



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
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May 19, 2022

Rockwood Homes
5436 Carvel Grove
Colorado Springs, CO 80922

Attn: Pat Hiner

Re: Soil, Geology and Geologic Hazard Evaluation
12265 Highway 94
Tax Schedule No. 44000-00-237
El Paso County, Colorado

Dear Mr. Hiner:

GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in a portion of the N½ of Section 18, Township 14 South, Range 64 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 5 miles east State Highway 24 in Colorado Springs, Colorado, and due south of Highway 94 in El Paso County, Colorado. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is gradually to moderately sloping to the south, with steeper slopes along the drainage in the central portion of the site, and along the cut/fill slope in the eastern portion of the site. Water was not observed in the drainages at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included residential, commercial, with several multiuse out buildings, vehicle storage, and undeveloped land. The site contains primarily field grasses, weeds, yucca and some scattered trees in the drainage and planted as landscaping surrounding the residence. Site photographs, taken March 15, 2022, are included in Appendix A.

Total acreage involved in the proposed subdivision is 40-acres. Five commercial lots along state Highway 94 are proposed as part of the replat. The lots will be serviced by individual on-site wastewater treatment systems and water wells. The Site Plan is presented in Figure 3.

LAND USE AND ENGINEERING GEOLOGY

This site was found to be suitable for the proposed development, which will consist of four commercial lots of undetermined size and associated site improvements. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include areas of artificial fill, potentially expansive soils, shallow bedrock, potentially unstable slopes, and potentially seasonal shallow groundwater areas. Based on the proposed development plan, it appears that these areas will have some impacts on the development. These conditions will be discussed in greater detail in the report.

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

SCOPE OF THE REPORT

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 with respect to major geographic and geologic features, geologic descriptions and their effects on the development of the property.

FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS) (Reference 1), previously the Soil Conservation Service (SCS) survey was also reviewed to evaluate the site (Reference 2). The position of mappable units within the subject site are shown on the Geologic Map Figure, 6. Our mapping procedures involved both field reconnaissance and measurements, and aerial photo reconnaissance and interpretation. The field mapping was performed by personnel of Entech Engineering, Inc.

Ten test borings were drilled and three test pits were excavated on the site to determine general suitability of the soil characteristics for commercial construction and on-site wastewater treatment systems. The locations of the test borings and test pits are indicated on the Site Plan/Test Boring Location Map, Figure 3. The Test Boring and Test Pit Logs are presented in Appendix B, and Laboratory Testing results are included in Appendix C.

SOIL AND GEOLOGIC CONDITIONS

Soil Survey

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

<u>Type</u>	<u>Description</u>
54	Midway Clay Loam, 3 – 25% Slopes
89	Tassel Fine Sandy Loam, 3 – 18% Slopes

The soils have been described to have moderate to rapid permeabilities. The soils are described as well suited for use as home sites. Possible hazards with soils erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards (Reference 1).

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Soils

Two soil types and two bedrock types were encountered in the test borings on the site, Soil Type 1: native clayey sand (SC), Soil Type 2: native sandy clay (CL), Soil Type 3: silty to clayey sandstone bedrock (SM, SC), and Soil Type 4: sandy claystone bedrock (CL). Bedrock was encountered in eight of the test borings at depths ranging from the surface to 19 feet. The borings were drilled to 20 feet bgs. Each soil type was classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results.

Soil Type 1 classified as native clayey sand (SC). The sand was encountered in 2 of the test borings either from the ground surface and extending to 4 feet, or interbedded in the Type 2 clay (Test Boring No. 10) from 7 to 12 feet bgs (Test Boring No. 4). Standard Penetration Testing on the sand resulted in N-values of 23 bpf indicating medium dense states. Water content testing resulted in approximately 10 percent water content with approximately 25 percent of the soil sized particles passing the No. 200 sieve.

Soil Type 2 classified as native sandy to silty clay (CL, CH). The clay was encountered in 6 of the test borings at the existing ground surface or 4 to 12 feet bgs extending to 7 to 9 feet or to termination of borings (20 feet). The clay was also encountered in all three test pits. Standard Penetration Testing on the clay resulted in N-values of 14 to 50 bpf indicating firm to very stiff consistencies. Water content and grain size testing resulted in approximately 11 to 33 percent water content with 79 to 100 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing on the clay resulted in liquid limits of 51 to 66 percent and plastic indexes of 34 to 39 percent. Swell/Consolidation Testing resulted in volume changes of 0.6 to 3.9 percent, indicating low to high expansion potential. FHA Swell Testing on a sample of sandy clay from Test Boring No. 7 at a depth of 5 feet resulted in a swell pressure of 1040 psi indicating a moderate expansion potential. Sulfate Testing resulted in less than 0.01 percent soluble sulfate by weight indicating a negligible potential for below grade concrete degradation due to sulfate attack.

Soil Type 3 classified as a silty to very silty to clayey sandstone bedrock (SM, SC). The sandstone was encountered in 4 of the test borings at the existing ground surface or 14 feet bgs extending to 4 feet bgs or to the termination of the boring (20 feet). Standard Penetration Testing on the sandstone resulted in N-values of 50 or greater than 50 bpf indicating very dense states. Water content and grain size testing resulted in approximately water contents of 6 to 16 percent with 34 to 42 percent of the soil size particles passing the No. 200 sieve. Atterberg Limits Testing resulted in no values and the sandstone is anticipated to present a low expansion risk

Soil Type 4 classified as a sandy to very sandy claystone bedrock (CL). The claystone was encountered in 7 of the test borings at the existing ground surface or 10 to 14 feet bgs and extending 18 feet bgs or to the termination of the borings (20 feet). Standard Penetration Testing on the claystone resulted in N-values of 19 to greater than 50 bpf indicating some highly weathered zones and stiff to hard consistencies. Water content and grain size testing resulted in approximately 14 to 29 percent water content with 61 to 100 percent of the soil size particles passing the No. 200 sieve. Swell/Consolidation Testing on samples of the claystone resulted in volume changes of 0.6 to 4.0 percent, indicating a low to high expansion potential.

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Groundwater

Groundwater was not encountered in the test borings or test pits at the time of our site investigation. It should be noted that fluctuation in groundwater levels could change due to seasonal variations, changes in land runoff characteristics and future development of nearby areas. Isolated sand layers within the soil profile can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of subsurface water during construction.

Geology

Approximately 14 miles west of the site is the southern extent of a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within a large structural feature known as the Denver Basin. Bedrock in the area is typically gently dipping in a northeasterly direction (Reference 4). Overlying the Dawson Formation are deposits of man-made fill soils, sheetwash and residual, and alluvial deposited sands and clays.

The geology of the site was evaluated using the *Geologic map of the Pueblo 1-degree x 2-degrees' quadrangle, south-central Colorado* published by the U.S. Geologic Survey in 1976 (Reference 3), and the *Geologic Map of Corral Bluffs Quadrangle*, by Soister in 1968, (Reference 4). The Geology Map for the site is presented in Figure 6. Two mappable units were identified on this site which is described as follows:

- Qaf Artificial Fill of Holocene Age:** man-made fill deposits associated with fill piles and other areas of fill located across the property. The fill is considered uncontrolled. Fill primarily consisted of site soils with various debris, garden soil and fertilizer.
- Qpc Piney Creek Alluvium of Holocene Age:** This material is a water-deposited alluvium, typically classified as a silty to well-graded sand, brown to dark brown in color and of moderate density. The Piney Creek Alluvium can sometimes be very highly stratified containing thin layers of very silty and clayey soil.
- Qc/Tkd Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:** The materials consist of colluvial and residual soils overlying the bedrock materials on the site. The colluvial soils were deposited by the action of sheetwash and gravity. The residual soils were derived from the in-situ weathering of the bedrock on site. These materials typically consist of silty to clayey sand and sandy clays. The bedrock consists of the Dawson Formation. The Dawson Formation typically consists of coarse-grained, arkosic sandstone with interbedded lenses of fine-grained sandstone, siltstone and claystone.

The soils listed above were mapped from site-specific mapping, the *Geologic map of the Pueblo 1-degree x 2-degrees' quadrangle, south-central Colorado* published by the U.S. Geologic Survey in 1976 (Reference 3), and the *Geologic Map of Corral Bluffs Quadrangle*, by Soister in 1968, (Reference 4). The test borings and test pits were used in evaluating the site and are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

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ENGINEERING GEOLOGIC HAZARDS

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

Artificial Fill – Constraint

These are man-made fill deposits associated with fill piles and a fill slope located across the site. The fill primarily consisted of site soils with various debris, garden soil and fertilizer and is indicated on the Geology/Engineering Geology Map, Figure 6.

Mitigation: The fill is considered uncontrolled for construction purposes. Should any uncontrolled fill be encountered beneath foundations, removal and recompaction at 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 will be required.

Expansive Soils - Constraint

Expansive clay soils and claystone bedrock were encountered in the test borings or pits. Expansive clays or claystone, if encountered beneath foundations, can cause differential movement in the structure foundation.

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% 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.

Potentially Unstable Slopes – Constraint

The areas identified with this constraint area located along the drainage in the central portion of the site, and the fill slope in the eastern portion of the site. These areas are indicated on the Geology/Engineering Geology Map, Figure 6. The slopes are considered stable in their present condition; however, considerable care should be exercised in these areas not to create areas of instability.

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

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Drainage Areas/Floodplains – Constraint

The site does not lie within a mapped floodplain zone according to the FEMA Map Nos. 08041CO780G dated December 7, 2018 (Figure 7, Reference 6). Finished floor levels must be a minimum of one foot above any floodplain level. Exact locations of floodplain and specific drainage studies are beyond the scope of this report. A drainage was observed in the central portion of the site flowing in a southerly direction. Water was not observed in the drainage at the time of our site investigation. The drainage area has been identified as a potentially seasonal shallow groundwater area and is further discussed below. The drainage area has been included in a proposed drainage easement and will be avoided future development.

Potentially Seasonal Shallow Groundwater Area – Constraint

The drainage in the central portion of the site has been identified as a 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. Construction in any portions of these areas, if required, or immediately adjacent to these areas should follow these precautions.

Mitigation: Foundations must have a minimum 30-inch depth for frost protection. In areas where high subsurface moisture conditions are anticipated periodically, subsurface perimeter drains are recommended to help prevent the intrusion of water into areas below grade. Typical drain details are presented in Figure 8. Any grading in these areas should be done to direct surface flow around construction to avoid areas of ponded water. All organic material would be completely removed prior to any fill placement. **Specific drainage studies are beyond the scope of this report.**

RELEVANCE OF GEOLOGIC CONDITIONS TO LAND USE PLANNING

The proposed development will consist of subdividing the parcel into five rural commercial lots, and associated site improvements. The existing geologic and engineering geologic conditions will impose some minor constraints on development and construction. The geologic conditions on the site include areas of artificial fill, potentially expansive soils, shallow bedrock, potentially unstable slopes, and potentially seasonal shallow groundwater area. These areas which can be satisfactorily mitigated through proper engineering design and construction practices, or avoidance.

The upper fine grained granular soils encountered in the test borings on the site were encountered at stiff consistencies, and the sandstone was encountered at very dense states. Sandstone bedrock was encountered at the surface to 19 feet in the test borings. High allowable bearing capacities should be expected in areas of shallow bedrock. Difficult excavation of the very dense sandstone should be expected.

The sandstone encountered in the test borings is considered to have low expansion potential, however, highly expansive claystone and siltstone are commonly interbedded in the sandstone of the Dawson Formation and was encountered in the borings. Mitigation of expansive soils where encountered will be required. Overexcavation and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Floor slabs on expansive soils should be expected to

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experience movement. Overexcavation and replacement has been successful in minimizing slab movements. These soils will not prohibit development.

A drainage was observed in the central portion of the site flowing in a southerly direction. Water was not observed in the drainage at the time of our site investigation. The drainage area has been identified as a potentially seasonal shallow groundwater area and is further discussed below. The drainage area has been included in a proposed drainage easement and will be avoided future development.

In summary, the granular soils where encountered will likely provide suitable support for shallow foundations. Expansive soils will require mitigation where encountered in the building areas. The geologic conditions encountered on site can be mitigated with avoidance or proper engineering and construction practices.

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.

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ROADWAY AND EMBANKMENT CONSTRUCTION RECOMMENDATIONS

The site soils can be used for the proposed roadways and embankments. Groundwater should be expected to be encountered in deeper cuts and along drainage 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 for granular soils, and at least 95% of its maximum Standard Proctor Dry Density, ASTM D-698 for clay soils. These materials should be placed at a moisture content conducive to compaction, usually 0 to $\pm 2\%$ 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.

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 6), the area is mapped as floodplain deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 6) the site is not mapped within any aggregate resources. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 7), the area of the site has been mapped as "Good" for industrial minerals. Generally, the Dawson formation does not contain significant industrial mineral resources. The sands associated with the alluvial deposits are not considered a good sand resource. Considering the silty to clayey nature of much of these materials and abundance of similar materials through the region, 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 7), the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped as "Good" for coal resources. No active or inactive mines have been mapped on the site, historic coal mines are located immediately south of the site. No metallic mineral resources have been mapped on the site (Reference 7).

Areas neighboring the site have been mapped as "Fair" for oil and gas resources (Reference 7). No oil or gas fields have been discovered in the area of the site. Several wildcat wells were

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previously drilled in the area of the site, but no production was reported. No oil or gas was reported and both wells were plugged. The sedimentary rocks in the area may lack the geologic structure for trapping oil or gas; therefore, it would not be considered a significant resource.

CLOSURE

It should be pointed out that because of the nature of data obtained by random sampling of such variable nonhomogeneous 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. Any new construction considered on this site will require additional investigation. Construction and design personnel should be made familiar with the contents of this report. Specific construction and foundation recommendations will be provided when investigations are completed at each building site prior to new construction.

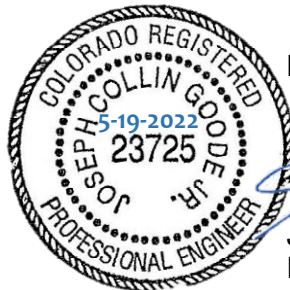
This report has been prepared for Rockwood Homes for application to the proposed development in accordance with generally accepted geologic, soil and engineering practices. No other warranty expresses or implied is made.

We trust that this report has provided you with all the information that you required. Should you have any questions or require additional information, please do not hesitate to contact us.


Respectfully Submitted,

ENTECH ENGINEERING, INC.


Logan L. Langford, P.G.
Geologist



Reviewed by:


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

LLL

Encl.

Entech Job No. 220535
AAprojects/2022/220535 sg&ghs

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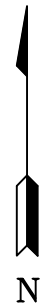
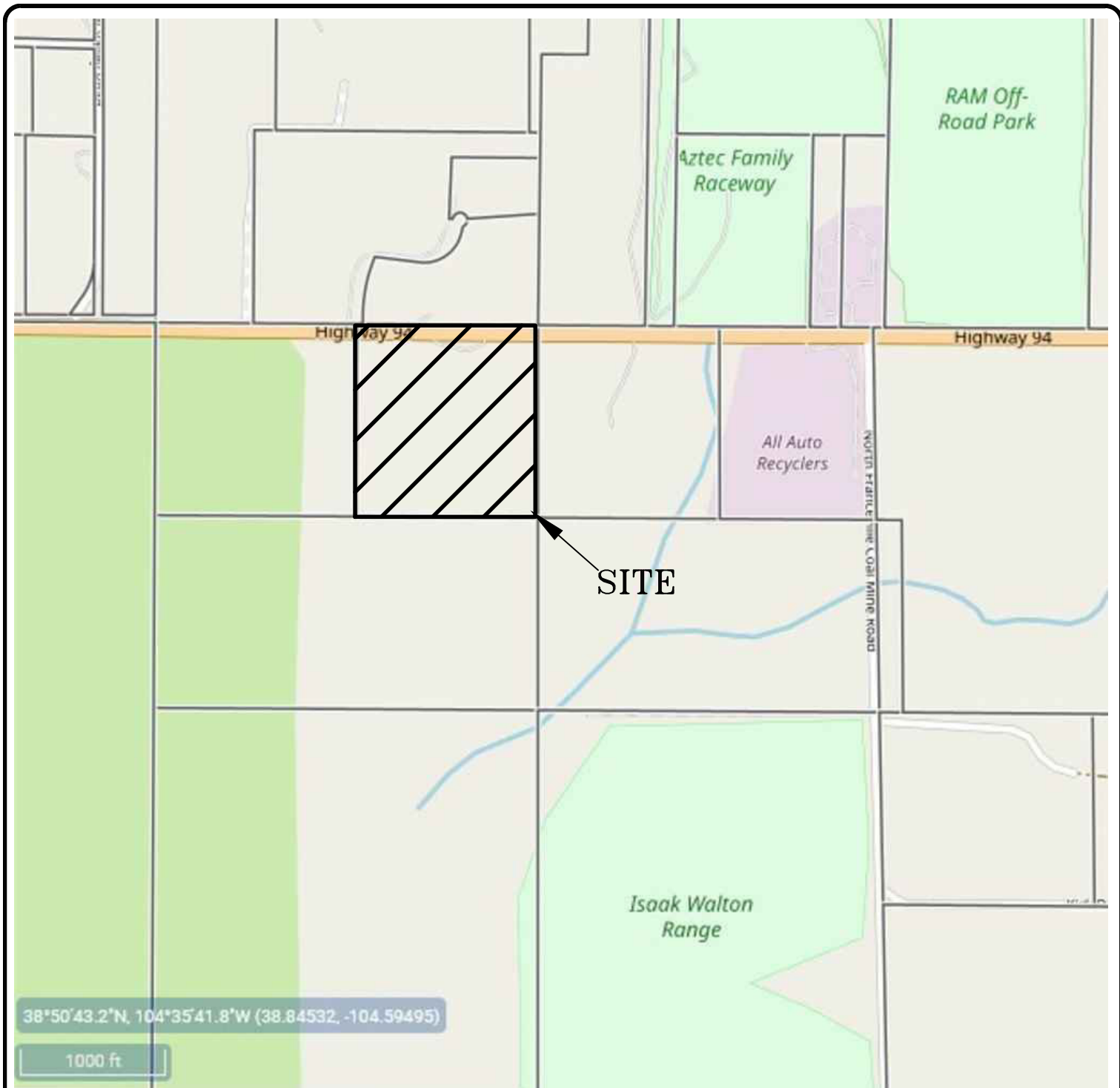
TABLE

