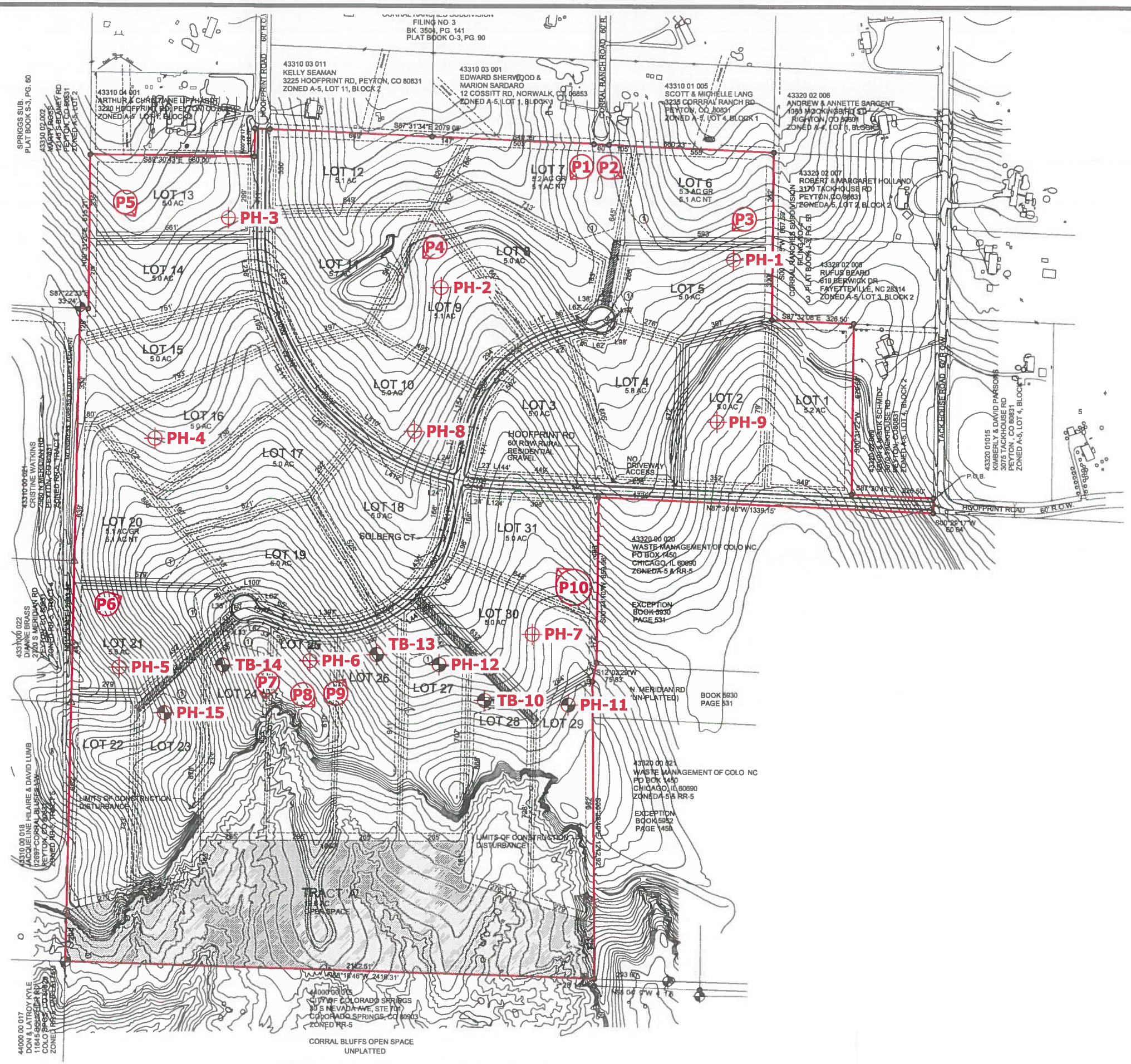
Aerial Photograph
The Reserve at Corral Bluffs
El Paso County, CO.
For: Corral Ranch Development Co.

DRAWN:	DATE:	CHECKED:	DATE:
KAH	12/2/19		

JOB NO.: 192142

FIG NO.: 3



P1 – APPROXIMATE LOCATION AND DIRECTION OF PHOTOS

PH-2 – APPROXIMATE LOCATION AND NUMBER OF PERCOLATION TEST FROM ORIGINAL REPORT

PH-15 – APPROXIMATE LOCATION AND NUMBER OF ADDITIONAL PERCOLATION TEST

TB-14 – APPROXIMATE LOCATION AND NUMBER OF ADDITIONAL TEST BORING

REVISIONS	BY:

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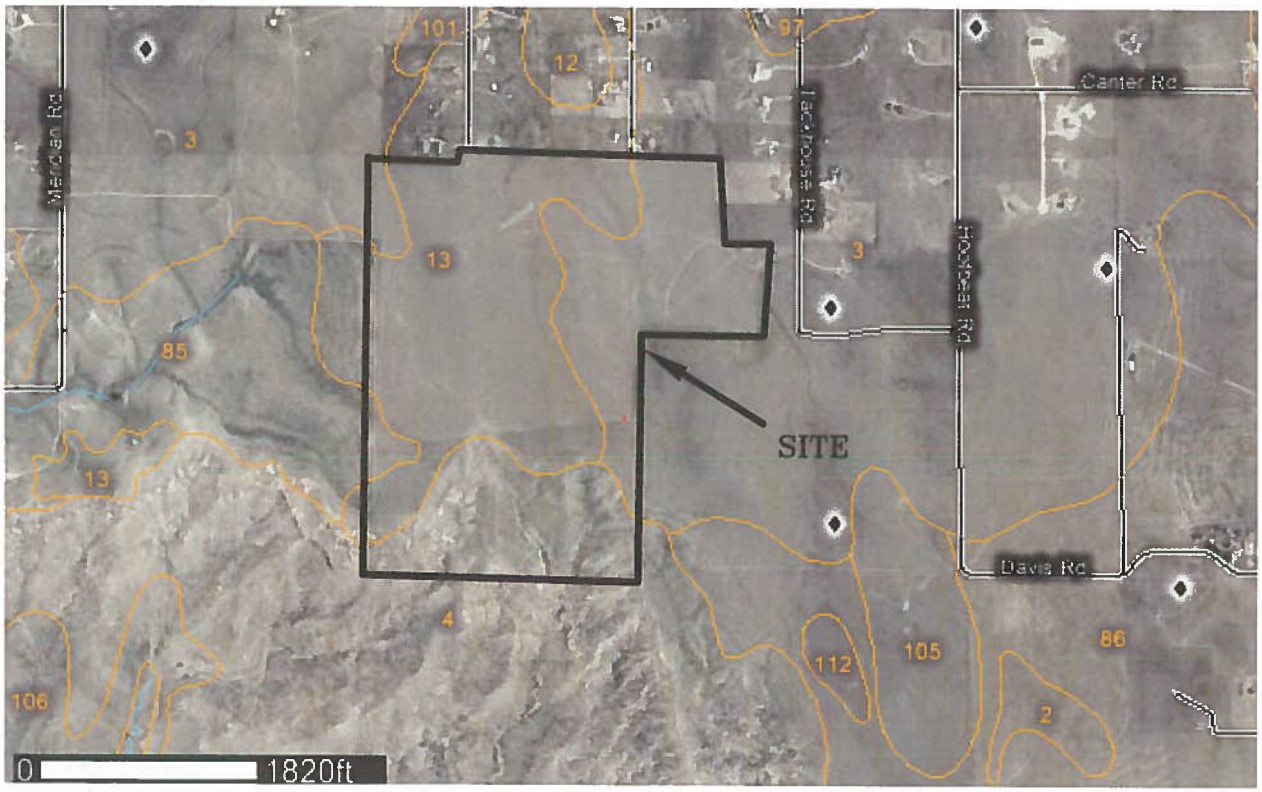
COLORADO SPRINGS, CO. 80907 (719) 531-5599

DEVELOPMENT PLAN / PERCOLATION TEST LOCATION MAP
THE RESERVE AT CORRAL BLUFFS
EL PASO COUNTY, CO
FOR: CORRAL RANCH DEVELOPMENT

DRAWN BY: JAC	
DESIGNED BY: KAH	
CHECKED BY:	
DATE: 12/04/19	
SCALE: 1:200	
JOB NO.: 192142	
FIGURE NO.: 4	



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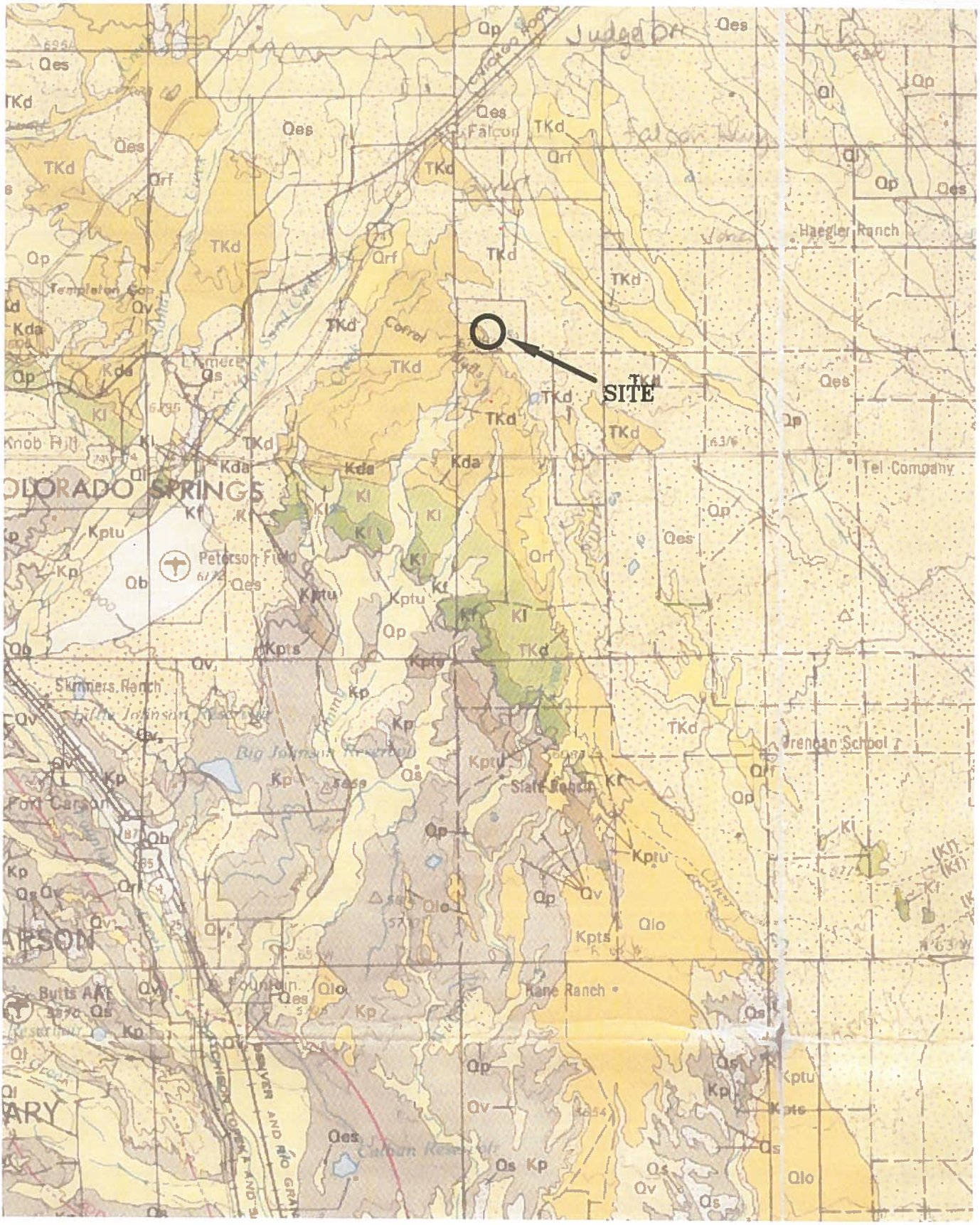
Soil Survey Map
The Reserve at Corral Bluffs
El Paso County, CO.
For: Corral Ranch Development Co.

