



ENTECH
ENGINEERING, INC.

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

December 11, 2023
Revised September 6, 2024

Lazy Y and Rockin' J
P.O. Box 516
Peyton, Colorado 80831

Attn: Scott Smith

Re: Soils and Geology Study
Lazy Y and Rockin' J Subdivision
12960 North Peyton Highway
Parcel No. 63070-00-007
El Paso County, Colorado
Entech Job No. 230520

Dear Mr. Smith:

The project consists of subdividing 36.24-acres into two lots. One rural residential lot and one lot for an RV Park. The existing quonset hut, cell tower, and outbuildings will remain. These are located on the RV parcel. The site is located south of US Highway 24 on North Peyton Highway, in El Paso County, Colorado.

GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in a portion of the NE $\frac{1}{4}$ of the SE $\frac{1}{4}$ of Section 7, Township 12 South, Range 63 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately $\frac{1}{2}$ mile south of Peyton, Colorado, on the western side of North Peyton Highway. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is primarily gradually sloping to the south and northeast off of a ridge that bisects the site. Moderate slopes to the northeast are present in the northeastern portion of the site. No drainages are located on the site. Brackett Creek is located $\frac{1}{2}$ mile to the north, and Black Squirrel Creek is located approximately $\frac{1}{2}$ mile to the south of the site. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included undeveloped agricultural grazing pastureland. Site photographs, taken November 21, 2023, are included in Appendix A.

Total acreage involved in the proposed subdivision is 36.24-acres. The existing structures, outbuildings, on-site wastewater treatment system, and water well located on the proposed RV Park Lot will remain. The new residential lot will be serviced by a new water well and on-site wastewater treatment system (OWTS), and the RV Park will be serviced by a new water well and OWTS. According to the preliminary grading plans new gravel roadways will be constructed for the RV Park with a detention pond proposed in the northeastern portion of the site. The Site Plan with the proposed replat is presented in Figure 3.

LAND USE AND ENGINEERING GEOLOGY

This site was found to be suitable for the proposed development. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include potentially expansive soils, areas of erosion, and radon. Based on the proposed development plan, it appears that these areas will have minor impacts on the development. These conditions will be discussed in greater detail in the report.



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

SCOPE OF THE REPORT

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

FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of 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 aerial photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Geology/Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. (Entech) on November 21, 2023. Recent site observations to monitor groundwater levels were also completed.

Five test borings were drilled, and four piezometers placed on the site to determine general suitability for the proposed site development, and general soil characteristics. The locations of the test borings and piezometer are indicated on the Site and Exploration Plan, Figure 3. The Test Boring Logs are presented in Appendix B. Results of this testing will be discussed later in this report.

Seventeen test pits were excavated across the site to identify suitable soil treatment areas for the RV Park OWTS. The OWTS Site Evaluation completed by Entech dated May 25, 2023 is included in Appendix D. The location of the test pits, Figures 1 – 1A, Test Pit Logs, Figures 2 – 11, and Grain-Size Analysis results, Figures 12 – 31 are included in Appendix D.

Soil and bedrock samples were obtained from the borings utilizing the Standard Penetration Test (ASTM D1586) using a 2" split-barrel spoon and California sampler. Results of the Standard Penetration Test (SPT) are included on the boring logs in terms of N-values expressed in blows per foot (bpf). Soil and bedrock samples recovered from the borings were visually classified and recorded on the boring logs. The soil and bedrock classifications were later verified utilizing laboratory testing and grouped by soil type. The soil type numbers are included on the boring logs. It should be understood that the soil descriptions shown on the boring logs may vary between boring location and sample depths. It should also be noted that the lines of stratigraphic separation shown on the boring logs represent approximate boundaries between soil types and the actual stratigraphic transitions may be more gradual or variable with location.



Water content testing (ASTM D2216) was performed on the samples recovered from the borings, and the results are shown on the boring logs. Grain-Size Analysis (ASTM D422) and Atterberg Limits testing (ASTM D4318) were performed on selected samples to assist in classifying the materials encountered in the borings. Swell/Consolidation testing (ASTM D4546) was performed to evaluate the soils expansion/compression characteristics. Results of the laboratory testing are included in Appendix C.

SOIL AND GEOLOGIC CONDITIONS

Soil Survey

The Natural Resource Conservation Service (NRCS) (Reference 1, Figure 4), previously the Soil Conservation Service (Reference 2) has mapped one soil type on the site. Complete description of the soil type is presented in Appendix E. In general, the soils typically consist of sandy loam to gravelly loamy sand. The soils are described as follows:

Type	Description
84	Stapleton sandy loam, 8 to 15% slopes

The soils have been described to have moderate to rapid permeabilities. The soils are described as well suited for use as home sites. Possible hazards with soils erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards (Reference 2).

Soils

Two primary soil and rock types were encountered in the test borings drilled for the subsurface investigation. Each soil and rock type were classified in accordance with the Unified Soil Classification System (USCS) using the laboratory testing results and the observations made during drilling. Bedrock was encountered at depths of 11 to 16 feet bgs.

Soil Type 1 classified as loose to dense sand with varying percentages of clay and silt (SM, SW-SM, SC) and was encountered in all the test borings at the existing ground surface and extended to depths of 1 to 16 feet bgs.

Soil Type 2 classified as stiff to hard clay with sand and sandy clay (CL). The clay was encountered three of the test borings at depths ranging from 1 to 8 feet and extended to depths of 11 to to 14 feet bgs. Swell/Consolidation Testing resulted in volume change of 1.5%, indicating a low to moderate expansion potential.

Soil Type 3 classified as highly to moderately weathered sandstone or very dense silty sand when classified as a soil (SM). The sandstone was encountered in the test borings at depths of 11 to 18 feet bgs and extended to the termination depth of TB-1 – TB4 (20 feet), and to 29 feet in P-1. Swell/Consolidation Testing on a sample of the sandstone resulted in a volume change of 0.1% indicating a low expansion potential.



Soil Type 4 classified as moderately weathered claystone or sandy clay and clay with sand when classified as a soil (CL). The claystone was encountered in TB-2 and P-1 at depths of 14 to 29 feet and extended to 18 feet in TB-2, and the termination depth of P-1 (50 feet). Swell/Consolidation Testing on a sample of the claystone resulted in a volume change of 1.5% indicating a low to moderate expansion potential.

Groundwater

Groundwater was encountered in TB-4 at 7 feet, and in TB-5 at 6.5 feet. TB-5 was placed in the proposed detention pond location. The remaining borings were dry. The borings were drilled to depths of 20 to 50 feet. Four piezometers were set in the anticipated soil treatment area of the onsite wastewater treatment system. The piezometer readings are presented in the table below. It is not anticipated groundwater will not affect shallow foundations on the site. Fluctuations in groundwater conditions may occur due to variations in rainfall or other factors not readily apparent at this time. Isolated sand layers within the soil profile can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of subsurface water features during construction.

Piezometer, and Total Depth (ft.)	Groundwater Level (ft.) 2/16/24	Groundwater Level (ft.) 2/26/24	Groundwater Level (ft.) 8/6/24
P1, 50'	47.2	48	49.2
P2, 50'	27	27.5	30.5
P3, 50'	30	40.2	42.5
P4, 40'	33	33	31

Geology

Approximately 23 miles west of the site is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southern extent of a large structural feature known as the Denver Basin. Bedrock in the area is typically gently dipping in a northerly direction (References 3 and 4). The bedrock underlying the site consists of the Dawson Formation of Tertiary to Cretaceous Age. The Dawson Formation typically consists of sandstone with interbedded layers of claystone and siltstone. The claystone and siltstone are typically expansive.

The geology of the site was evaluated using the *Bedrock Geologic Map of the Denver Basin*, distributed by CGS in 2011, (Reference 4, Figure 5). The Geology Map for the site is presented in Figure 6. One mappable unit was identified on this site which is described as follows:

Qc/Tkd Colluvial and Residual Soils of Quaternary Age overlying the Dawson Formation of Tertiary to Cretaceous Age: The colluvial and residual soils are associated sheetwash and the in-situ weathering of the bedrock. The Dawson formation typically consist of arkosic sandstone with interbedded claystone and siltstone.



The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Cheyenne Mountain Quadrangle* distributed by the Colorado Geologic Survey in 2003 (Reference 4, Figure 5), The *Geologic Map of the Colorado Springs-Castle Rock Area*, distributed by the US Geological Survey in 1979 (Reference 5), and the *Geologic Map of the Pueblo 1° x 2° Quadrangle*, distributed by the US Geological Survey in 1978 (Reference 6). The test borings and test pits were used in evaluating the site and is included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

ENGINEERING GEOLOGIC HAZARDS

Mapping has been performed on this site to identify areas where various geologic conditions exist of which developers should be cognizant during the planning, design and construction stages where new construction is proposed. The engineering geologic constraints/hazards identified on this site include potentially expansive soils, areas of erosion, and radon. These constraints/hazards and recommended mitigation techniques are discussed as follows:

Expansive Soils – Constraint

Expansive soils were encountered in the test borings. The clay and claystone encountered in the test borings exhibited low to moderate expansion potentials. Expansive soils or bedrock if encountered beneath foundations, can cause differential movement in the foundations. Mitigation for expansive soils may be required for structures, however, mitigation is not anticipated for the RV sites.

Mitigation: Should expansive soils be encountered beneath foundations; mitigation will be necessary. Mitigation of expansive soils typically requires 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.

Floodplain and Drainage Areas – Constraint

The site is not mapped within any floodplains according to the FEMA Map No. 08041CO375G, dated December 7, 2018 (Figure 7, Reference 7). No drainages or areas of shallow water were observed on the site. Groundwater was encountered in TB-4 at 7 feet in the proposed detention pond location, and in P-1 at 46.5 feet located south of the anticipated soil treatment area for the RV Park.

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. If shallow groundwater is encountered, underslab drains or interceptor drains may be necessary Figures 9 and 10. Specific drainage details and recommendations should be made once building locations and plans are finalized. 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.



Areas of Erosion – Constraint

These are areas that are undergoing erosion by water and sheetwash producing minor gullies and rill erosion and primarily located in the northern portion of the site. Preliminary grading plans indicated this area will be regraded as part of the site development.

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

Radon – Hazard

Radon is a colorless, tasteless radioactive gas with a United States Environmental Protection Agency (EPA) specified action level of 4.0 picocuries per liter (pCi/L) of air. Radon gas has a very short half-life of 3.8 days. Radon levels for the area have been reported by the Colorado Geologic Survey in the open file, Report No. 91-4 (Reference 9). Average Radon levels for the 80831-zip code is 4.50 pCi/l. The following is a table of radon levels in this area:

Average Radon Levels for the 80831 Zip Code	
0 < 4 pCi/L	0.00%
4 < 10 pCi/L	100.00%
10 < 20 pCi/L	0.00%
> 20 pCi/L	0.00%

Mitigation:

The potential for high radon levels is present for the site. Build-up of radon gas can usually be mitigated by providing increased ventilation of basement and crawlspace and sealing joints. **Specific requirements for mitigation should be based on site specific testing for structures.** Mitigation will not be required for RV sites.

RELEVANCE OF GEOLOGIC CONDITIONS TO LAND USE PLANNING

The proposed development consists of subdividing 36.24-acres into two lots. One rural residential lot and one RV Park lot are proposed. An existing quonset hut, cell tower, and outbuildings will remain of the RV Park Lot. The new rural residential lot and RV Park will be serviced by individual water wells and on-site wastewater treatment systems. The existing geologic and engineering geologic conditions will impose minor constraints on development and construction. The geologic conditions on the site potentially expansive soils, areas of erosion, and radon, which can be satisfactorily mitigated through avoidance or proper engineering design and construction practices.



The upper granular soils encountered in the test borings on the site were encountered at loose to medium dense states. Expansive soils were encountered in some of the test borings, and expansive claystone and siltstone are commonly interbedded in the sandstone of the Dawson Formation. If expansive soils are encountered at or near foundation or slab subgrade, overexcavation and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is recommended. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. These soils will not prohibit development.

Subsurface perimeter drains are recommended for structures with below grade usable areas. Typical drain details are presented in Figure 8. If shallow groundwater is encountered, underslab drains or interceptor drains may be necessary Figures (9 and 10). Specific drainage details and recommendations should be made once building locations and plans are finalized. Any grading around structures should be done to direct surface flow around construction to avoid areas of ponded water. All organic material should be completely removed prior to any fill placement. Specific drainage studies are beyond the scope of this report. The site is not mapped within any floodplains according to the FEMA Map No. 80841C0320G (Figure 7, Reference 7).

Groundwater was encountered in TB-5 at 6.5 feet in the proposed detention pond area. Preliminary plans indicate minimal cuts and primarily fill for the construction of the detention pond in the northeast corner of the site.

Areas with minor gullying and rill erosion were observed in the northern portion of the site. According to preliminary grading plans the area will be regrading during the site development. The areas identified where erosion is taking place may require check dams, regrading and revegetation using channel lining mats to anchor vegetation. Further recommendations for erosion control are discussed under Section "Erosion Control" of this report. Recommendations pertaining to revegetation may require input from a qualified landscape architect and/or the Natural Resource Conservation Service (previously Soil Conservation Service).

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

ROADWAY, EMBANKMENT CONSTRUCTION RECOMMENDATIONS, and STORMWATER DETENTION FACILITY CONSTRUCTION RECOMMENDATIONS

In general, the site soils are suitable for the proposed roadways and embankments. Roadway cuts are generally minimal across the site. Cuts for the proposed detention pond in the northeast corner of the site are minimal with primarily filling to construct the detention pond. 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 percent of optimum moisture content and compacted to a minimum of 95 percent of its maximum Standard Proctor Dry Density ASTM D-698 (cohesive soils) or 95 percent of its Modified Proctor Dry Density ASTM D-1557 (granular soils). prior to placing new fill. Areas receiving fill may require stabilization with rock or fabric if soft soils or 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 percent of its maximum Modified Proctor Dry Density, ASTM D-1557 for sandy soils, and a minimum of 95 percent 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 10), of the area of the site is with U3 – upland deposits, unevaluated resource, probably aggregate resource. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 11), the site is mapped with U4 – upland deposits, unevaluated resource, probably aggregate resource. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 12), the area of the site has been mapped as “little or no potential” for industrial minerals.

According to the *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 12), the site is not mapped within the Denver Basin Coal Region. 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 12).

The site has been mapped as “Fair” for oil and gas resources (Reference 12). No oil or gas fields have been discovered in the area of the site. The sedimentary rocks in the area may lack the geologic structure for trapping oil or gas; therefore, it may not be considered a significant resource. Hydraulic fracturing is a new method that is being used to extract oil and gas from rocks. It utilizes pressurized fluid to extract oil and gas from rocks that would not normally be productive. The area of the site has not been explored to determine if the rocks underlying the site would be commercially viable utilizing hydraulic fracturing. The practice of hydraulic fracturing has come under review due to concerns about environmental impacts, health and safety.

EROSION CONTROL

The soil types observed on the site are mildly to highly susceptible to wind erosion, and moderately to highly susceptible to water erosion. A minor wind erosion and dust problem may be created for a short time during and immediately after construction. Should the problem be



considered severe enough during this time, watering of the cut areas or the use of chemical palliative may be required to control dust. However, once construction has been completed and vegetation re-established, the potential for wind erosion should be considerably reduced.

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

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

CLOSURE

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

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

Lazy Y and Rockin' J
Soils and Geology Study
Lazy Y and Rockin' J Subdivision
12960 North Peyton Highway
Parcel No. 63070-00-007
El Paso County, Colorado
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This report has been prepared for Lazy Y and Rockin' J, 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 require. Should you require additional information, please do not hesitate to contact Entech Engineering, Inc.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

A blue ink signature of Logan L. Langford, consisting of a stylized 'L' followed by a series of loops and a final 'G'.

Logan L. Langford, P.G.
Sr. Geologist

Reviewed by:



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

LLL/JCG
Encl.

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REFERENCES

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FIGURES



VICINITY MAP

12960 NORTH PEYTON HIGHWAY
EL PASO COUNTY, CO
LAZY Y AND ROCKIN' J

JOB NO.
230520

FIG. 1

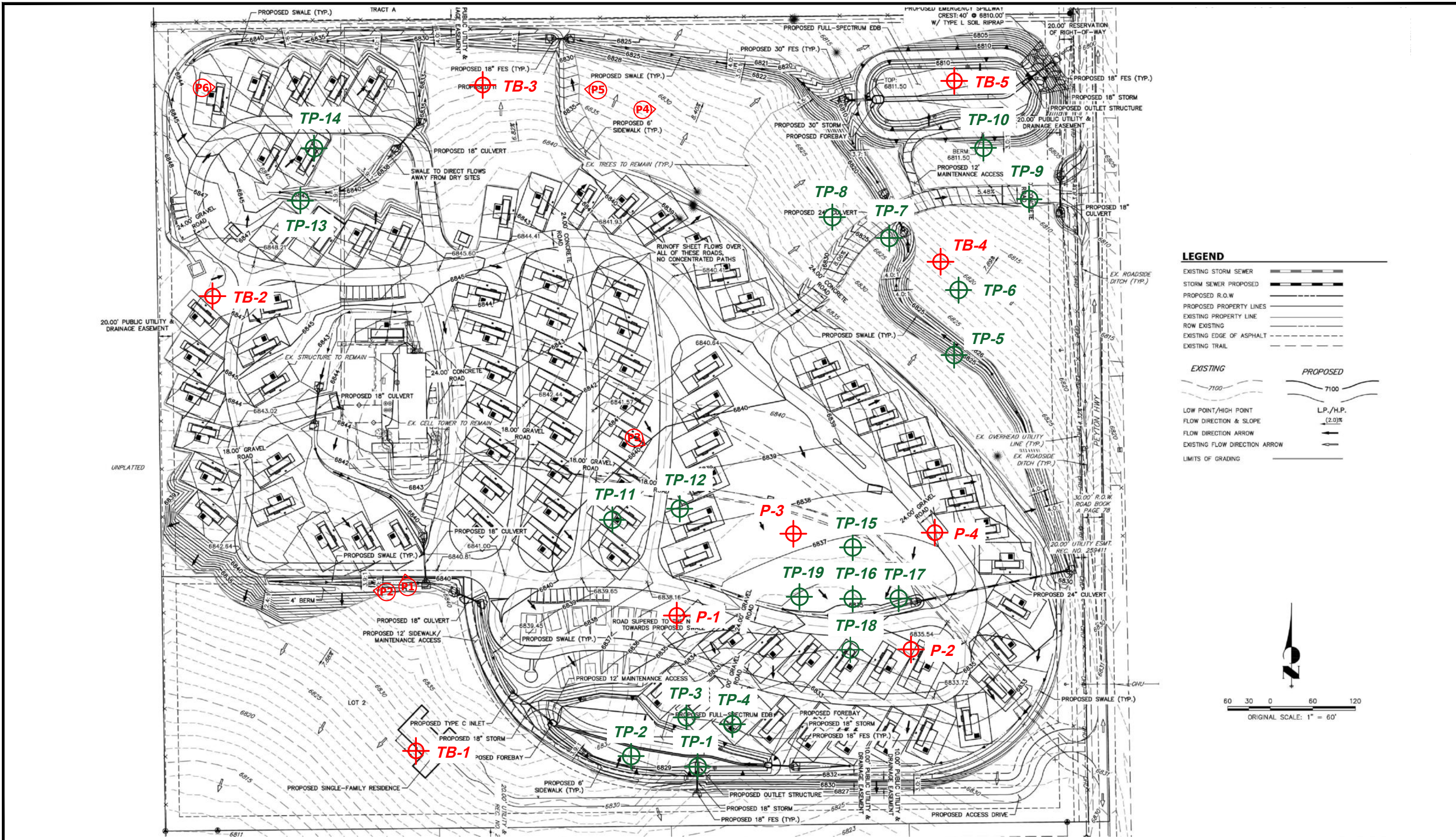


USGS TOPOGRAPHY MAP

12960 NORTH PEYTON HIGHWAY
EL PASO COUNTY, COLORADO
LAZY Y AND ROCKIN' J

JOB NO.
230520

FIG. 2



- ⊕ - APPROXIMATE TEST BORING LOCATION AND NUMBER
- ⊕ - APPROXIMATE TEST PIT LOCATION AND NUMBER
- ⊕ - APPROXIMATE PIEZOMETER LOCATION AND NUMBER
- ⊕ - APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER



SITE AND EXPLORATION PLAN

12960 NORTH PEYTON HIGHWAY
EL PASO COUNTY, CO
LAZY Y AND ROCKIN' J

JOB NO.
230520

FIG. 3

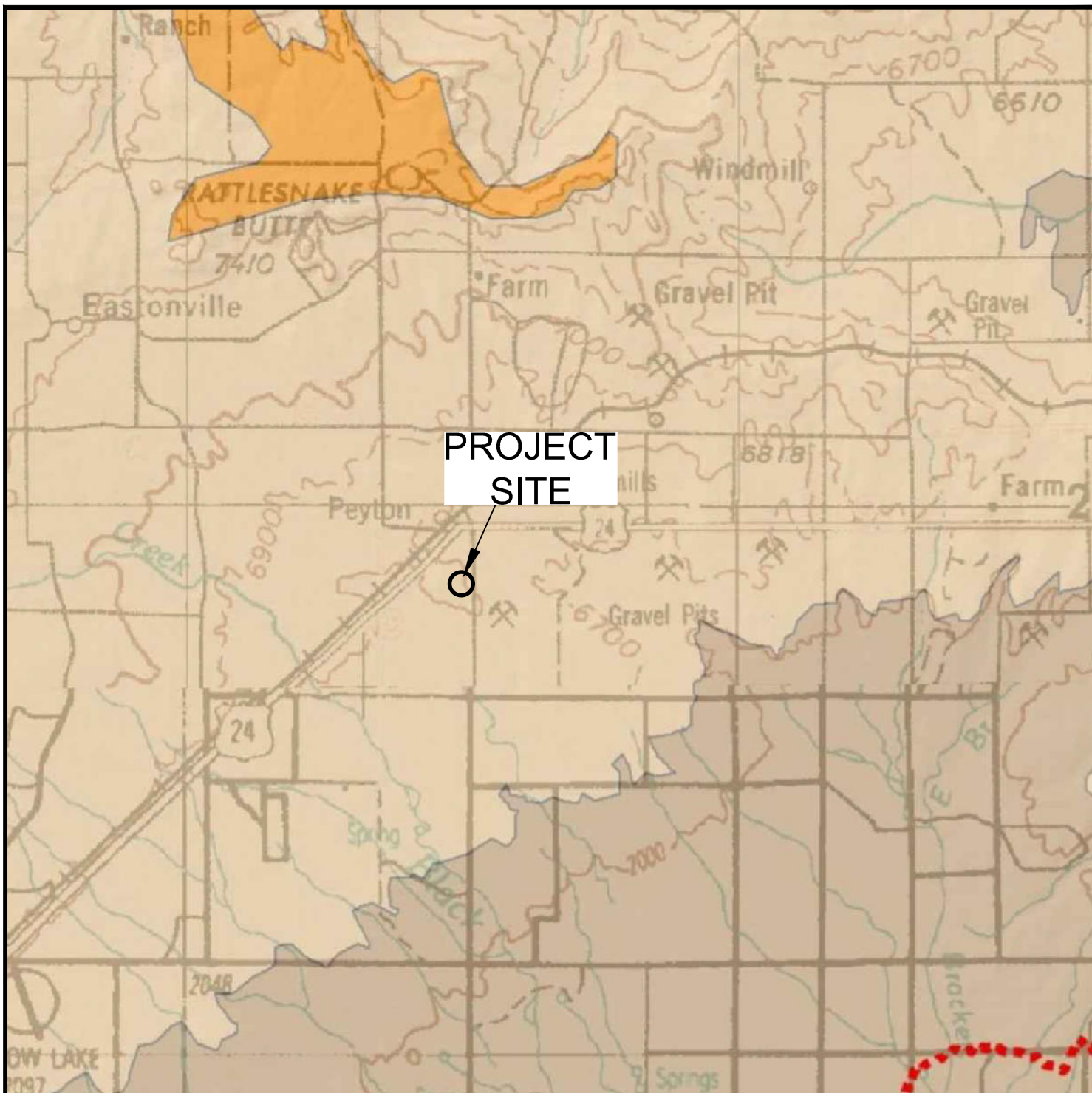


SOIL SURVEY MAP

305 PINE OAKS ROAD
EL PASO COUNTY, COLORADO
T-BONE CONSTRUCTION

JOB NO.
231440

FIG. 4



Geologic Units

- | | |
|---|---|
|  Undifferentiated younger Tertiary rocks |  Laramie Formation (Cretaceous) |
|  Denver Basin Group D2 Sequence (Eocene)
<i>Also known as Dawson Arkose or Dawson Formation.</i> |  Fox Hills Sandstone (Cretaceous)
<i>Base is modeled at a depth of 200 ft below the top</i> |
|  Table Mountain Lava Flows (Paleocene) |  Pierre Shale (Cretaceous) |
|  Denver Basin Group D1 Sequence (Cretaceous to Paleocene)
<i>Also known as, or including, the Dawson Arkose, Dawson Fm., Denver Fm. or Arapahoe Fm.</i> |  Undifferentiated Mesozoic and Paleozoic Rocks |
| |  Undifferentiated Precambrian Crystalline Basement |

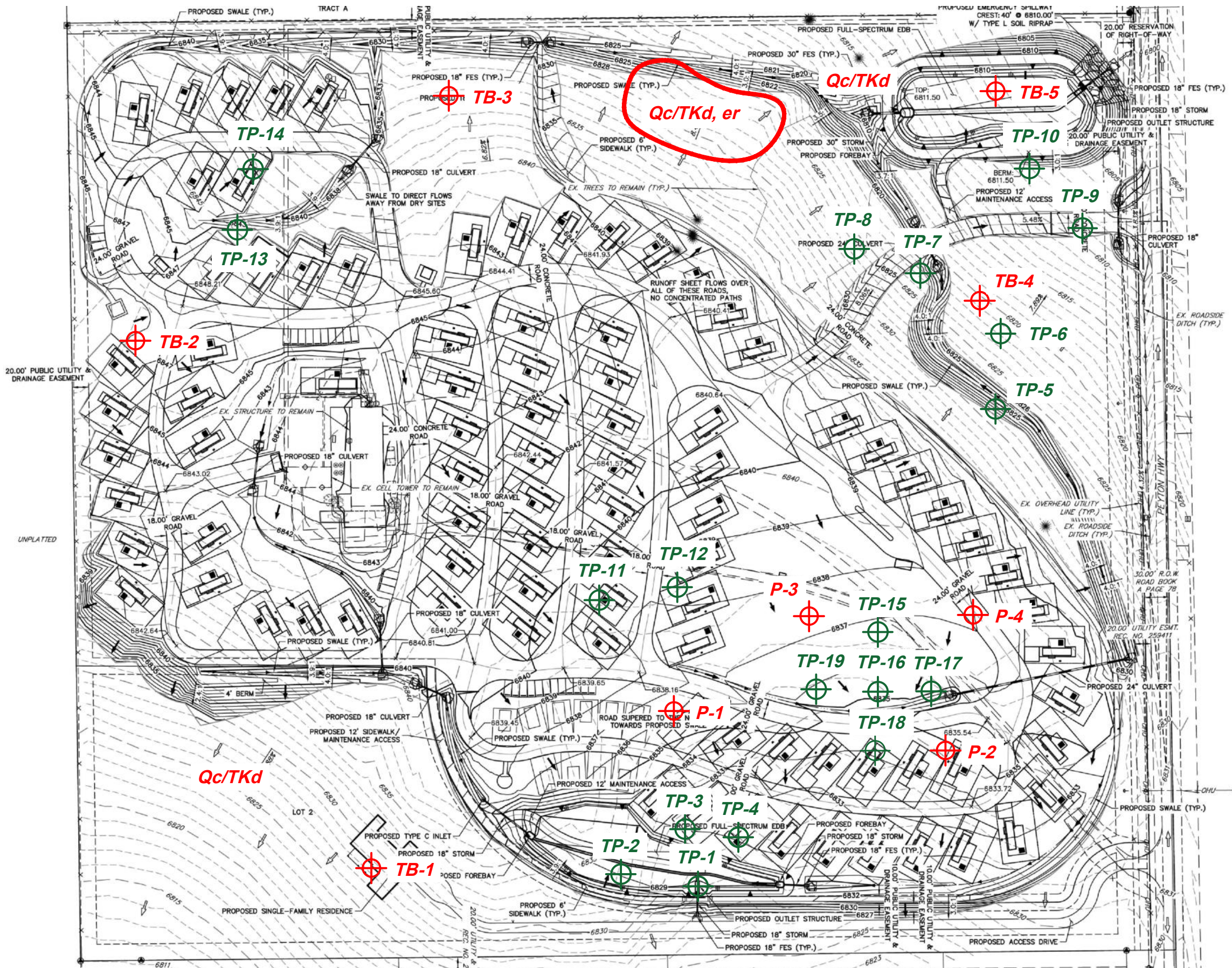


BEDROCK GEOLOGIC MAP OF THE DENVER BASIN

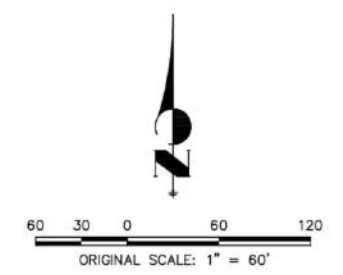
12960 NORTH PEYTON HIGHWAY
EL PASO COUNTY, COLORADO
LAZY Y AND ROCKIN' J

JOB NO.
230520

FIG. 5



LEGEND	
EXISTING STORM SEWER	
STORM SEWER PROPOSED	
PROPOSED R.O.W	
PROPOSED PROPERTY LINES	
EXISTING PROPERTY LINE	
ROW EXISTING	
EXISTING EDGE OF ASPHALT	
EXISTING TRAIL	
EXISTING	PROPOSED
LOW POINT/HIGH POINT	L.P./H.P.
FLOW DIRECTION & SLOPE	(2.0)%
FLOW DIRECTION ARROW	
EXISTING FLOW DIRECTION ARROW	
LIMITS OF GRADING	



Legend:
 Qc/TKd - Colluvial and Residual Soils of Quaternary Age overlying the Dawson Formation of Tertiary to Cretaceous Age: older fan and rockfall deposits
 er - area of erosion



GEOLOGY / ENGINEERING MAP
 12960 NORTH PEYTON HIGHWAY
 EL PASO COUNTY, COLORADO
 LAZY Y AND ROCKIN' J

JOB NO.
 230520
FIG. 6

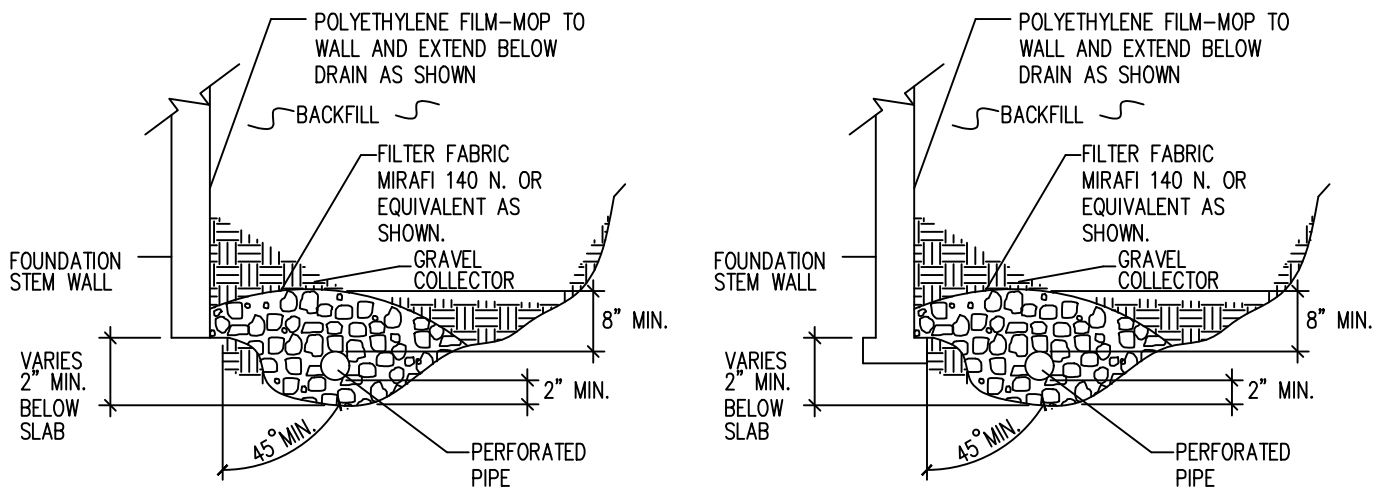


FEMA FLOODPLAIN MAP

12960 NORTH PEYTON HIGHWAY
EL PASO COUNTY, COLORADO
LAZY Y AND ROCKIN' J

JOB NO.
230520

FIG. 7



NOTES:

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

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

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

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

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

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

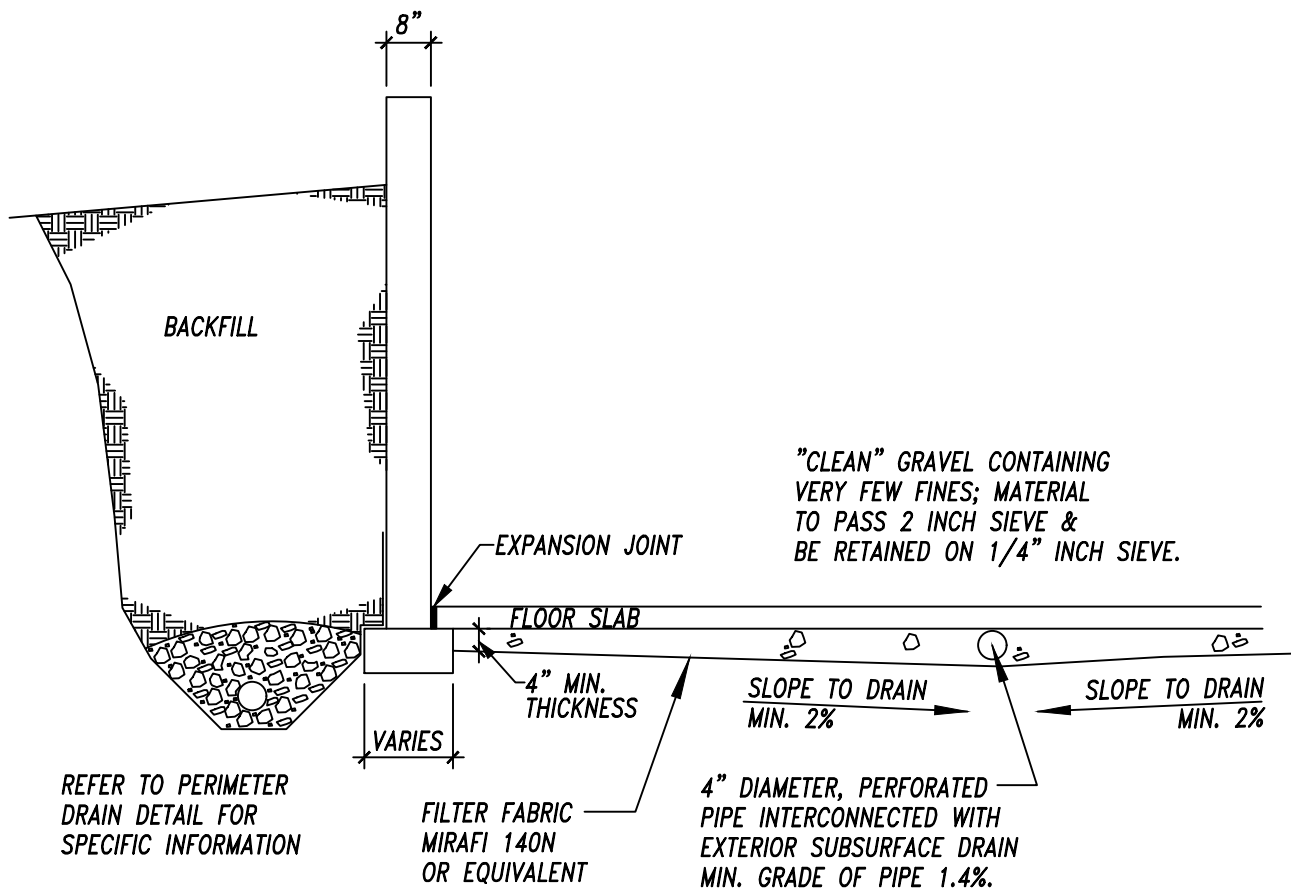


PERIMETER DRAIN DETAIL

12960 NORTH PEYTON HIGHWAY
EL PASO COUNTY, COLORADO
LAZY Y AND ROCKIN' J

JOB NO.
230520

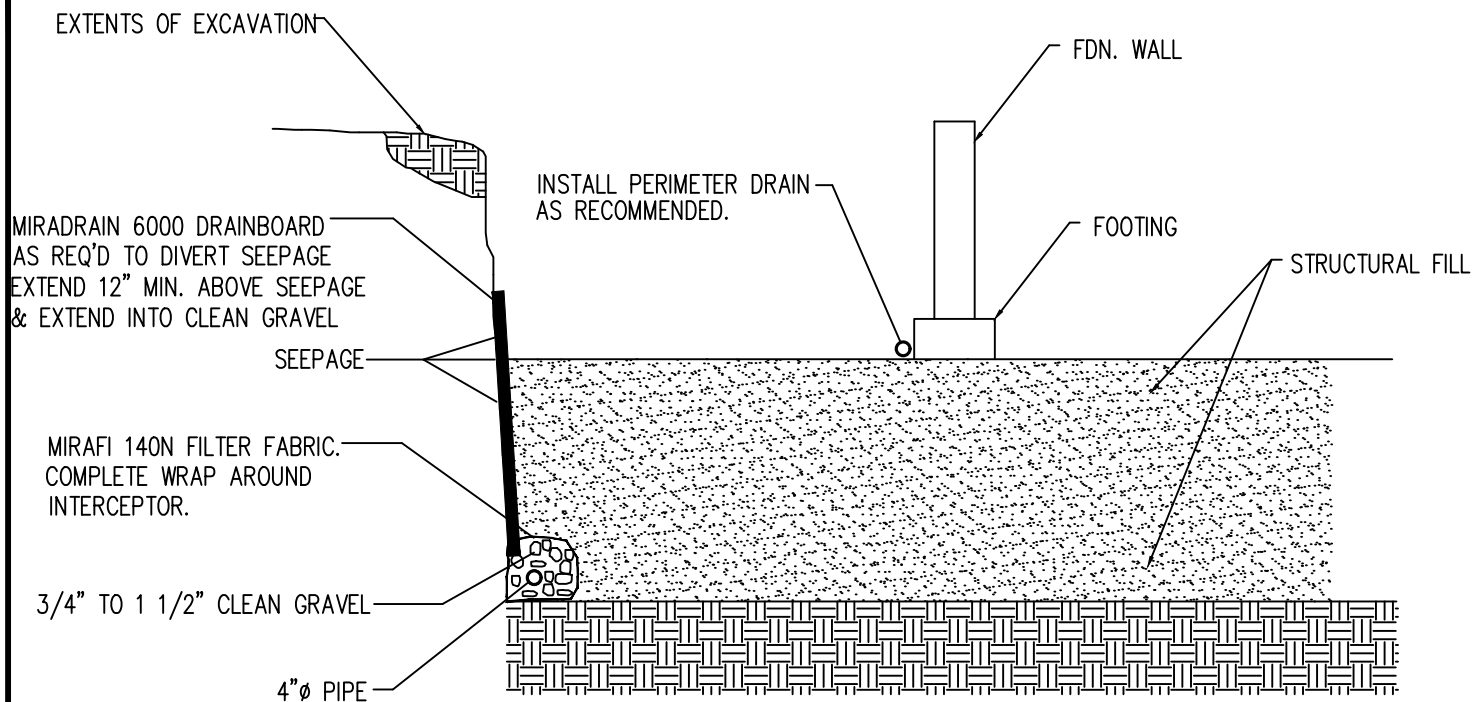
FIG. 8



**TYP. UNDERSLAB DRAINAGE LAYER
(CAPILLARY BREAK)**
12960 NORTH PEYTON HIGHWAY
EL PASO COUNTY, COLORADO
LAZY Y AND ROCKIN' J

JOB NO.
230520

FIG. 9



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

INTERCEPTOR DRAIN DETAIL

N.T.S.