TABLE 1
SUMMARY OF LABORATORY TEST RESULTS

CLIENT ROCKWOOD HOMES
 PROJECT 12265 HIGHWAY 94
 JOB NO. 220535

SOIL TYPE	TEST BORING/ PIT NO.	DEPTH (FT)	WATER CONTENT (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	TP-3	2			24.8						SC	SAND, CLAYEY
2	1	5	16.3	106.2	65.8	51	34			3.9	CH	CLAY, SANDY
2	4	5	23.3	101.2	99.7	66	39	<0.01		0.6	CH	CLAY, SILTY
2	6	2-3	10.3	102.5	79.2					2.1	CL	CLAY, SANDY
2	7	5			83.8				1040		CL	CLAY, SANDY
2	10	5	13.2	96.8	89.7					1.3	CL	CLAY, SANDY
2	TP-1	6			98.0						CL	CLAY, SANDY
2	TP-2	3			98.0						CL	CLAY, SANDY
2	TP-3	4			98.2						CL	CLAY, SANDY
3	3	2-3			33.8						CL	CLAY, SANDY
3	8	2-3			41.9						SC	SANDSTONE, CLAYEY
3	5	15			35.9	NV	NP	0.00			SM	SANDSTONE, VERY SILTY
3	9	20			42.4	NV	NP	0.00			SM	SANDSTONE, SILTY
4	2	15	23.5	106.7	99.8					4.0	CL	SANDSTONE, VERY SILTY
4	9	17			61.1						CL	CLAYSTONE, SILTY
4	3	15	17.1	112.5	74.0					0.6	CL	CLAYSTONE, VERY SANDY CLAYSTONE, SANDY

FIGURES



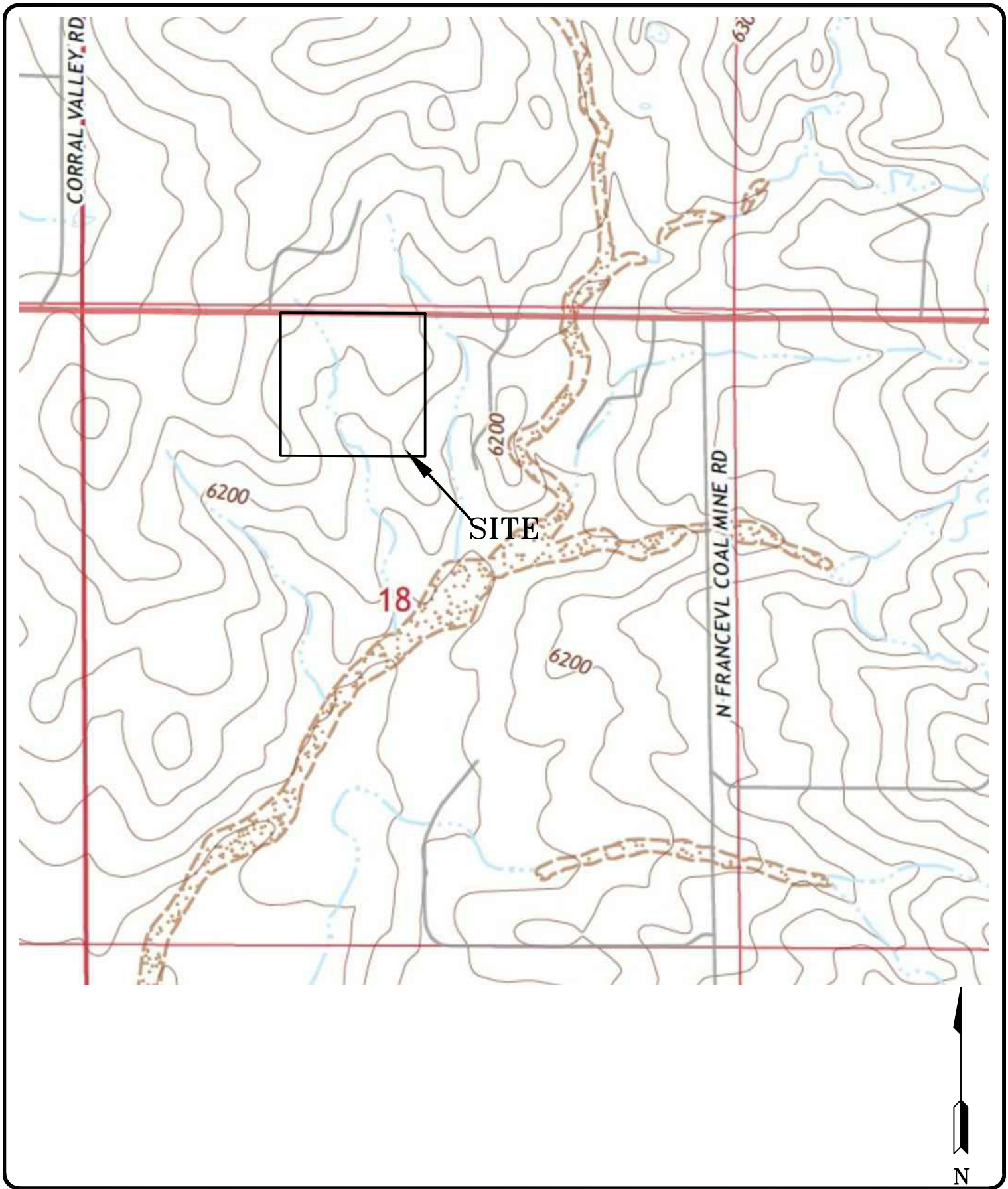
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VICINITY MAP
12265 CO HWY 94
EL PASO COUNTY, CO.
FOR: ROCKWOOD HOMES

DRAWN: LLL	DATE: 4/27/22	CHECKED:	DATE:
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JOB NO.:
220535

FIG NO.:
1



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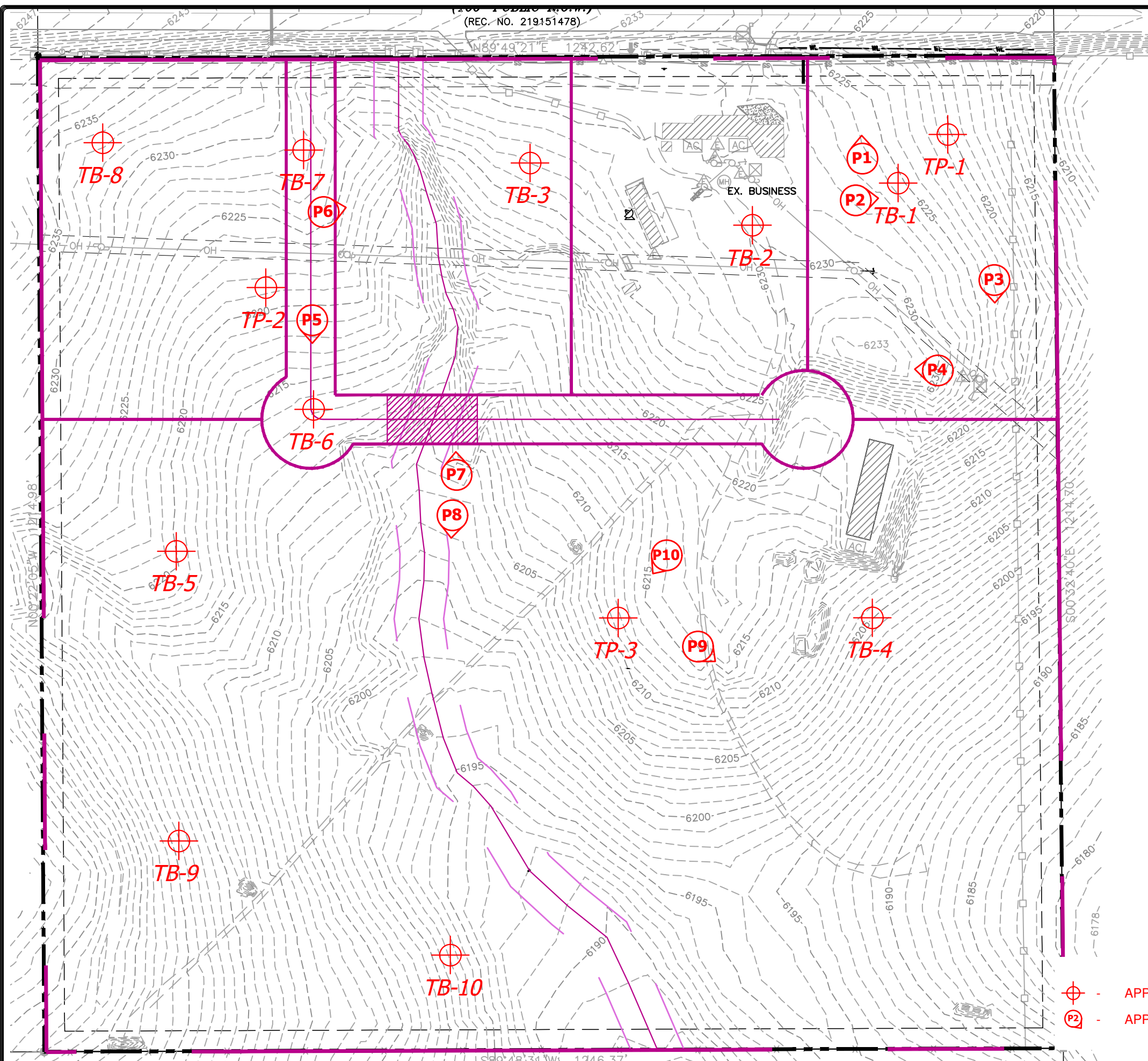
USGS MAP TOPOGRAPHY MAP
12265 CO HWY 94
EL PASO COUNTY, CO.
FOR: ROCKWOOD HOMES

DRAWN: LLL	DATE: 4/27/22	CHECKED:	DATE:
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JOB NO.:
220535

FIG NO.:
2

(REC. NO. 219151478)



-  - APPROXIMATE TEST BORING/TEST PIT LOCATION
-  - APPROXIMATE PHOTOGRAPH LOCATION AND DIRECTION

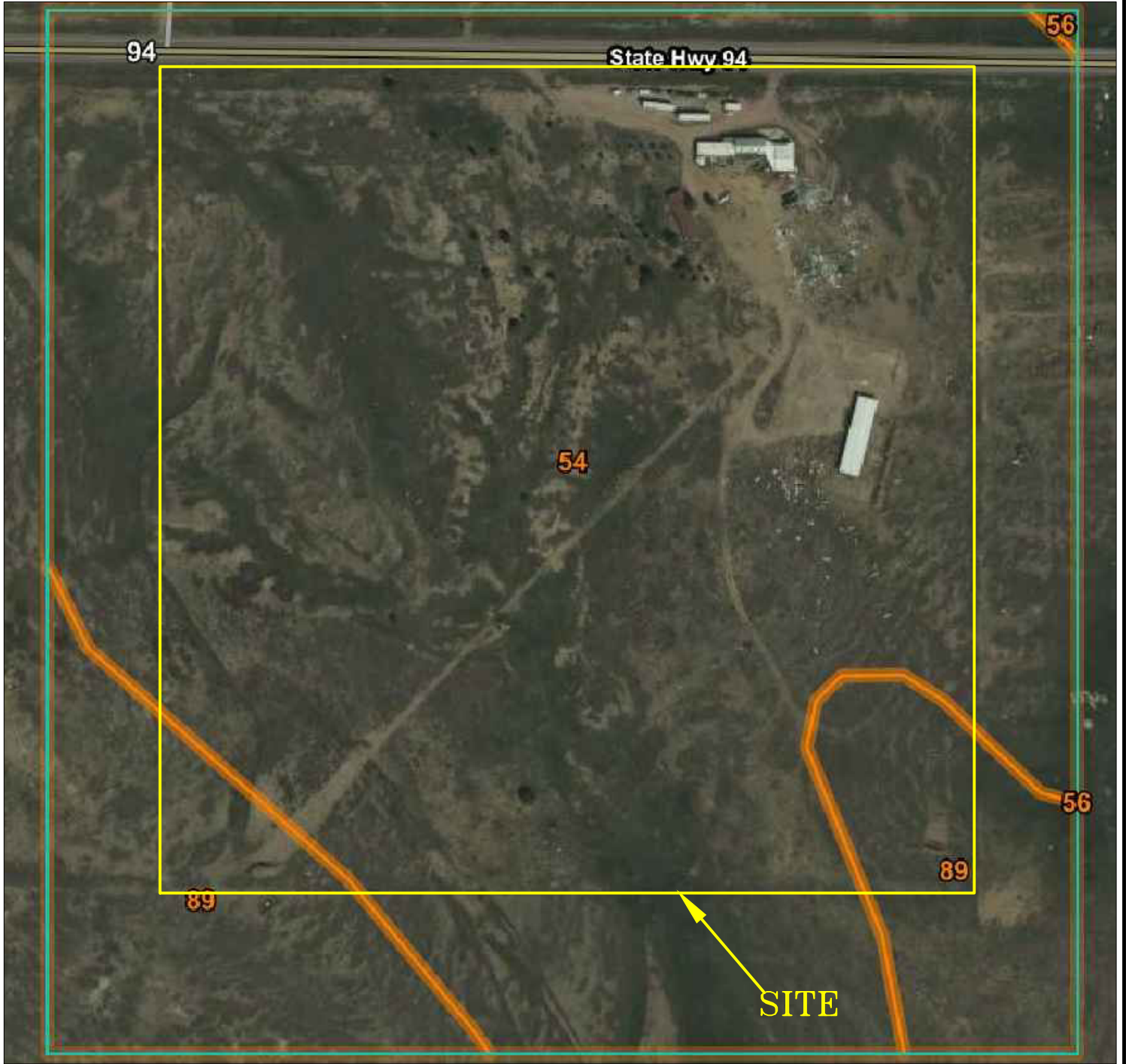
REVISION	BY

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SITE PLAN/TESTING LOCATION MAP
12265 CO HWY 94
EL PASO COUNTY, CO.
FOR: ROCKWOOD HOMES

DRAWN	LLL
CHECKED	
DATE	5/9/22
SCALE	AS SHOWN
JOB NO.	220535
FIGURE No.	3



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SOIL SURVEY MAP
12265 CO HWY 94
EL PASO COUNTY, CO.
FOR: ROCKWOOD HOMES

DRAWN:
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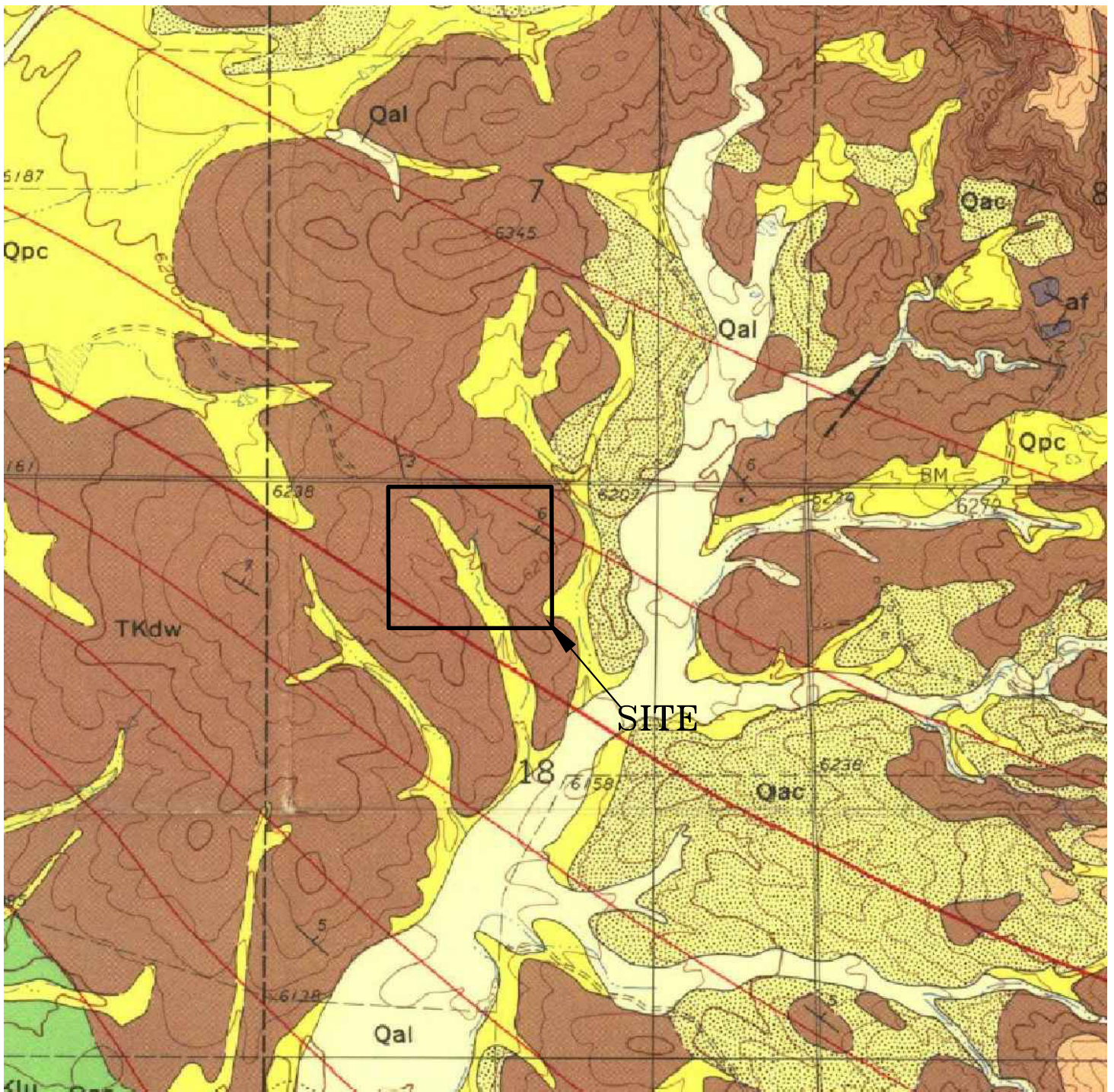
DATE:
4/27/22