DRAWN:	DATE:	CHECKED:	DATE:
KAH	12/2/19		

JOB NO.: 192142

FIG NO.: 5



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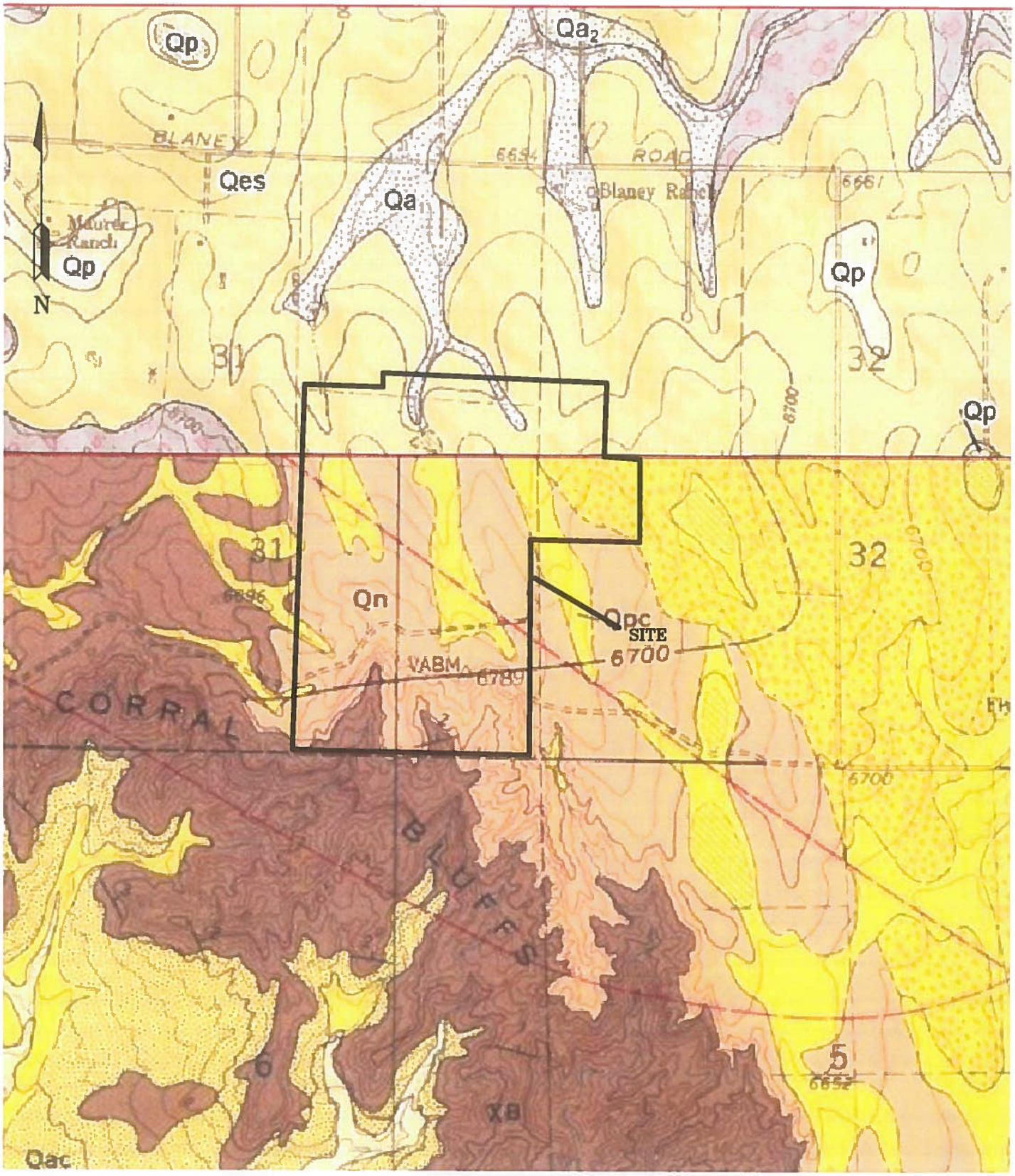
Colorado Geology Map
The Reserve at Corral Bluffs
El Paso County, CO.
For: Corral Ranch Development Co.

DRAWN:	DATE:	CHECKED:	DATE:
KAH	12/2/19		

JOB NO.: 192142

FIG NO.: 6



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Corral Bluffs/Falcon Geology Map
The Reserve at Corral Bluffs
El Paso County, CO.
For: Corral Ranch Development Co.

DRAWN:	DATE:	CHECKED:	DATE:
KAH	12/2/19		

JOB NO.: 192142

FIG NO.: 7

LEGEND

Qaf - Artificial Fill of Holocene Age:
Man-made fill deposits.

Qal - Recent Alluvium of Holocene Age:
Recent water deposited materials

Qp - Piney Creek Alluvium of Holocene Age:
Water deposited sands and clays

Qes - Eolian Sand of Quaternary Age:
Wind blown sand deposits

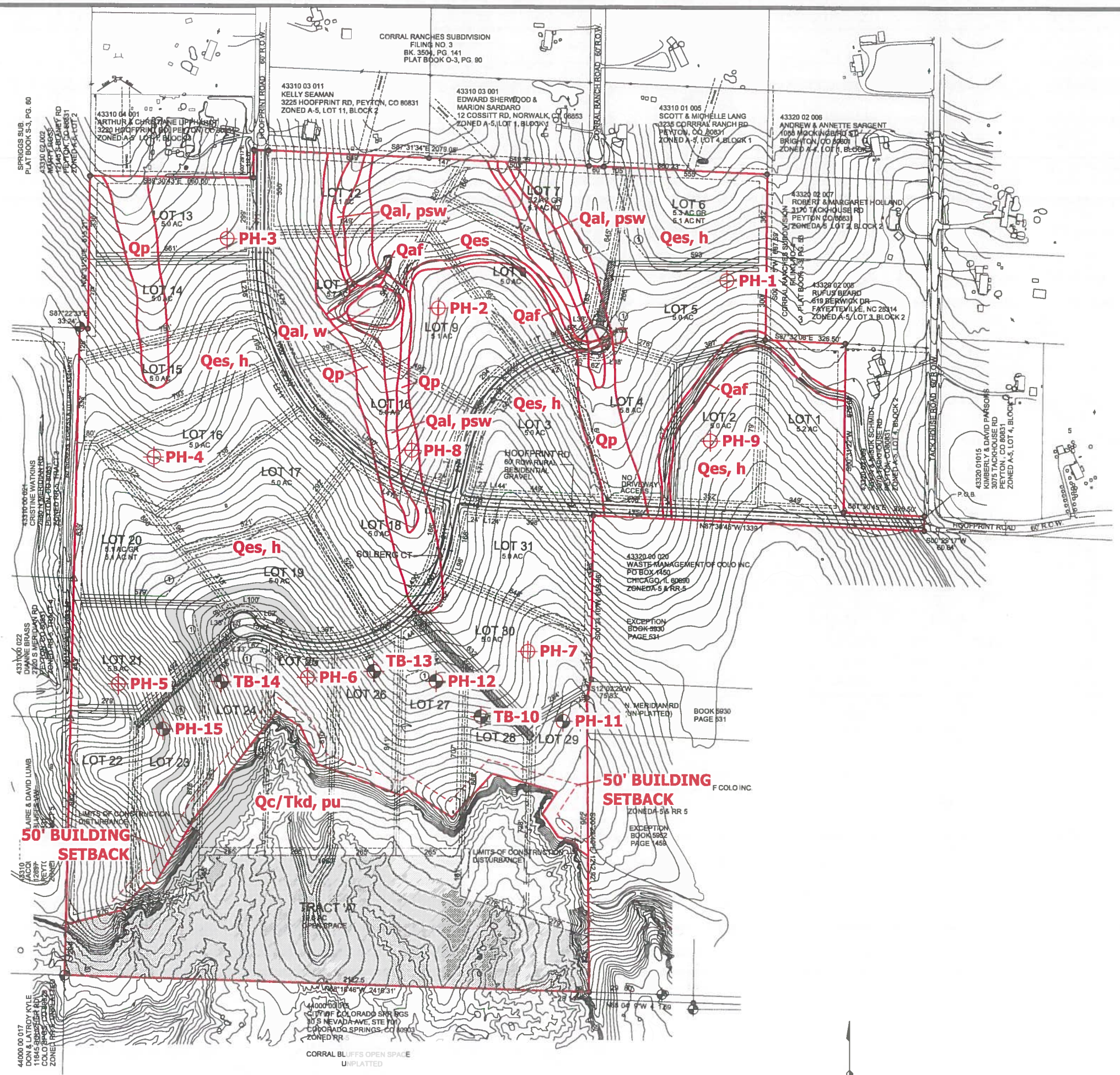
Qc/Tkd - Colluvium of Quaternary Age Overlying the Dawson Formation of Tertiary to Cretaceous Age:
Sheetwash and residual soil deposits overlying arkosic sandstone with interbedded siltstone and claystone.

w - areas of ponded water

psw - potentially seasonal shallow groundwater

h - hydrocompaction

pu - potentially unstable slope



PH-2- APPROXIMATE TEST BORING LOCATION AND NUMBER

REVISIONS	BY:

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

GEOLOGY/ENGINEERING GEOLOGY MAP
THE RESERVE AT CORRAL BLUFFS
EL PASO COUNTY, CO
FOR: CORRAL RANCH DEVELOPMENT

DRAWN BY: JAC	
DESIGNED BY: KAH	
CHECKED BY:	
DATE: 12/04/19	
SCALE: 1:200	
JOB NO.: 192142	
FIGURE NO.: 8	

LEGEND

SPECIAL FLOOD HAZARD AREAS INUNDATED BY 100–YEAR FLOOD

ZONE A No base flood elevations determined.

ZONE AE Base flood elevations determined.

ZONE AH Flood depths of 1 to 3 feet (usually areas of ponding); base flood elevations determined.

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

ZONE A99 To be protected from 100–year flood by Federal flood protection system under construction; no base elevations determined.

ZONE V Coastal flood with velocity hazard (wave action); no base flood elevations determined.

ZONE VE Coastal flood with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

OTHER FLOOD AREAS

ZONE X Areas of 500–year flood; areas of 100–year flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 100–year flood.

OTHER AREAS

ZONE X Areas determined to be outside 500–year floodplain.

ZONE D Areas in which flood hazards are undetermined.

UNDEVELOPED COASTAL BARRIERS

Identified 1983 | Identified 1990 | Otherwise Protected Areas

Coastal barrier areas are normally located within or adjacent to Special Flood Hazard Areas.

Flood Boundary

Floodway Boundary

Zone D Boundary

Boundary Dividing Special Flood Hazard Zones, and Boundary Dividing Areas of Different Coastal Base Flood Elevations Within Special Flood Hazard Zones.

513 — Base Flood Elevation Line; Elevation in Feet. See Map Index for Elevation Datum.

D — D — Cross Section Line

(EL 987) — Base Flood Elevation in Feet Where Uniform Within Zone. See Map Index for Elevation Datum.

RM7 — Elevation Reference Mark

M2 — River Mile

97°07'30", 32°22'30" — Horizontal Coordinates Based on North American Datum of 1927 (NAD 27) Projection.

N

REVISION	BY

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(719) 531-5599

Floodplain Map
The Reserve at Corral Bluffs
El Paso County, CO.
For: Corral Ranch Development Co

DRAWN	KAH
CHECKED	
DATE	12/2/19
SCALE	AS SHOWN
JOB NO.	192142
FIGURE No.	9

APPENDIX A: Site Photographs

Looking southwest from the north central portion of the site.

December 19, 2011

Looking southeast from the north central portion of the site.

December 19, 2011

Job No. 83691

3

Looking southwest from the southeast portion of the site.

December 19, 2011

4

Looking at dam and pond in central portion of the site.

December 19, 2011

Job No. 83691

5

Looking southeast from the northwest portion of the site.

December 19, 2011

6

Looking northeast from the southwest portion of the site.

December 19, 2011

Job No. 83691

7

Looking south at potentially unstable slopes in south central portion of the site.

December 19, 2011

8

Looking southeast at potentially unstable slopes in south central portion of the site.

December 19, 2011

Job No. 83691

9

Looking northeast from the south central portion of the site.

December 19, 2011

10

Looking northwest from the southeast portion of the site.

December 19, 2011

Job No. 83691

APPENDIX B: Test Boring Logs from Profile Holes (Reference 1)

PROFILE HOLE NO 1
DATE DRILLED 12/28/2011
Job # 83691

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 14', 12/29/11						
SAND, VERY SILTY, FINE GRAINED, BROWN TO TAN, MEDIUM DENSE, MOIST				21	6.1	1
	5			12	8.2	1
CLAY-SILT, VERY SANDY, TAN, VERY STIFF, MOIST	10			35	9.0	2
	15			35		2
	20					

PROFILE HOLE NO 2
DATE DRILLED 12/28/2011
CLIENT CORRAL RANCH DEVELOPMENT
LOCATION RESERVE AT CORRAL BLUFFS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 15', 12/29/11						
SILT, VERY SANDY, TAN TO BROWN, STIFF TO VERY STIFF, MOIST				21	10.1	3
	5			19	12.0	3
	10			21	11.9	3
	15			32	20.7	3
	20					

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PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: B-1

PROFILE HOLE NO 3
DATE DRILLED 12/28/2011
Job # 83691

REMARKS

DRY TO 15', 12/29/11

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SILT, SANDY, TAN TO BROWN, STIFF TO VERY STIFF, MOIST				
			17	13.9	3
5			27	12.6	3
10			21	13.7	3
15			41	7.9	3
20					

PROFILE HOLE NO 4
DATE DRILLED 1/4/2012
CLIENT CORRAL RANCH DEVELOPMENT
LOCATION RESERVE AT CORRAL BLUFFS

REMARKS

DRY TO 14', 1/5/12

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	CLAY, SANDY, DARK BROWN, STIFF, MOIST				
			19	16.4	2
5	CLAY-SILT, SANDY, TAN, VERY STIFF TO STIFF, MOIST		30	10.9	2
10			24	5.8	2
15	SANDSTONE, VERY CLAYEY, VERY SILTY, FINE GRAINED, TAN, VERY DENSE, MOIST		50 / 10"	6.0	4
20					

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 8369
FIG NO.: B-2

PROFILE HOLE NO 5
DATE DRILLED 1/4/2012
Job # 83691

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 7', 1/5/12						
SAND, SILTY, FINE TO MEDIUM GRAINED, TAN TO BROWN, MEDIUM DENSE, MOIST				28	7.4	1
	5			24	8.9	1
SANDSTONE, SILTY, FINE TO MEDIUM GRAINED, TAN, VERY DENSE, MOIST	10			50 / 9"	6.1	4
	15					
	20					

PROFILE HOLE NO 6
DATE DRILLED 1/4/2012
CLIENT CORRAL RANCH DEVELOPMENT
LOCATION RESERVE AT CORRAL BLUFFS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 9', 1/5/12						
SAND, VERY SILTY, FINE GRAINED, DENSE, TAN, MOIST				32	10.4	1
	5			40	6.9	1
SANDSTONE, VERY CLAYEY, FINE GRAINED, TAN, VERY DENSE, MOIST	10			50 / 11"	7.6	4
	15					
	20					

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: B-3

PROFILE HOLE NO 7
DATE DRILLED 1/4/2012
Job # 83691

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 14', 1/5/12						
SAND, VERY SILTY, FINE GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST				21	10.8	1
	5			40	8.0	1
SAND, SILTY, FINE TO MEDIUM GRAINED, BROWN, DENSE, MOIST	10			38	4.5	1
SANDSTONE, SILTY, FINE TO MEDIUM GRAINED, TAN, VERY DENSE, MOIST	15			50 / 11"	8.1	4
	20					

PROFILE HOLE NO 8
DATE DRILLED 1/4/2012
CLIENT CORRAL RANCH DEVELOPMENT
LOCATION RESERVE AT CORRAL BLUFFS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 10', 1/5/12						
SAND, VERY SILTY, FINE GRAINED, TAN, DENSE, MOIST				30	7.5	1
SAND, SILTY, FINE TO MEDIUM GRAINED, BROWN, DENSE, MOIST	5			47	6.7	1
	10			40	5.0	1
	15					
	20					

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PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: B-4