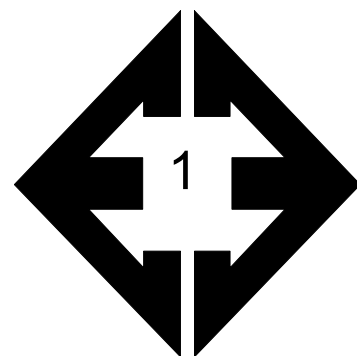
INTERCEPTOR DRAIN DETAIL

12960 NORTH PEYTON HIGHWAY
EL PASO COUNTY, COLORADO
LAZY Y AND ROCKIN' J

JOB NO.
230520

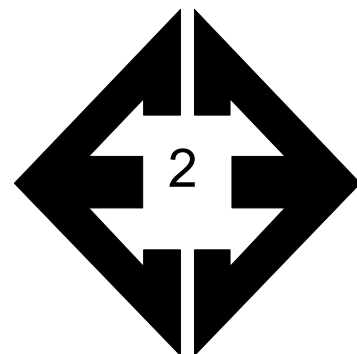
FIG. 10

APPENDIX A: Site Photographs



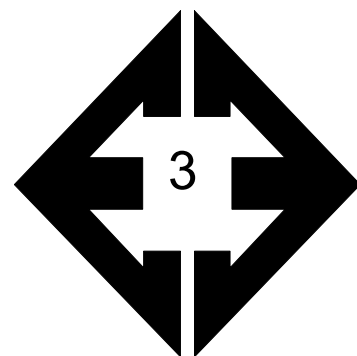
**Looking north from the
west-central portion of
the site.**

November 21, 2023



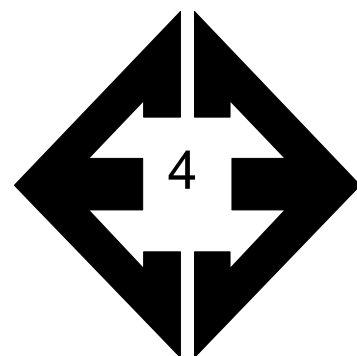
**Looking west from the
west-central portion of
the site.**

November 21, 2023



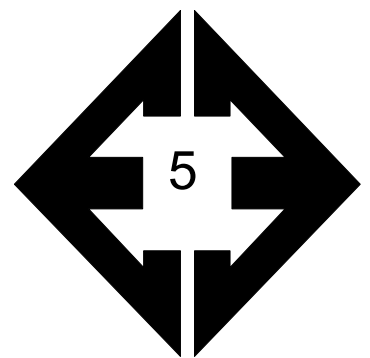
**Looking southeast
from the central
portion the site.**

November 21, 2023



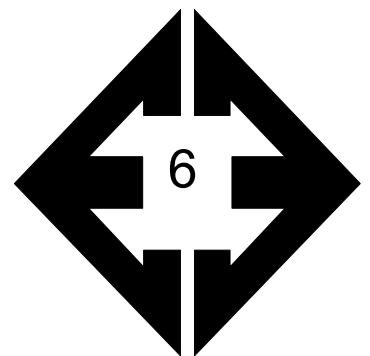
**Looking east from the
northern side of the
site.**

September 20, 2023



**Looking west from the
northern side of the
site.**

November 21, 2023



**Looking east from the
northwestern side of
the site.**

November 21, 2023

APPENDIX B: Test Boring Logs

TABLE B-1
DEPTH TO GROUNDWATER & BEDROCK

TEST BORING	DEPTH TO GROUNDWATER (ft.)	DEPTH TO BEDROCK (ft.)
1	>20	11
2	>20	14
3	>20	16
4	8.7	11
5	6.5	10
P-1	37	11
P-2	27	17
P-3	23	18
P-4	33	18

TEST BORING 1
DATE DRILLED 11/22/2023
REMARKS

DRY TO 20', 2/23/24

SAND, SILTY, TAN
CLAY, WITH SAND, LIGHT
BROWN to TAN, STIFF to HARD,
MOIST

SANDSTONE, EXTREMELY WEAK,
TAN, MODERATELY WEATHERED
(SAND, SILTY, VERY DENSE,
MOIST)

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
1					
1.1					
			14	14.0	2
5			42	12.8	2
10			37	15.8	2
15			50 9"	9.1	3
20			50 10"	9.0	3

TEST BORING 2
DATE DRILLED 11/22/2023
REMARKS

DRY TO 20', 2/23/24

SAND, WITH SILT, TAN, MEDIUM
DENSE, DRY to MOIST

CLAY, WITH SAND, GRAY, VERY
STIFF, MOIST

CLAYSTONE, VERY WEAK, GRAY,
MODERATELY WEATHERED
(CLAY, WITH SAND, HARD,
MOIST)
SANDSTONE, EXTREMELY WEAK,
TAN, MODERATELY WEATHERED
(SAND, SILTY, VERY DENSE,
MOIST)

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			23	2.6	1
5			21	7.0	1
10			28	14.5	2
15			50 10"	11.8	4
20			50 9"	8.5	3



TEST BORING LOGS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

JOB NO.
230520

FIG. B-1

TEST BORING 3
DATE DRILLED 11/22/2023
REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
DRY TO 20', 2/23/24						
SAND, CLAYEY, BROWN, LOOSE, MOIST	5			5	12.6	1
	5			8	10.8	1
SAND, SILTY, TAN, DENSE, MOIST	10			36	10.1	1
	15			40	10.0	1
SANDSTONE, EXTREMELY WEAK, TAN, HIGHLY WEATHERED (SAND, SILTY, VERY DENSE, MOIST)	20			50 7"	7.4	3

TEST BORING 4
DATE DRILLED 11/22/2023
REMARKS

REMARKS	Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
WATER @ 8.7', 2/23/224, WATER @ 7', 11/24/23						
TOPSOIL						
SAND, SILTY, DARK BROWN, MEDIUM DENSE, MOIST	5			16	5.2	1
SAND, CLAYEY, BROWN to TAN, LOOSE to DENSE, MOIST	5			7	15.8	1
	10			47	13.9	1
SANDSTONE, EXTREMELY WEAK, TAN to GRAY, HIGHLY WEATHERED (SAND, SILTY, VERY DENSE, MOIST)	15			50 9"	9.7	3
	20			50	12.7	3



TEST BORING LOGS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

JOB NO.
230520

FIG. B-2

TEST BORING 5
 DATE DRILLED 2/15/2024
 REMARKS

WATER @ 6.5', 2/23/24,
 WATER @ 8', 2/15/24

CLAY, SANDY, BROWN, STIFF,
 MOIST

SAND, WITH SILT, TAN, LOOSE,
 MOIST

CLAY, SANDY, OLIVE, HARD, MOIST
 CLAYSTONE, VERY WEAK, GRAY,
 MODERATELY WEATHERED
 (CLAY, SANDY, HARD, MOIST)



Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			8	14.3	2
5			8	10.0	1
10			34	20.1	2
15			50 7"	14.4	3
20			50 6"	9.2	3



TEST BORING LOGS

12960 N. PEYTON HIGHWAY
 LAZY Y & ROCKIN' J

JOB NO.
 230520

FIG. B-3

PIEZOMETER 1
 DATE DRILLED 11/22/2023
 REMARKS

WATER @ 47.2', 2/16/24,
 WATER @ 46.5', 11/24/23

SAND, SILTY, LIGHT BROWN,
 LOOSE, DRY

 CLAY, SANDY, GRAY, HARD, MOIST

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

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
			7	1.6	1
5			35	9.0	2
10			32	11.3	2
15			50 7"	6.3	3
20			50 10"	10.8	3
25			50 11"	11.6	3

PIEZOMETER 1 cont.
 DATE DRILLED 11/22/2023
 REMARKS

SANDSTONE, VERY WEAK, TAN to
 BROWN, HIGHLY WEATHERED
 (SAND, SILTY, VERY DENSE,
 MOIST)
 CLAYSTONE, VERY WEAK, GRAY,
 MODERATELY WEATHERED
 (CLAY, WITH SAND, HARD,

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
					3
30			50 11"	8.9	4
35			50 6"	9.5	4
40			50 8"	8.5	4
45			50 9"	12.3	4
50			50 6"	13.9	4



TEST BORING LOGS

12960 N. PEYTON HIGHWAY
 LAZY Y & ROCKIN' J

JOB NO.
 230520

FIG. B-4

PIEZOMETER 2
DATE DRILLED 2/15/2024
REMARKS

WATER @ 27', 2/16/24,
WATER @ 28', 2/15/24

SAND, SILTY, TAN, MEDIUM
DENSE, MOIST

CLAY, SANDY, GRAY, VERY STIFF,
MOIST

SANDSTONE, VERY WEAK, TAN,
MODERATELY WEATHERED
(SAND, SILTY, VERY DENSE,
MOIST)

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5			26	6.9	1
10			29	17.1	2
15					
20			50 9"	9.5	3
25					

PIEZOMETER 2 cont.
DATE DRILLED 2/15/2024
REMARKS

CLAYSTONE, VERY WEAK, GRAY,
MODERATELY WEATHERED
(CLAY, SANDY, HARD, MOIST)

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
30			50 9"	16.1	4
35					
40			50 10"	16.6	4
45					
50			50 7"	19.4	4



TEST BORING LOGS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

JOB NO.
230520

FIG. B-5

PIEZOMETER 3
 DATE DRILLED 2/15/2024
 REMARKS

WATER @ 30', 2/16/24,
 WATER @ 23', 2/15/24
 SAND, SILTY, TAN

CLAY SANDY, TAN, VERY STIFF,
 MOIST

SANDSTONE, VERY WEAK, TAN,
 MODERATELY WEATHERED
 (SAND, SILTY, VERY DENSE,
 MOIST)



Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5					1
10			22	16.0	2
15					
20			50 8"	5.0	3
25					

PIEZOMETER 3 cont.
 DATE DRILLED 2/15/2024
 REMARKS

CLAYSTONE, VERY WEAK, GRAY,
 MODERATELY WEATHERED
 (CLAY, SANDY, BROWN, HARD,
 MOIST)

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
30			50 8"	18.2	3
35					
40			50 9"	17.5	4
45					
50			50 8"	17.5	4



TEST BORING LOGS

12960 N. PEYTON HIGHWAY
 LAZY Y & ROCKIN' J

JOB NO.
 230520

FIG. B-6

PIEZOMETER 4
 DATE DRILLED 2/15/2024
 REMARKS

WATER AT 33', 2/16/24,
 DRY TO 40', 2/15/24
 SAND, SILTY, TAN

CLAY, SANDY, OLIVE, VERY STIFF,
 MOIST

CLAYSTONE, EXTREMELY WEAK,
 LIGHT BROWN, MODERATELY
 WEATHERED (CLAY, SANDY,
 HARD, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
5					1
10			24	20.6	2
15					
20			50 11"	19.0	4
25					

PIEZOMETER 4 cont.
 DATE DRILLED 2/15/2024
 REMARKS

SANDSTONE, VERY WEAK, TAN,
 MODERATELY WEATHERED
 (SAND, SILTY, VERY DENSE,
 MOIST)

CLAYSTONE, EXTREMELY WEAK,
 LIGHT BROWN, MODERATELY
 WEATHERED (CLAY, SANDY,
 HARD, MOIST

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
30			50 6"	10.6	3
35					
40			50 8"	13.1	4
45					
50					



TEST BORING LOGS

12960 N. PEYTON HIGHWAY
 LAZY Y & ROCKIN' J

JOB NO.
 230520

FIG. B-7

APPENDIX C: Laboratory Test Results

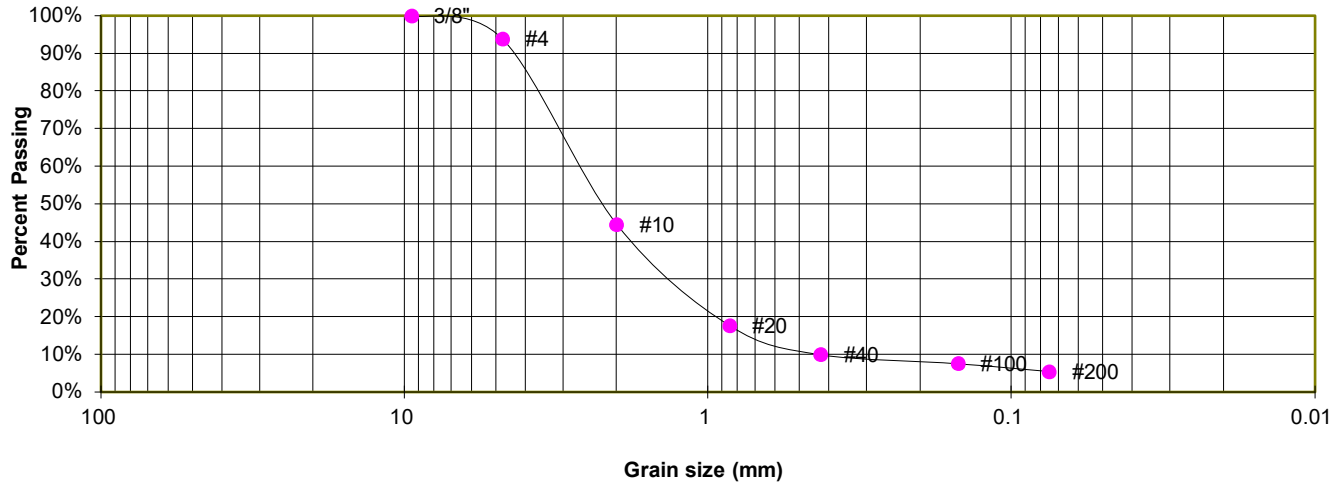
TABLE C-1
SUMMARY OF LABORATORY TEST RESULTS

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	SULFATE (WT %)	SWELL/ CONSOL (%)	USCS	SOIL DESCRIPTION
1	2	2-3			5.4	NV	NP	NP	<0.01	1.5	SW-SM	SAND, WITH SILT
1	5	5			9.7						SW-SM	SAND, WITH SILT
2	1	5	14.0	117.2	70.4	34	17	17	<0.01		CL	CLAY, WITH SAND
2	P-1	5	17.0	99.9	89.7					1.5	CL	CLAY, SLIGHTLY SANDY
2	5	2-3			69.5						CL	CLAY, SANDY
3	3	20			17.7	NV	NP	NP	0.00		SM	SANDSTONE (SAND, SILTY)
3	4	20	14.3	113.7	40.3	NV	NP	NP	<0.01	0.1	SM	SANDSTONE (SAND, SILTY)
3	P-1	15			10.7						SW-SM	SANDSTONE (SAND, WITH SILT)
4	P-1	35	14.0	113.3	72.5					1.5	CL	CLAYSTONE (CLAY, WITH SAND)

TEST BORING	2
DEPTH (FT)	2-3

SOIL DESCRIPTION SAND, WITH SILT
SOIL TYPE 1

Sieve Analysis Grain Size Distribution



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.8%
10	44.5%
20	17.7%
40	10.0%
100	7.6%
200	5.4%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SW-SM



LABORATORY TEST RESULTS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

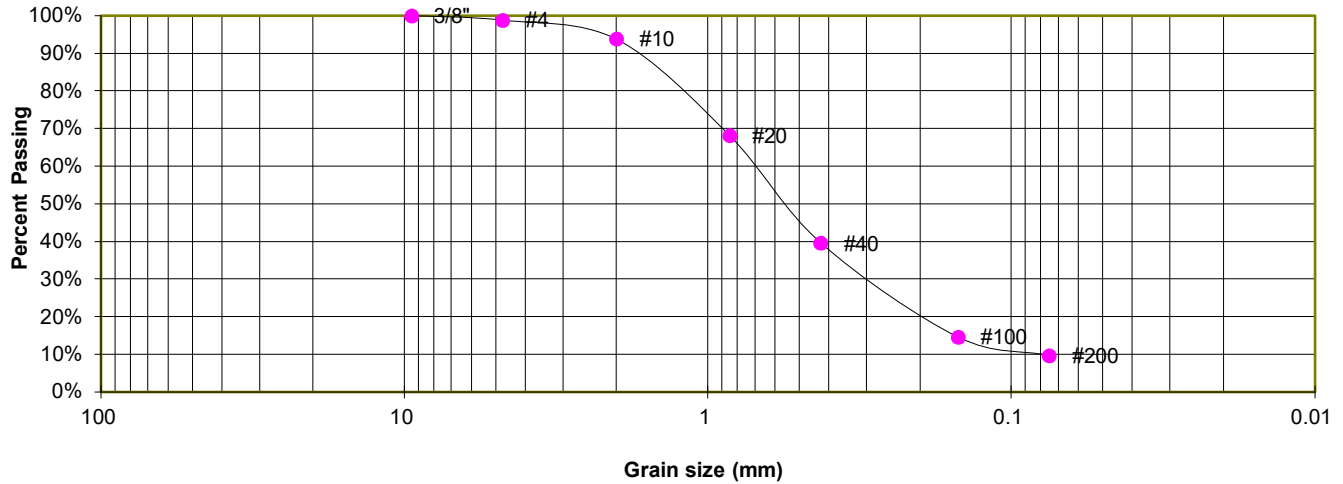
JOB NO.
230520

FIG. C-1

TEST BORING 5
DEPTH (FT) 5

SOIL DESCRIPTION SAND, WITH SILT
SOIL TYPE 1

**Sieve Analysis
Grain Size Distribution**



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.9%
10	93.8%
20	68.2%
40	39.6%
100	14.7%
200	9.7%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SW-SM



LABORATORY TEST RESULTS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

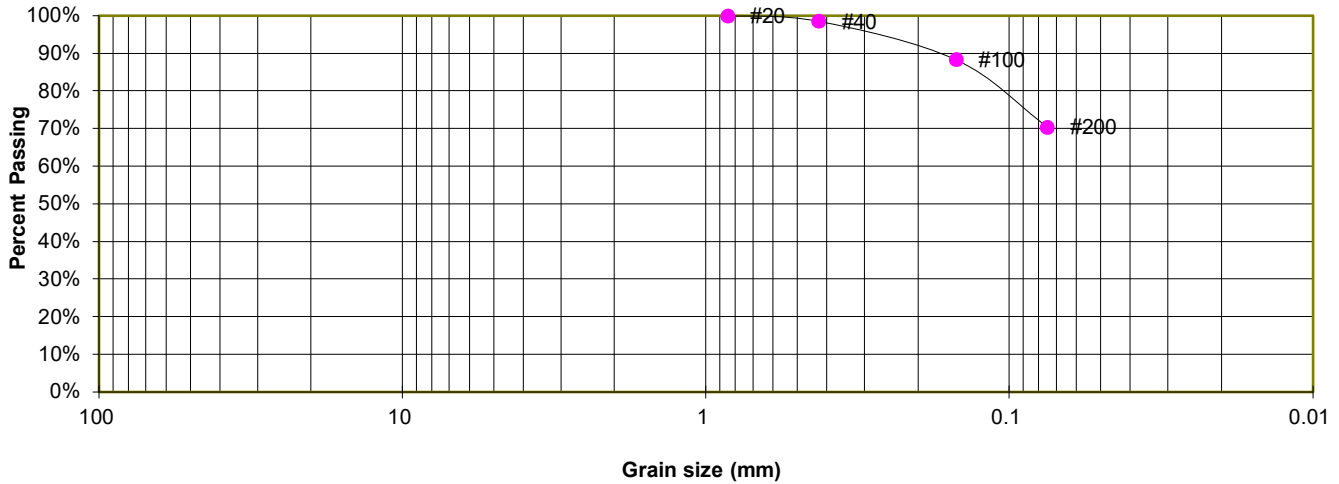
JOB NO.
230520

FIG. C-2

TEST BORING	1
DEPTH (FT)	5

SOIL DESCRIPTION	CLAY, WITH SAND
SOIL TYPE	2

Sieve Analysis Grain Size Distribution



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	98.5%
100	88.4%
200	70.4%

ATTERBERG LIMITS

Plastic Limit	17
Liquid Limit	34
Plastic Index	17

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL



LABORATORY TEST RESULTS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

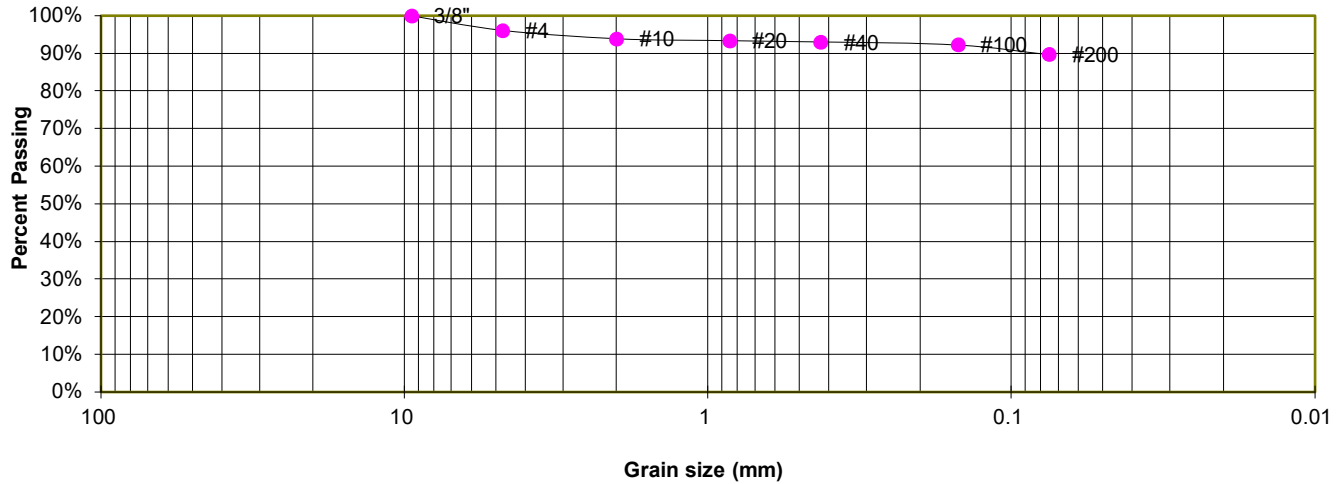
JOB NO.
230520

FIG. C-3

TEST BORING P-1
DEPTH (FT) 5

SOIL DESCRIPTION CLAY, SLIGHTLY SANDY
SOIL TYPE 2

**Sieve Analysis
Grain Size Distribution**



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.1%
10	93.9%
20	93.4%
40	93.0%
100	92.3%
200	89.7%