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DATE:

JOB NO.:
220535

FIG NO.:
4



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

GEOLOGIC MAP OF THE CORRAL BLUFFS QUADRANGLE
12265 CO HWY 94
EL PASO COUNTY, CO.
FOR: ROCKWOOD HOMES

DRAWN:
LLL

DATE:
4/27/22

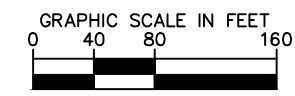
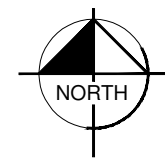
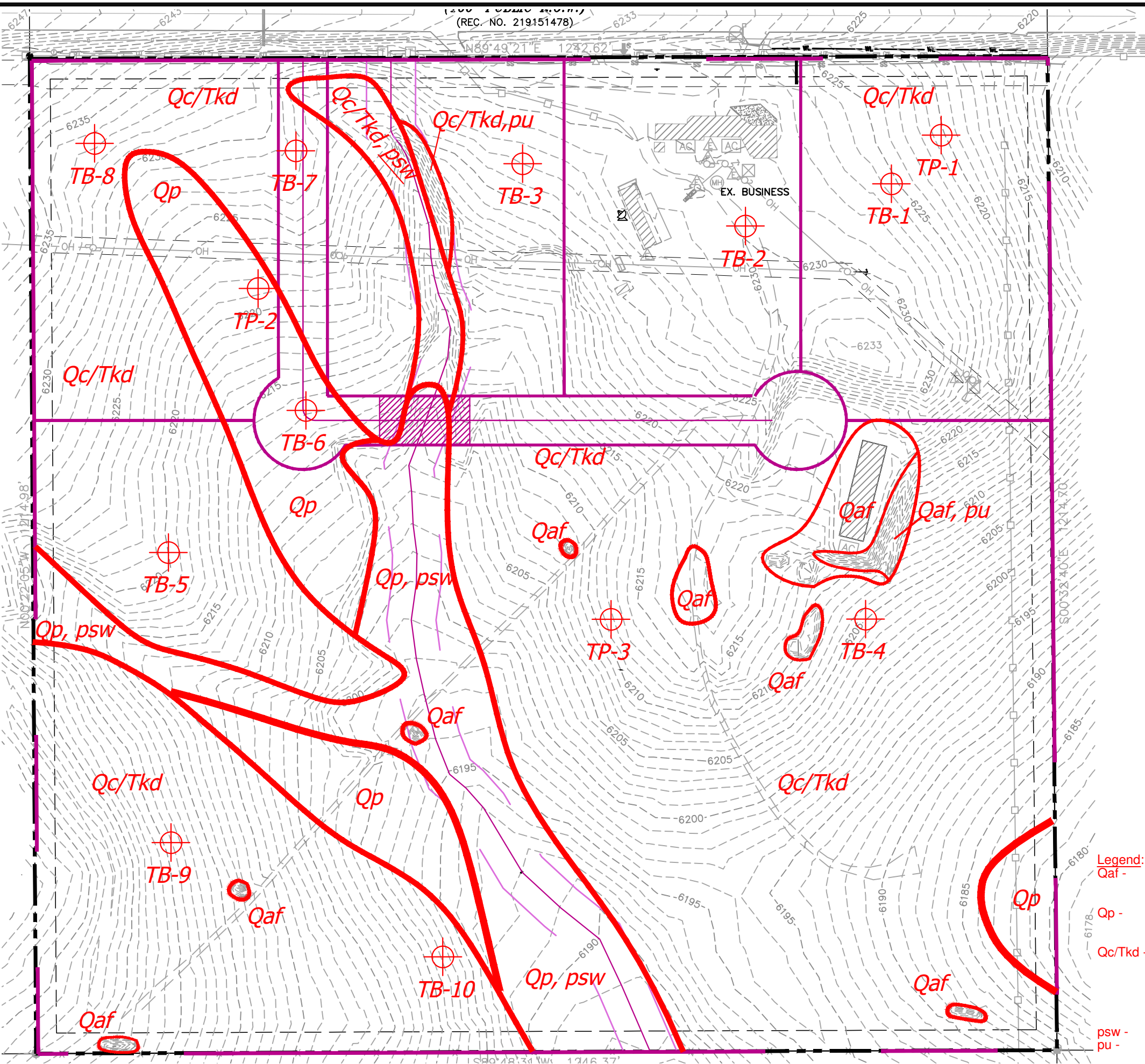
CHECKED:

DATE:

JOB NO.:
220535

FIG NO.:
5

(REC. NO. 219151478)



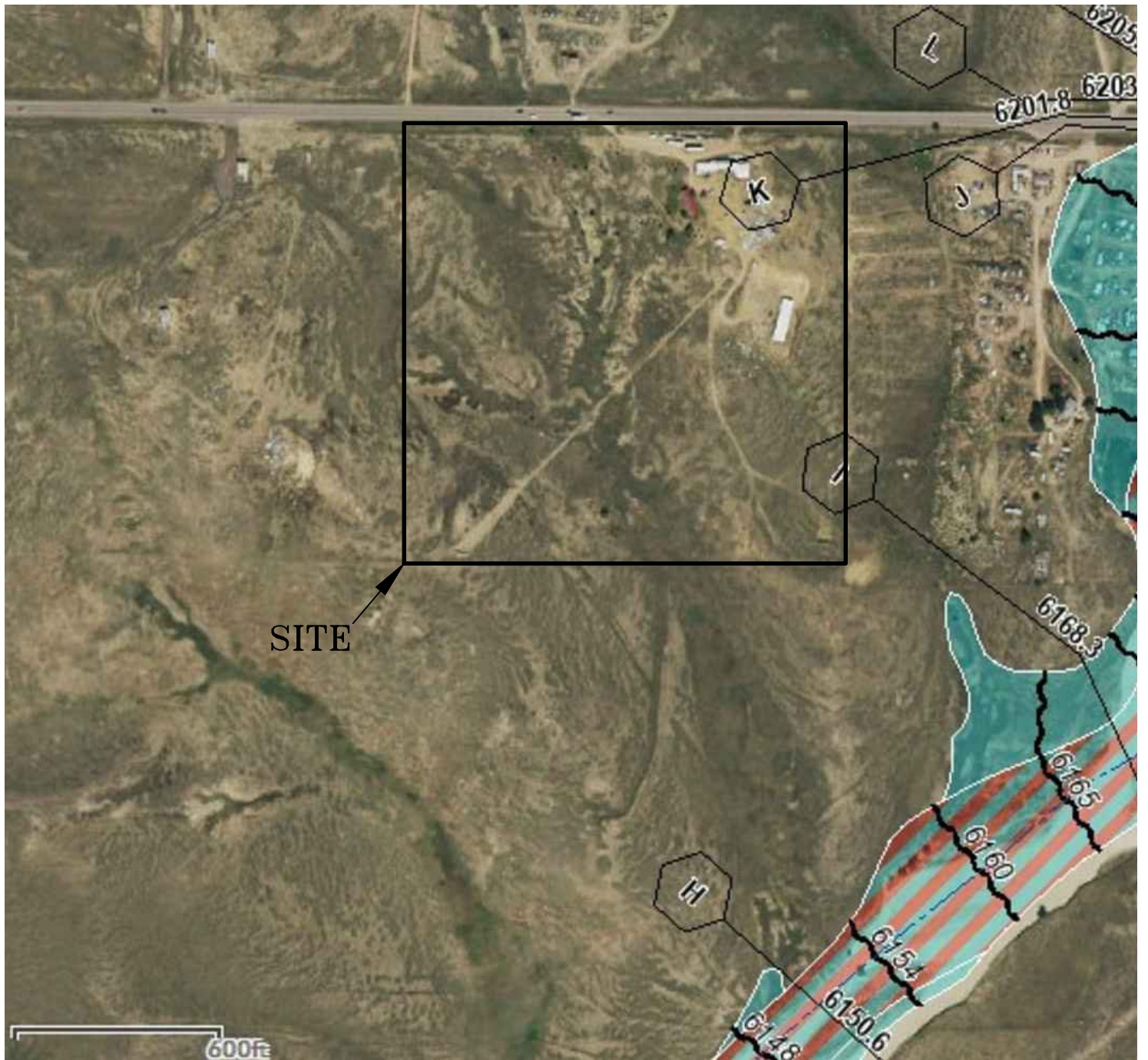
- Legend:**
- Qaf - Artificial Fill of Holocen Age:
Man-made fill deposits associated with fill piles, and fill slope in the eastern portion of the site
 - Qp - Piney Creek Alluvium of Holocene Age:
water deposited sands and clays
 - Qc/Tkd - Colluvium of Quaternary Age overlying the Dawson Formation of Tertiary to Cretaceous Age:
sheetwash and residual soil deposits overlying arkosic sandstone with interbedded siltstone and claystone
 - psw - potentially seasonally wet
 - pu - potentially unstable slopes

REVISION	BY

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COLORADO SPRINGS, CO. 80907

ENGINEERING GEOLOGY/GEOLOGY MAP
12265 CO HWY 94
EL PASO COUNTY, CO.
FOR: ROCKWOOD HOMES

DRAWN LLL
CHECKED
DATE 5/17/22
SCALE AS SHOWN
JOB NO. 220535
FIGURE No. 6



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FEMA FLOODPLAIN MAP
12265 CO HWY 94
EL PASO COUNTY, CO.
FOR: ROCKWOOD HOMES

DRAWN:
LLL

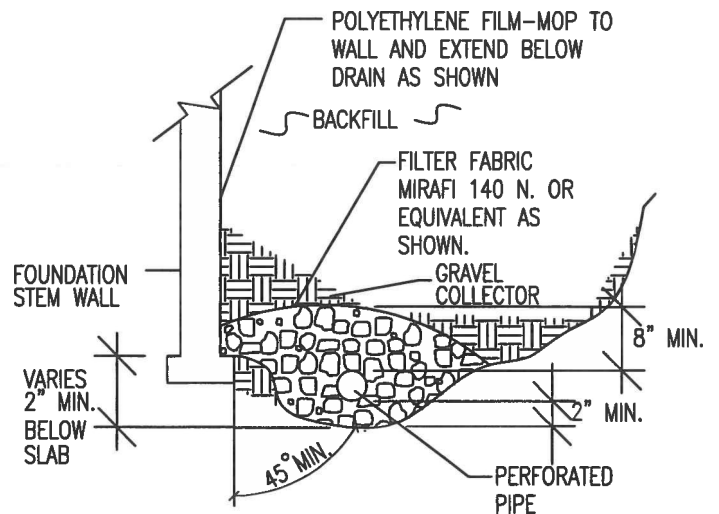
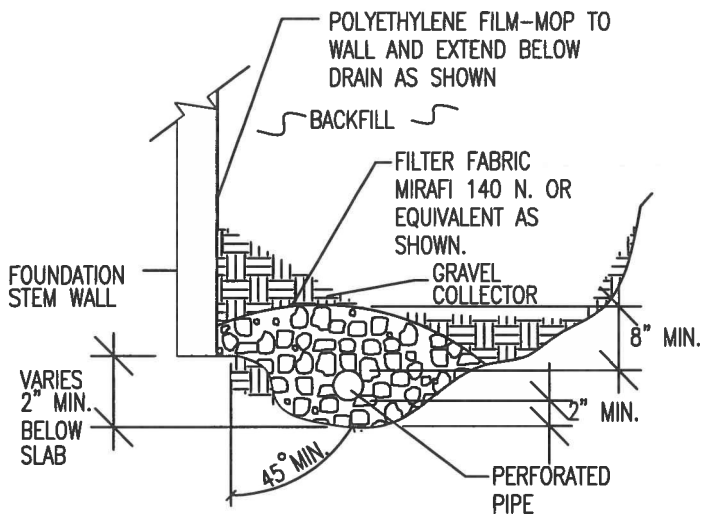
DATE:
4/27/22

CHECKED:

DATE:

JOB NO.:
220535

FIG NO.:
7



NOTES:

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

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

-ALL PIPE SHALL BE PERFORATED PLASTIC. THE DISCHARGE PORTION OF THE PIPE SHOULD BE NON-PERFORATED PIPE.

-FLEXIBLE PIPE MAY BE USED UP TO 8 FEET IN DEPTH, IF SUCH PIPE IS DESIGNED TO WITHSTAND THE PRESSURES. RIGID PLASTIC PIPE WOULD OTHERWISE BE REQUIRED.

-MINIMUM GRADE FOR DRAIN PIPE TO BE 1% OR 3 INCHES OF FALL IN 25 FEET.

-DRAIN TO BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. A SUMP AND PUMP MAY BE USED IF GRAVITY OUF FALL IS NOT AVAILABLE.



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PERIMETER DRAIN DETAIL

DRAWN:

DATE:

DESIGNED:

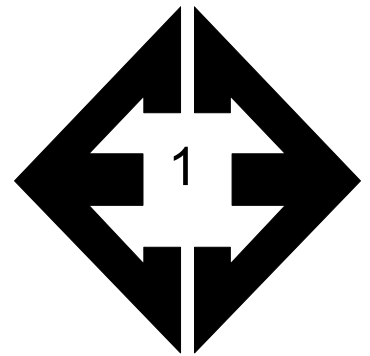
CHECKED:

JOB NO.:
 220535

FIG NO.:

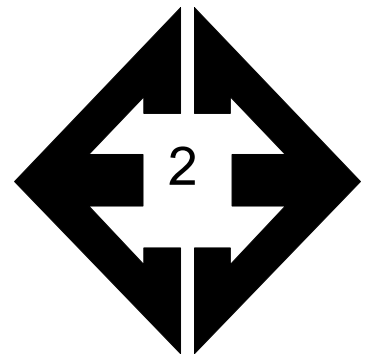
8

APPENDIX A: Site Photographs



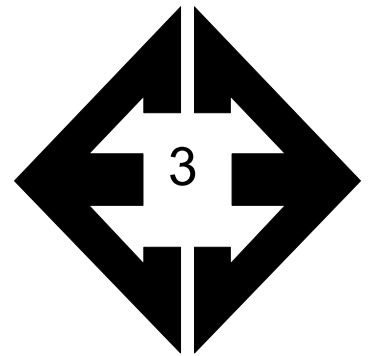
Looking north from the northeastern portion of the site.

March 15, 2022



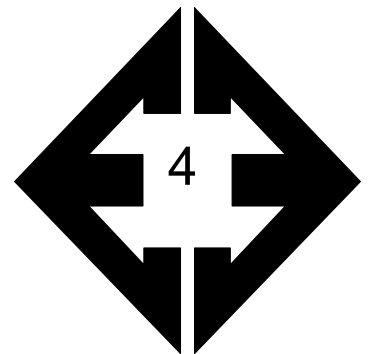
Looking east from the northeastern portion of the site.

March 15, 2022



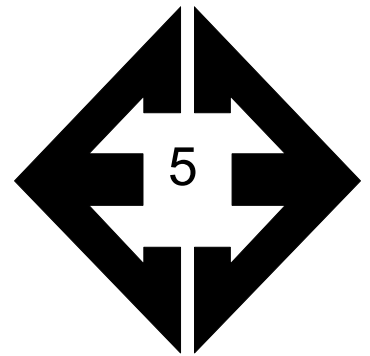
Looking south from the northwestern portion of the site.

March 15, 2022



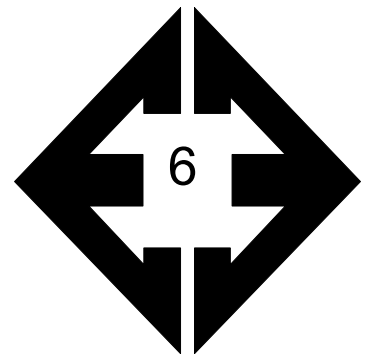
Looking west from the east-central portion of the site.