POFILE HOLE NO. 9
DATE DRILLED 1/4/2012
Job # 83691

POFILE HOLE NO.
DATE DRILLED
CLIENT CORRAL RANCH DEVELOPMENT
LOCATION RESERVE AT CORRAL BLUFFS

REMARKS

DRY TO 10', 1/5/12

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
	SAND, SILTY, FINE TO MEDIUM GRAINED, TAN, MEDIUM DENSE TO DENSE, MOIST				
		■	26	8.6	1
5		■	33	7.4	1
10		■	45	6.4	1
15					
20					

REMARKS

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

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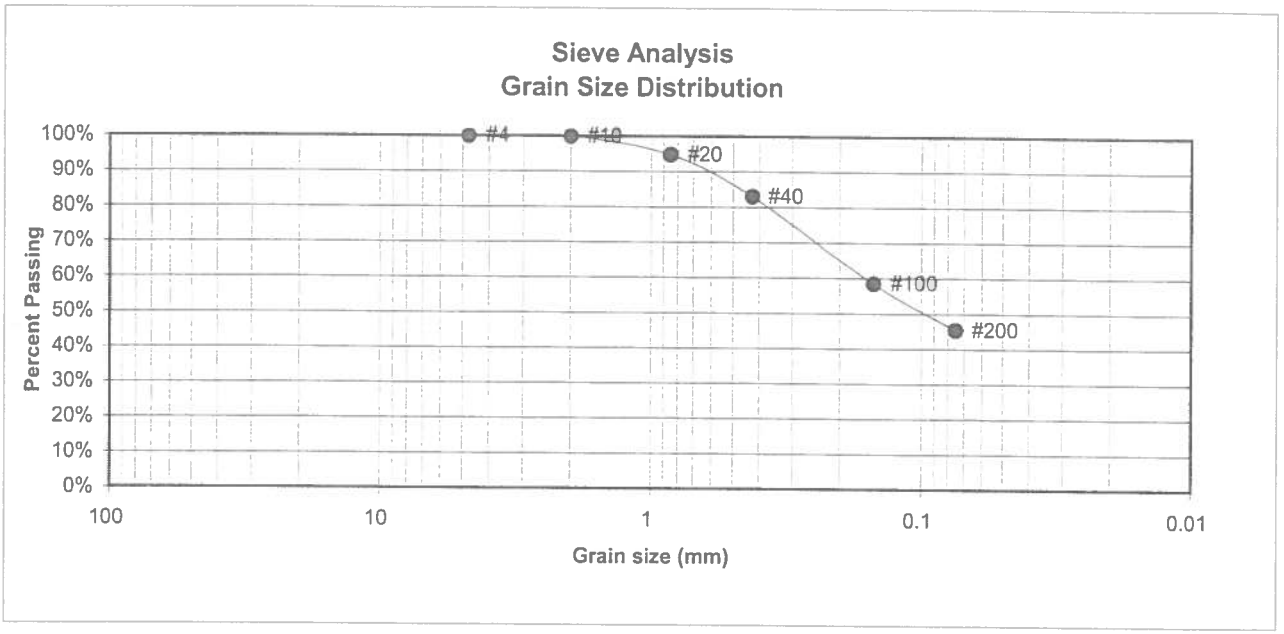
PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: B-5

APPENDIX C: Laboratory Test Results
(Reference 1)

UNIFIED CLASSIFICATION	SM	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	1	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	1	JOB NO.	83691
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.9%
20	94.8%
40	83.0%
100	58.5%
200	45.3%

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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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

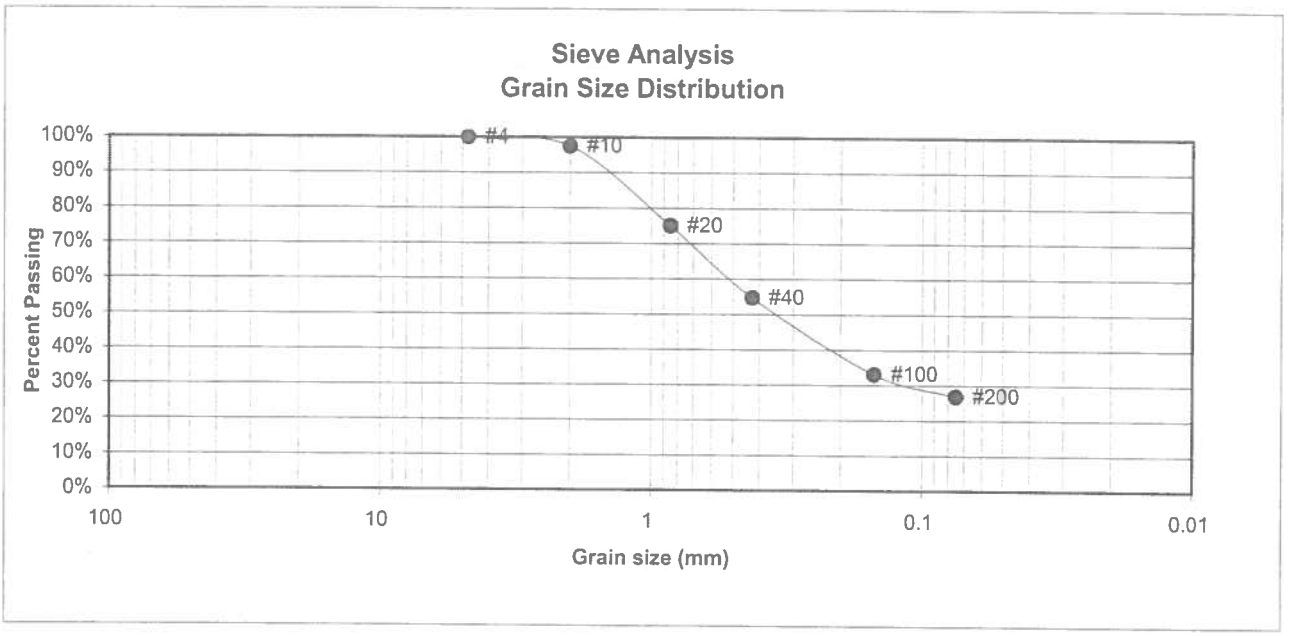
LABORATORY TEST RESULTS

DRAWN	DATE.	CHECKED:	DATE.
			1/17/12

JOB NO.: 83691

FIG NO.: C-1

UNIFIED CLASSIFICATION	SM	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	1	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	5	JOB NO.	83691
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	97.5%
20	75.0%
40	54.7%
100	33.2%
200	26.9%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

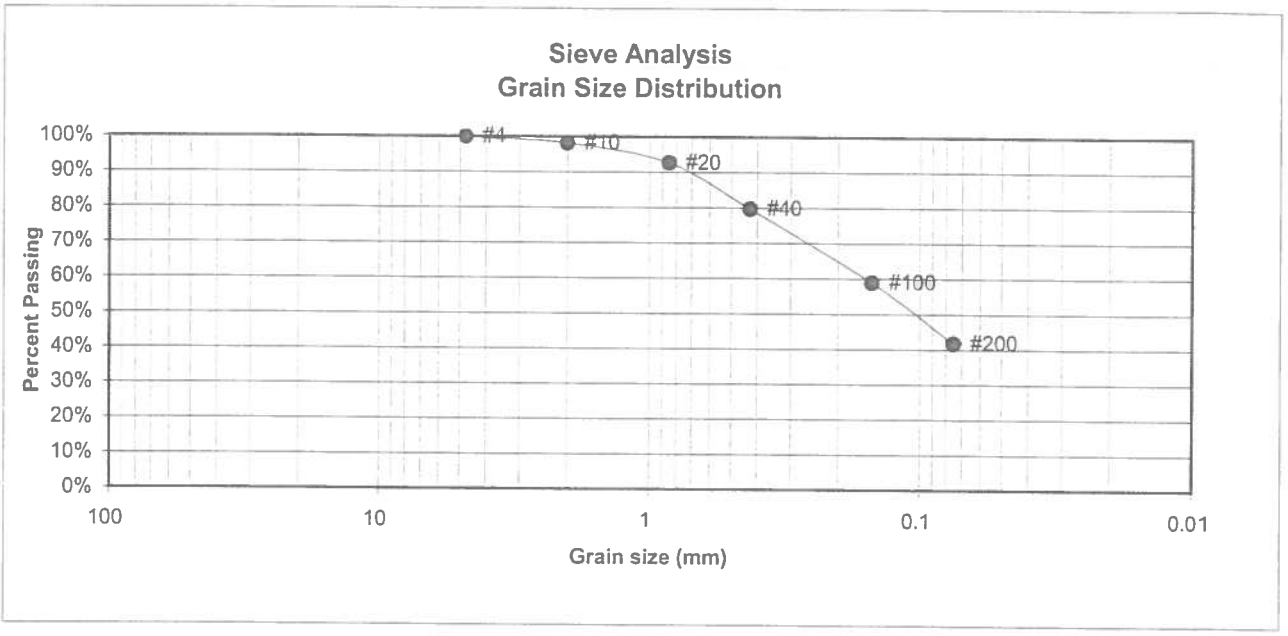
ENTECH ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: C-2

UNIFIED CLASSIFICATION	SM	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	1	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	6	JOB NO.	83691
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.2%
20	92.7%
40	79.7%
100	58.9%
200	41.7%

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

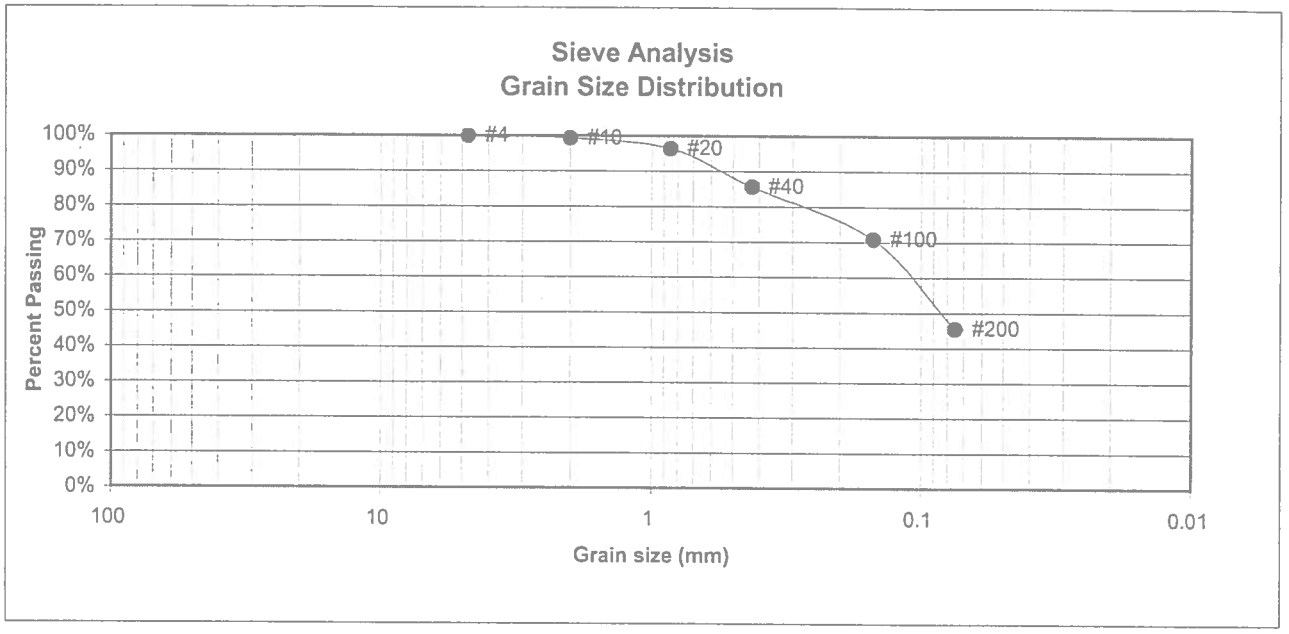
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LL	1/17/12

JOB NO.: 83691

FIG NO.: C-3

UNIFIED CLASSIFICATION	SM	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	1	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	7	JOB NO.	83691
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.3%
20	96.4%
40	85.7%
100	70.8%
200	45.5%

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

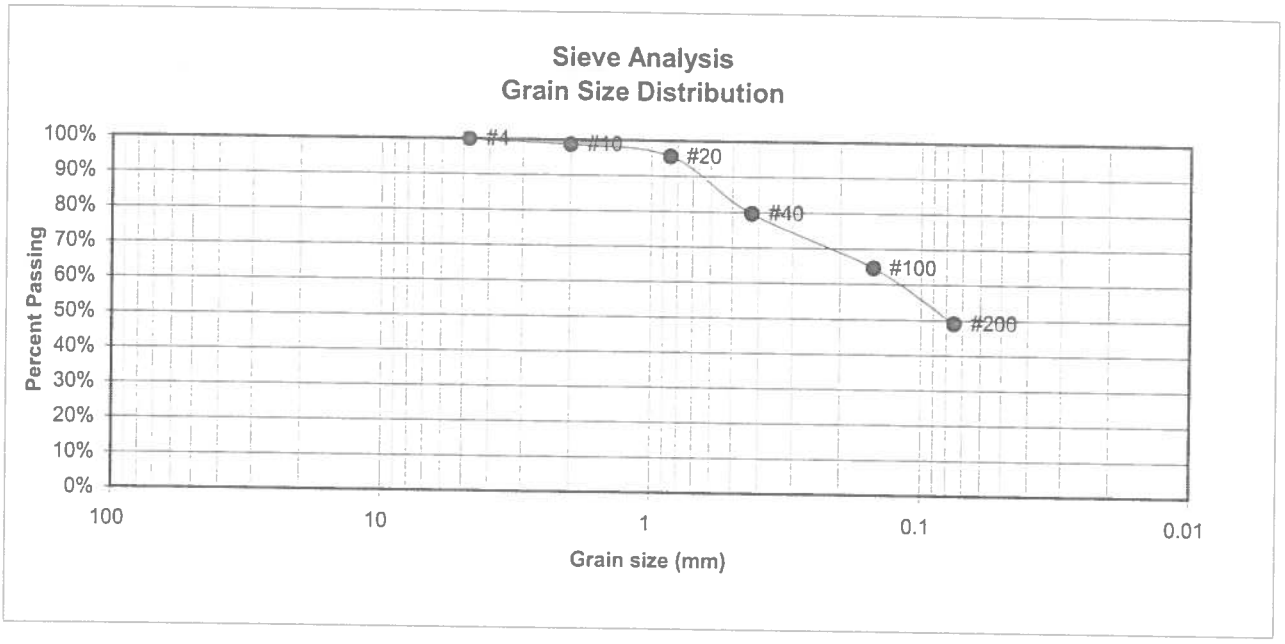
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691