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL



LABORATORY TEST RESULTS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

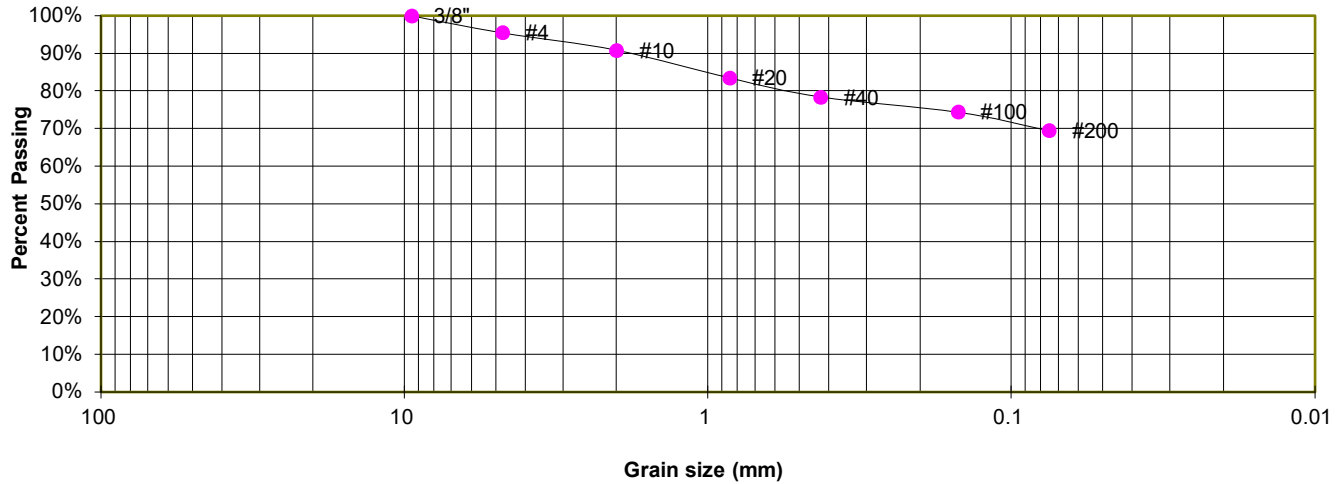
JOB NO.
230520

FIG. C-4

TEST BORING 5
DEPTH (FT) 2-3

SOIL DESCRIPTION CLAY, SANDY
SOIL TYPE 2

**Sieve Analysis
Grain Size Distribution**



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	95.5%
10	90.9%
20	83.5%
40	78.4%
100	74.4%
200	69.5%

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL



LABORATORY TEST RESULTS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

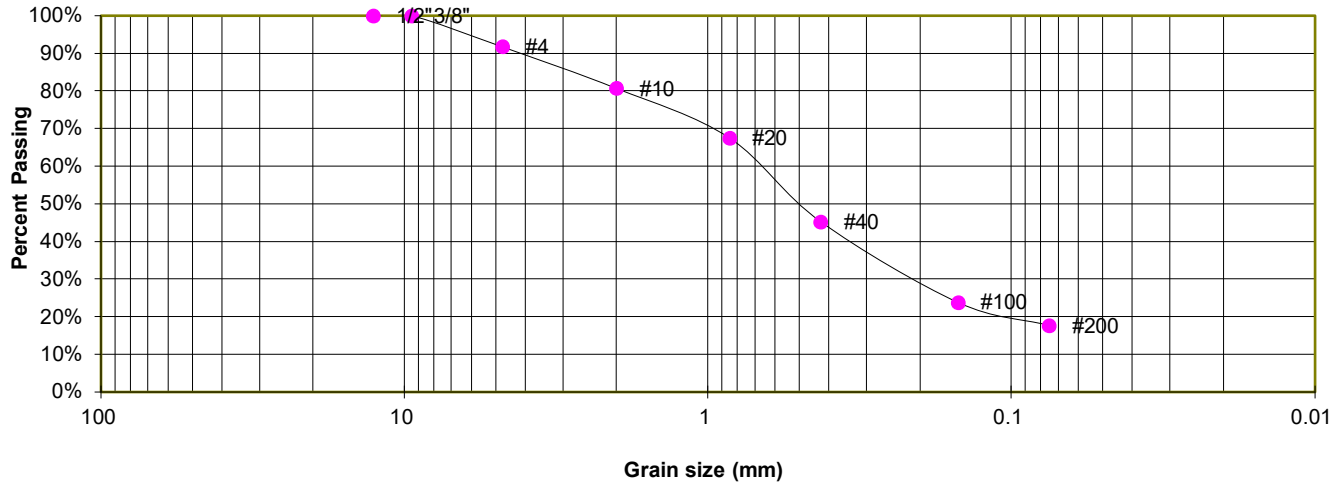
JOB NO.
230520

FIG. C-5

TEST BORING 3
DEPTH (FT) 20

SOIL DESCRIPTION SANDSTONE (SAND, SILTY)
SOIL TYPE 3

Sieve Analysis Grain Size Distribution



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	100.0%
4	91.8%
10	80.7%
20	67.6%
40	45.2%
100	23.9%
200	17.7%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM



LABORATORY TEST RESULTS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

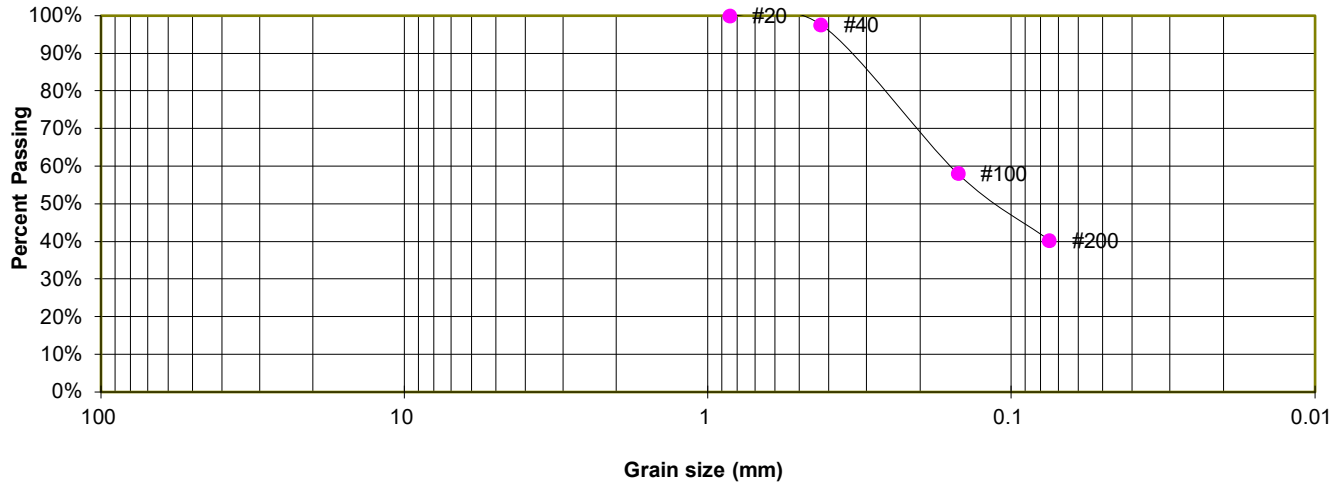
JOB NO.
230520

FIG. C-6

TEST BORING	4
DEPTH (FT)	20

SOIL DESCRIPTION SANDSTONE (SAND, SILTY)
SOIL TYPE 3

Sieve Analysis Grain Size Distribution



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	97.6%
100	58.1%
200	40.3%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM



LABORATORY TEST RESULTS

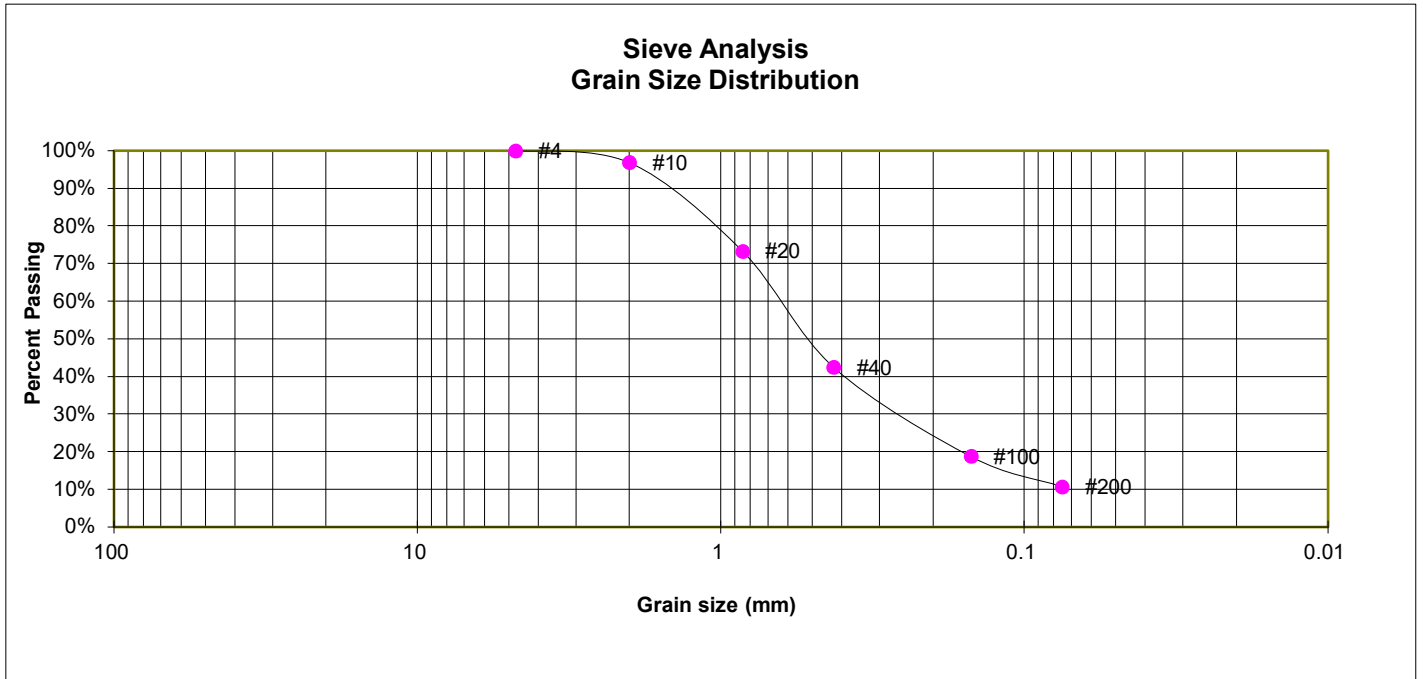
12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

JOB NO.
230520

FIG. C-7

TEST BORING P-1
DEPTH (FT) 15

SOIL DESCRIPTION SANDSTONE (SAND, WITH SILT)
SOIL TYPE 3



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	96.9%
20	73.3%
40	42.4%
100	18.8%
200	10.7%

SOIL CLASSIFICATION

USCS CLASSIFICATION: SW-SM



LABORATORY TEST RESULTS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

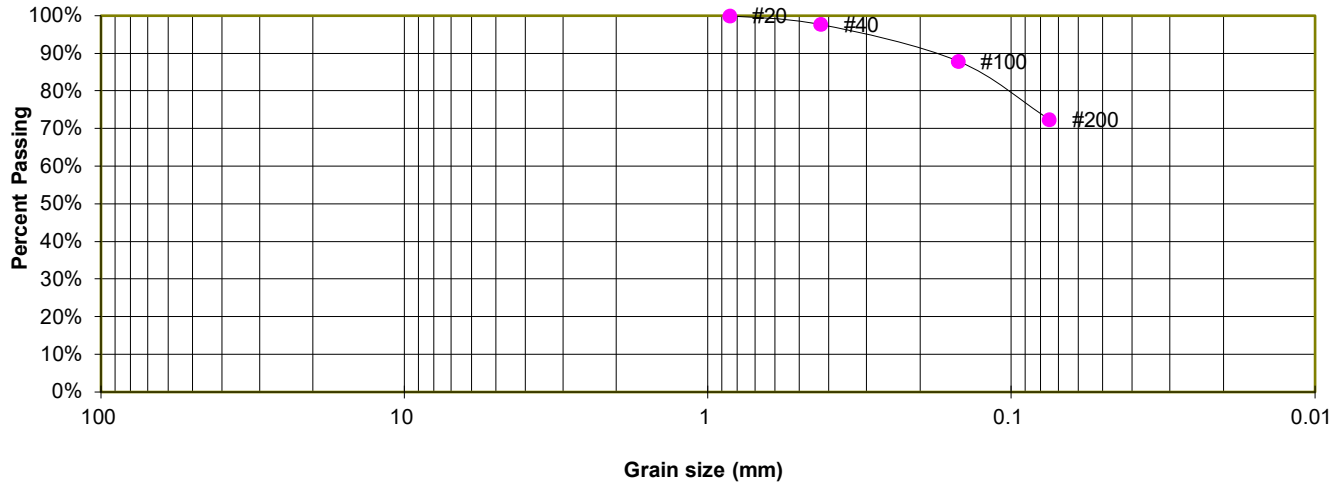
JOB NO.
230520

FIG. C-8

TEST BORING P-1
DEPTH (FT) 35

SOIL DESCRIPTION CLAYSTONE (CLAY, WITH SAND)
SOIL TYPE 4

**Sieve Analysis
Grain Size Distribution**



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	
10	
20	100.0%
40	97.7%
100	88.0%
200	72.5%

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL



LABORATORY TEST RESULTS

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

JOB NO.
230520

FIG. C-9

TEST BORING 1
DEPTH (FT) 5

SOIL DESCRIPTION CLAY, SLIGHTLY SANDY
SOIL TYPE 2



SWELL/CONSOLIDATION TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 117
NATURAL MOISTURE CONTENT: 14.0%
SWELL/CONSOLIDATION (%): 1.5%



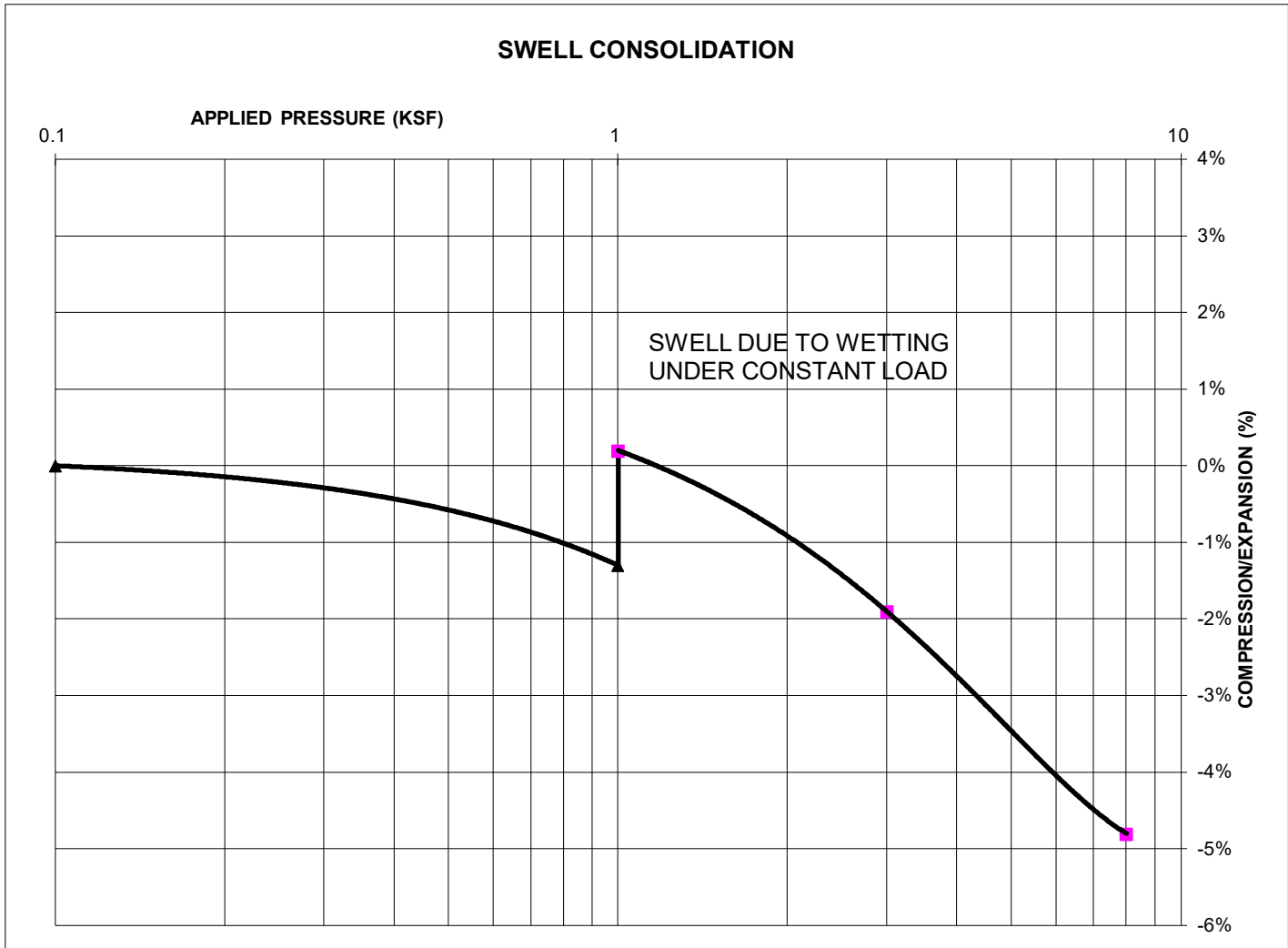
**SWELL/CONSOLIDATION
TEST RESULTS**

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

JOB NO.
230520

FIG. C-10

TEST BORING	TP-1	SOIL DESCRIPTION	CLAY, SLIGHTLY SANDY
DEPTH (FT)	5	SOIL TYPE	2



SWELL/CONSOLIDATION TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 100
NATURAL MOISTURE CONTENT: 17.0%
SWELL/CONSOLIDATION (%): 1.5%



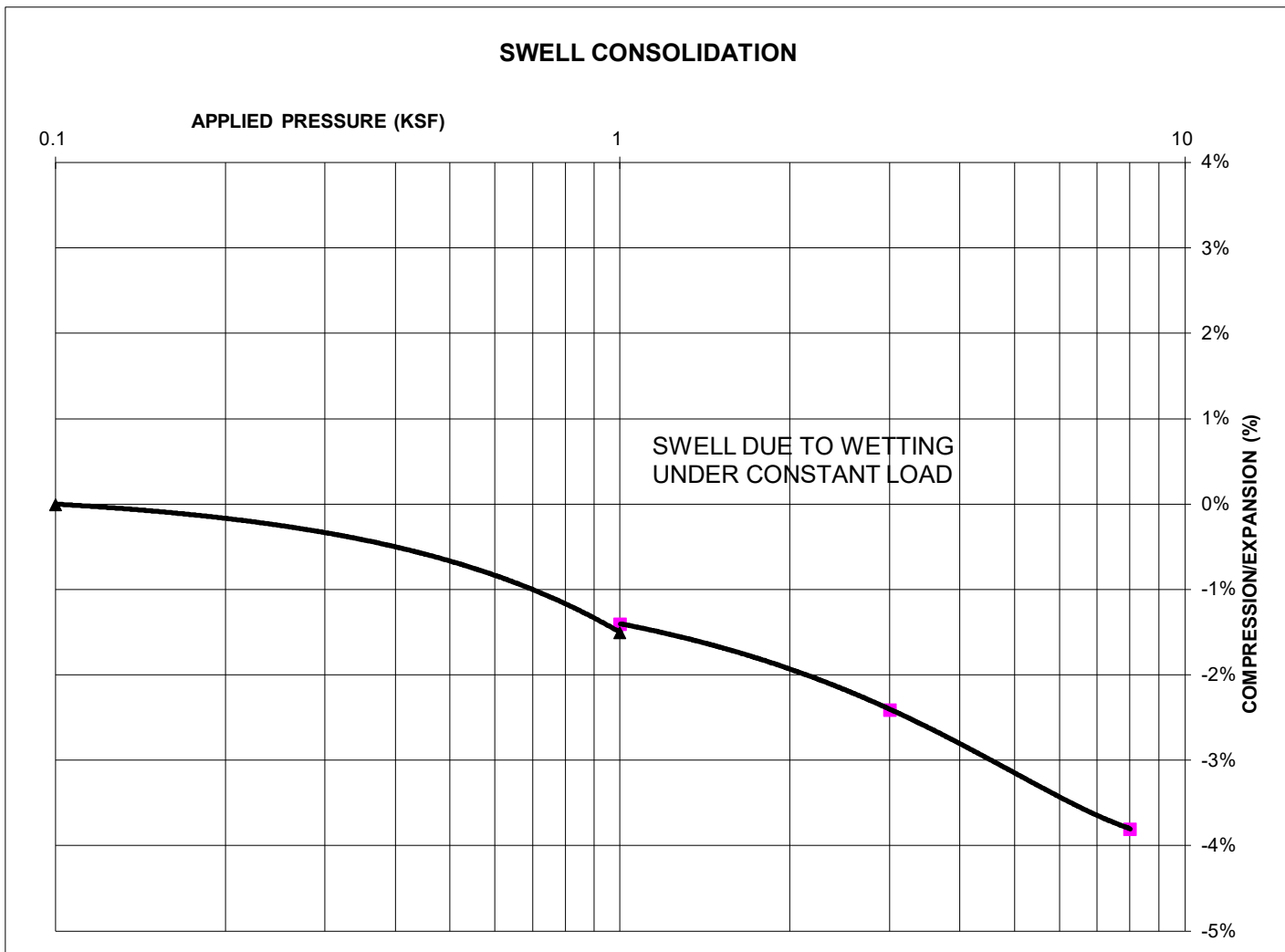
**SWELL/CONSOLIDATION
TEST RESULTS**

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

JOB NO.
230520

FIG. C-11

TEST BORING	4	SOIL DESCRIPTION	SANDSTONE (SAND, SILTY)
DEPTH (FT)	20	SOIL TYPE	3



SWELL/CONSOLIDATION TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 114
 NATURAL MOISTURE CONTENT: 14.3%
 SWELL/CONSOLIDATION (%): 0.1%