March 15, 2022



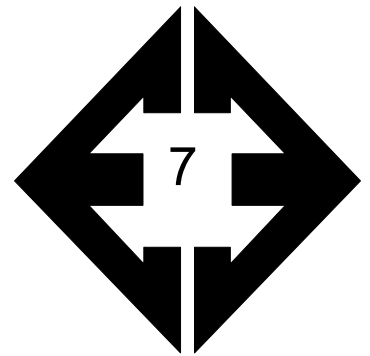
**Looking south from
the north-central
portion of the site.**

March 15, 2022



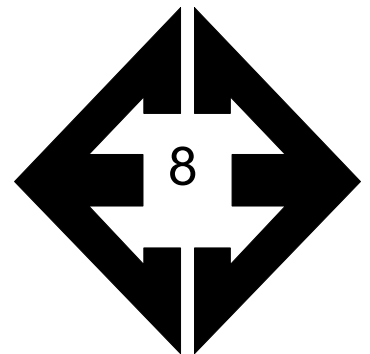
**Looking east from the
north-central portion
of the site.**

March 15, 2022



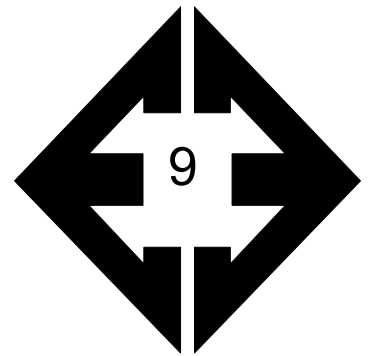
**Looking north along
drainage from the west
central portion of the
site.**

March 15, 2022



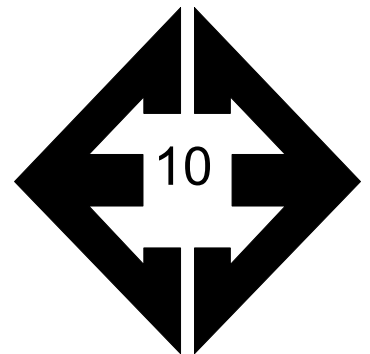
**Looking south along
drainage in the central
portion of the site.**

March 15, 2022



**Looking southeast
from the east-central
portion of the site.**

March 15, 2022



**Looking southwest
from the east-central
portion of the site.**

March 15, 2022

APPENDIX B: Test Boring Logs

TEST BORING NO. 1
 DATE DRILLED 3/16/2022
 Job # 220535

TEST BORING NO. 2
 DATE DRILLED 3/16/2022
 CLIENT ROCKWOOD HOMES
 LOCATION 12265 HIGHWAY 94

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 18.5', 3/21/22 CLAY, SANDY, GRAY BROWN, STIFF TO HARD, MOIST							DRY TO 19', 3/21/22 WEATHERED CLAYSTONE, SILTY, GRAY BROWN, VERY STIFF TO HARD, MOIST						
	5			19	11.5	2		5			40	17.6	4
				21	12.3	2					50	15.3	4
											11"		
	10			20	10.7	2	HIGHLY WEATHERED ZONE	10			39	16.5	4
	15			31	22.1	2		15			49	16.4	4
	20			50	15.9	2		20			42	17.0	4



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TEST BORING LOG

DRAWN:

DATE:

CHECKED:

DATE:

LLL

4/27/22

JOB NO.:
 220535

FIG NO.:
 B- 1

TEST BORING NO. 3
 DATE DRILLED 3/16/2022
 Job # 220535

TEST BORING NO. 4
 DATE DRILLED 3/16/2022
 CLIENT ROCKWOOD HOMES
 LOCATION 12265 HIGHWAY 94

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 19.5', 3/21/22							DRY TO 19.5', 3/21/22						
WEATHERED SANDSTONE, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST	5	(Dotted pattern)	5	50	10.1	3	SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST	5	(Dotted pattern)	5	23	9.5	1
	10	(Dotted pattern)	5	50	15.2	3	CLAY, SANDY, GRAY BROWN, STIFF TO VERY STIFF, MOIST	5	(Dotted pattern)	5	28	23.5	2
	15	(Dotted pattern)	5	50	15.9	3		10	(Dotted pattern)	5	34	20.7	2
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST	20	(Cross-hatch pattern)	5	50	14.4	4		15	(Cross-hatch pattern)	5	45	16.2	2
	25	(Cross-hatch pattern)	5	50	19.2	4		20	(Cross-hatch pattern)	5	32	22.8	2



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ENGINEERING, INC.

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED: <i>LLL</i>	DATE: <i>4/27/22</i>
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JOB NO.:
220535

FIG NO.:
B- 2

TEST BORING NO. 5
 DATE DRILLED 3/15/2022
 Job # 220535

TEST BORING NO. 6
 DATE DRILLED 3/15/2022
 CLIENT ROCKWOOD HOMES
 LOCATION 12265 HIGHWAY 94

REMARKS

DRY TO 19', 3/21/22
 CLAY, SANDY, TAN, STIFF,
 MOIST

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

CLAYSTONE, SANDY, GRAY
 BROWN, HARD, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			20	11.5	2
5			27	12.5	2
10			22	16.6	2
15			50 6"	14.9	3
20			50 4"	20.9	4

REMARKS

DRY TO 19.5', 3/21/22
 CLAY, SANDY, GRAY BROWN,
 STIFF TO FIRM, MOIST

HIGHLY WEATHERED CLAYSTONE,
 SANDY, GRAY BROWN, STIFF
 TO VERY STIFF, MOIST

CLAYSTONE, SANDY, HARD,
 MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			20	12.1	2
5			14	12.9	2
10			25	20.7	4
15			46	22.0	4
20			50 10"	16.1	4



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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:

DATE:

CHECKED:
LLL

DATE:
 4/27/22

JOB NO.:
 220535

FIG NO.:
 B- 3

TEST BORING NO. 7
 DATE DRILLED 3/15/2022
 Job # 220535

TEST BORING NO. 8
 DATE DRILLED 3/15/2022
 CLIENT ROCKWOOD HOMES
 LOCATION 12265 HIGHWAY 94

REMARKS						REMARKS					
Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 3/21/22 CLAY, SANDY, TAN, VERY STIFF TO STIFF, MOIST						DRY TO 19.5', 3/21/22 SANDSTONE, VERY SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST					
5			30	14.6	2	5			50 11"	7.7	3
			25	12.8	2	5			50 9"	12.5	3
10			27	15.9	2	10			50 6"	5.8	3
15			50 10"	22.0	4	15			45	19.6	4
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST						CLAYSTONE, SANDY, TAN, VERY STIFF TO HARD, MOIST					
20			50 8"	16.2	4	20			50 4"	21.1	4



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TEST BORING LOG

DRAWN:

DATE:

CHECKED:
LLL

DATE:
 4/27/22

JOB NO.:
 220535

FIG NO.:
 B- 4

TEST BORING NO. 9
 DATE DRILLED 3/15/2022
 Job # 220535

TEST BORING NO. 10
 DATE DRILLED 3/15/2022
 CLIENT ROCKWOOD HOMES
 LOCATION 12265 HIGHWAY 94

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 18', 3/21/22							DRY TO 19', 3/21/22						
SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST				50	6.8	3	CLAY, SANDY, BROWN, STIFF TO HARD, MOIST				22	17.4	2
				10"							21	10.6	2
HIGHLY WEATHERED CLAYSTONE, SANDY, BROWN, STIFF TO HARD, MOIST	5			19	28.7	4		5					
							SAND, CLAYEY, FINE GRAINED, BROWN, MEDIUM DENSE, MOIST				23	10.2	1
	10			39	22.1	4		10					
							CLAY, SANDY, BROWN, VERY STIFF, MOIST				33	23.0	2
CLAYSTONE, VERY SANDY, GRAY BROWN, HARD, MOIST	15			50	15.4	4		15					
				8"									
				*	12.5	4							
SANDSTONE, VERY SILTY, FINE TO COARSE GRAINED, GRAY BROWN, VERY DENSE, MOIST	20			50	14.4	3	WEATHERED CLAYSTONE, SANDY, BROWN, HARD, MOIST	20			50	18.5	4
				3"									

* - BULK SAMPLE TAKEN



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TEST BORING LOG

DRAWN:

DATE:

CHECKED:

DATE:

LL

4/27/22

JOB NO.:
 220535

FIG NO.:
 B- 5

TEST PIT NO. 1
 DATE EXCAVATED 3/15/2022
 Job # 220535

TEST PIT NO. 2
 DATE EXCAVATED 3/15/2022
 CLIENT ROCKWOOD HOMES
 LOCATION 12265 HWY 94

REMARKS

REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy clay, dark brown	1	[Symbol]					topsoil, sandy clay, dark brown	1	[Symbol]				
sandy clay, fine grained, brown	2	[Symbol]		bl	s	4	sandy clay, fine grained, brown	2	[Symbol]		bl	s	4
	3	[Symbol]						3	[Symbol]				
sandy clay, fine grained, brown	4	[Symbol]		ma		4A	sandy clay, fine grained, brown	4	[Symbol]		ma		4A
	5	[Symbol]						5	[Symbol]				
	6	[Symbol]						6	[Symbol]				
	7	[Symbol]						7	[Symbol]				
	8	[Symbol]						8	[Symbol]				
	9	[Symbol]						9	[Symbol]				
	10	[Symbol]						10	[Symbol]				

Soil Structure Shape

granular - gr
 platy - pl
 blocky - bl
 prismatic - pr
 single grain - sg
 massive - ma

Soil Structure Grade

weak - w
 moderate - m
 strong - s
 loose - l



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 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:

DATE:

CHECKED:
 LLL

DATE:
 4/27/22

JOB NO.:
 220535

FIG NO.:
 B-6

TEST PIT NO. 3
 DATE EXCAVATED 3/15/2022
 Job # 220535

DATE EXCAVATED 3/15/2022
 CLIENT ROCKWOOD HOMES
 LOCATION 12265 HWY 94

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type	REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil, sandy clay loam, dark brown	1							1					
sandy clay loam, fine to medium grained, light brown	2			gr	s	3		2					
sandy claystone, fine grained, gray-brown	3			bl	s	4		3					
	4							4					
	5							5					
	6			ma		4A		6					
	7							7					
	8							8					
	9							9					
	10							10					

Soil Structure Shape

granular - gr
 platy - pl
 blocky - bl
 prismatic - pr
 single grain - sg
 massive - ma

Soil Structure Grade

weak - w
 moderate - m
 strong - s
 loose - l



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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:

DATE:

CHECKED:
 LLL

DATE:
 4/27/22

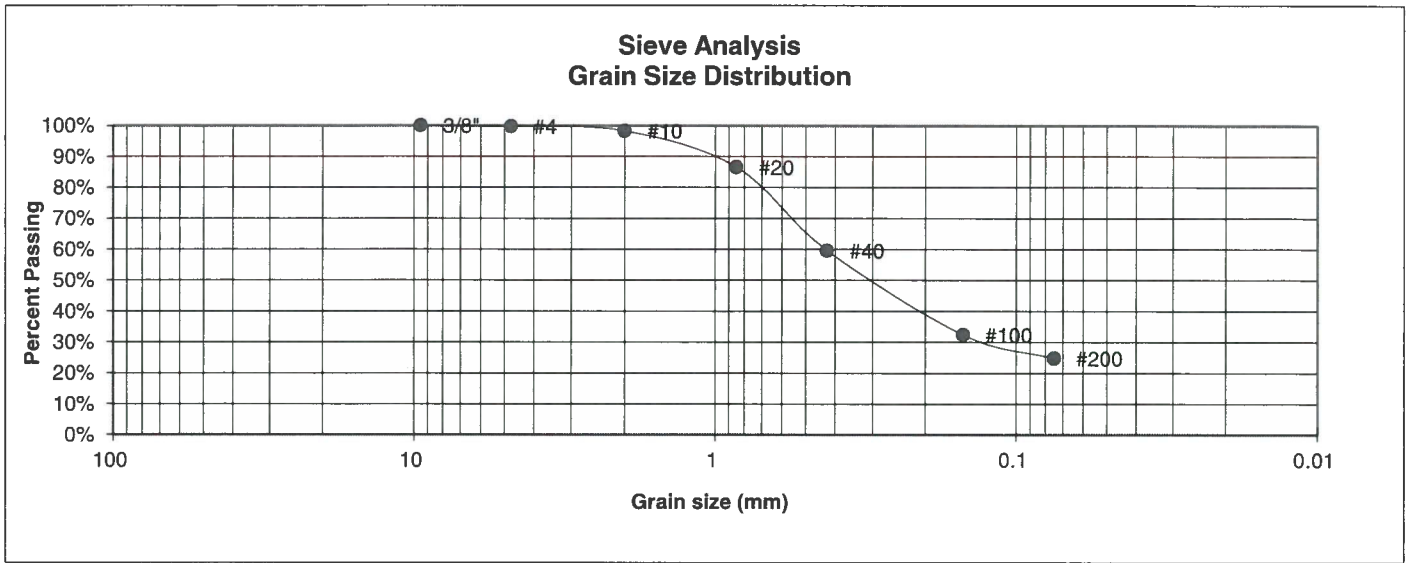
JOB NO.:
 220535

FIG NO.:

B-7

APPENDIX C: Laboratory Testing Results

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	1	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	TP-3	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	2	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	98.3%
20	86.5%
40	59.6%
100	32.4%
200	24.8%

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**

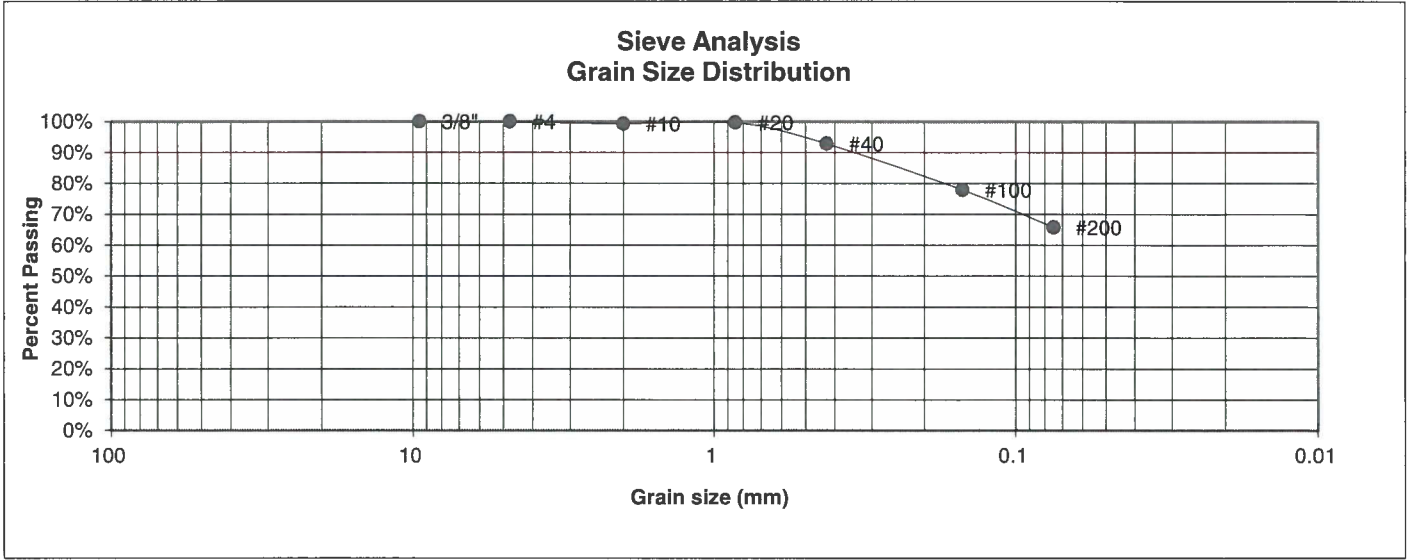
DRAWN:	DATE:	CHECKED: LLL	DATE: 4/27/22
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JOB NO.:
220535

FIG NO.:

C-1

<u>UNIFIED CLASSIFICATION</u>	CH	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	1	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	100.0%
10	99.3%
20	99.7%
40	92.8%
100	77.9%
200	65.8%

<u>Atterberg Limits</u>	
Plastic Limit	17
Liquid Limit	51
Plastic Index	34

<u>Swell</u>	
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**

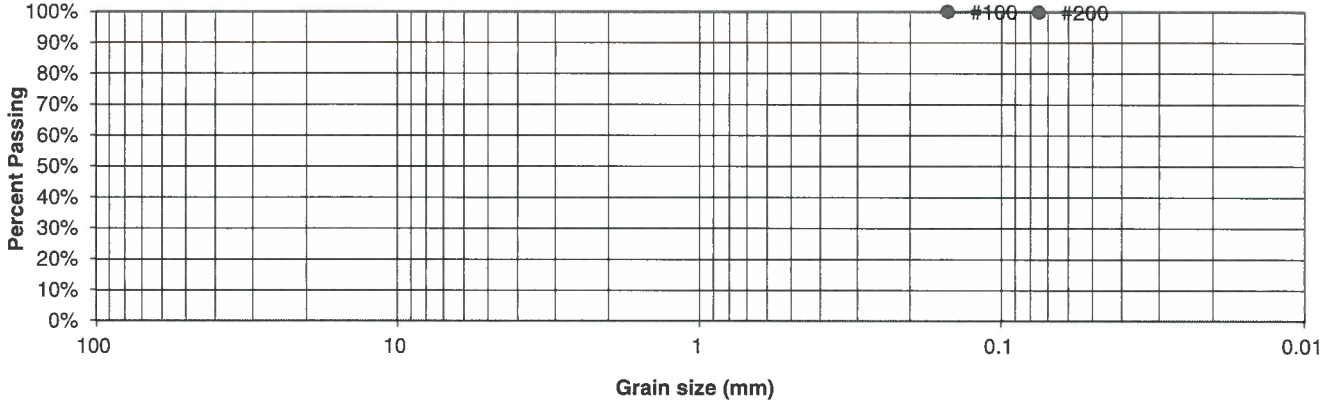
DRAWN:	DATE:	CHECKED: <i>LL</i>	DATE: <i>4/27/22</i>
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JOB NO.:
220535

FIG NO.:
C-2

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	2	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	15	<u>TEST BY</u>	BL