FIG NO.: C-4

UNIFIED CLASSIFICATION	SM	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	1	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	8	JOB NO.	83691
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.7%
20	95.6%
40	79.6%
100	64.6%
200	49.0%

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.
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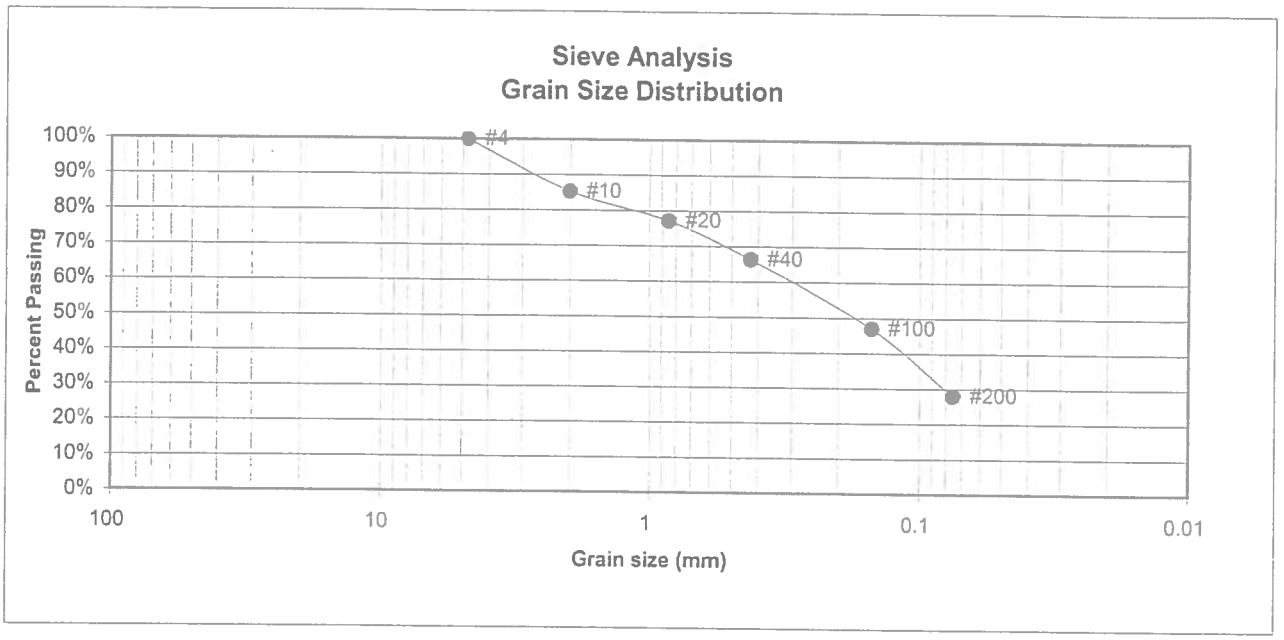
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: C-5

UNIFIED CLASSIFICATION	SM	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	1	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	9	JOB NO.	83691
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	85.3%
20	77.1%
40	66.3%
100	47.0%
200	28.0%

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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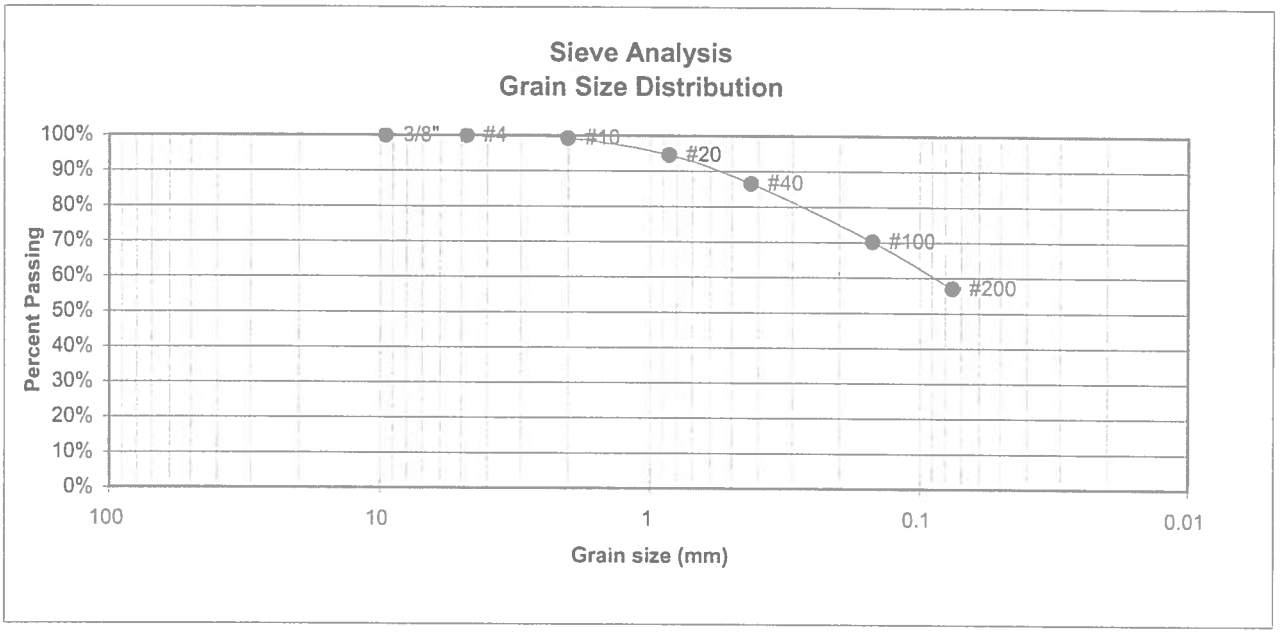
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		W	1/17/12

JOB NO.: 83691
FIG NO.: C-6

UNIFIED CLASSIFICATION	CL-ML	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	2	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	1	JOB NO.	83691
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	100.0%
10	99.3%
20	94.6%
40	86.5%
100	70.2%
200	57.0%

Atterberg Limits	
Plastic Limit	12
Liquid Limit	18
Plastic Index	7

Swell	
Moisture at start	#DIV/0!
Moisture at finish	#DIV/0!
Moisture increase	#DIV/0!
Initial dry density (pcf)	0
Swell (psf)	0

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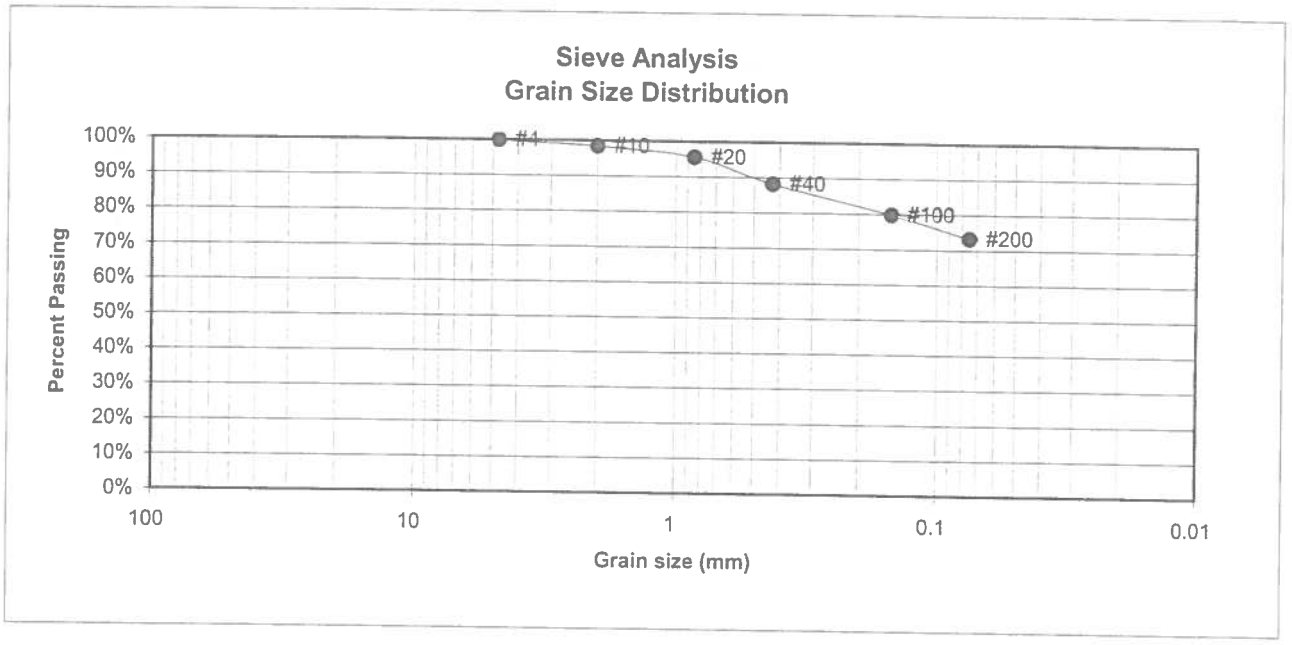
LABORATORY TEST RESULTS

DRAWN	DATE	CHECKED	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: C-7

UNIFIED CLASSIFICATION	CL	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	2	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	4	JOB NO.	83691
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.4%
20	95.6%
40	88.2%
100	79.9%
200	73.2%

Atterberg Limits	
Plastic Limit	13
Liquid Limit	21
Plastic Index	8

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

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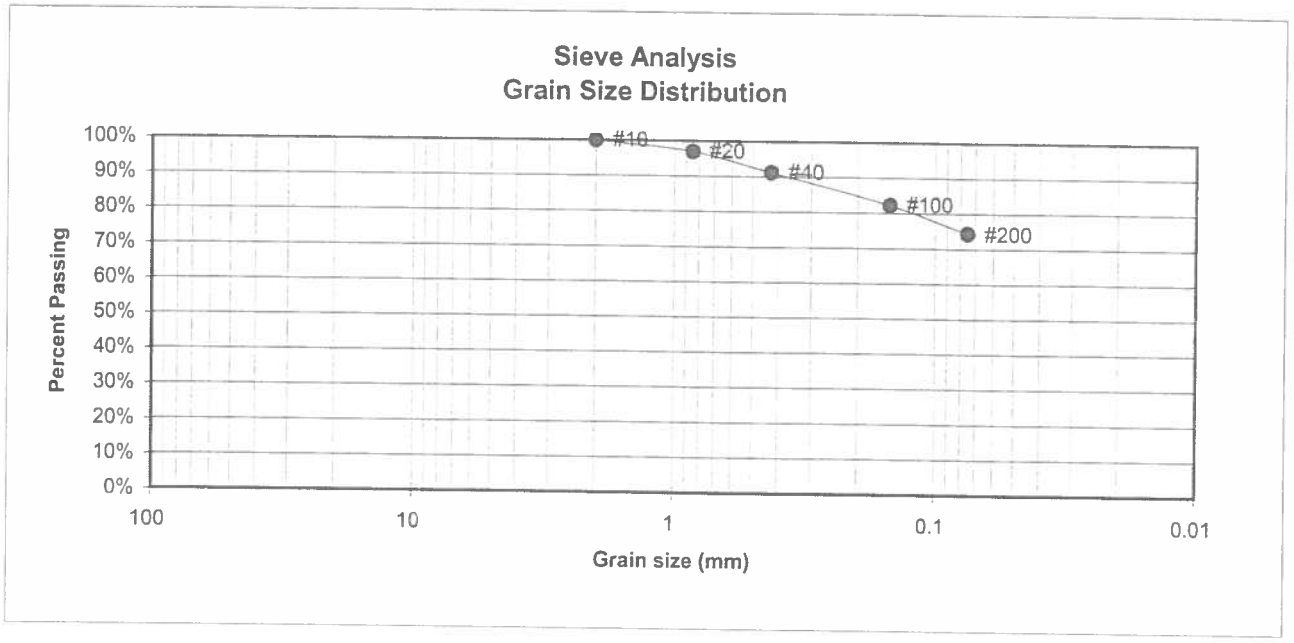
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: C-8

UNIFIED CLASSIFICATION	CL-ML	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	2	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	4	JOB NO.	83691
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	97.0%
40	91.2%
100	82.2%
200	74.3%

Atterberg Limits	
Plastic Limit	14
Liquid Limit	20
Plastic Index	6

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

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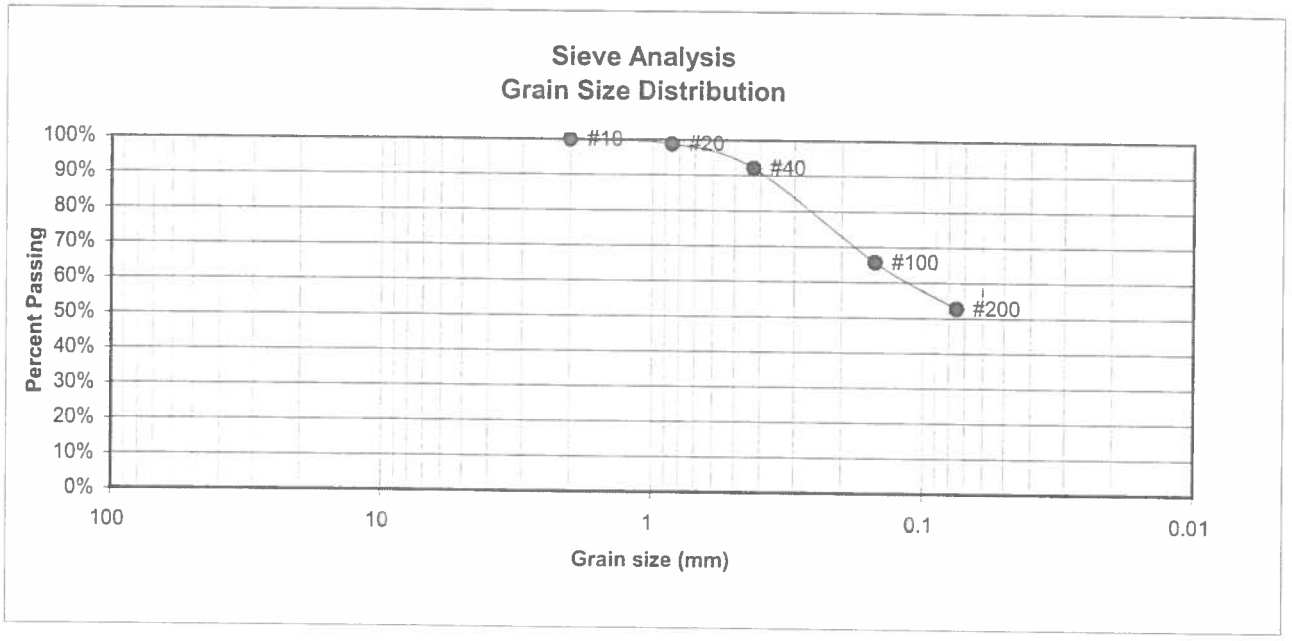
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		hr	1/17/12