**SWELL/CONSOLIDATION
TEST RESULTS**

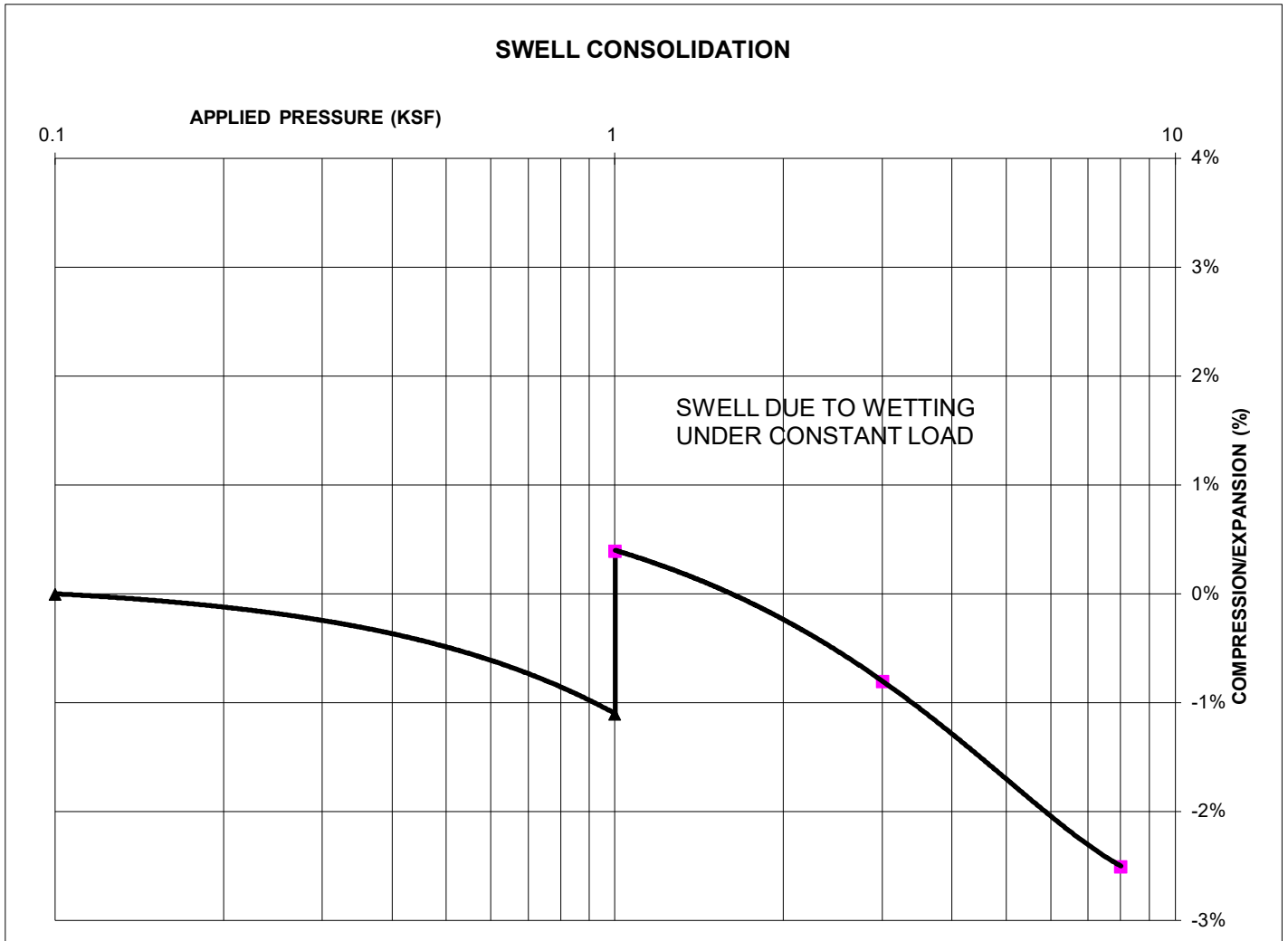
12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

JOB NO.
230520

FIG. C-12

TEST BORING TP-1
DEPTH (FT) 35

SOIL DESCRIPTION CLAYSTONE (CLAY, SANDY)
SOIL TYPE 4



SWELL/CONSOLIDATION TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 113
NATURAL MOISTURE CONTENT: 14.0%
SWELL/CONSOLIDATION (%): 1.5%



**SWELL/CONSOLIDATION
TEST RESULTS**

12960 N. PEYTON HIGHWAY
LAZY Y & ROCKIN' J

JOB NO.
230520

FIG. C-13

APPENDIX D: OWTS Site Evaluation

May 25, 2023

Lazy Y and Rockin' J
PO Box 516
Peyton, CO 80831



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599
FAX (719) 531-5238

Attn: Scott Smith

Re: OWTS Site Evaluation
12960 North Peyton Highway
Parcel No. 3207-000-007
El Paso County, Colorado
Entech Job No. 230520

Dear Mr. Smith:

As requested, personnel of Entech Engineering, Inc. have observed the excavation of nineteen test pits in the areas of the proposed location for the on-site wastewater treatment system (OWTS) absorption field at the above referenced site. This letter presents the results of our testing.

The test pits were excavated on April 13, 2023, April 14, 2023, and May 9, 2023 to approximate depths of 2.5 to 8-feet. The locations of the test pits are shown in Figure 1. Soils encountered in Test Pit Nos. 1, 2, 3 and 4 consisted of sandy clay to sandy clay loam with underlying sandy clay bedrock. Soils encountered in Test Pit Nos. 5, 6, 7, and 8 consisted of sandy clay to gravelly sandy clay loam with underlying sandy clay bedrock. Soils encountered in Test Pit Nos. 9 and 10 consisted of sandy clay to sandy clay loam with underlying bedrock. Soils encountered in Test Pit Nos. 11 and 12 consisted of sandy clay loam with gravel with underlying sandy clay. Soils encountered in Test Pit Nos. 13 and 14 consisted of sandy loam with gravel overlying sandy clay bedrock. Soils encountered in Test Pit Nos. 15, 16, 17, 18 and 19 consisted of gravelly sandy clay loam, sandy clay with underlying sandy loam to sandy clay loam bedrock (in Test Pit No. 15), gravelly sandy clay loam with underlying sandy clay, and sandy loam with underlying gravelly sandy clay loam.

The Test Pit Logs and Laboratory Test Results are shown in Figures 2 through 31 and Tables 1 and 2. Refusal due to bedrock was encountered at various depths throughout the site from 2.5 to 8.0 feet below grade (termination of Test Pit). No bedrock was encountered near Test Pit Nos. 11, 12, 16, 17, 18, or 19. Redoximorphic features were encountered at 7.0 to 7.5 feet below grade in Test Pit Nos. 11, 12, and 16, and at 6.0 feet below grade in Test Pit No. 18.

Visual and tactile evaluation of the soils was performed. The limiting layer encountered in Test Pit Nos. 11, 12, 15, 16, 17, and 19 is the sandy clay loam with gravel and the underlying sandy clay which classifies as USDA Soil Type 3, R-1, and 4A. For design purposes a maximum LTAR value of 0.55 gallons per day per square foot is recommended for Treatment Level 3, provided the soil treatment area is installed near Test Pit Nos. 11, 12, 15, 16, 17, and 19. A minimum 2 feet thick sand filter is required to achieve the Treatment Level 3 LTAR.

An engineered OWTS design is required for this site due to the following:

- The Proposed Flow Rate (10,000 to 12,500 gallons per day)
- Soil Types 3A, 4, 4A, and R1 encountered in the test pits
- Shallow refusal due to bedrock and redoximorphic features encountered in the test pits

Lazy Y and Rockin' J
OWTS Site Evaluation
12960 North Peyton Highway
Parcel No. 3207-000-007
El Paso County, Colorado
Entech Job No. 230520

The on-site wastewater treatment system should be installed in accordance with El Paso County Department of Public Health and Environment and Colorado Department of Health and Environment regulations.

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

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Reviewed by:


Robert P. Jaquet, P.E.




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

JG/rj

Encl.

AA projects/2023/230520 owts site eval

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT LAZY Y AND ROCKIN' J
PROJECT 12960 NORTH PEYTON HIGHWAY
JOB NO. 230520

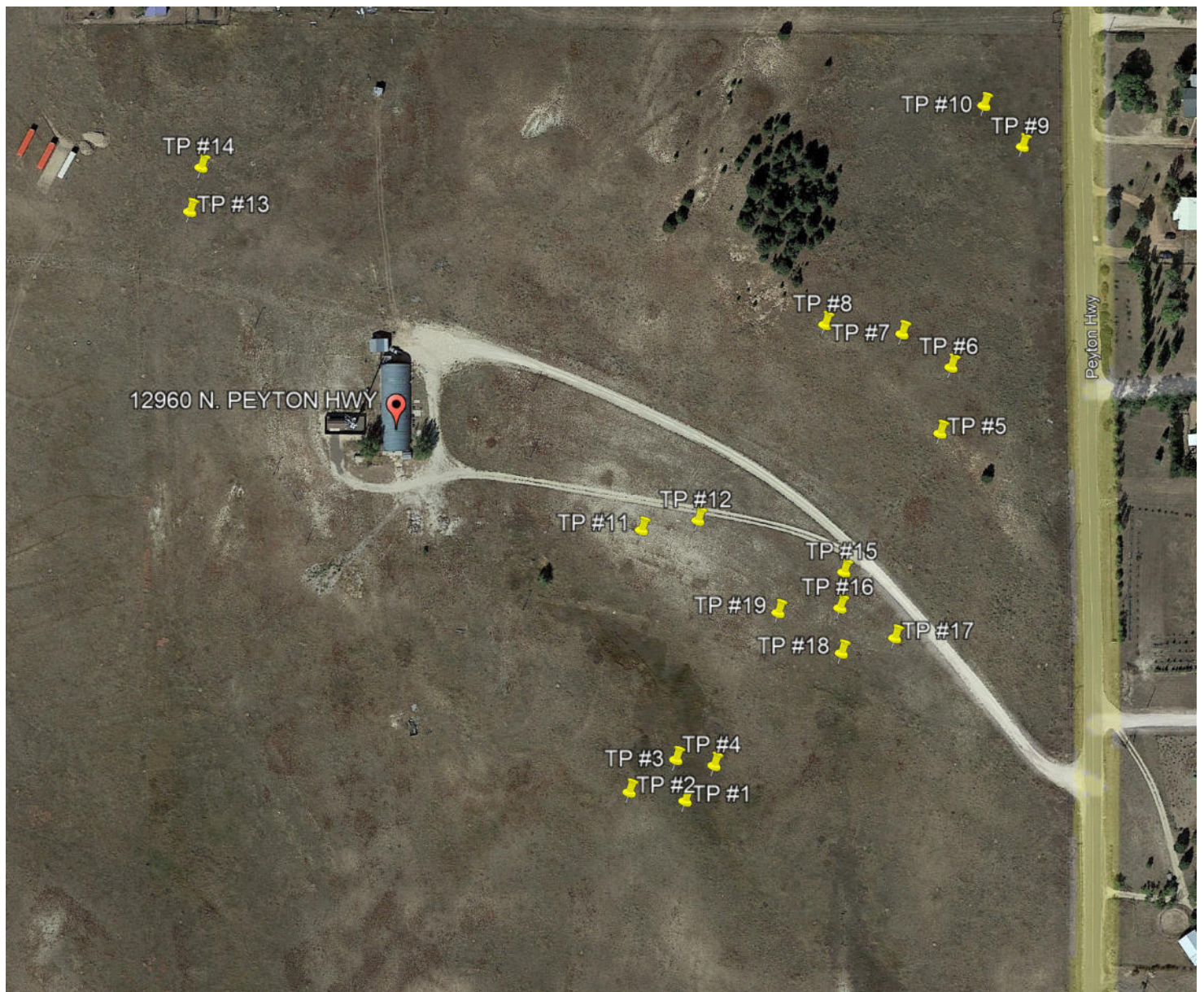
TEST PIT NO.	USDA SOIL TYPE	DEPTH (FT)	PASSING NO. 200 SIEVE (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
TP-1	4A	4.0	53.6	CL	SANDY CLAY
TP-2	4A	2.0	95.1	CL	SANDY CLAY
TP-3	3	2.0	24.7	SC	SANDY CLAY
TP-4	4A	4.5	87.3	CL	SANDY CLAY
TP-5	3	3.0	20.1	SC	SANDY CLAY
TP-6	4A	3.5	33.6	SC	SANDY CLAY
TP-7	4A	2.5	23.1	SC	SANDY CLAY
TP-8	3A / R1	1.5	8.7	SM-SW	SANDY CLAY LOAM WITH GRAVEL
TP-9	3A	2.0	16.4	SC	SANDY CLAY LOAM
TP-10	4A	2.0	66.0	CL	SANDY CLAY
TP-11	3 / R1	4.0	7.7	SM-SW	SANDY CLAY LOAM WITH GRAVEL
TP-12	4A	7.5	21.5	SC	SANDY CLAY
TP-13	2 / R1	3.0	8.5	SM-SW	SANDY LOAM WITH GRAVEL
TP-14	4A	5.0	46.7	SC	VERY CLAYEY SAND
TP-15	3A	3.5	13.4	SC	SANDY CLAY LOAM
TP-16	3A / R1	3.0	9.1	SC	SANDY CLAY LOAM WITH GRAVEL
TP-16	3A / R1	6.5	12.6	SC	SANDY CLAY LOAM WITH GRAVEL
TP-17	4A	3.0	62.2	CL	SANDY CLAY
TP-18	3	4.0	9.2	SC	SANDY CLAY LOAM
TP-19	3 / R1	4.0	8.5	SC	SANDY CLAY LOAM WITH GRAVEL

TABLE 2

SUMMARY OF TEST PIT LOGS

CLIENT LAZY Y AND ROCKIN' J
PROJECT 12960 NORTH PEYTON HIGHWAY
JOB NO. 230520

TEST PIT NO.	LIMITING SOIL LAYER	RECOMMENDED L.T.A.R.	DEPTH TO REDOXIMORPHIC FEATURES (ft.)	DEPTH TO BEDROCK (ft.)
TP-1	4A	0.15 T.L.1	n/a	4.5
TP-2	4A	0.15 T.L.1	n/a	2.5
TP-3	4A	0.15 T.L.1	n/a	6.5
TP-4	4A	0.15 T.L.1	n/a	5.0
TP-5	4A	0.15 T.L.1	n/a	6.0
TP-6	4A	0.15 T.L.1	n/a	4.0
TP-7	4A	0.15 T.L.1	n/a	3.0
TP-8	4A/R1	0.20 T.L.3	n/a	2.5
TP-9	3A	0.30 T.L.1	n/a	2.5
TP-10	4A	0.15 T.L.1	n/a	3.0
TP-11	3/R1	0.65 T.L.3	7.5	n/a
TP-12	3/R1	0.65 T.L.3	7.5	n/a
TP-13	4A/R1	0.20 T.L.3	6.0	6.0
TP-14	4A/R1	0.20 T.L.3	n/a	6.0
TP-15	3A/R1	0.30 T.L.3	n/a	5.0
TP-16	3A/R1	0.30 T.L.3	7.0	n/a
TP-17	4A/R1	0.20 T.L.3	n/a	n/a
TP-18	4A/R1	0.20 T.L.3	6.0	n/a
TP-19	4A/R1	0.20 T.L.3	6.0	n/a



T.P. LOCATION MAP

SCALE: 1" = 210'

TP- APPROXIMATE TEST PIT LOCATION AND NUMBER

- TP-1	39° 0'55.45"N,	104°28'49.68"W	- TP-11	39° 0'59.18"N,	104°28'50.45"W
- TP-2	39° 0'55.57"N,	104°28'50.67"W	- TP-12	39° 0'59.31"N,	104°28'49.46"W
- TP-3	39° 0'56.02"N,	104°28'49.84"W	- TP-13	39° 1' 3.53"N,	104°28'58.40"W
- TP-4	39° 0'55.94"N,	104°28'49.16"W	- TP-14	39° 1' 4.13"N,	104°28'58.20"W
- TP-5	39° 1' 0.51"N,	104°28'45.17"W	- TP-15	39° 0'58.60"N,	104°28'46.88"W
- TP-6	39° 1' 1.42"N,	104°28'44.96"W	- TP-16	39° 0'58.11"N,	104°28'46.94"W
- TP-7	39° 1' 1.88"N,	104°28'45.83"W	- TP-17	39° 0'57.70"N,	104°28'45.97"W
- TP-8	39° 1' 2.00"N,	104°28'47.21"W	- TP-18	39° 0'57.49"N,	104°28'46.91"W
- TP-9	39° 1' 4.53"N,	104°28'43.61"W	- TP-19	39° 0'58.05"N,	104°28'48.04"W
- TP-10	39° 1' 5.10"N,	104°28'44.30"W			



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

TEST PIT LOCATION MAP
12960 NORTH PEYTON HIGHWAY
EL PASO COUNTY, COLORADO
FOR: LAZY Y & ROCKIN' J

JOB NO.:

230520

FIG NO.:

1

TEST PIT NO. 1
 DATE EXCAVATED 4/13/2023
 Job # 230520

TEST PIT NO. 2
 DATE EXCAVATED 4/13/2023
 CLIENT LAZY Y AND ROCKIN' J
 LOCATION 12960 NORTH PEYTON HIGHWAY

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
bedrock refusal @ 4'-6"							redoximorphic features / bedrock refusal @ 2'-6"						
topsoil, sandy clay loam, brown, moist	1			bl	s	4	topsoil, sandy clay loam, brown, moist	1					
sandy clay, fine to coarse grained, brown, moist	2						sandy clay, fine to coarse grained, tan, moist	2			ma		4A
	3						bedrock @ 2'-6"	3					
sandy clay, fine to medium grained, brown, moist	4			ma		4A		4					
bedrock @ 4'-6"	5							5					
	6							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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 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

JOB NO.:
 230520
 FIG NO.:
 2

TEST PIT NO. 3
 DATE EXCAVATED 4/13/2023
 Job # 230520

TEST PIT NO. 4
 DATE EXCAVATED 4/13/2023
 CLIENT LAZY Y AND ROCKIN' J
 LOCATION 12960 NORTH PEYTON HIGHWAY

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
bedrock refusal @ 6'-6"						
topsoil, sandy clay loam, brown, moist	1					
sandy clay loam, fine to coarse grained, tan, moist	2			bl	m	3
	3					
	4					
	5					
sandy clay, fine to medium grained, brown, moist	6			ma		4A
bedrock @ 6'-6"	7					
	8					
	9					
	10					

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
bedrock refusal @ 5'-0"						
topsoil, sandy clay loam, brown, moist	1					
	2					
sandy clay loam, fine to coarse grained, tan, moist	3			gr	m	3
sandy clay, fine to medium grained, brown, moist	4			ma		4A
bedrock @ 5'-0"	5					
	6					
	7					
	8					
	9					
	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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 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

JOB NO.:
 230520
 FIG NO.:
 3

TEST PIT NO. 5
 DATE EXCAVATED 4/13/2023
 Job # 230520

TEST PIT NO. 6
 DATE EXCAVATED 4/13/2023
 CLIENT LAZY Y AND ROCKIN' J
 LOCATION 12960 NORTH PEYTON HIGHWAY

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
bedrock refusal @ 6'-0"						
topsoil, sandy clay loam, brown, moist	1					
	2					
sandy clay loam, fine to coarse grained, tan, moist	3			gr	m	3
	4					
sandy clay, fine to medium grained, dark brown, moist	5			ma		4A
bedrock @ 6'-0"	6					
	7					
	8					
	9					
	10					

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
bedrock refusal @ 4'-0"						
topsoil, sandy clay loam, brown, moist	1					
	2					
sandy clay, fine to medium grained, brown, moist	3					
bedrock @ 4'-0"	4			ma		4A
	5					
	6					
	7					
	8					
	9					
	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

JOB NO.:
 230520
 FIG NO.:
 4

TEST PIT NO. 7
 DATE EXCAVATED 4/13/2023
 Job # 230520

TEST PIT NO. 8
 DATE EXCAVATED 4/13/2023
 CLIENT LAZY Y AND ROCKIN' J
 LOCATION 12960 NORTH PEYTON HIGHWAY

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
bedrock refusal @ 3'-0"							bedrock refusal @ 2'-6"						
topsoil, sandy clay loam, brown, moist	1			gr	s	4	topsoil, sandy clay loam, brown, moist	1			ma		3A/R1
sandy clay, fine to medium grained, brown, moist	2			ma		4A	sandy clay loam with gravel, fine to medium grained, red	2			ma		4A
sandy clay, fine to medium grained, dark brown, moist	3						sandy clay, fine to medium grained, greyish brown, moist	3					
bedrock @ 3'-0"	4						bedrock @ 2'-6"	4					
	5							5					
	6							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

JOB NO.:
 230520

FIG NO.:
 5

TEST PIT NO. 9
 DATE EXCAVATED 4/14/2023
 Job # 230520

TEST PIT NO. 10
 DATE EXCAVATED 4/14/2023
 CLIENT LAZY Y AND ROCKIN' J
 LOCATION 12960 NORTH PEYTON HIGHWAY

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
bedrock refusal @ 2'-6"							bedrock refusal @ 3'-0"						
topsoil, sandy clay loam, brown, moist	1						topsoil, sandy clay loam, brown, moist	1					
sandy clay loam, fine to coarse grained, brown, moist	2			ma		3A	sandy clay, fine to medium grained, dark brown, moist	2			ma		4A
bedrock @ 2'-6"	3						bedrock @ 3'-0"	3					
	4							4					
	5							5					
	6							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

JOB NO.:
 230520

FIG NO.:
 6

TEST PIT NO. 11
 DATE EXCAVATED 4/14/2023
 Job # 230520

TEST PIT NO. 12
 DATE EXCAVATED 4/14/2023
 CLIENT LAZY Y AND ROCKIN' J
 LOCATION 12960 NORTH PEYTON HIGHWAY

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
redoximorphic features @ 7'-6"							redoximorphic features @ 7'-6"						
topsoil, sandy clay loam, brown, moist	1						topsoil, sandy clay loam, brown, moist	1					
	2							2					
sandy clay loam with gravel pockets, fine to very coarse grained, reddish brown, moist	3			gr	s	3/R1	sandy clay loam with gravel pockets, fine to very coarse grained, reddish brown, moist	3			gr	s	3/R1
	4							4					
	5							5					
	6							6					
	7							7					
sandy clay, fine to medium grained, greyish brown, moist	8			ma		4A	sandy clay, fine to medium grained, greyish brown, moist	8			ma		4A
	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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ENGINEERING, INC.