**Sieve Analysis
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	100.0%
200	99.8%

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:
LLL

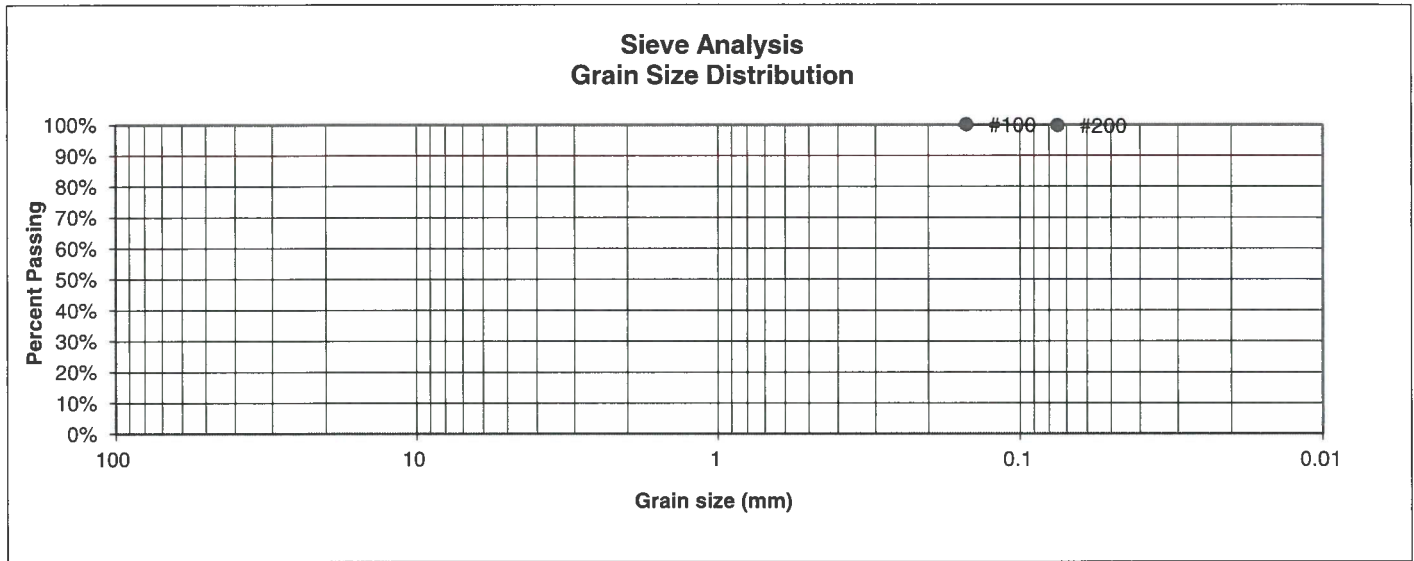
DATE:
4/27/22

JOB NO.:
220535

FIG NO.:

C-3

<u>UNIFIED CLASSIFICATION</u>	CH	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	4	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	100.0%
200	99.7%

<u>Atterberg Limits</u>	
Plastic Limit	27
Liquid Limit	66
Plastic Index	39

<u>Swell</u>	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	



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**LABORATORY TEST
RESULTS**

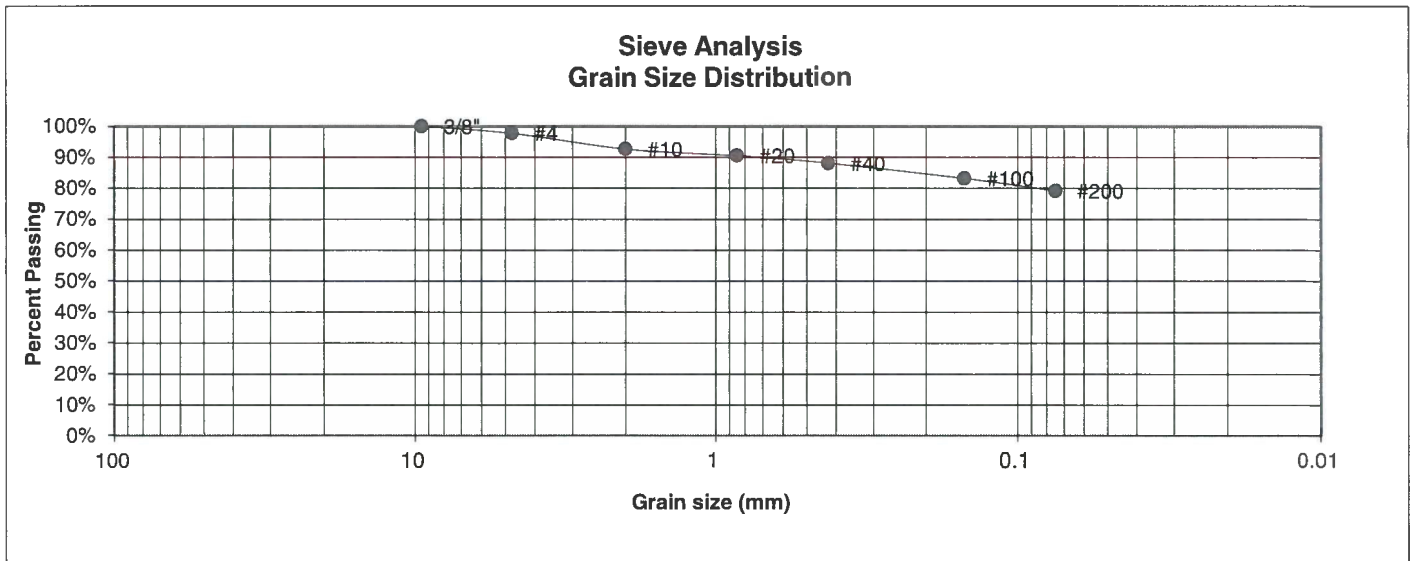
DRAWN:	DATE:	CHECKED: <i>LLL</i>	DATE: <i>4/27/22</i>
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JOB NO.:
220535

FIG NO.:

C-4

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	6	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.8%
10	92.6%
20	90.5%
40	88.1%
100	83.2%
200	79.2%

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:

LL

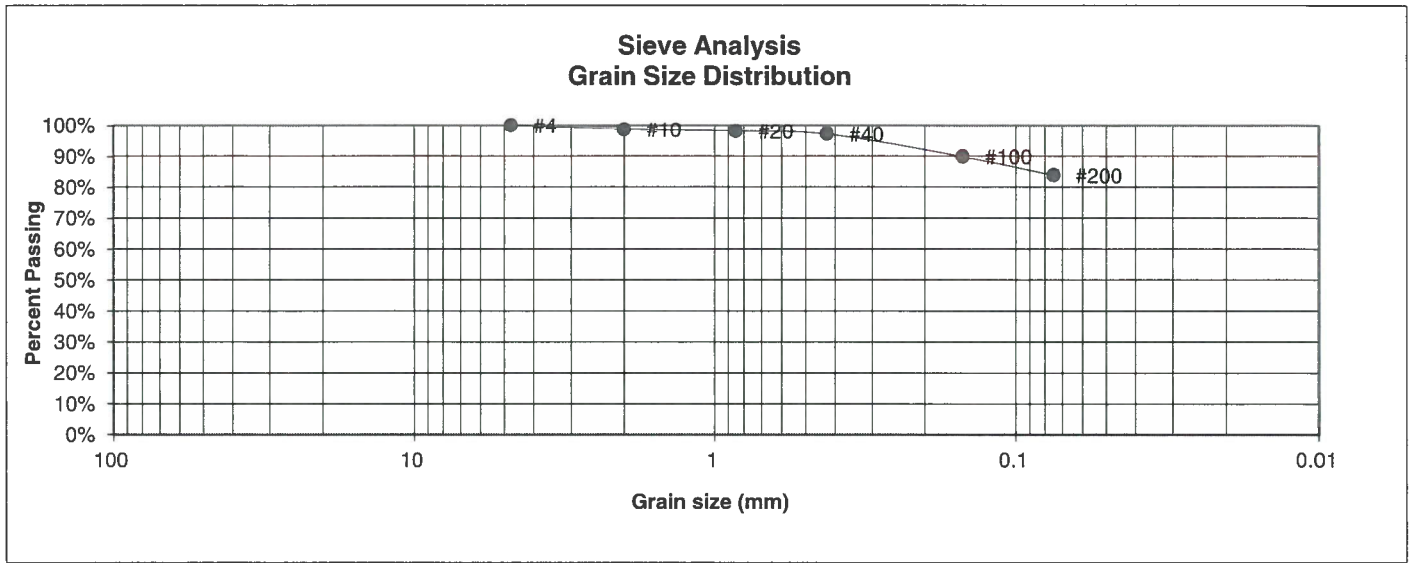
4/27/02

JOB NO.:
220535

FIG NO.:

6-5

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	7	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.7%
20	98.2%
40	97.2%
100	89.8%
200	83.8%

Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index

<u>Swell</u>	
Moisture at start	10.1%
Moisture at finish	18.9%
Moisture increase	8.8%
Initial dry density (pcf)	103
Swell (psf)	1040



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**LABORATORY TEST
RESULTS**

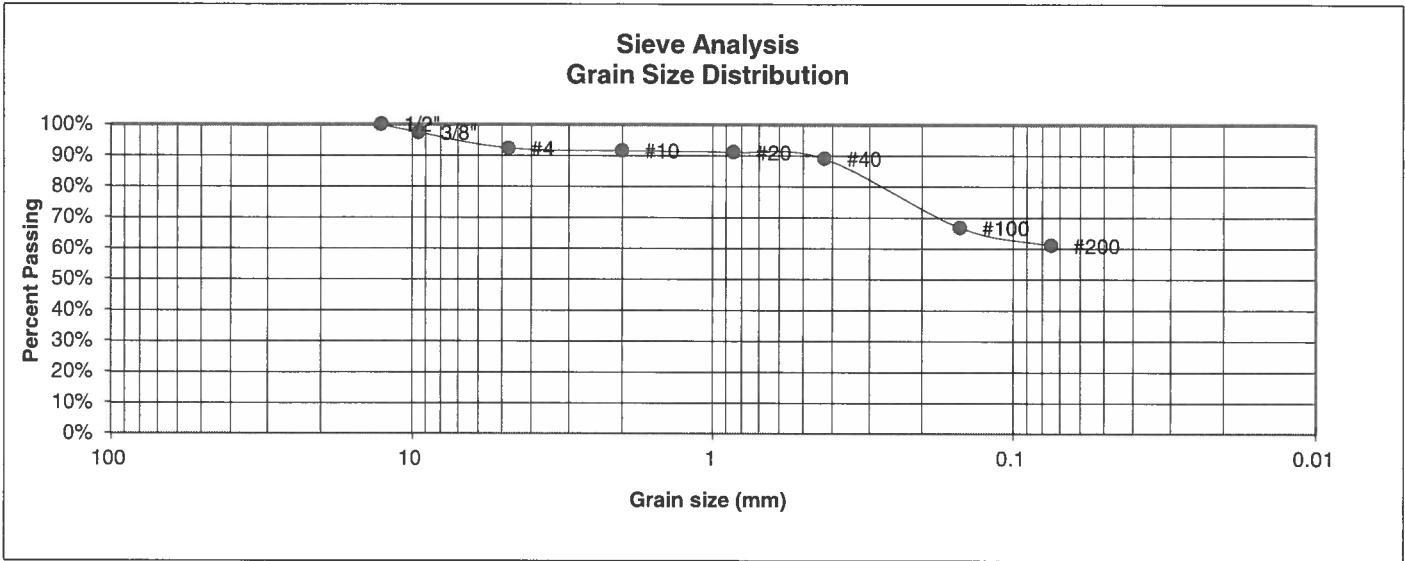
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/27/22

JOB NO.:
220535

FIG NO.:

C-6

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	9	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	17	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.4%
4	92.4%
10	91.6%
20	91.1%
40	89.1%
100	66.8%
200	61.1%

- 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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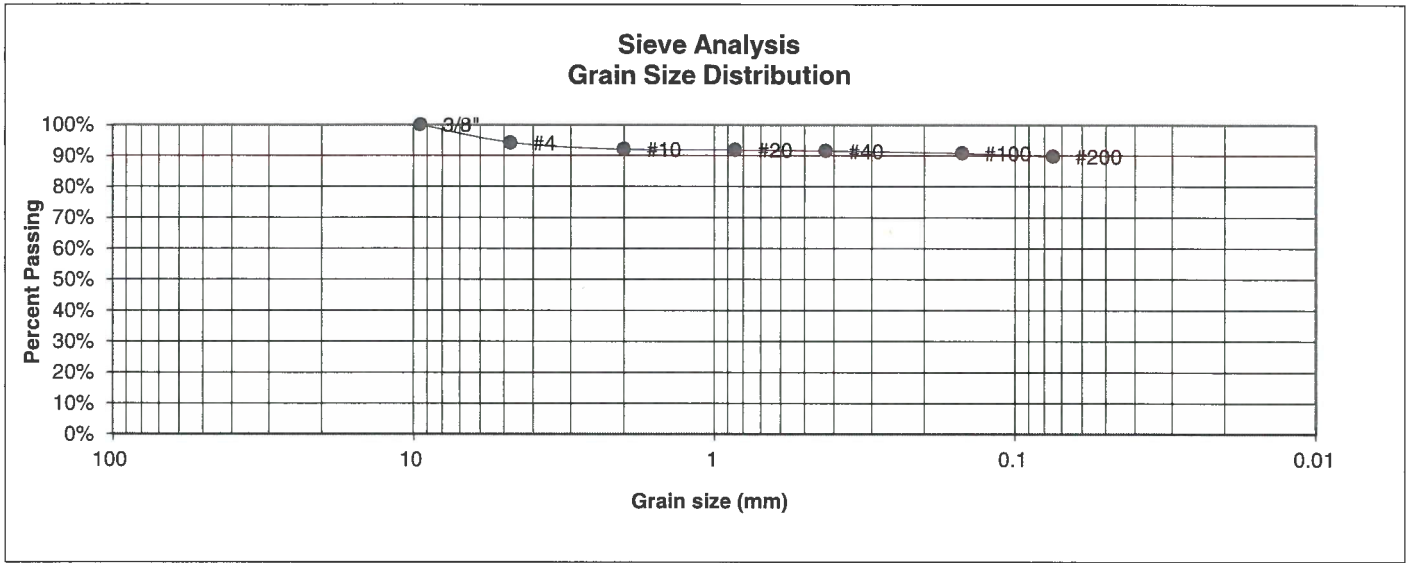
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: <i>LLL</i>	DATE: <i>9/27/22</i>
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JOB NO.:
220535

FIG NO.:
C-7

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	10	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.1%
10	92.0%
20	91.8%
40	91.5%
100	90.7%
200	89.7%

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

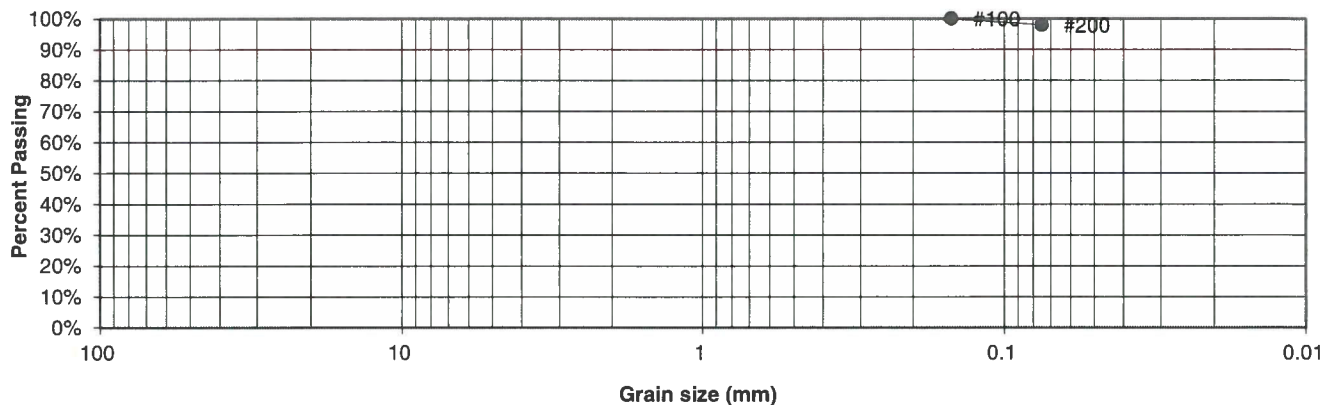
DRAWN:	DATE:	CHECKED: <i>LL</i>	DATE: <i>4/27/22</i>
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JOB NO.:
220535

FIG NO.:
C-8

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	TP-1	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	6	<u>TEST BY</u>	BL