JOB NO.: 83691
FIG NO.: C-9

UNIFIED CLASSIFICATION	ML	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	3	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	2	JOB NO.	83691
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	98.8%
40	92.0%
100	65.7%
200	52.7%

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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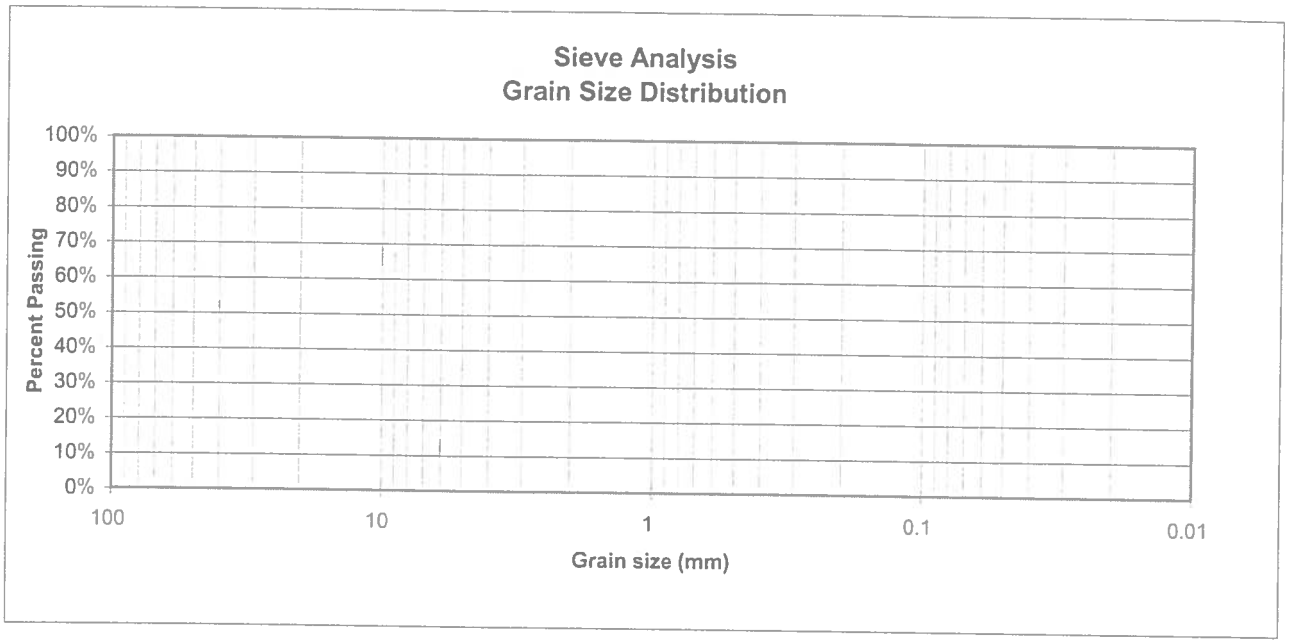
505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: C-10

UNIFIED CLASSIFICATION	ML	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	3	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	2	JOB NO.	83691
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	
200	

Atterberg Limits	
Plastic Limit	
Liquid Limit	
Plastic Index	

Swell	
Moisture at start	9.4%
Moisture at finish	15.3%
Moisture increase	5.9%
Initial dry density (pcf)	103
Swell (psf)	850

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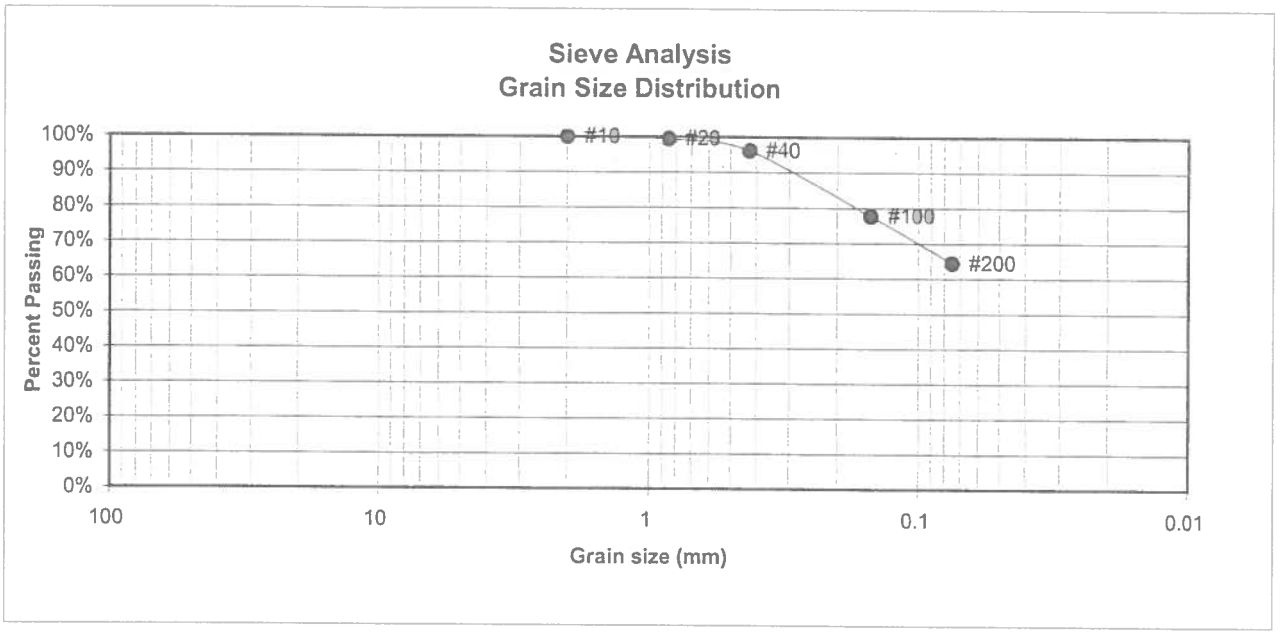
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: C-11

UNIFIED CLASSIFICATION	ML	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	3	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	3	JOB NO.	83691
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	99.4%
40	96.2%
100	77.7%
200	64.4%

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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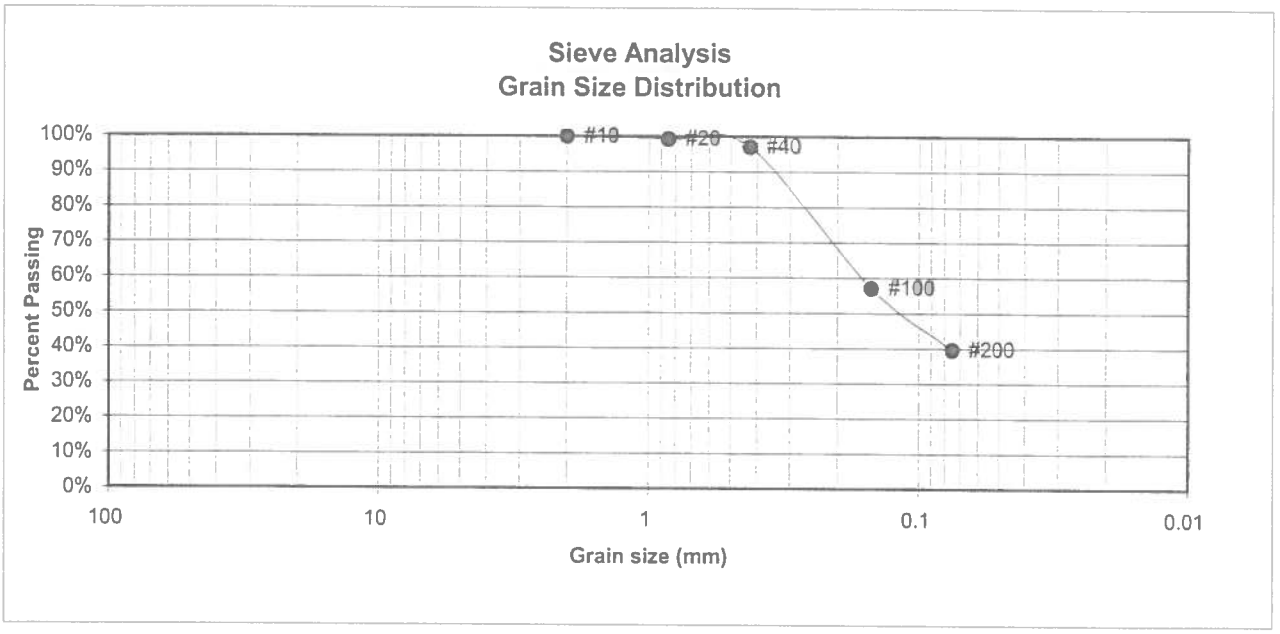
LABORATORY TEST RESULTS

DRAWN.	DATE	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691

FIG NO.: C-12

UNIFIED CLASSIFICATION	SC-SM	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	4	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	4	JOB NO.	83691
DEPTH (FT)	15	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	100.0%
20	99.3%
40	97.0%
100	57.1%
200	39.6%

Atterberg Limits	
Plastic Limit	10
Liquid Limit	17
Plastic Index	6

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

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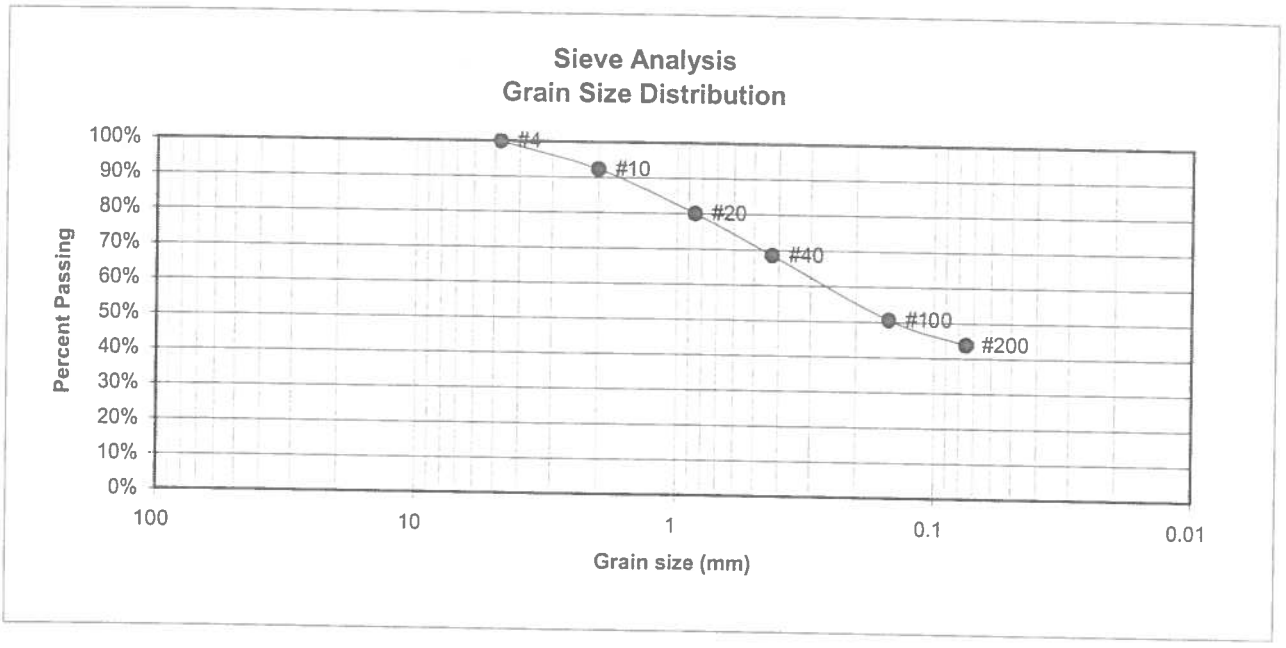
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			1/12/12

JOB NO.: 83691
FIG NO.: C-13

UNIFIED CLASSIFICATION	SC	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	4	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	6	JOB NO.	83691
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	92.3%
20	80.0%
40	68.5%
100	50.6%
200	43.8%

Atterberg Limits	
Plastic Limit	12
Liquid Limit	28
Plastic Index	16

Swell	
Moisture at start	14.2%
Moisture at finish	23.6%
Moisture increase	9.4%
Initial dry density (pcf)	103
Swell (psf)	1330