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

JOB NO.:
 230520

FIG NO.:
 7

TEST PIT NO. 13
DATE EXCAVATED 4/14/2023
Job # 230520

TEST PIT NO. 14
DATE EXCAVATED 4/14/2023
CLIENT LAZY Y AND ROCKIN' J
LOCATION 12960 NORTH PEYTON HIGHWAY

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
redoximorphic features / bedrock refusal @ 6'-0"							bedrock refusal @ 6'-0"						
topsoil, sandy clay loam, brown, moist	1						topsoil, sandy clay loam, brown, moist	1					
	2							2					
sandy loam with gravel, fine to very coarse grained, tan, moist	3			gr	s	2/R1	sandy loam with gravel, fine to very coarse grained, tan, moist	3			gr	s	2/R1
	4							4					
sandy clay, fine to medium grained, dark brown, moist	5			ma		4A	sandy clay, fine to medium grained, dark brown, moist	5			ma		4A
bedrock @ 6'-0"	6						bedrock @ 6'-0"	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

JOB NO.:
230520
FIG NO.:
8

TEST PIT NO. 15
 DATE EXCAVATED 5/9/2023
 Job # 230520

TEST PIT NO. 16
 DATE EXCAVATED 5/9/2023
 CLIENT LAZY Y AND ROCKIN' J
 LOCATION 12960 NORTH PEYTON HIGHWAY

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
bedrock refusal @ 5'-0"	1						redoximorphic features @ 7'-0"	1					
topsoil, sandy clay loam, brown, moist	2			gr	s	3/R1	topsoil, sandy clay loam, brown, moist	2			gr	s	3
gravelly sandy clay loam, fine to very coarse grained, brown, moist	3						gravelly sandy clay loam, fine to coarse grained, dark brown, moist	3			ma		3A/R1
gravelly sandy clay loam, fine to very coarse grained, brown, moist	4			ma		3A/R1	sandy clay loam with gravel, fine to very coarse grained, brown, moist	4					
bedrock @ 5'-0"	5							5					
	6						sandy clay loam with gravel, fine to very coarse grained, greyish brown, moist	6			gr	s	3
	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



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

JOB NO.:
 230520

FIG NO.:
 9

TEST PIT NO. 17
 DATE EXCAVATED 5/9/2023
 Job # 230520

TEST PIT NO. 18
 DATE EXCAVATED 5/9/2023
 CLIENT LAZY Y AND ROCKIN' J
 LOCATION 12960 NORTH PEYTON HIGHWAY

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, brown, moist	1						topsoil, sandy clay loam, brown, moist	1					
	2						gravelly sandy clay loam, fine to coarse grained, dark brown, moist	2		gr	s		3
sandy clay, fine to medium grained, brown, moist	3		ma			4A		3					
	4						gravelly sandy clay loam, fine to coarse grained, brown, moist	4		gr	s		3/R1
	5							5					
gravelly sandy loam, fine to very coarse grained, tan, moist	6		gr	s		2/R1		6					
gravelly sandy clay loam, fine to very coarse grained, brown, moist	7		ma			3A	sandy loam with gravel, fine to very coarse grained, brown, moist	7		ma			4A
	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



ENTECH
ENGINEERING, INC.

505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

JOB NO.:
 230520

FIG NO.:
 10

TEST PIT NO. 19
 DATE EXCAVATED 5/9/2023
 Job # 230520

TEST PIT NO.
 DATE EXCAVATED
 CLIENT LAZY Y AND ROCKIN' J
 LOCATION 12960 NORTH PEYTON HIGHWAY

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
redoximorphic features @ 6'-0"													
topsoil, sandy clay loam, brown, moist	1			gr	s	2/R1		1					
gravelly sandy loam, fine to very coarse grained, tan, moist	2							2					
	3							3					
gravelly sandy clay loam, fine to very coarse grained, brown, moist	4			gr	s	3/R1		4					
	5							5					
	6							6					
sandy clay loam, fine to coarse grained, reddish brown, moist	7			gr	s	3		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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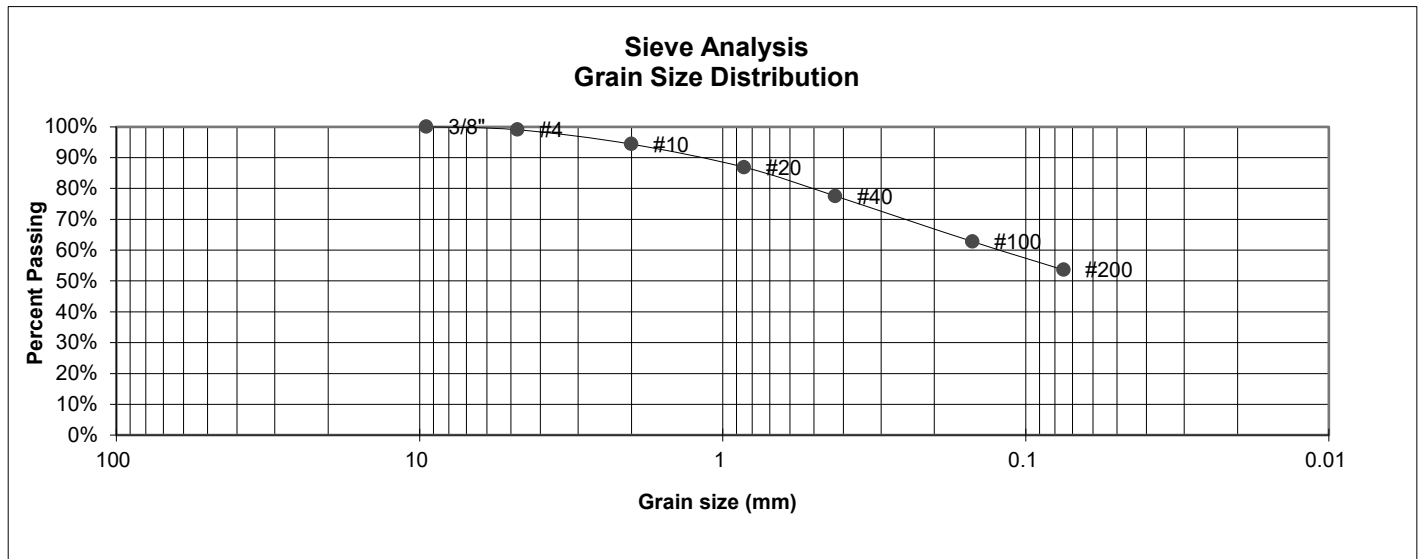
505 ELKTON DRIVE
 COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

JOB NO.:
 230520

FIG NO.:
 11

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	4A	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-1	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	4	<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	99.1%
10	94.4%
20	86.8%
40	77.5%
100	62.8%
200	53.6%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



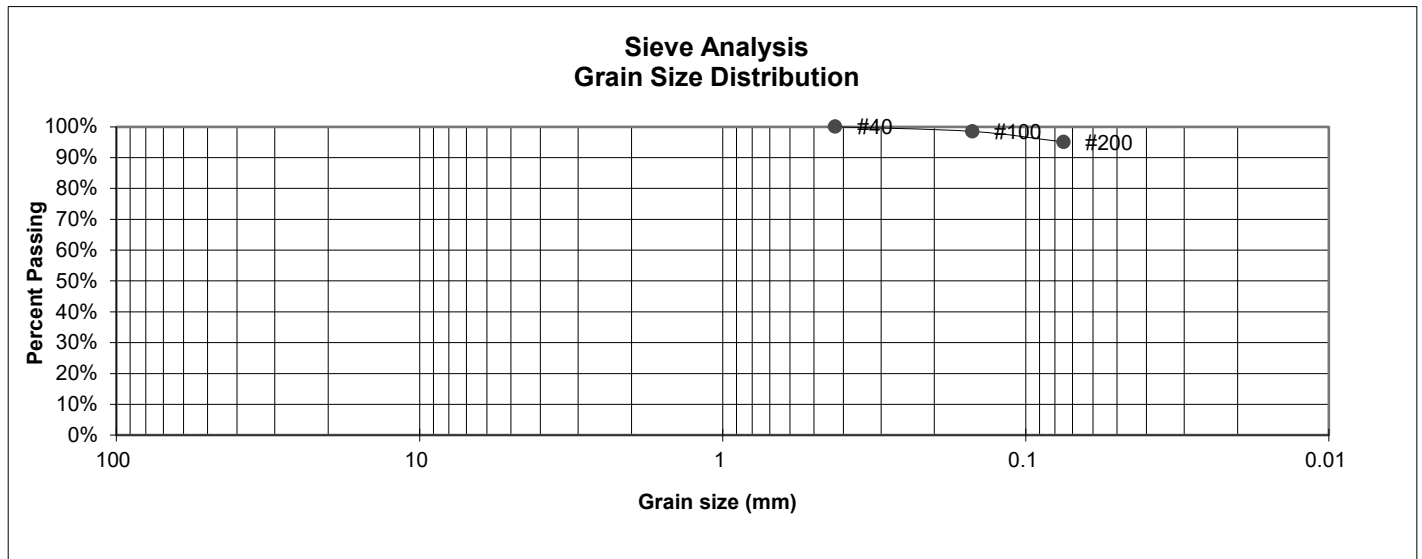
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**LABORATORY TEST
RESULTS**

JOB NO.
230520
FIG NO.
12

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	4A	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-2	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	2	<u>TEST BY</u>	BL



U.S.
Sieve #

Percent
Finer

Atterberg
Limits

3"

Plastic Limit

1 1/2"

Liquid Limit

3/4"

Plastic Index

1/2"

3/8"

4

Swell

10

Moisture at start

20

Moisture at finish

40

100.0%

Moisture increase

100

98.5%

Initial dry density (pcf)

200

95.1%

Swell (psf)



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LABORATORY TEST
RESULTS

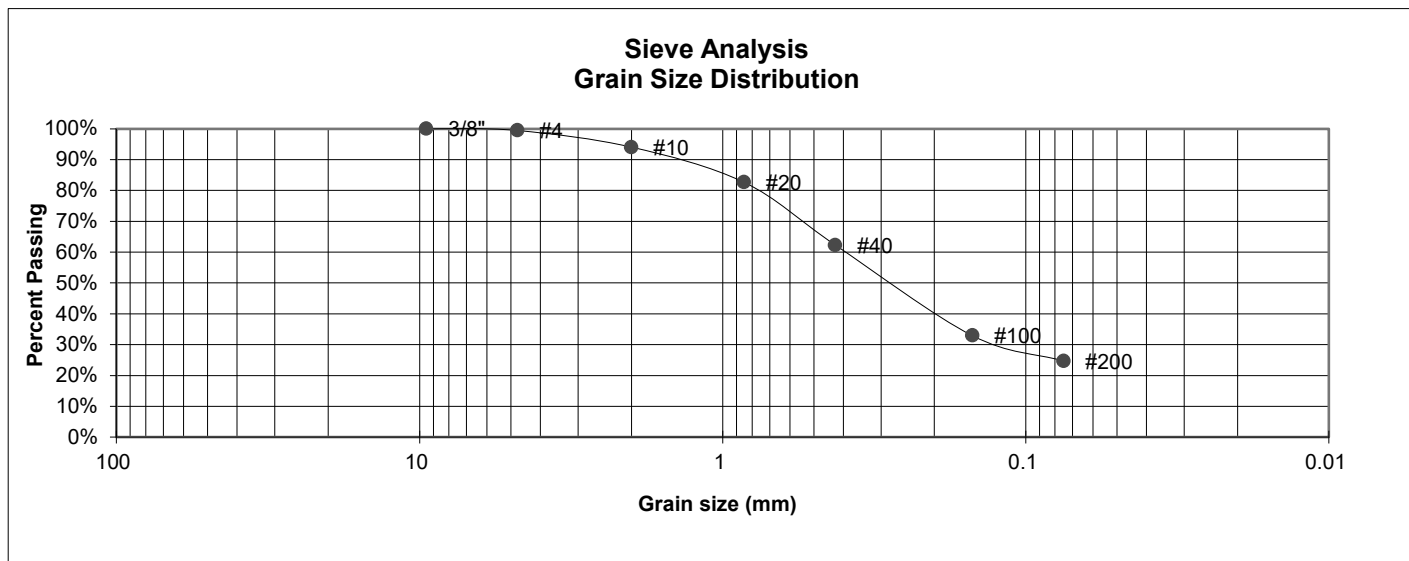
JOB NO.

230520

FIG NO.

13

UNIFIED CLASSIFICATION	SC	CLIENT	LAZY Y AND ROCKIN' J
SOIL TYPE #	3	PROJECT	12960 NORTH PEYTON HIGHWAY
TEST BORING #	TP-3	JOB NO.	230520
DEPTH (FT)	2	TEST BY	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.4%
10	94.0%
20	82.6%
40	62.3%
100	32.9%
200	24.7%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



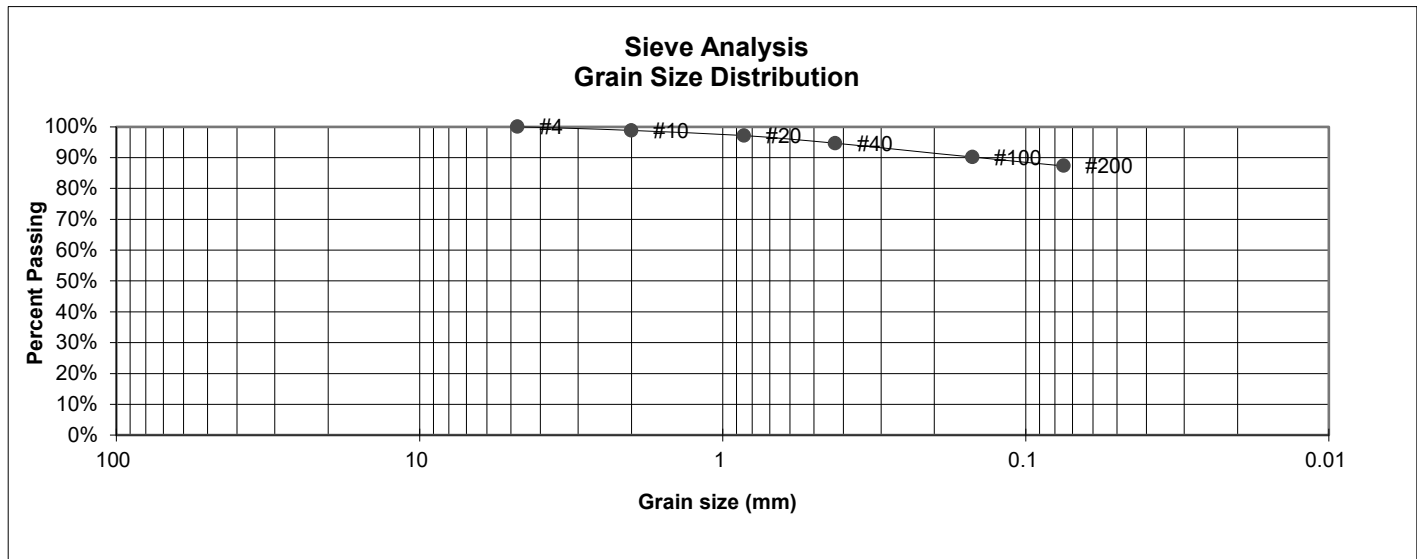
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**LABORATORY TEST
RESULTS**

JOB NO.
230520
FIG NO.
14

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	4A	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-4	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	4.5	<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	100.0%
10	98.8%
20	97.1%
40	94.7%
100	90.2%
200	87.3%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



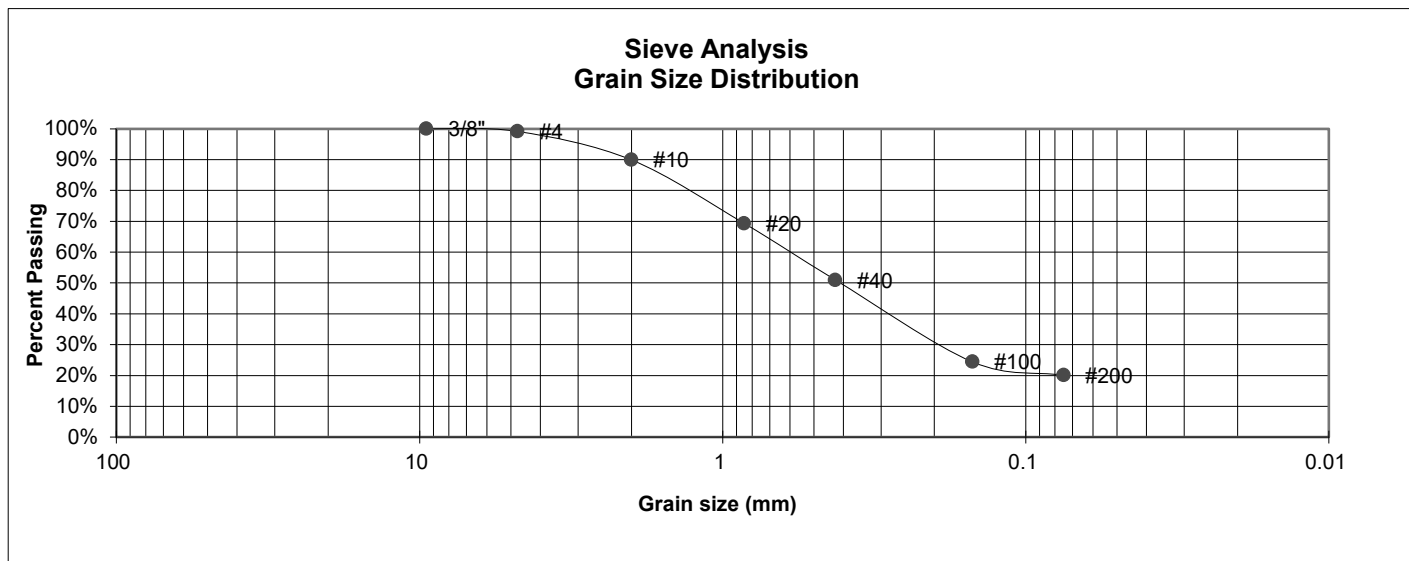
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LABORATORY TEST
RESULTS

JOB NO.
230520
FIG NO.
15

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	3	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-5	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	3	<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	99.2%
10	89.9%
20	69.3%
40	50.9%
100	24.4%
200	20.1%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



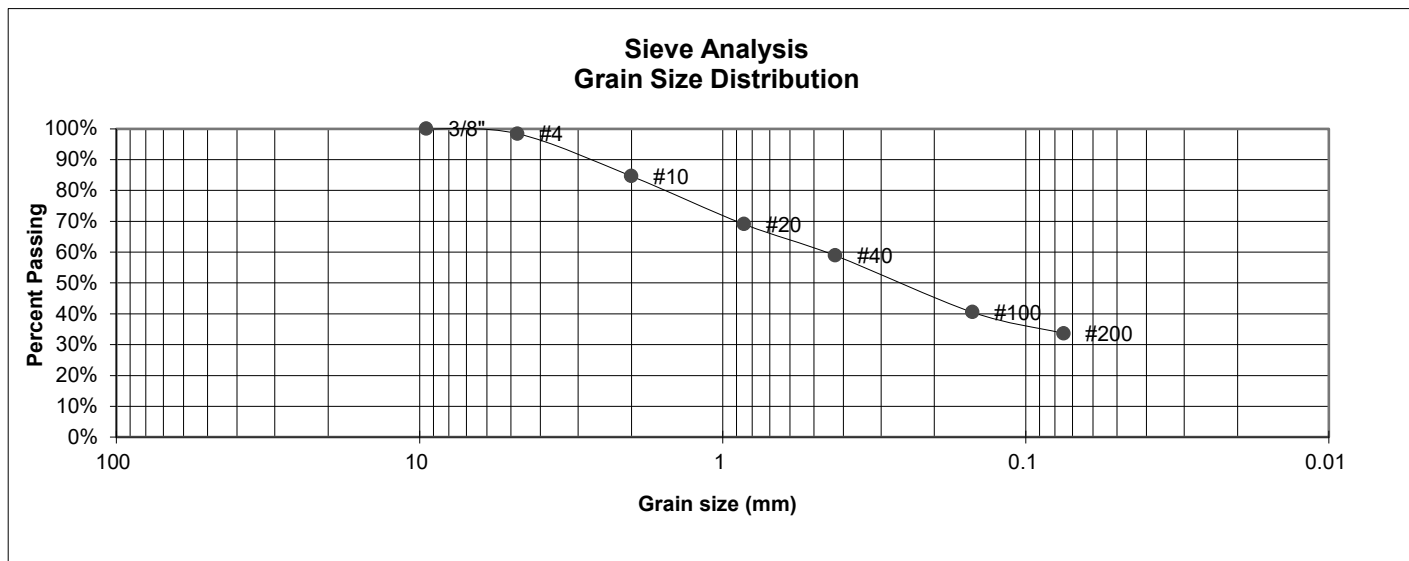
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LABORATORY TEST
RESULTS