**Sieve Analysis
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	100.0%
200	98.0%

- 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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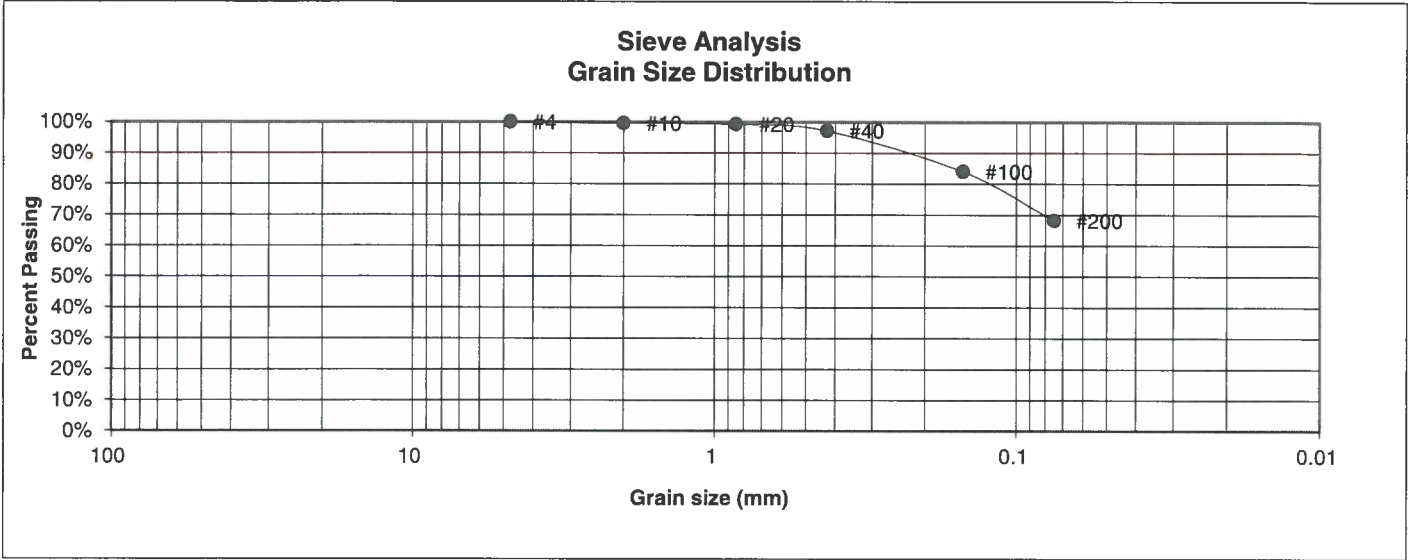
**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED: <i>LLL</i>	DATE: <i>4/27/22</i>
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JOB NO.:
220535

FIG NO.:
C-9

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	TP-2	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	3	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.6%
20	99.3%
40	97.2%
100	84.1%
200	68.1%

- 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

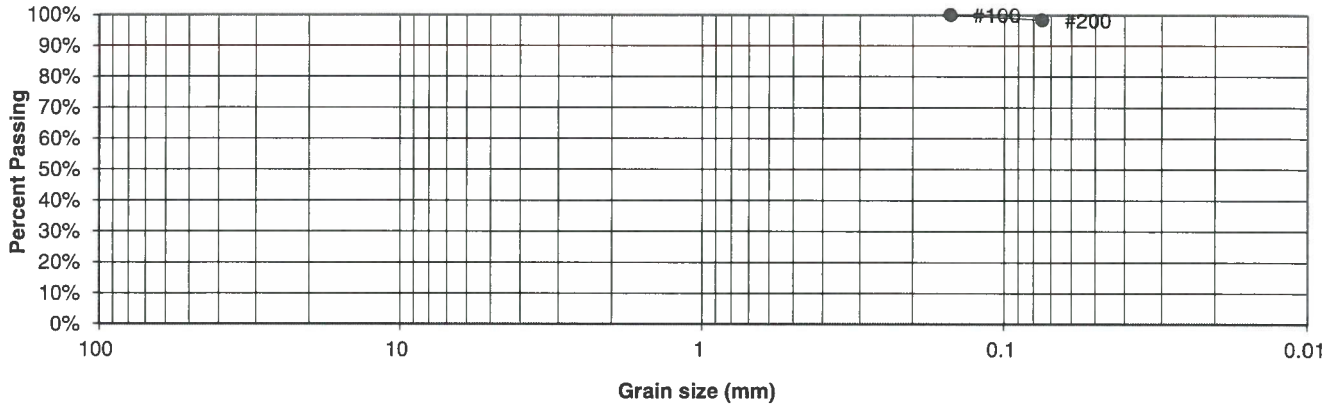
DRAWN:	DATE:	CHECKED: <i>LL</i>	DATE: <i>4/27/22</i>
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JOB NO.:
220535

FIG NO.:
C-10

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	2	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	TP-3	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	4	<u>TEST BY</u>	BL

**Sieve Analysis
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	100.0%
200	98.3%

- 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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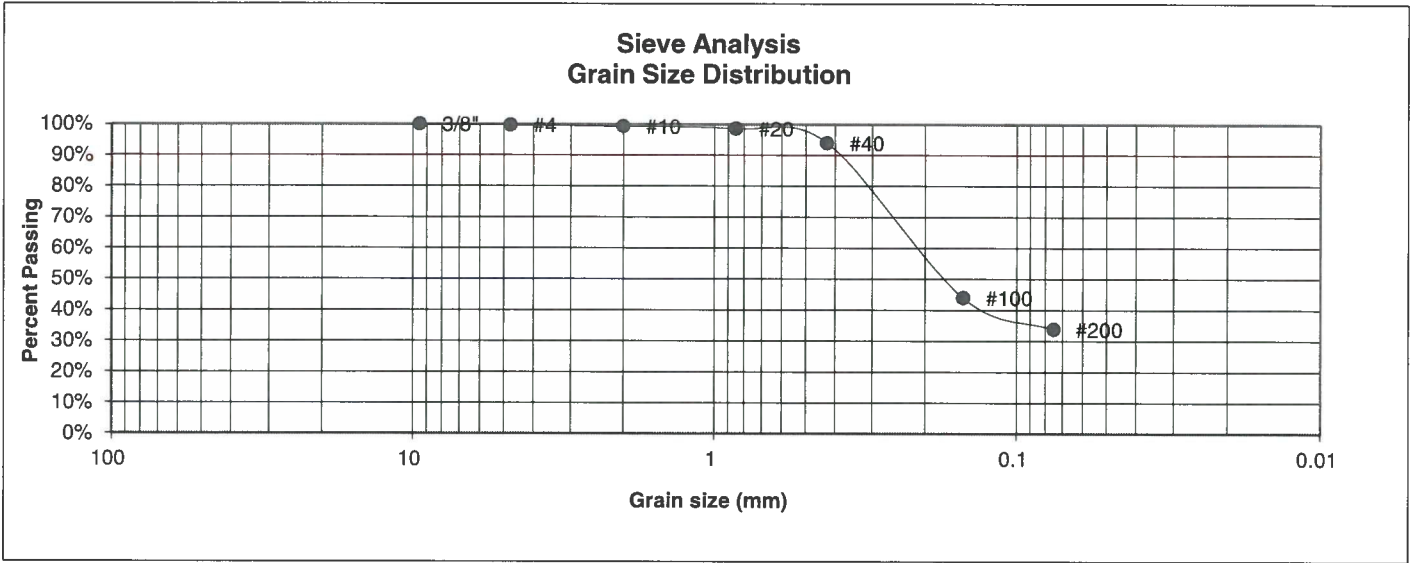
**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED: 777	DATE: 22/2/22
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JOB NO.:
220535

FIG NO.:
2-11

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	3	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	3	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.7%
10	99.3%
20	98.5%
40	93.9%
100	43.9%
200	33.8%

- 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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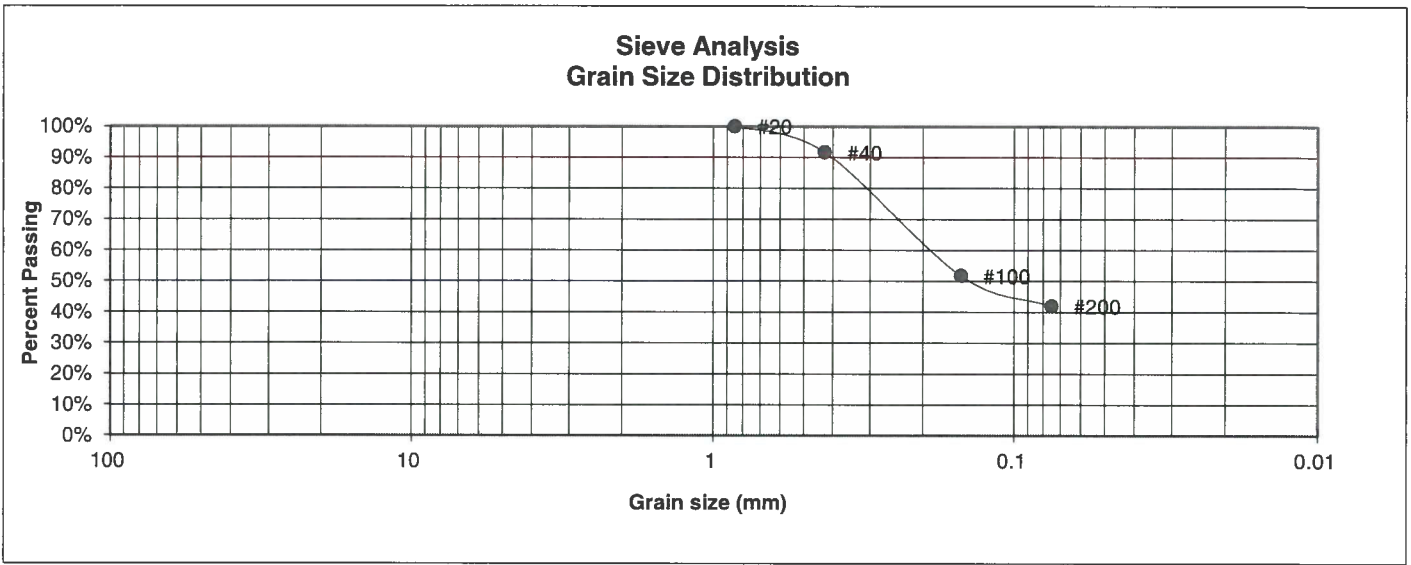
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LL	4/27/22

JOB NO.:
220535

FIG NO.:
C-12

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	3	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	8	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	2-3	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	91.6%
100	51.7%
200	41.9%

- Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index
- Swell
 Moisture at start
 Moisture at finish
 Moisture increase
 Initial dry density (pcf)
 Swell (psf)



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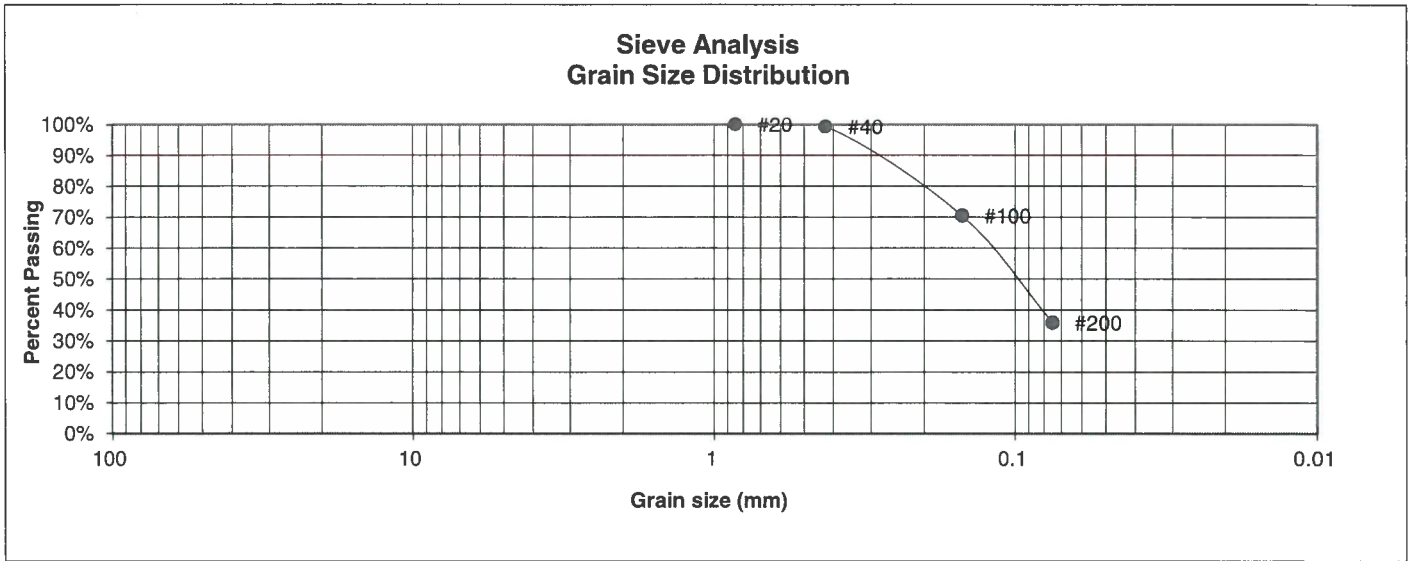
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: <i>LLL</i>	DATE: <i>9/27/22</i>
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JOB NO.:
220535

FIG NO.:
C-13

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	3	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	5	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	15	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	99.3%
100	70.4%
200	35.9%

<u>Atterberg Limits</u>	
Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

<u>Swell</u>	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	



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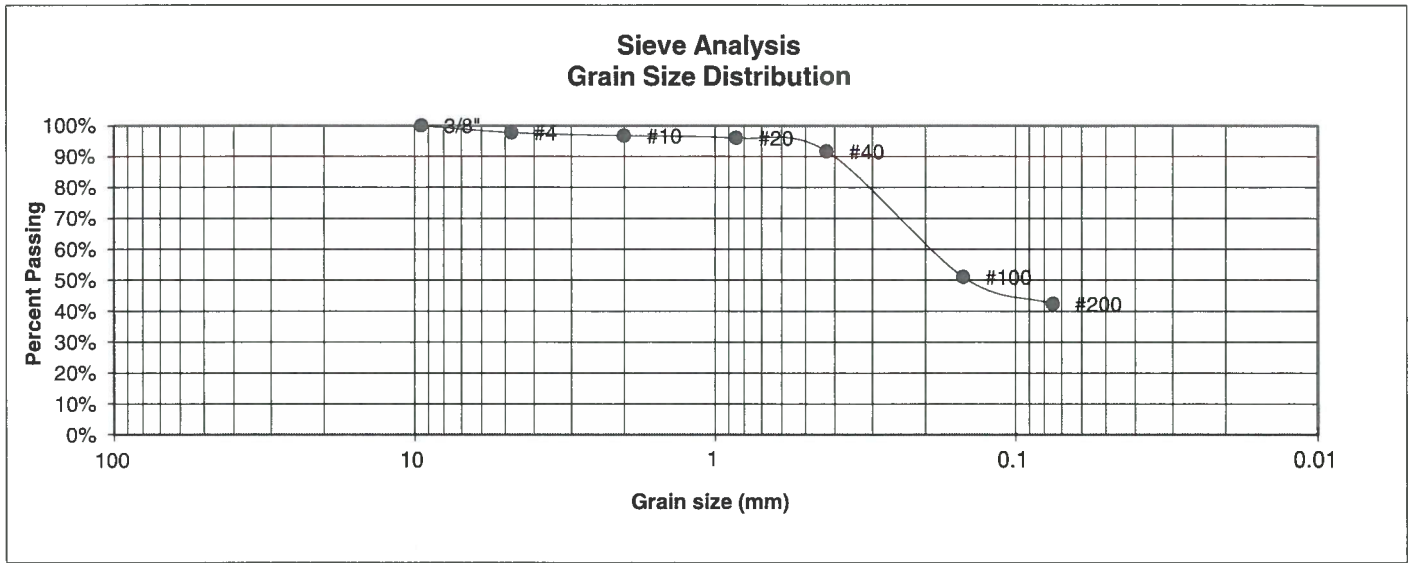
**LABORATORY TEST
RESULTS**

DRAWN:	DATE:	CHECKED: LLL	DATE: 4/27/22
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JOB NO.:
220535

FIG NO.:
C-14

<u>UNIFIED CLASSIFICATION</u>	SM	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	3	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	9	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	20	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	97.7%
10	96.7%
20	95.9%
40	91.7%
100	51.0%
200	42.4%

<u>Atterberg Limits</u>	
Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

<u>Swell</u>	
Moisture at start	
Moisture at finish	
Moisture increase	
Initial dry density (pcf)	
Swell (psf)	



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**LABORATORY TEST
RESULTS**

DRAWN:

DATE:

CHECKED:
LLL

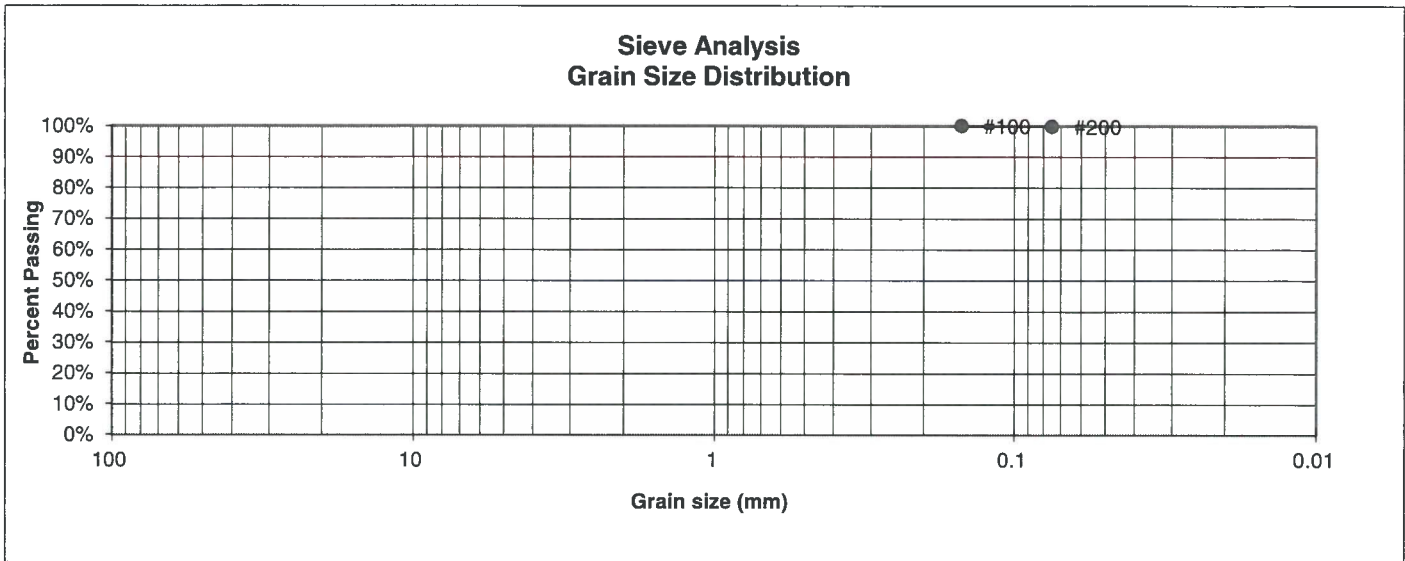
DATE:
4/27/22

JOB NO.:
220535

FIG NO.:

L-15

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	4	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	2	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	15	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	
100	100.0%
200	99.8%

- Atterberg Limits
 Plastic Limit
 Liquid Limit
 Plastic Index
- Swell
 Moisture at start
 Moisture at finish
 Moisture increase
 Initial dry density (pcf)
 Swell (psf)



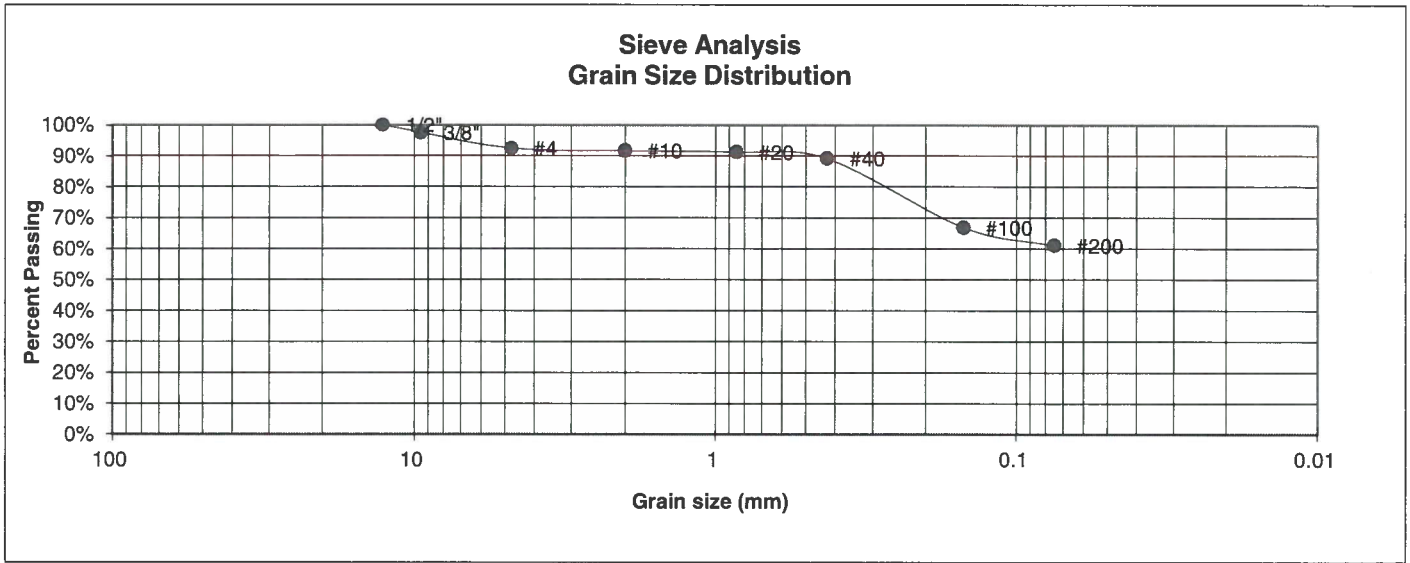
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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED: LLL	DATE: 4/27/22
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JOB NO.: 220535
 FIG NO.: C-16

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	4	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	9	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	17	<u>TEST BY</u>	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.4%
4	92.4%
10	91.6%
20	91.1%
40	89.1%
100	66.8%
200	61.1%

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**

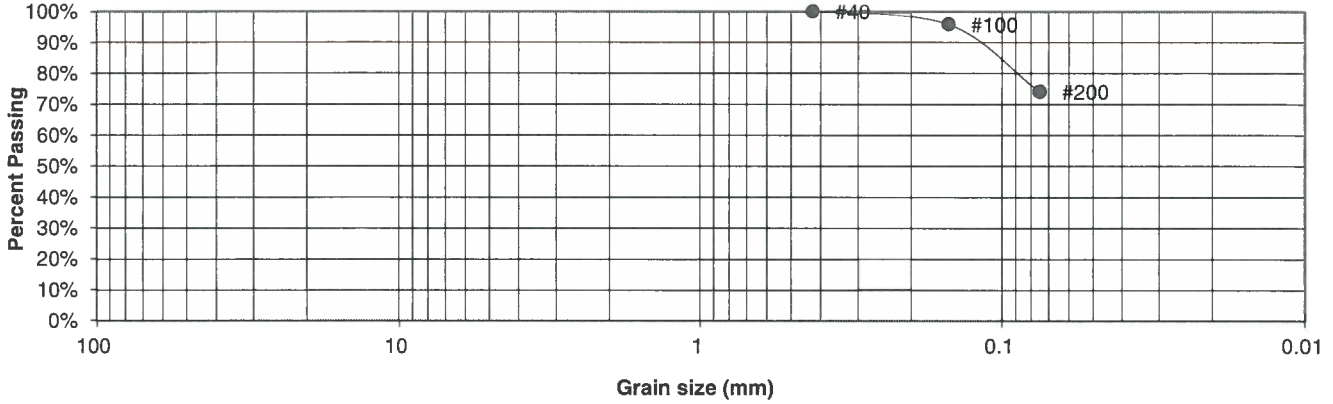
DRAWN:	DATE:	CHECKED: LLL	DATE: 4/27/22
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JOB NO.:
220535

FIG NO.:
C-17

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	ROCKWOOD HOMES
<u>SOIL TYPE #</u>	4	<u>PROJECT</u>	12265 HIGHWAY 94
<u>TEST BORING #</u>	3	<u>JOB NO.</u>	220535
<u>DEPTH (FT)</u>	15	<u>TEST BY</u>	BL

**Sieve Analysis
Grain Size Distribution**



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	
40	100.0%
100	95.8%
200	74.0%

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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**LABORATORY TEST
RESULTS**

<u>DRAWN:</u>	<u>DATE:</u>	<u>CHECKED:</u> LL	<u>DATE:</u> 4/27/02
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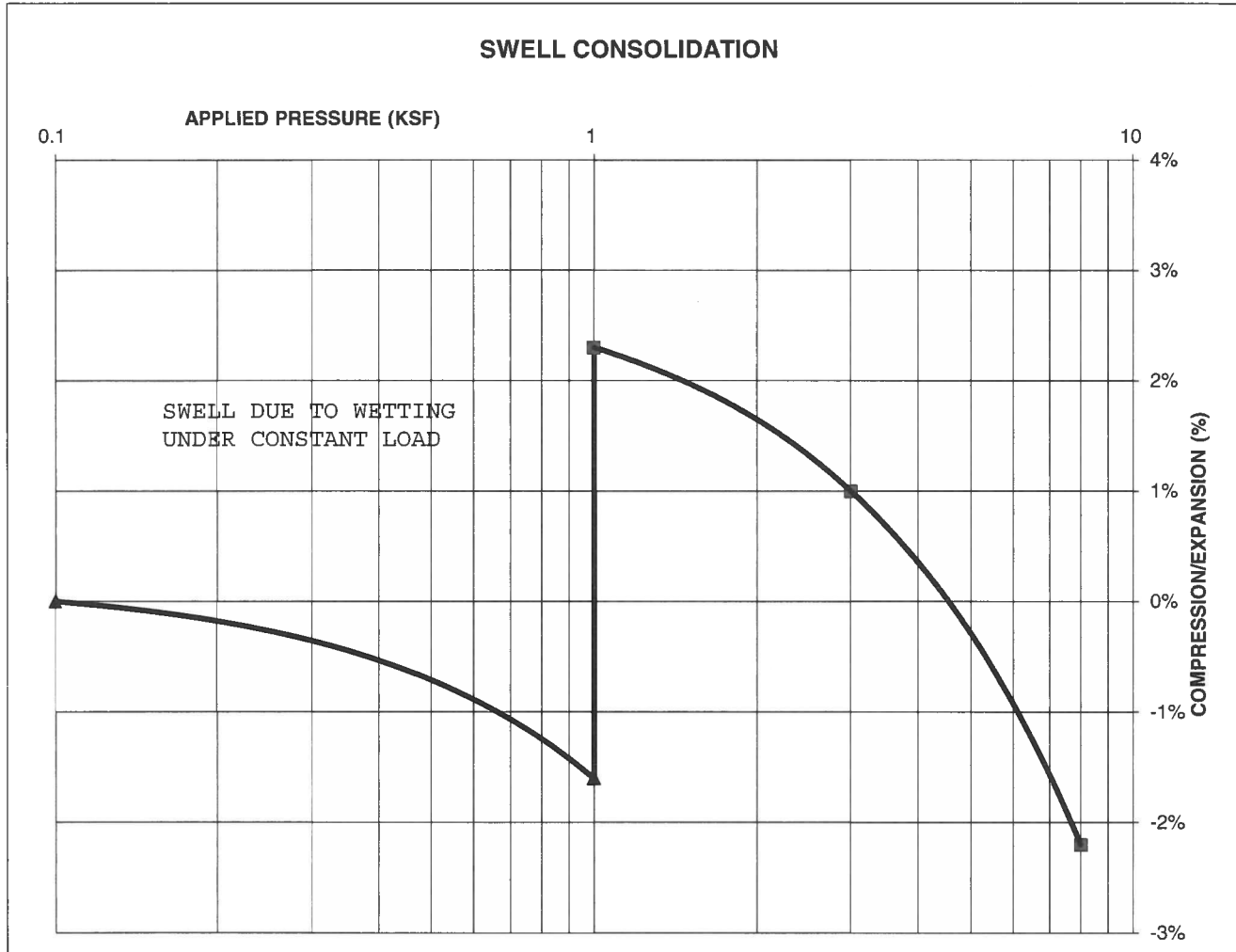
JOB NO.:
220535

FIG NO.:
C-18

CONSOLIDATION TEST RESULTS

TEST BORING #	1	DEPTH(ft)	5
DESCRIPTION	CH	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)	106		
NATURAL MOISTURE CONTENT	16.3%		
SWELL/CONSOLIDATION (%)	3.9%		

JOB NO. 220535
 CLIENT ROCKWOOD HOMES
 PROJECT 12265 HIGHWAY 94



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505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
 TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

RL

4/27/02

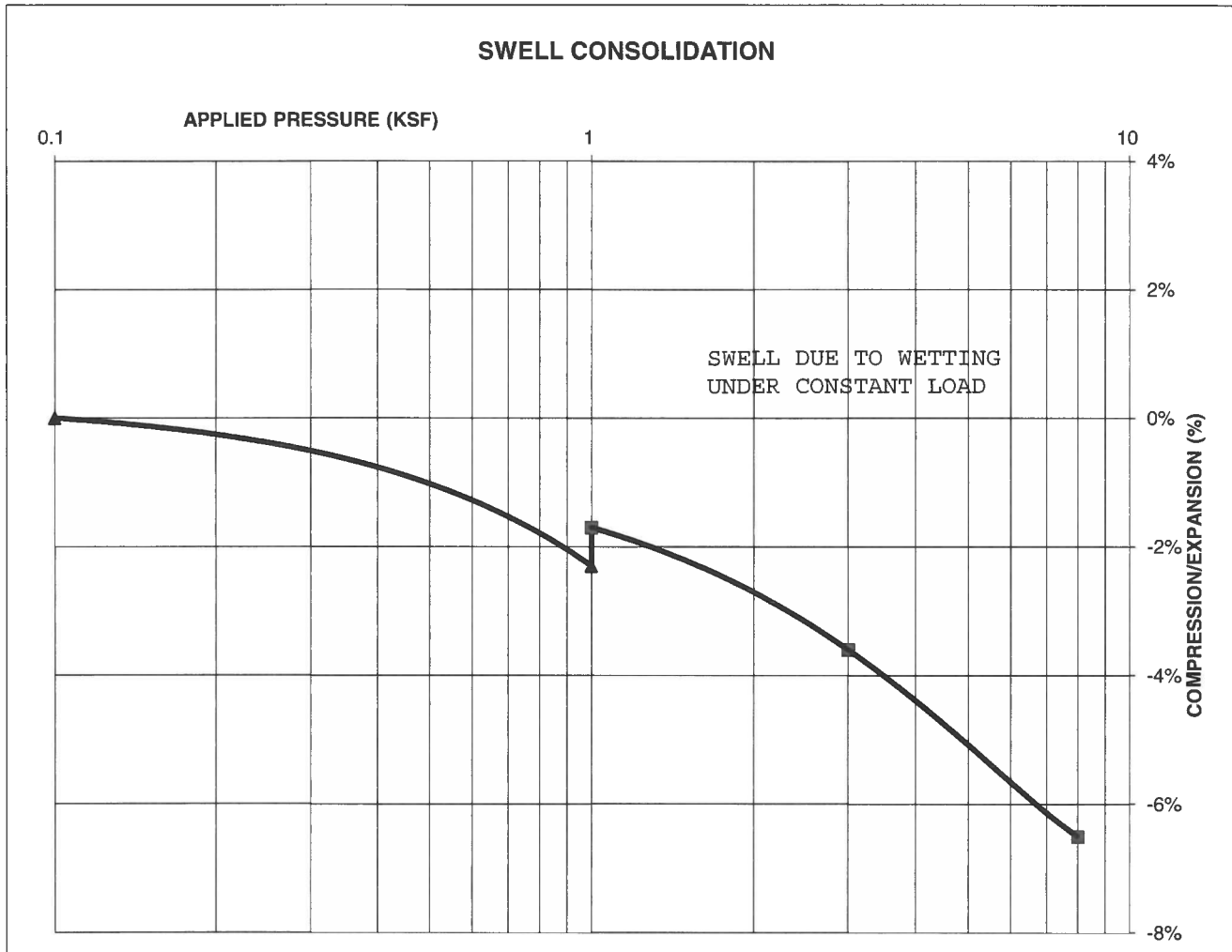
JOB NO.:
220535

FIG NO.:
C-19

CONSOLIDATION TEST RESULTS

TEST BORING #	4	DEPTH(ft)	5
DESCRIPTION	CH	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			101
NATURAL MOISTURE CONTENT			23.3%
SWELL/CONSOLIDATION (%)			0.6%

JOB NO. 220535
 CLIENT ROCKWOOD HOMES
 PROJECT 12265 HIGHWAY 94



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**SWELL CONSOLIDATION
 TEST RESULTS**

DRAWN:

DATE:

CHECKED:

DATE:

LL

4/27/22

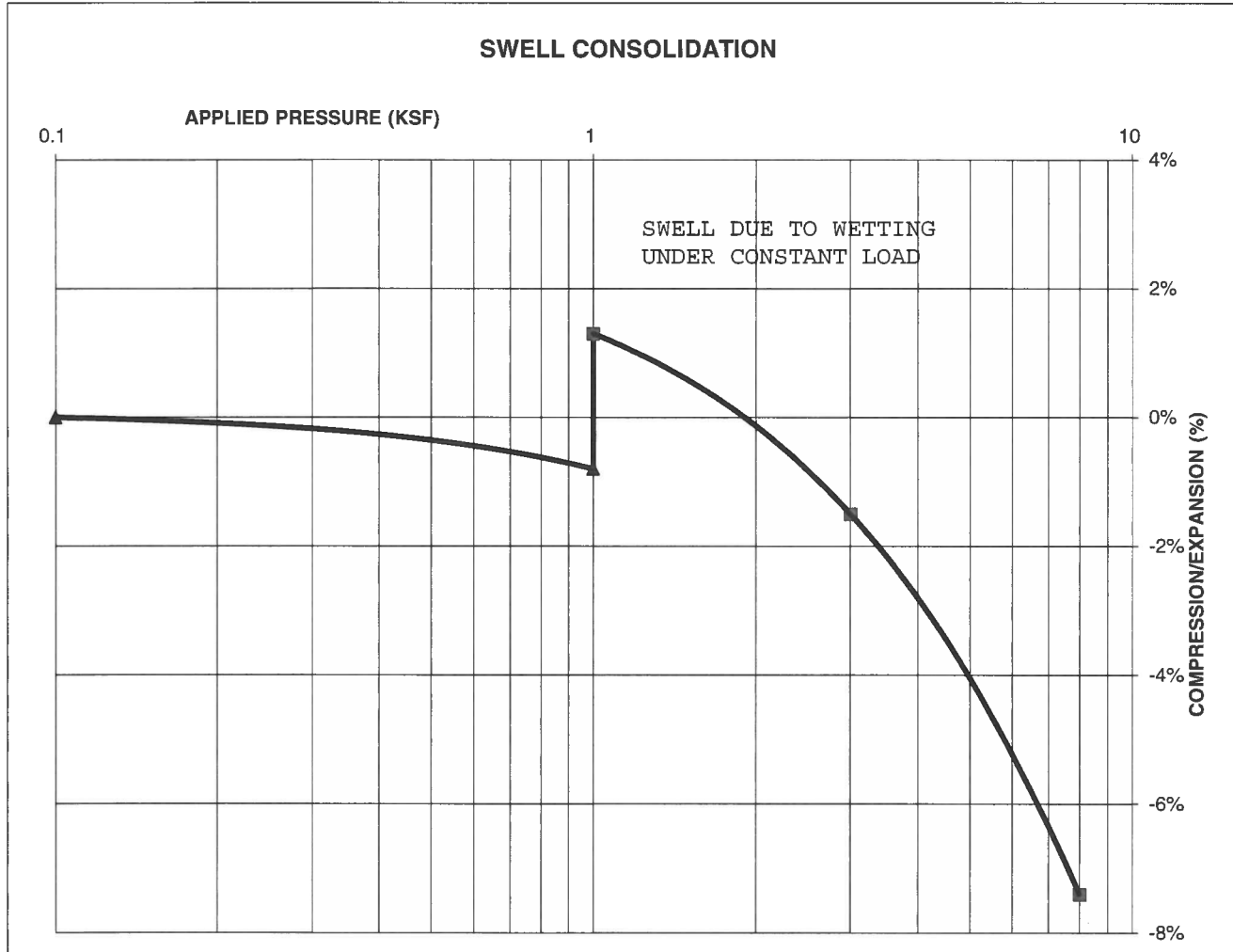
JOB NO.:
 220535

FIG NO.:
2-20

CONSOLIDATION TEST RESULTS

TEST BORING #	6	DEPTH(ft)	2-3
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			102
NATURAL MOISTURE CONTENT			10.3%
SWELL/CONSOLIDATION (%)			2.1%