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LABORATORY TEST RESULTS

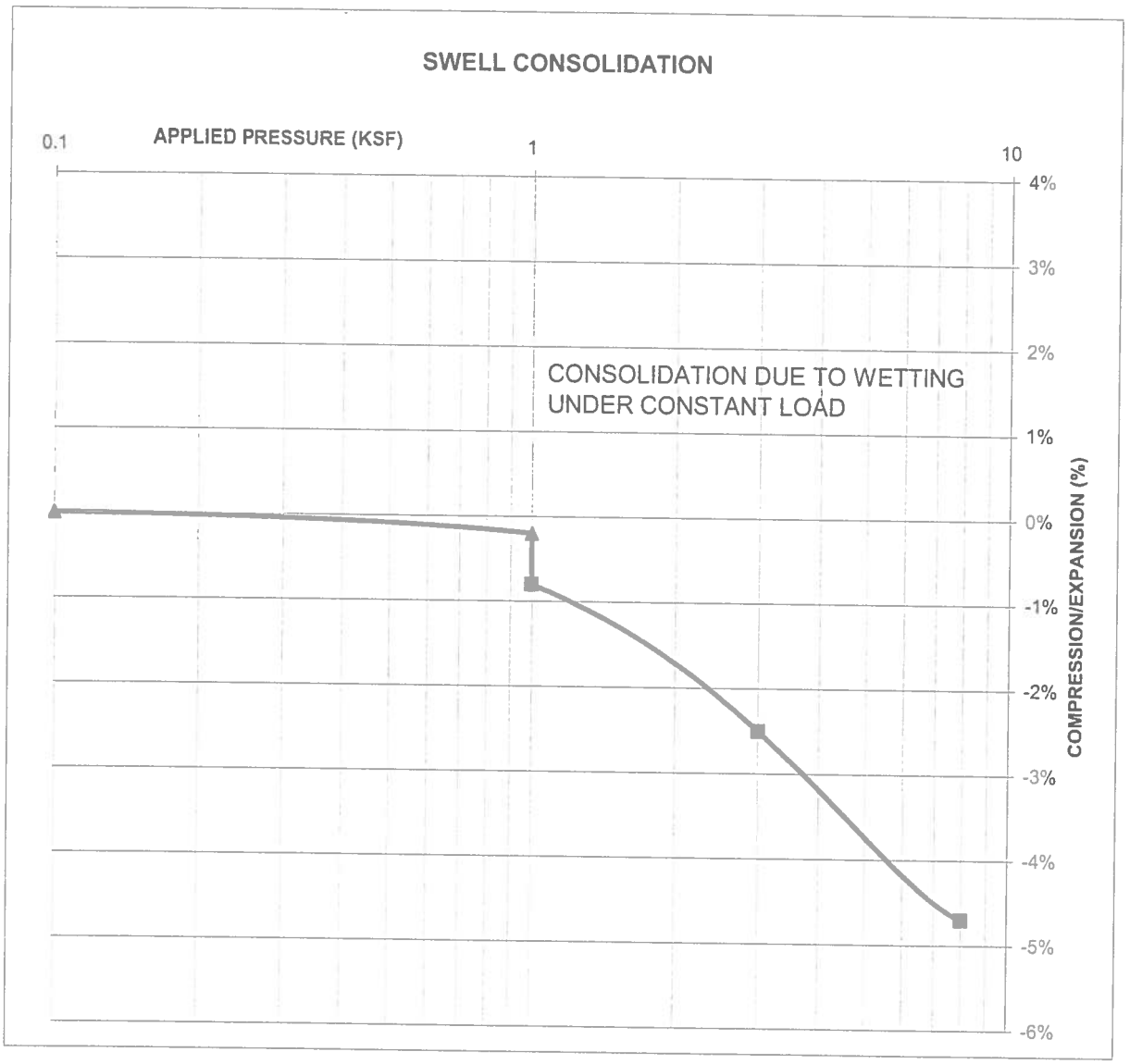
DRAWN:	DATE:	CHECKED:	DATE:
		KAV	1/23/12

JOB NO.: 83691
FIG NO.: C-14

CONSOLIDATION TEST RESULTS

TEST BORING #	1	DEPTH(ft)	2-3
DESCRIPTION	SM	SOIL TYPE	1
NATURAL UNIT DRY WEIGHT (PCF)			107
NATURAL MOISTURE CONTENT			6.3%
SWELL/CONSOLIDATION (%)			-0.6%

JOB NO. 83691
CLIENT CORRAL RANCH DEV.
PROJECT RESERVE AT CORRAL BLUFFS



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SWELL CONSOLIDATION
TEST RESULTS

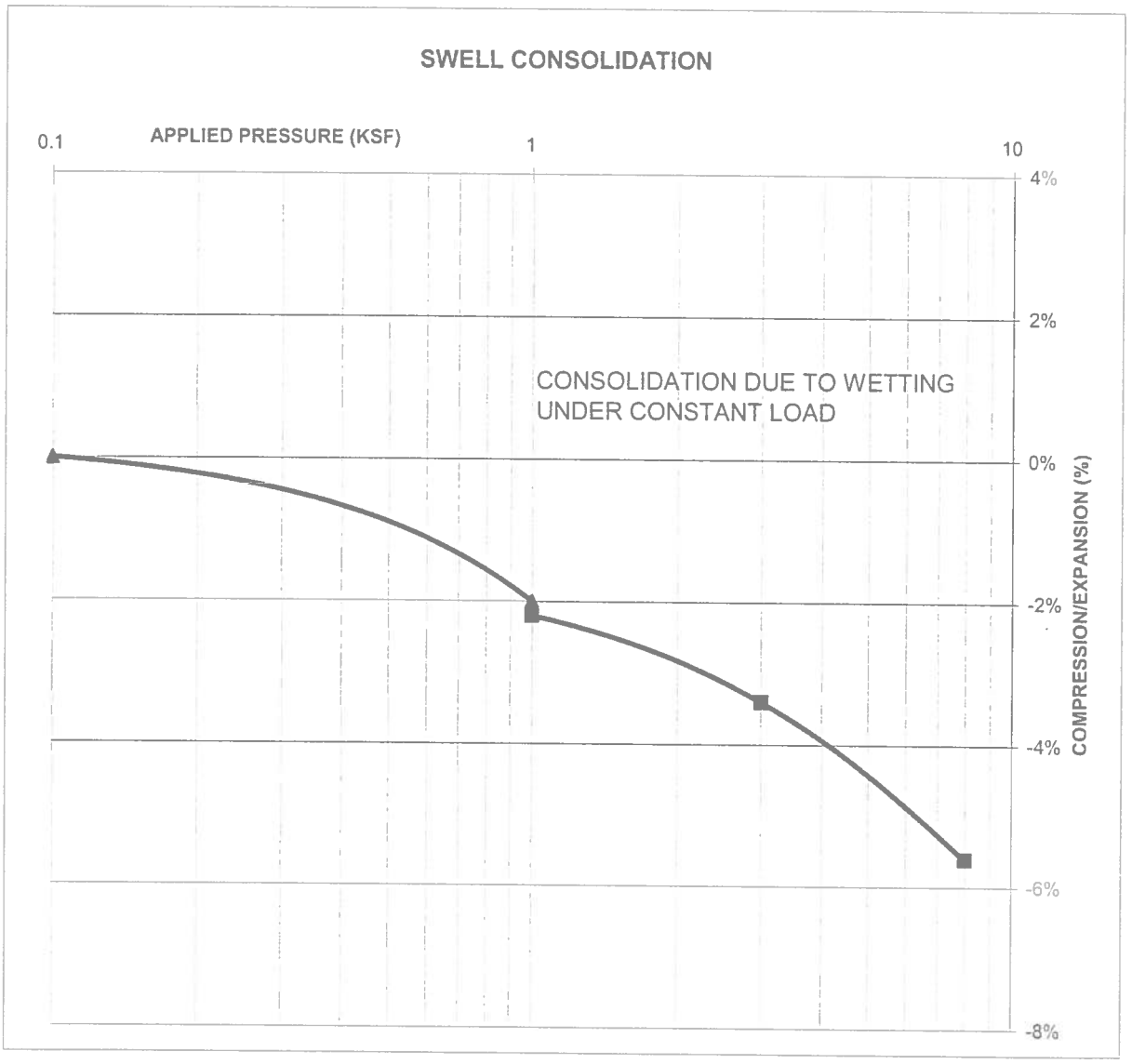
DRAWN:	DATE:	CHECKED:	DATE:
		hr	1/17/12

JOB NO.: 83691
FIG NO.: C-15

CONSOLIDATION TEST RESULTS

TEST BORING #	4	DEPTH(ft)	2-3
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			109
NATURAL MOISTURE CONTENT			16.7%
SWELL/CONSOLIDATION (%)			-0.2%

JOB NO. 83691
CLIENT CORRAL RANCH DEV.
PROJECT RESERVE AT CORRAL BLUFFS



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SWELL CONSOLIDATION
TEST RESULTS

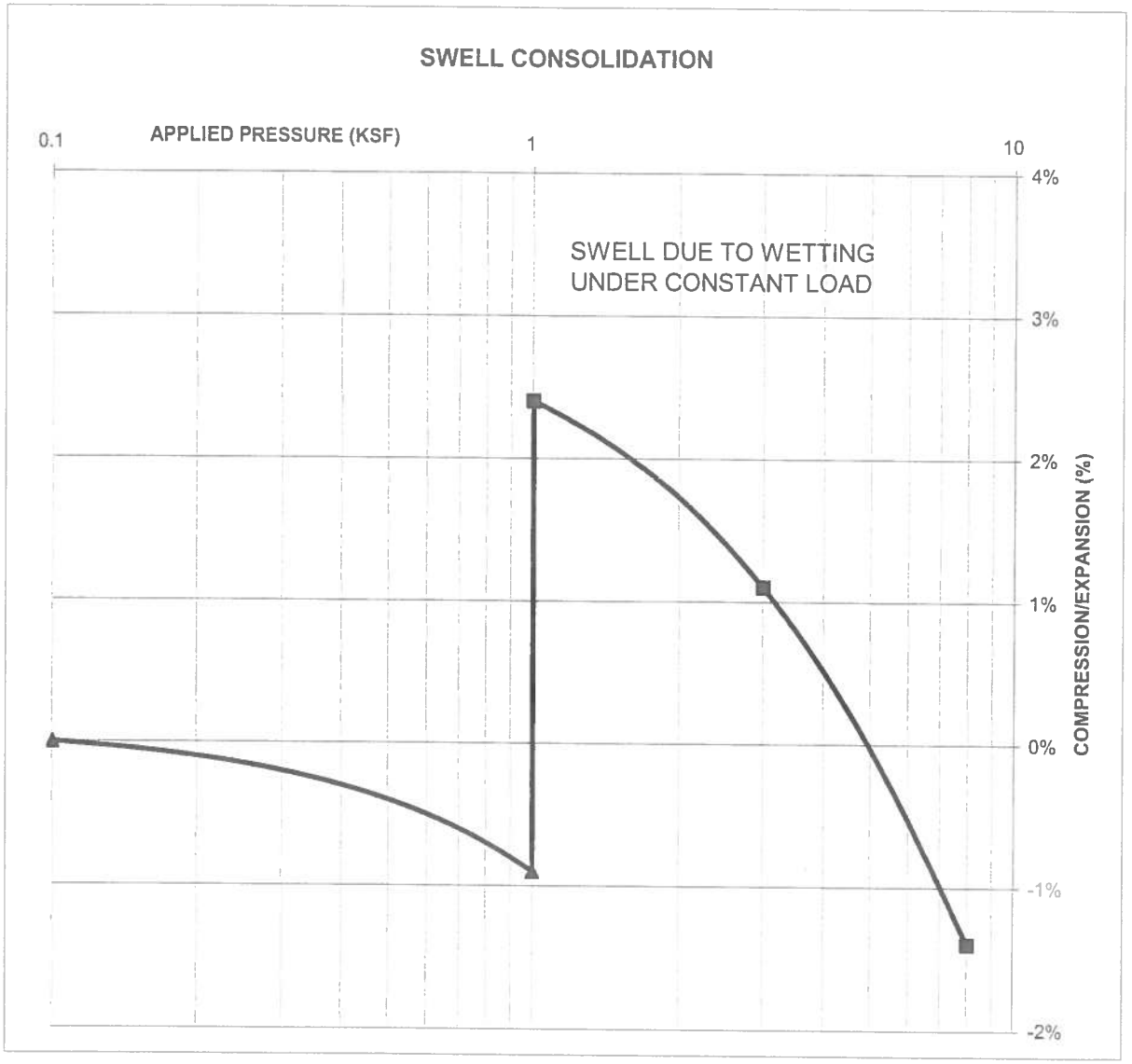
DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: C-16

CONSOLIDATION TEST RESULTS

TEST BORING #	4	DEPTH(ft)	5
DESCRIPTION	CL-M	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			110
NATURAL MOISTURE CONTENT			11.0%
SWELL/CONSOLIDATION (%)			3.3%

JOB NO. 83691
CLIENT CORRAL RANCH DEV.
PROJECT RESERVE AT CORRAL BLUFFS



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COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			1/17/12

JOB NO.: 83691
FIG NO.: C-17

APPENDIX D: Test Boring Logs and Laboratory Test Results From Additional Testing (Reference 2)

TEST BORING NO. 10
DATE DRILLED 8/13/2012
Job # 83691

REMARKS

LOT 28

DRY TO 10', 8/14/12

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

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5		■	15	10.3	1
10		■	28	4.3	1
15					
20					

PROFILE HOLE NO. 11
DATE DRILLED 8/13/2012
CLIENT CORRAL RANCH DEVELOPMENT
LOCATION RESERVE AT CORRAL BLUFFS

REMARKS

LOT 29

DRY TO 10', 8/14/12

SAND, VERY SILTY, FINE GRAINED, TAN, MEDIUM DENSE, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5		■	10	9.9	1
10		■	18	8.2	1
15					
20					

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TEST BORING / PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
		L	8/30/12

JOB NO.: 83691
FIG NO.: A-1

PROFILE HOLE NO. 12
DATE DRILLED 8/13/2012
Job # 83691

REMARKS

LOT 27

DRY TO 10', 8/14/12

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

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5		■	30	7.7	1
10		■	23	10.2	1
15					
20					

TEST BORING NO. 13
DATE DRILLED 8/13/2012
CLIENT CORRAL RANCH DEVELOPMENT
LOCATION RESERVE AT CORRAL BLUFFS

REMARKS

LOT 26

DRY TO 10', 8/14/12

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

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5		■	10	7.4	1
10		■	16	9.2	1
15					
20					

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TEST BORING / PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
		L	8/30/12

JOB NO.: 83691
FIG NO.: A-2

TEST BORING NO. 14
DATE DRILLED 8/13/2012
Job # 83691

REMARKS

LOT 24

DRY TO 10', 8/14/12

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

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5		■	21	9.7	1
10		■	29	6.8	1
15					
20					