JOB NO.
230520
FIG NO.
16

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	4A	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-6	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	3.5	<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	98.4%
10	84.6%
20	69.0%
40	58.9%
100	40.5%
200	33.6%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



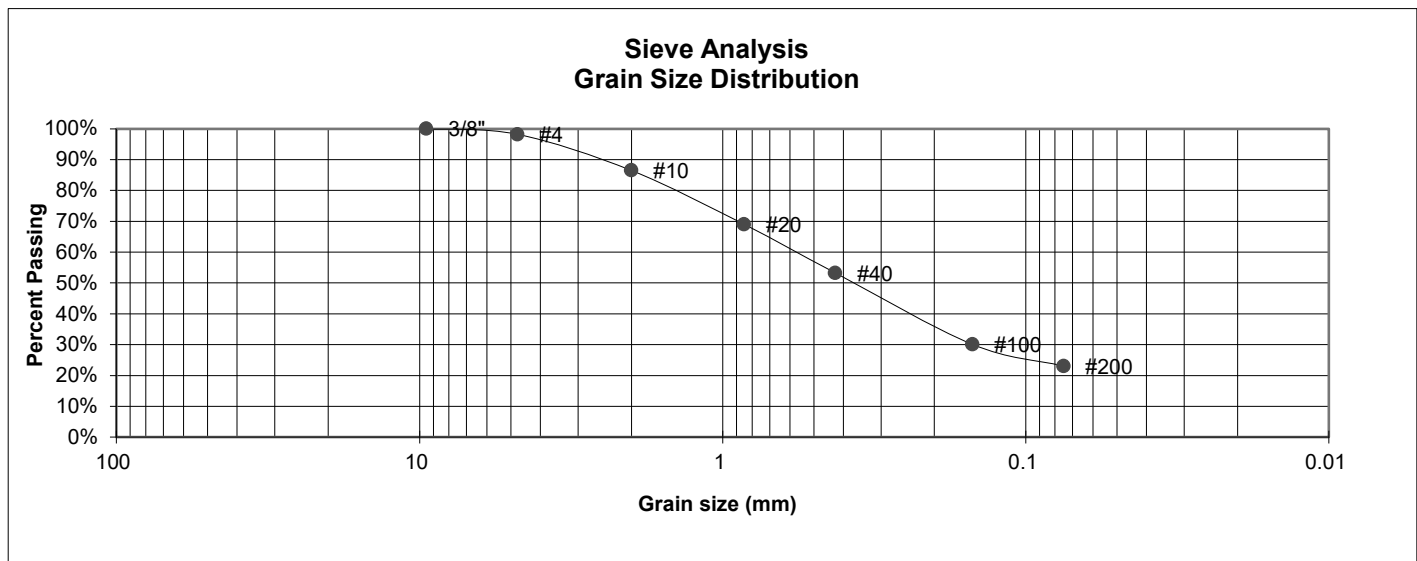
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LABORATORY TEST
RESULTS

JOB NO.
230520
FIG NO.
17

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	4A	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-7	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	2.5	<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	98.2%
10	86.5%
20	69.0%
40	53.2%
100	30.1%
200	23.1%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



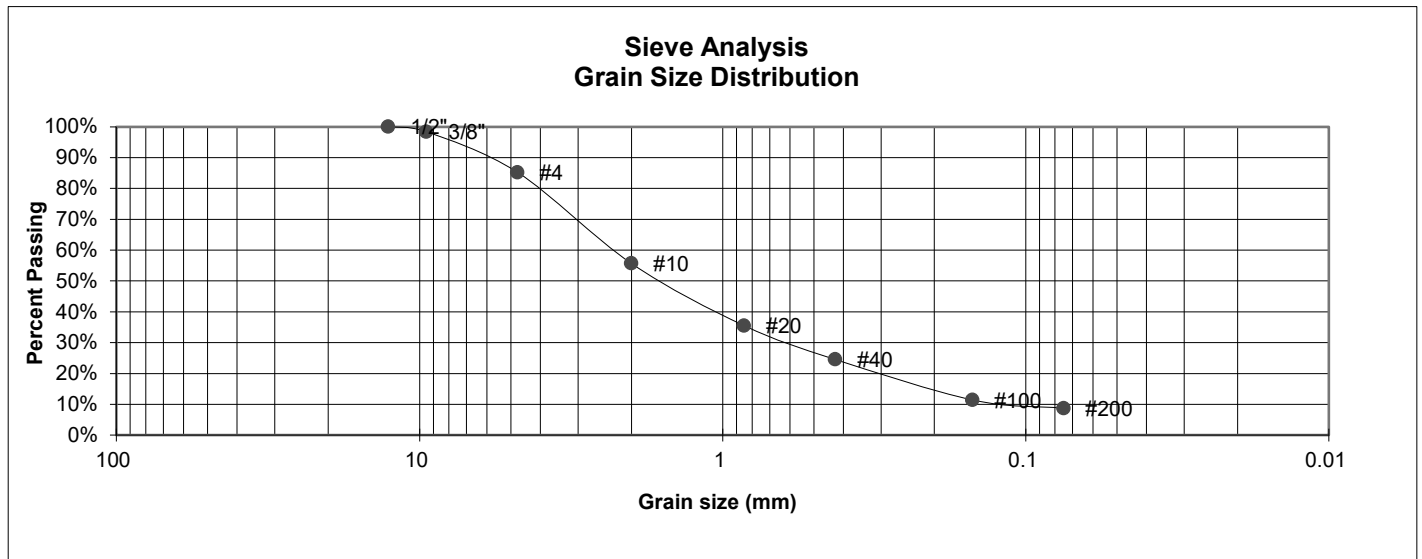
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**LABORATORY TEST
RESULTS**

JOB NO.
230520
FIG NO.
18

<u>UNIFIED CLASSIFICATION</u>	SM-SW	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	3A/R1	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-8	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	1.5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.4%
4	85.2%
10	55.7%
20	35.5%
40	24.6%
100	11.4%
200	8.7%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



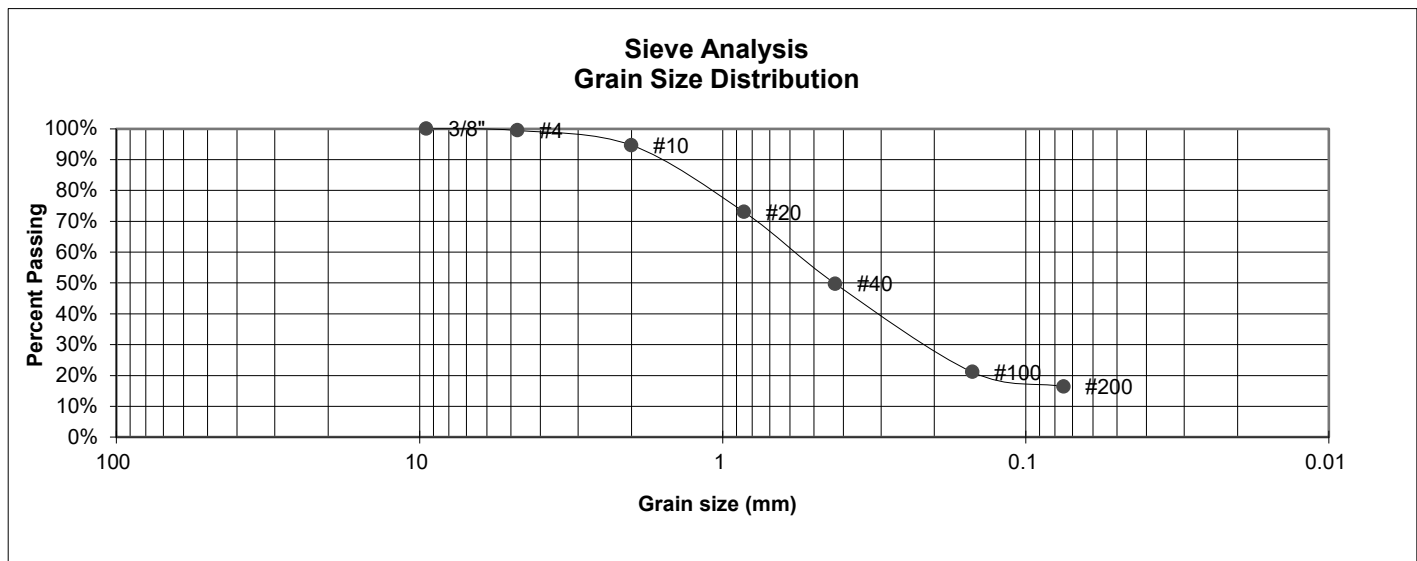
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LABORATORY TEST
RESULTS

JOB NO.
230520
FIG NO.
19

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	3A	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-9	<u>JOB NO.</u>	230520
<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	99.5%
10	94.6%
20	73.0%
40	49.7%
100	21.1%
200	16.4%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



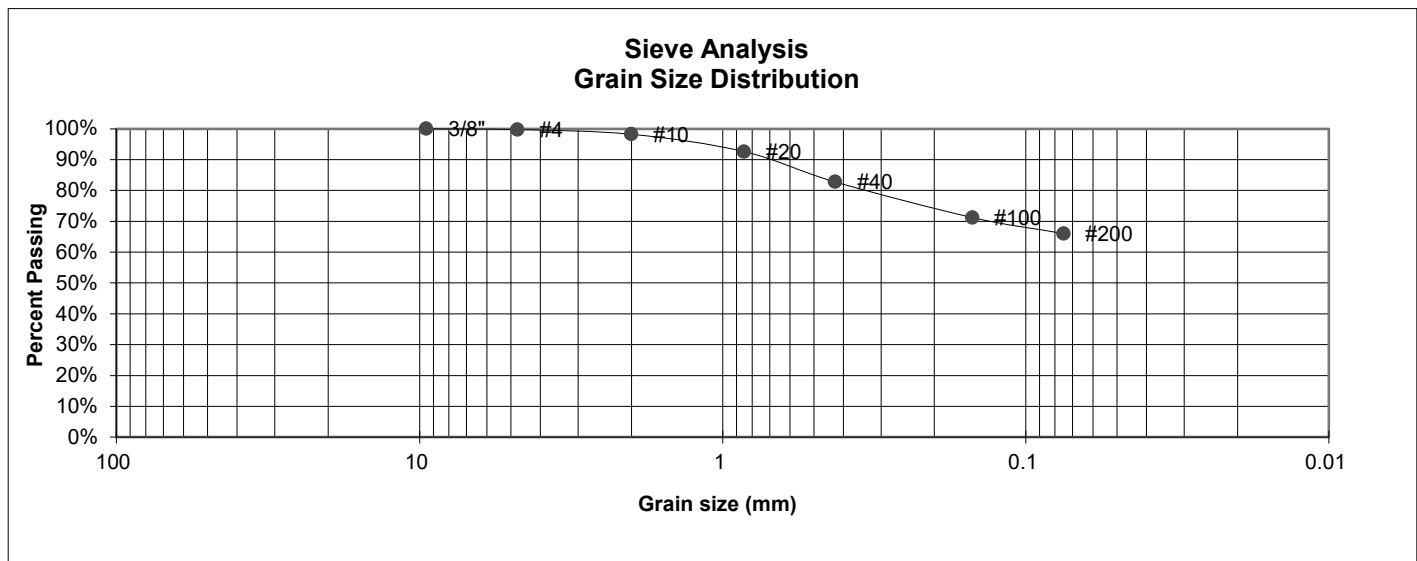
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LABORATORY TEST
RESULTS

JOB NO.
230520
FIG NO.
20

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	4A	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-10	<u>JOB NO.</u>	230520
<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	98.2%
20	92.6%
40	82.8%
100	71.2%
200	66.0%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



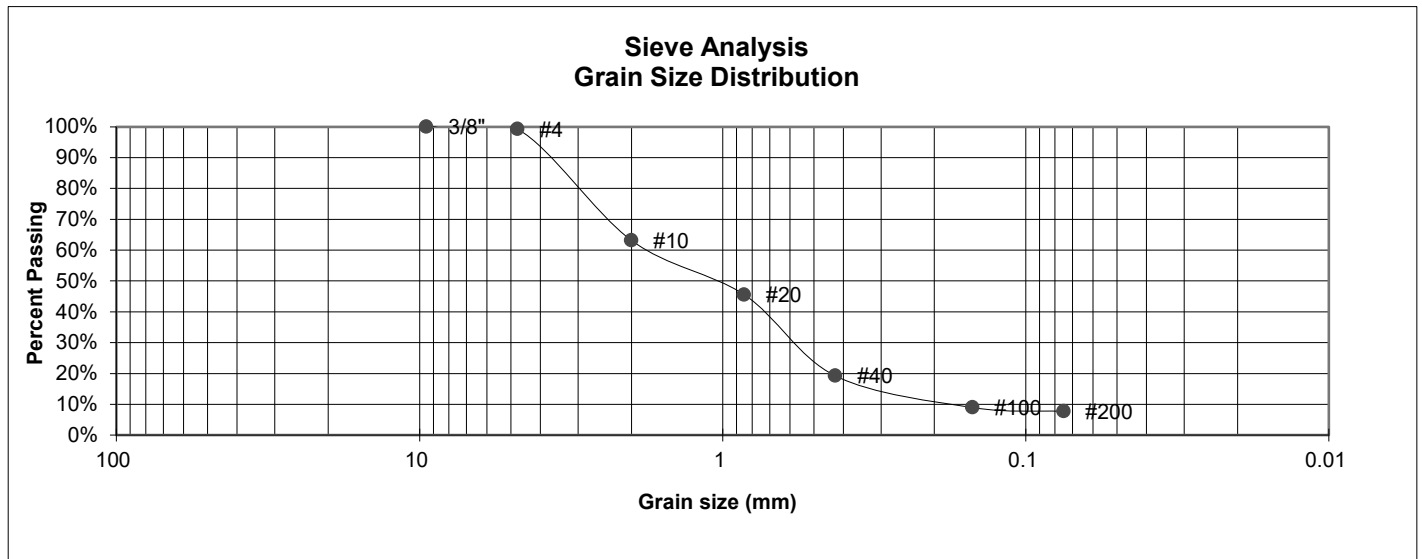
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COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST
RESULTS

JOB NO.
230520
FIG NO.
21

UNIFIED CLASSIFICATION	SM-SW	CLIENT	LAZY Y AND ROCKIN' J
SOIL TYPE #	3/R1	PROJECT	12960 NORTH PEYTON HIGHWAY
TEST BORING #	TP-11	JOB NO.	230520
DEPTH (FT)	4	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.3%
10	63.2%
20	45.6%
40	19.2%
100	9.0%
200	7.7%

**Atterberg
Limits**
Plastic Limit
Liquid Limit
Plastic Index

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



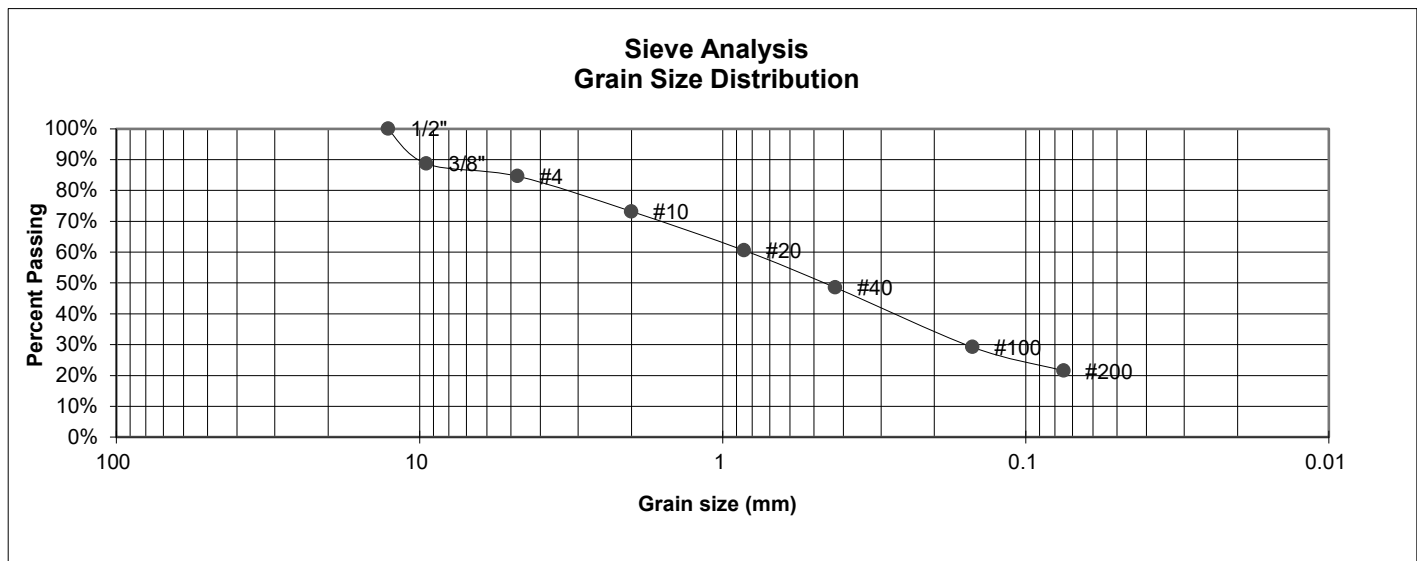
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**LABORATORY TEST
RESULTS**

JOB NO.
230520
FIG NO.
22

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	4A	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-12	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	7.5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	88.7%
4	84.6%
10	73.2%
20	60.6%
40	48.5%
100	29.2%
200	21.5%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



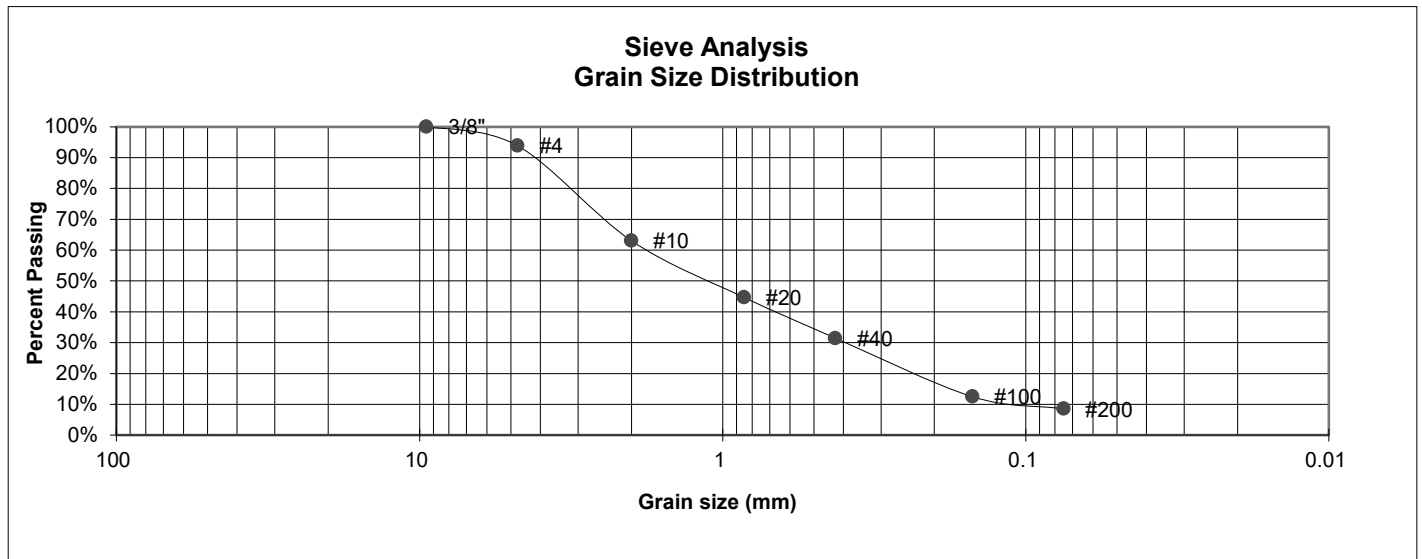
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COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST
RESULTS

JOB NO.
230520
FIG NO.
23

<u>UNIFIED CLASSIFICATION</u>	SM-SW	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	2/R1	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-13	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	3	<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	93.9%
10	63.0%
20	44.7%
40	31.5%
100	12.5%
200	8.5%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