JOB NO. 220535
 CLIENT ROCKWOOD HOMES
 PROJECT 12265 HIGHWAY 94



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SWELL CONSOLIDATION
 TEST RESULTS

DRAWN:

DATE:

CHECKED:

DATE:

LL

4/27/22

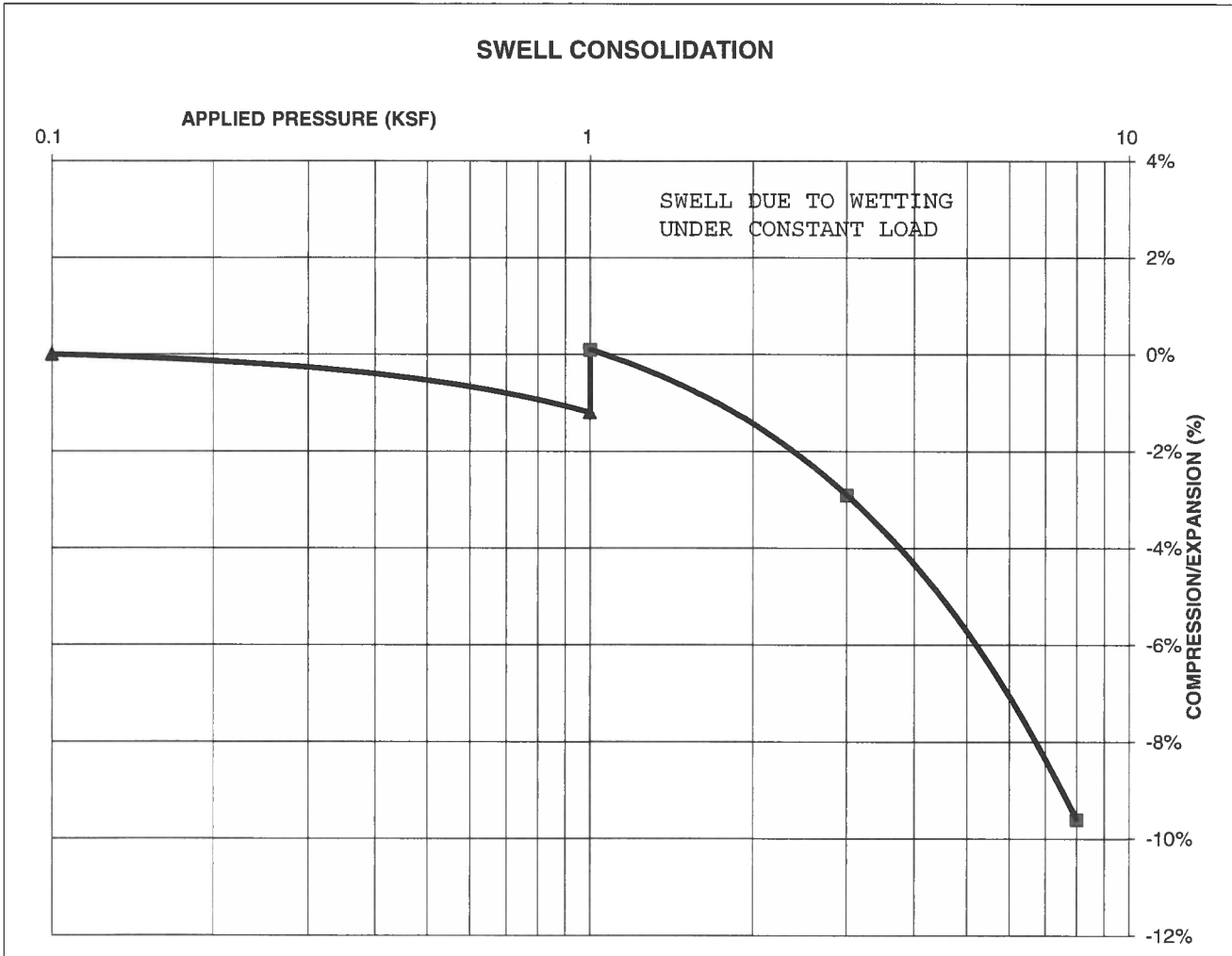
JOB NO.:
220535

FIG NO.:
C-21

CONSOLIDATION TEST RESULTS

TEST BORING #	10	DEPTH(ft)	5
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)	97		
NATURAL MOISTURE CONTENT	13.2%		
SWELL/CONSOLIDATION (%)	1.3%		

JOB NO. 220535
 CLIENT ROCKWOOD HOMES
 PROJECT 12265 HIGHWAY 94



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**SWELL CONSOLIDATION
TEST RESULTS**

DRAWN:

DATE:

CHECKED:
LL

DATE:
4/27/22

JOB NO.:
220535

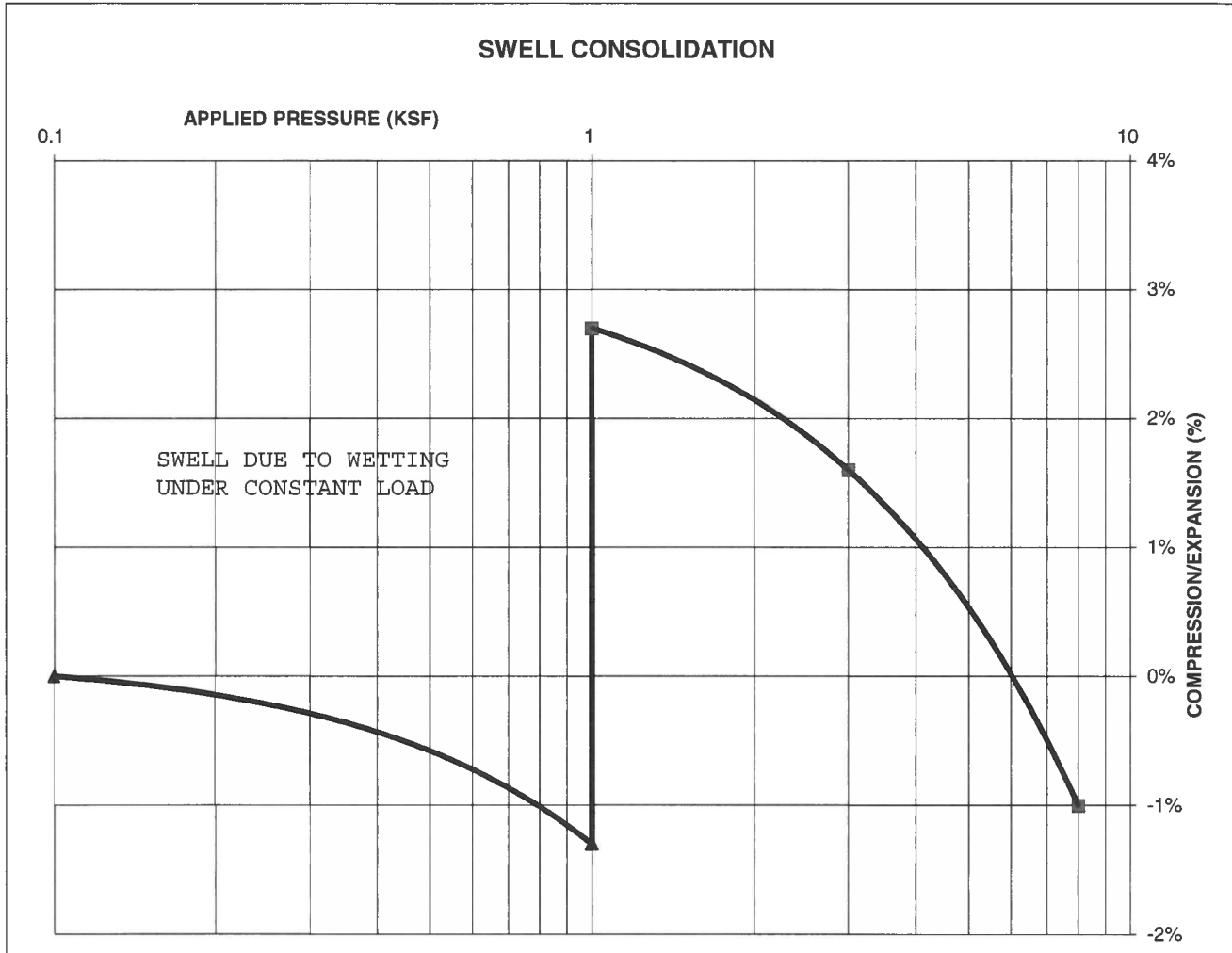
FIG NO.:

C-22

CONSOLIDATION TEST RESULTS

TEST BORING #	2	DEPTH(ft)	15
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			107
NATURAL MOISTURE CONTENT			23.5%
SWELL/CONSOLIDATION (%)			4.0%

JOB NO. 220535
 CLIENT ROCKWOOD HOMES
 PROJECT 12265 HIGHWAY 94



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**SWELL CONSOLIDATION
 TEST RESULTS**

DRAWN:

DATE:

CHECKED:

DATE:

LL

4/27/22

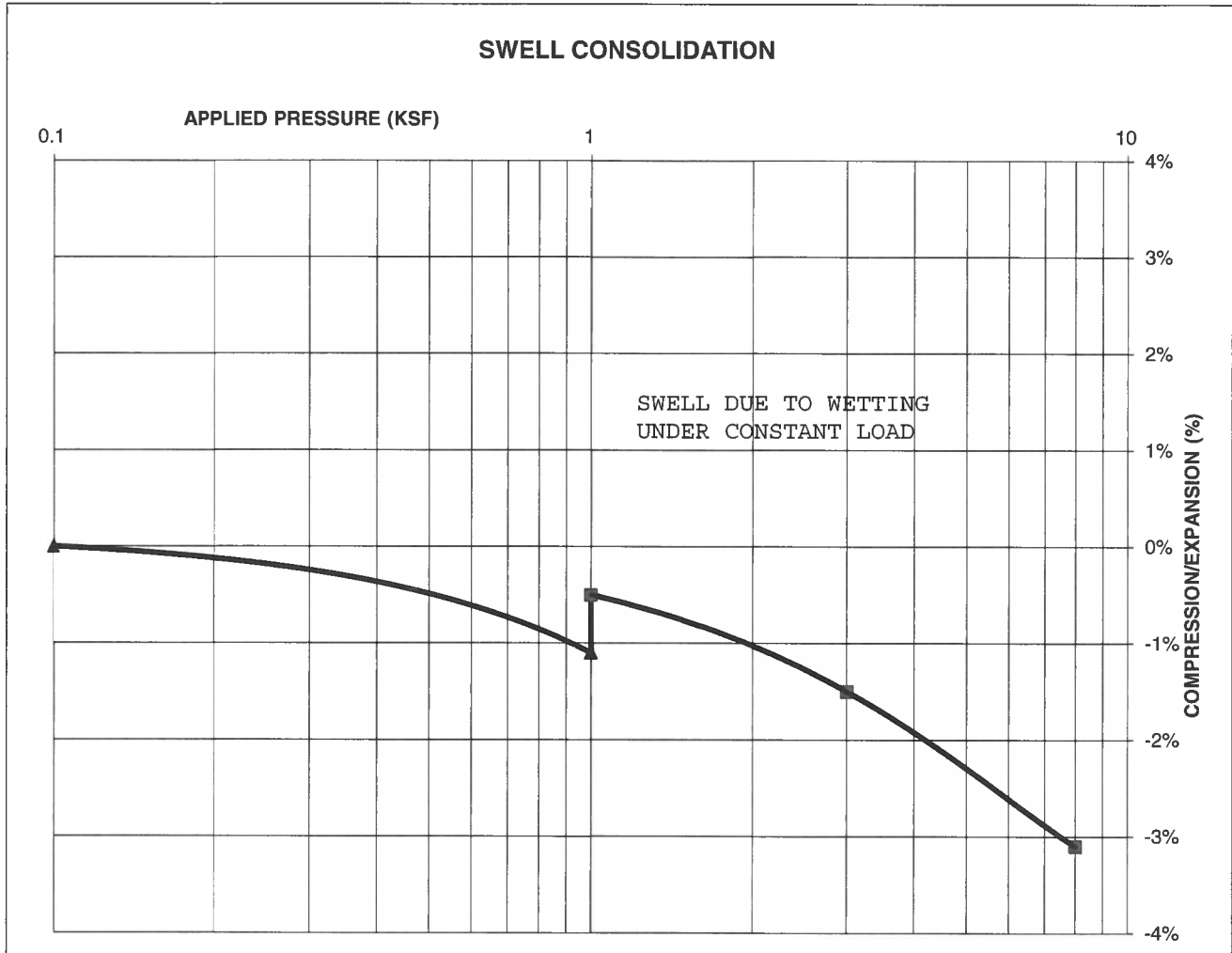
JOB NO.:
 220535

FIG NO.:
 C-23

CONSOLIDATION TEST RESULTS

TEST BORING #	3	DEPTH(ft)	15
DESCRIPTION	CL	SOIL TYPE	4
NATURAL UNIT DRY WEIGHT (PCF)			112
NATURAL MOISTURE CONTENT			17.1%
SWELL/CONSOLIDATION (%)			0.6%

JOB NO. 220535
 CLIENT ROCKWOOD HOMES
 PROJECT 12265 HIGHWAY 94



**ENTECH
 ENGINEERING, INC.**

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

**SWELL CONSOLIDATION
 TEST RESULTS**

DRAWN:

DATE:

CHECKED:

DATE:

LLL

4/27/22

JOB NO.:
 220535

FIG NO.:

C-24

CLIENT	<u>ROCKWOOD HOMES</u>	JOB NO.	<u>220535</u>
PROJECT	<u>12265 HIGHWAY 94</u>	DATE	<u>3/21/2022</u>
LOCATION	<u>12265 HIGHWAY 94</u>	TEST BY	<u>BL</u>

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-4	5	2	CH	<0.01
TB-5	15	3	SM	0.00
TB-9	20	3	SM	0.00

QC BLANK PASS


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

**LABORATORY TEST
SULFATE RESULTS**

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	4/27/22

JOB NO.:
 220535
 FIG NO.:
 C-25

APPENDIX D: Soil Survey Descriptions

El Paso County Area, Colorado

54—Midway clay loam, 3 to 25 percent slopes

Map Unit Setting

National map unit symbol: 368y
Elevation: 5,200 to 6,200 feet
Mean annual precipitation: 12 to 14 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 135 to 155 days
Farmland classification: Not prime farmland

Map Unit Composition

Midway and similar soils: 95 percent
Minor components: 5 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Midway

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Slope alluvium over residuum weathered from shale

Typical profile

A - 0 to 4 inches: clay loam
C - 4 to 13 inches: clay
Cr - 13 to 17 inches: weathered bedrock

Properties and qualities

Slope: 3 to 25 percent
Depth to restrictive feature: 6 to 20 inches to paralithic bedrock
Drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately low to moderately high (0.06 to 0.20 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Calcium carbonate, maximum content: 15 percent
Gypsum, maximum content: 15 percent
Maximum salinity: Very slightly saline to moderately saline (2.0 to 8.0 mmhos/cm)
Sodium adsorption ratio, maximum: 15.0
Available water supply, 0 to 60 inches: Very low (about 2.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 7e
Hydrologic Soil Group: D
Ecological site: R069XY046CO - Shaly Plains LRU's A and B
Other vegetative classification: SHALY PLAINS (069AY046CO)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 4 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

89—Tassel fine sandy loam, 3 to 18 percent slopes

Map Unit Setting

National map unit symbol: 36b5

Elevation: 5,600 to 6,400 feet

Mean annual precipitation: 13 to 15 inches

Mean annual air temperature: 47 to 51 degrees F

Frost-free period: 135 to 155 days

Farmland classification: Not prime farmland

Map Unit Composition

Tassel and similar soils: 95 percent

Minor components: 5 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tassel

Setting

Landform: Hills

Landform position (three-dimensional): Side slope, crest

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Calcareous slope alluvium over residuum weathered from sandstone

Typical profile

A - 0 to 4 inches: fine sandy loam

C - 4 to 10 inches: sandy loam

Cr - 10 to 14 inches: weathered bedrock

Properties and qualities

Slope: 3 to 18 percent

Depth to restrictive feature: 6 to 20 inches to paralithic bedrock

Drainage class: Well drained

Runoff class: Medium

Capacity of the most limiting layer to transmit water

(Ksat): Moderately high (0.20 to 0.60 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum content: 10 percent

Available water supply, 0 to 60 inches: Very low (about 1.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 6s

Hydrologic Soil Group: D

Ecological site: R067BY024CO - Sandy Plains

Other vegetative classification: SANDY PLAINS (069AY026CO)

Hydric soil rating: No

Minor Components

Other soils

Percent of map unit: 5 percent

Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado

Survey Area Data: Version 19, Aug 31, 2021