PROFILE HOLE NO. 15
DATE DRILLED 8/13/2012
CLIENT CORRAL RANCH DEVELOPMENT
LOCATION RESERVE AT CORRAL BLUFFS

REMARKS

LOT 23

DRY TO 10', 8/14/12

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

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5		■	17	6.2	1
10		■	20	4.6	1
15					
20					

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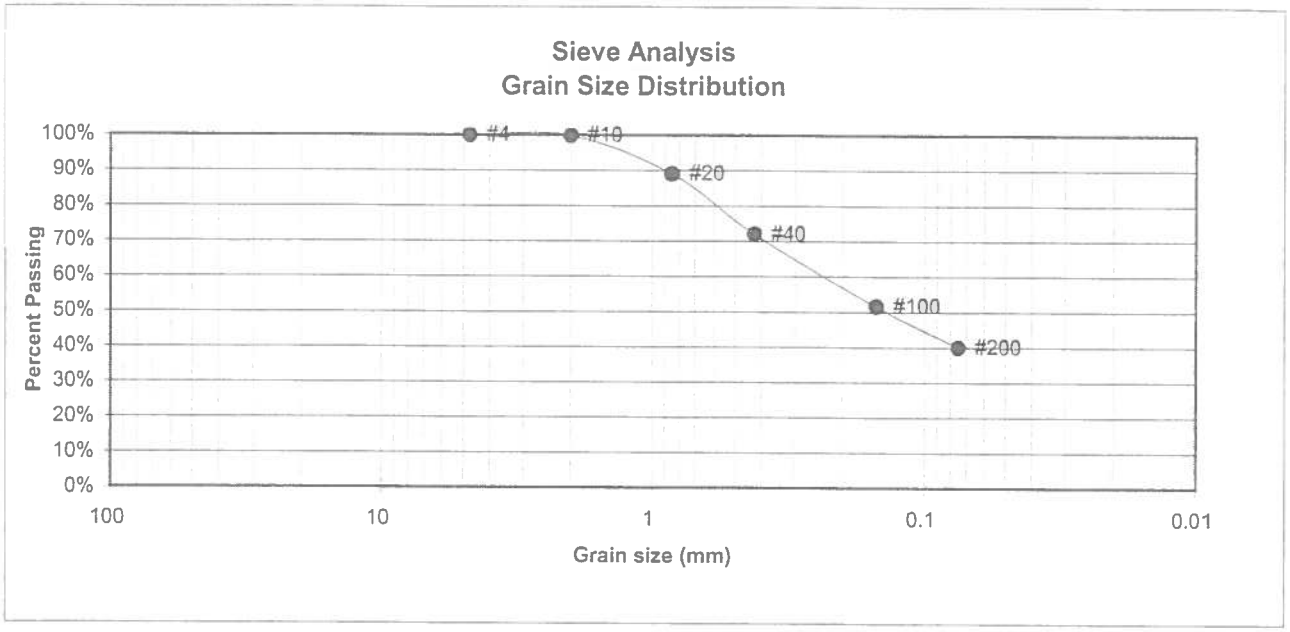
COLORADO SPRINGS, COLORADO 80907

TEST BORING / PROFILE HOLE LOG

DRAWN:	DATE:	CHECKED:	DATE:
		✓	8/30/12

JOB NO.: 83691
FIG NO.: A-3

UNIFIED CLASSIFICATION	SM	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	1	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	11	JOB NO.	83691
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.9%
20	89.1%
40	72.0%
100	51.6%
200	40.0%

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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COLORADO SPRINGS, COLORADO 80907

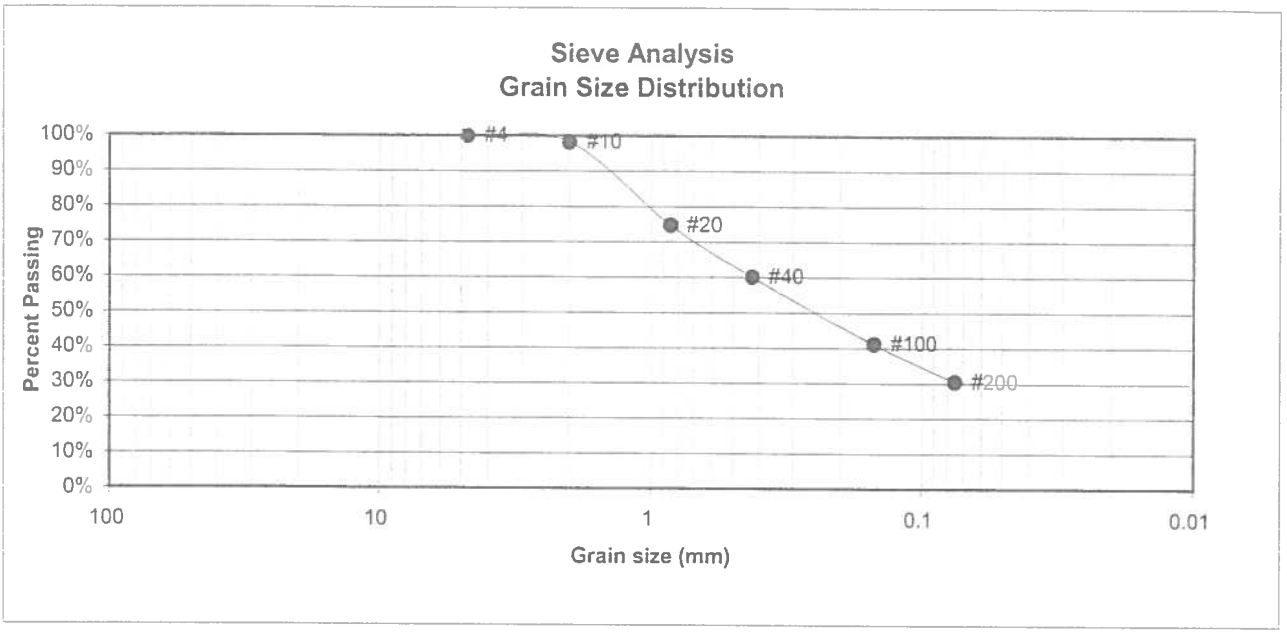
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			8/21/12

JOB NO.: 83691

FIG NO.: B-1

UNIFIED CLASSIFICATION	SM	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	1	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	12	JOB NO.	83691
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.3%
20	74.8%
40	60.1%
100	41.2%
200	30.5%

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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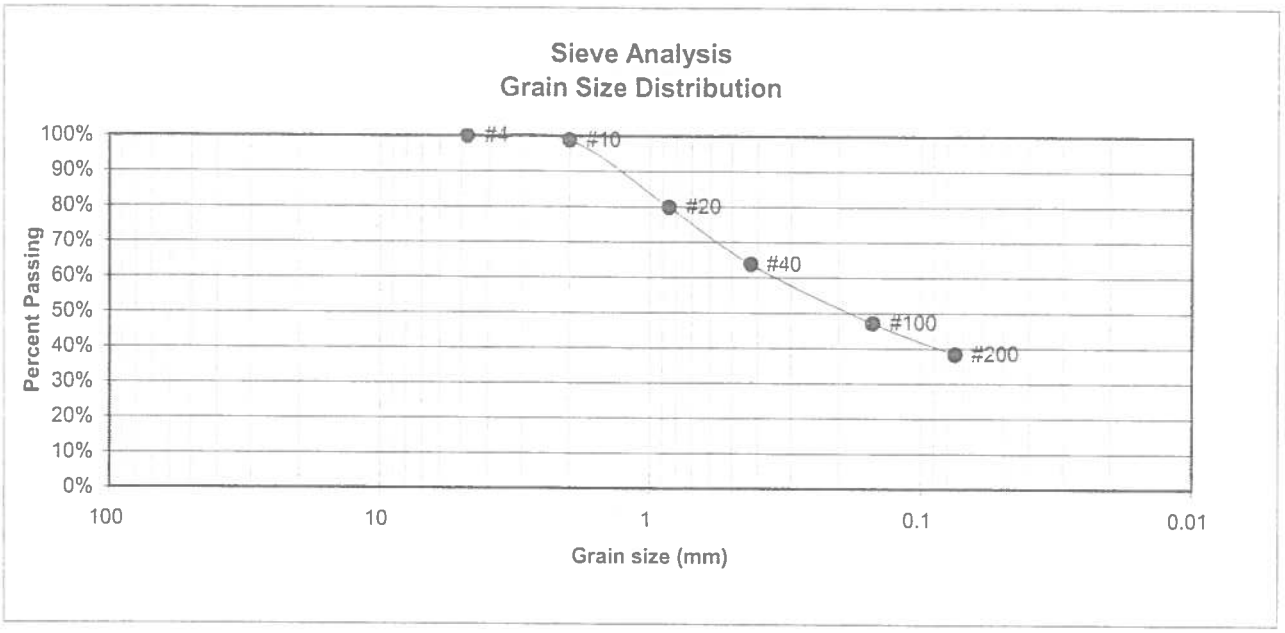
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
			8/21/12

JOB NO.: 83691

FIG NO.: B-2

UNIFIED CLASSIFICATION	SM	CLIENT	CORRAL RANCH DEV.
SOIL TYPE #	1	PROJECT	RESERVE AT CORRAL BLUFFS
TEST BORING #	15	JOB NO.	83691
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.8%
20	79.9%
40	63.7%
100	47.2%
200	38.3%

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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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		u	8/21/12

JOB NO.: 83691
FIG NO.: B-3

APPENDIX E: Soil Survey Descriptions

3—Ascalon sandy loam, 3 to 9 percent slopes. This deep, well drained soil formed in mixed alluvium and wind-laid materials on uplands. Elevation ranges from 5,500 to 6,500 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 48 degrees F, and the average frost-free period is about 140 days.

Typically, the surface layer is brown sandy loam about 8 inches thick. The subsoil is brown, yellowish brown, and pale brown sandy clay loam about 22 inches thick. The substratum is calcareous, very pale brown sandy loam and loamy sand.

Included with this soil in mapping are small areas of Bresser sandy loam, 3 to 5 percent slopes; Olney sandy loam, 3 to 5 percent slopes; Vona sandy loam, 3 to 9 percent slopes; and Fort Collins loam, 3 to 8 percent slopes.

Permeability of this Ascalon soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Organic matter content of the surface layer is medium. Surface runoff is slow to medium, and the hazards of erosion and soil blowing are moderate.

Most areas of this soil are used as range, but some areas on the more gentle slopes are cultivated. Wheat is the main crop, but some sorghum is also grown.

Native vegetation is dominantly blue grama, needle-andthread, side-oats grama, sand dropseed, and buckwheat. Western wheatgrass, junegrass, and mountain muhly are also present, predominantly where this soil occurs in the northern part of the survey area.

Seeding is a good practice if the range has deteriorated. Native grasses should be used. If the range is severely eroded and blowouts have developed, fertilizing the new seeding is a good practice. Brush control and grazing management may be needed to improve the depleted range. Grazing of animals should be managed so that enough forage is left standing to protect the soil from blowing, to increase infiltration of water, and to catch and hold snow.

Windbreaks and environmental plantings are generally suited to this soil. Soil blowing is the principal limitation to the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be necessary at the time of planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, undisturbed nesting cover is vital and should be provided for in plans for habitat development. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for use as homesites. Its main limitation for foundations, roads, and streets is moderate shrink-swell potential. Special design of roads is also necessary because of potential frost action. Capability subclasses IVe, nonirrigated, and IIIe, irrigated.

4—**Badland.** Badland occupies steep, rough, eroding areas. Slopes range from 0 to more than 100 percent. Depending on the location, Badland formed from material derived from shale, sandstone, siltstone, and gold ore mill tailings. Areas of Badland are in the vicinity of the town of Calhan; the Corral Bluffs, east of Colorado Springs; the southwestern part of the survey area on Fort Carson; and the old Golden Cycle gold ore processing mill in the western part of Colorado Springs.

Runoff is very rapid, and the hazard of erosion is high. The reaction of the tailings material is slightly acid to extremely acid. Little or no soil development has taken place. Gullying is severe in most areas of Badland.

Vegetation grows only in small patches of soil material in drainageways and in some of the less eroded areas. The sloping part of Badland is extremely gullied and lacks vegetation.

Most areas of Badland are used for wildlife habitat. In the mill tailings area in the western part of Colorado Springs, some urban development has taken place in level areas that have had a layer of topsoil applied to the surface. Capability subclass VIIIs.

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SCS SOIL DESCRIPTION

Drawn	Date	Checked	Date
			12/5/19

Job No. 192142

Fig. No. E-2

13—Bresser sandy loam, 5 to 9 percent slopes. This deep, well drained soil formed in arkosic alluvium and residuum on terraces and uplands. Elevation ranges from 6,000 to 6,800 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

Typically, the surface layer is grayish brown sandy loam about 5 inches thick. The subsoil is brown sandy clay loam about 31 inches thick. The substratum is light yellowish brown loamy coarse sand to a depth of 60 inches.

Included with this soil in mapping are small areas of Bresser soils that have a loam surface layer, mostly along the western side of the survey area; Truckton sandy loam, 3 to 9 percent slopes; Yoder gravelly sandy loam, 1 to 8 percent slopes; Kutch clay loam, 3 to 5 percent slopes; and Kutch clay loam, 5 to 20 percent slopes. Some areas of Ustic Torrifluvents, loamy, are along narrow drainageways. In some areas, arkose beds are at a depth of 0 to 40 inches. These beds occur as sandstone or shale.

Permeability of this Bresser soil is moderate. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is medium, and the hazard of erosion is moderate. Some gullies are present.

Most areas of this soil are used for range. A small acreage is used for dryland crops, mostly wheat.

This soil is suited to limited cultivation. It is better suited to use as rangeland or pastureland because these uses protect the soil by providing permanent cover. Basin terraces may be needed before seeding this soil back to grass.

Native vegetation is mainly cool- and warm-season grasses such as western wheatgrass, side-oats grama, and needleandthread.

Proper range management is needed to prevent excessive removal of plant cover from the soil. Interseeding improves the existing vegetation. Deferment of grazing in spring increases plant vigor and soil stability. Proper location of livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings are generally suited to this soil. Soil blowing is the main limitation for the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

This soil is suited to wildlife habitat. It is best suited to habitat for openland and rangeland wildlife. In cropland areas, habitat favorable for ring-necked pheasant, mourning dove, and many nongame species can be developed by establishing areas for nesting and escape cover. For pheasant, undisturbed nesting cover is vital and should be provided for in plans for habitat development. This is especially true in areas of intensive farming. Rangeland wildlife, such as pronghorn antelope, can be encouraged by developing livestock watering facilities, properly managing livestock grazing, and reseeding range where needed.

This soil has good potential for homesites. Practices are needed to control surface runoff and keep soil losses to a minimum. Limiting the disturbance of the soil and the removal of existing plant cover during construction helps to control erosion. Capability subclass IVe.

85—Stapleton-Bernal sandy loams, 3 to 20 percent slopes. These gently sloping to moderately steep soils are on upland ridges and hills. Elevation ranges from about 6,500 to 6,800 feet. The average annual precipitation is about 15 inches, the average annual air temperature is about 47 degrees F, and the average frost-free period is about 135 days.

The Stapleton soil makes up about 40 percent of the complex, the Bernal soil about 30 percent, and included soils about 30 percent.

Included with these soils in mapping are areas of Blakeland loamy sand, 1 to 9 percent slopes; Louviers silty clay loam, 3 to 18 percent slopes; Travessilla-Rock outcrop complex, 8 to 90 percent slopes; Truckton sandy loam, 3 to 9 percent slopes; and small outcrops of arkose sandstone and shale.

The Stapleton soil is commonly on the lower part of slopes. It is deep and well drained. It formed in sandy alluvium derived from arkosic bedrock. Typically, the surface layer is grayish brown sandy loam about 11 inches thick. The subsoil is grayish brown gravelly sandy loam about 6 inches thick. The substratum extends to a depth of 60 inches or more. It is pale brown gravelly sandy loam in the upper part and grades to gravelly loamy sand in the lower part.

Permeability of the Stapleton soil is rapid. Effective rooting depth is 60 inches or more. Available water capacity is moderate. Surface runoff is medium, and the hazard of erosion is moderate.

The Bernal soil is commonly on ridges and hills. It is shallow and well drained. It formed in material weathered from sandstone and modified by eolian sediment. Typically, the surface layer is dark grayish brown sandy loam about 4 inches thick. The subsoil is brown sandy clay loam about 7 inches thick. The substratum is brown sandy loam about 2 inches thick. Hard, light colored sandstone is at a depth of about 13 inches.

Permeability of the Bernal soil is moderate. Effective rooting depth is 8 to 20 inches. Available water capacity is low. Surface runoff is medium, and the hazard of erosion is moderate.

The soils in this complex are used for grazing livestock, for wildlife habitat, and as homesites.

The native vegetation on the Stapleton soil is mainly western wheatgrass, side-oats grama, needleandthread, and little bluestem. The dominant shrub on this soil is true mountainmahogany. Yucca is present in some places.

The native vegetation on the Bernal soil is mainly blue grama, side-oats grama, western wheatgrass, Scribner needlegrass, and needleandthread. The dominant shrubs and trees are mountainmahogany, skunkbush sumac, and one-seeded juniper. There are lesser amounts of pinyon pine.

Deferred grazing late in summer and early in fall improves the condition of the range on the Stapleton soil. Careful management of plant cover is essential because of the difficulty of vegetating the Bernal soil. Properly locating livestock watering facilities helps to control grazing.

Windbreaks and environmental plantings generally are suited to the Stapleton soil. Soil blowing is the main limitation for the establishment of trees and shrubs. This limitation can be overcome by cultivating only in the tree rows and leaving a strip of vegetation between the rows. Supplemental irrigation may be needed when planting and during dry periods. Trees that are best suited and have good survival are Rocky Mountain juniper, eastern redcedar, ponderosa pine, Siberian elm, Russian-olive, and hackberry. Shrubs that are best suited are skunkbush sumac, lilac, and Siberian peashrub.

Windbreaks and environmental plantings generally are not suited to the Bernal soil. Onsite investigation is needed to determine if plantings are feasible.

Rangeland wildlife, such as antelope, cottontail, coyote, and scaled quail, is best adapted for life on the soils in this complex. Proper livestock grazing management is necessary if wildlife and livestock share the range. Livestock watering developments are also important, and they are used by various wildlife species.

The main limitations of the Stapleton soil for urban use are frost-action potential and slope. The main limitations of the Bernal soil are depth to bedrock, frost-action potential, and slope. Special designs for sites, buildings, and roads and streets are needed to control soil blowing and water erosion on construction sites where vegetation has been removed. Capability subclass VIe.

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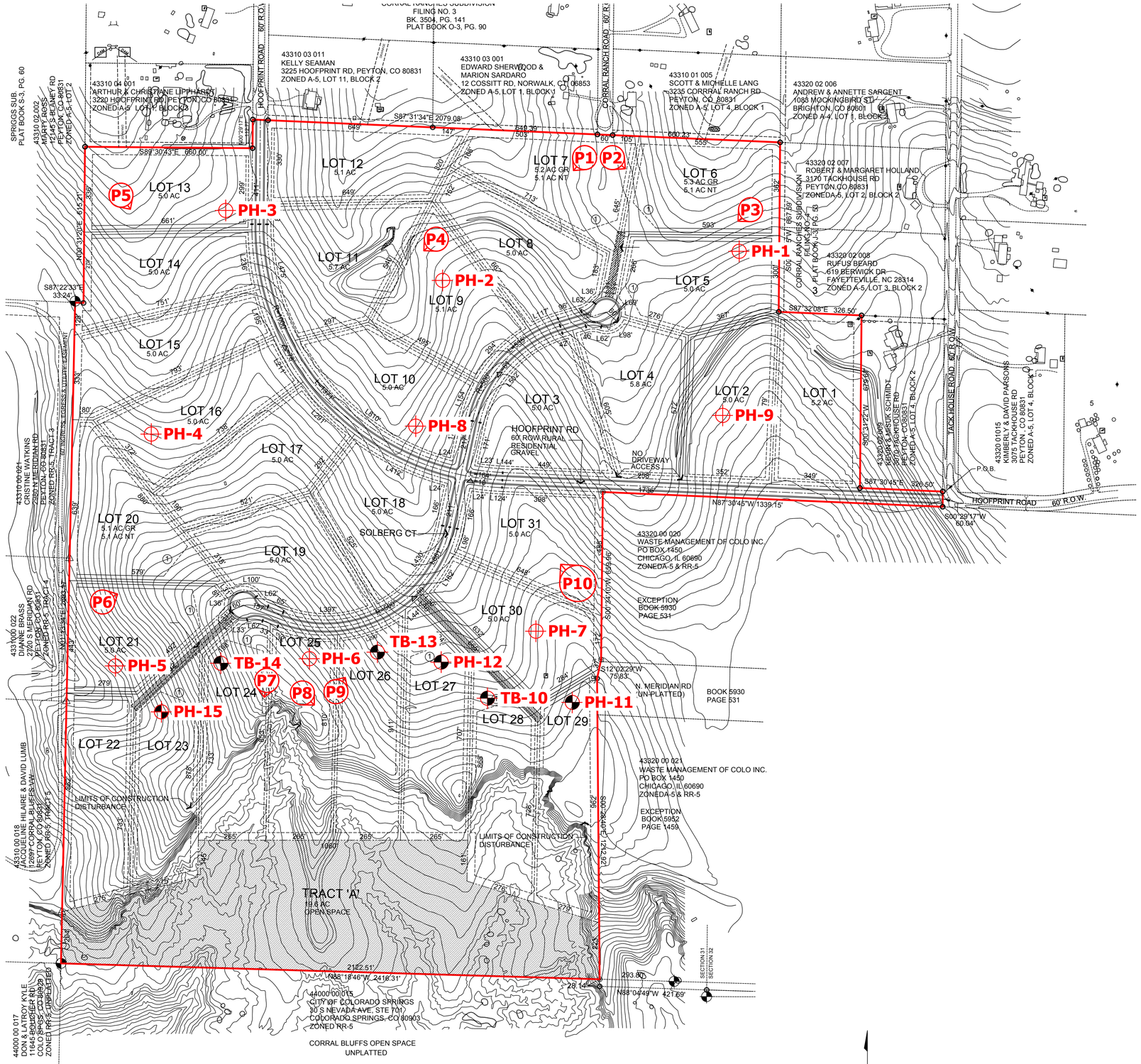
SCS SOIL DESCRIPTION

Drawn	Date	Checked	Date
			12/5/19

Job No. 192142

Fig. No. E-4



P1 – APPROXIMATE LOCATION AND DIRECTION OF PHOTOS

PH-2 – APPROXIMATE LOCATION AND NUMBER OF PERCOLATION TEST FROM ORIGINAL REPORT

PH-15 – APPROXIMATE LOCATION AND NUMBER OF ADDITIONAL PERCOLATION TEST

TB-14 – APPROXIMATE LOCATION AND NUMBER OF ADDITIONAL TEST BORING

REVISIONS	BY:

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DEVELOPMENT PLAN / PERCOLATION TEST LOCATION MAP
THE RESERVE AT CORRAL BLUFFS
EL PASO COUNTY, CO
FOR: CORRAL RANCH DEVELOPMENT

DRAWN BY: JAC

DESIGNED BY: KAH

CHECKED BY:

DATE: 12/04/19

SCALE: 1:200

JOB NO.: 192142

FIGURE NO.: 4

LEGEND

Qaf - Artificial Fill of Holocene Age:
Man-made fill deposits.

Qal - Recent Alluvium of Holocene Age:
Recent water deposited materials

Qp - Piney Creek Alluvium of Holocene Age:
Water deposited sands and clays

Qes - Eolian Sand of Quaternary Age:
Wind blown sand deposits

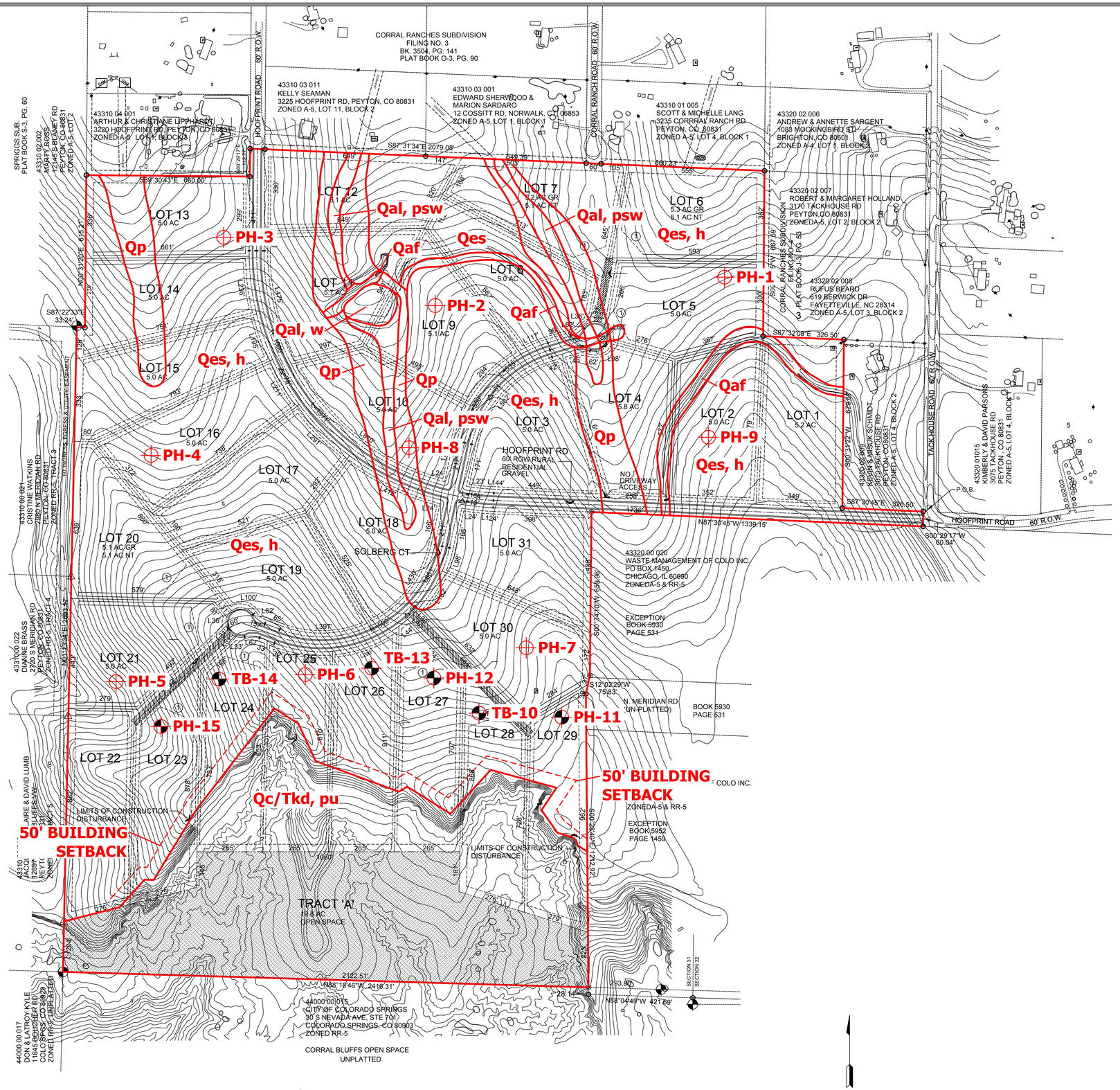
Qc/Tkd - Colluvium of Quaternary Age Overlying the Dawson Formation of Tertiary to Cretaceous Age:
Sheetwash and residual soil deposits overlying arkosic sandstone with interbedded siltstone and claystone.

w - areas of ponded water

psw - potentially seasonal shallow groundwater

h - hydrocompaction

pu - potentially unstable slope



PH-2- APPROXIMATE TEST BORING LOCATION AND NUMBER

REVISIONS	BY:

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GEOLOGY/ENGINEERING GEOLOGY MAP
THE RESERVE AT CORRAL BLUFFS
EL PASO COUNTY, CO
FOR: CORRAL RANCH DEVELOPMENT

DRAWN BY:	JAC
DESIGNED BY:	KAH
CHECKED BY:	
DATE:	12/04/19
SCALE:	1:200
JOB NO.:	192142
FIGURE NO.:	8