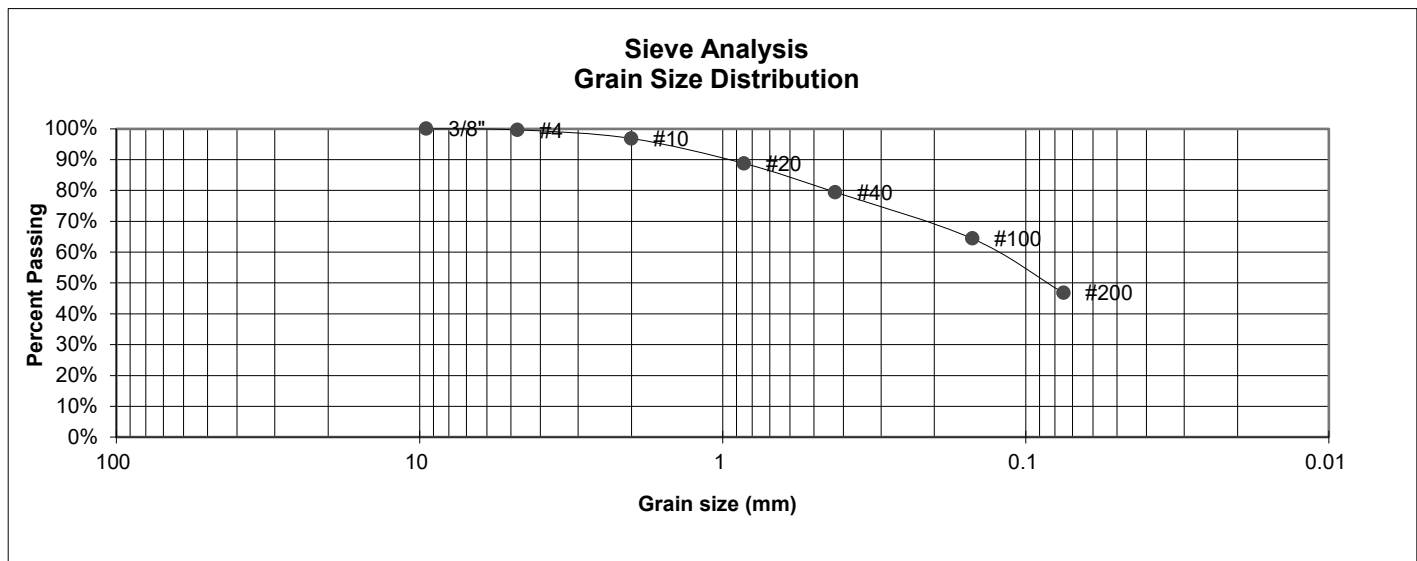
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**LABORATORY TEST
RESULTS**

JOB NO.
230520
FIG NO.
24

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	4A	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	TP-14	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	5	<u>TEST BY</u>	BL



U.S.
Sieve #
3"

1 1/2"

3/4"

1/2"

3/8"

4

10

20

40

100

200

Percent
Finer

100.0%

99.6%

96.8%

88.7%

79.4%

64.4%

46.7%

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

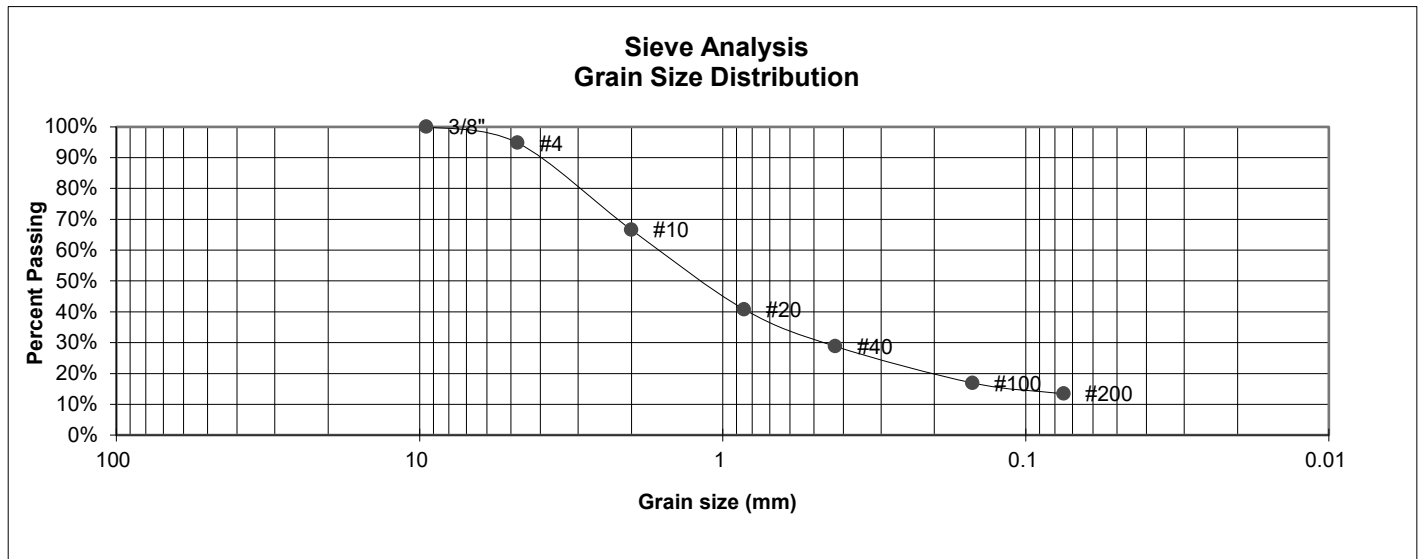
JOB NO.

230520

FIG NO.

25

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	3A/R1	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	15	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	3.5	<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	94.8%
10	66.6%
20	40.8%
40	28.8%
100	16.9%
200	13.4%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



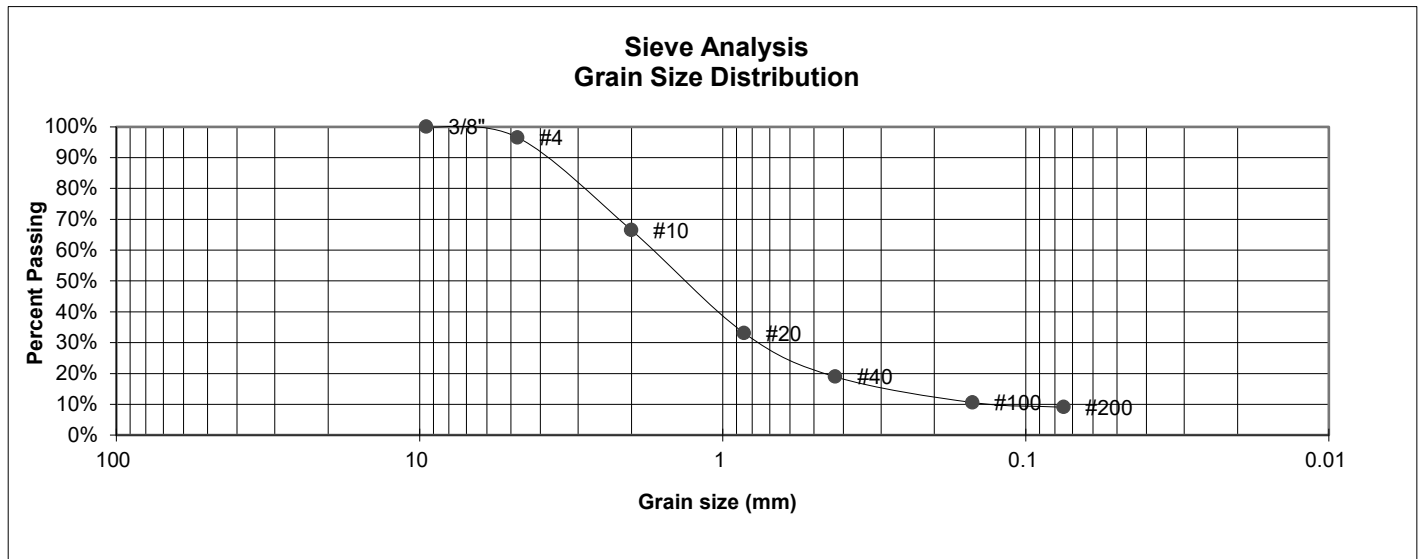
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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST
RESULTS**

JOB NO.
230520
FIG NO.
26

<u>UNIFIED CLASSIFICATION</u>	SC-SW	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	3A/R1	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	16	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	3	<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	96.5%
10	66.5%
20	33.1%
40	18.9%
100	10.6%
200	9.1%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



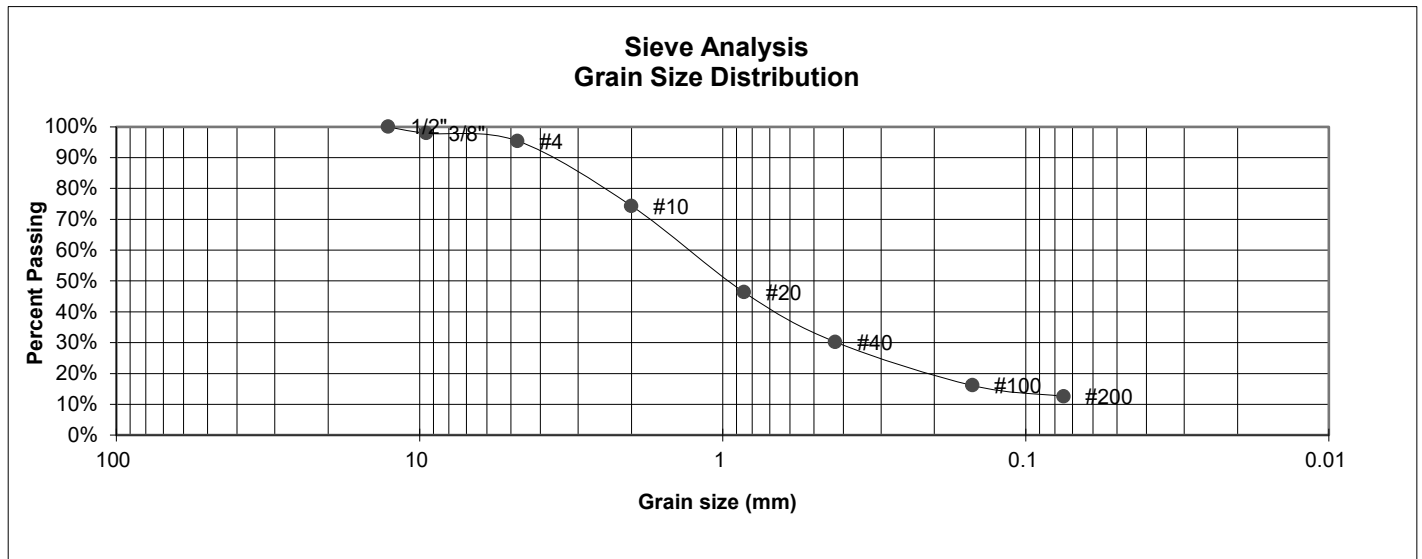
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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

LABORATORY TEST
RESULTS

JOB NO.
230520
FIG NO.
27

<u>UNIFIED CLASSIFICATION</u>	SC	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	3	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	16	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	6.5	<u>TEST BY</u>	BL



<u>U.S. Sieve #</u>	<u>Percent Finer</u>
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.9%
4	95.4%
10	74.3%
20	46.3%
40	30.2%
100	16.1%
200	12.6%

Atterberg
Limits
Plastic Limit
Liquid Limit
Plastic Index

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



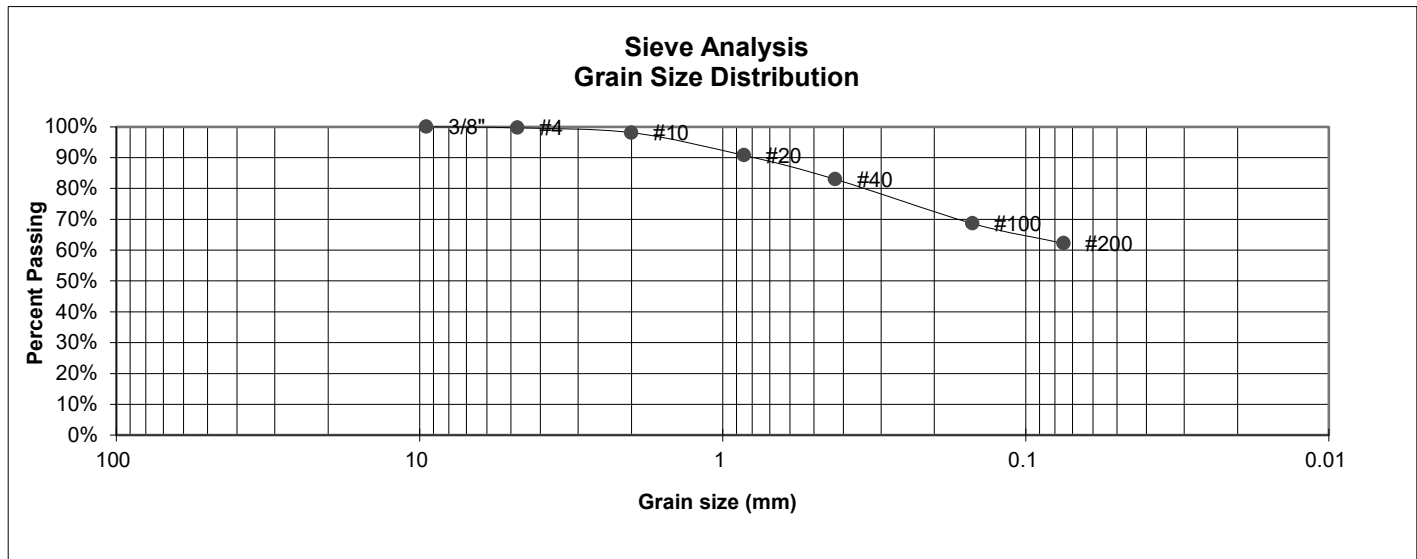
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**LABORATORY TEST
RESULTS**

JOB NO.
230520
FIG NO.
28

<u>UNIFIED CLASSIFICATION</u>	CL	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	4A	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	17	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	3	<u>TEST BY</u>	BL



U.S.
Sieve #
3"

Percent
Finer

Atterberg
Limits

1 1/2"

Plastic Limit

3/4"

Liquid Limit

1/2"

Plastic Index

3/8"

100.0%

4

99.7%

10

98.1%

20

90.7%

40

83.0%

100

68.6%

200

62.2%

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

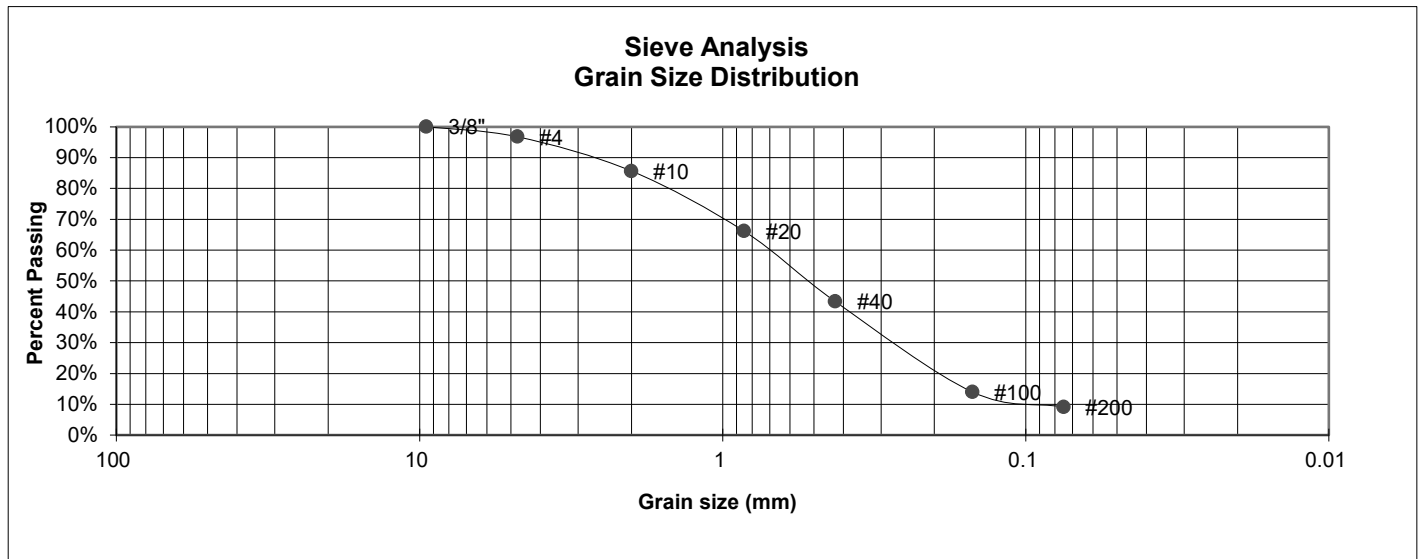
JOB NO.

230520

FIG NO.

29

UNIFIED CLASSIFICATION	SC-SW	CLIENT	LAZY Y AND ROCKIN' J
SOIL TYPE #	3/R1	PROJECT	12960 NORTH PEYTON HIGHWAY
TEST BORING #	18	JOB NO.	230520
DEPTH (FT)	4	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.7%
10	85.6%
20	66.2%
40	43.3%
100	14.0%
200	9.2%

**Atterberg
Limits**
Plastic Limit
Liquid Limit
Plastic Index

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



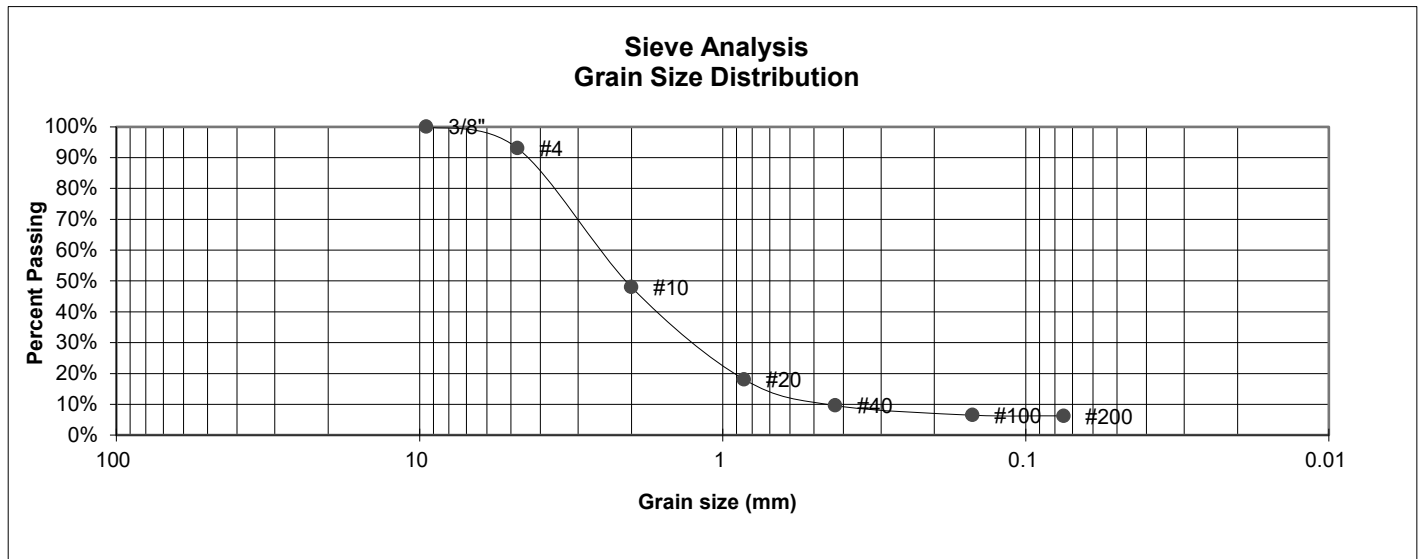
**ENTECH
ENGINEERING, INC.**

505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

**LABORATORY TEST
RESULTS**

JOB NO.
230520
FIG NO.
30

<u>UNIFIED CLASSIFICATION</u>	SC-SW	<u>CLIENT</u>	LAZY Y AND ROCKIN' J
<u>SOIL TYPE #</u>	3/R1	<u>PROJECT</u>	12960 NORTH PEYTON HIGHWAY
<u>TEST BORING #</u>	19	<u>JOB NO.</u>	230520
<u>DEPTH (FT)</u>	4	<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	93.0%
10	48.0%
20	18.0%
40	9.6%
100	6.5%
200	6.2%

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

JOB NO.
230520
FIG NO.
31

APPENDIX E: USDA Soil Descriptions

El Paso County Area, Colorado

84—Stapleton sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 36b0

Elevation: 6,500 to 7,300 feet

Mean annual precipitation: 14 to 16 inches

Mean annual air temperature: 46 to 48 degrees F

Frost-free period: 125 to 145 days

Farmland classification: Not prime farmland

Map Unit Composition

Stapleton and similar soils: 95 percent

Minor components: 5 percent

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

Description of Stapleton

Setting

Landform: Hills

Landform position (three-dimensional): Side slope

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Sandy alluvium derived from arkose

Typical profile

A - 0 to 11 inches: sandy loam

Bw - 11 to 17 inches: gravelly sandy loam

C - 17 to 60 inches: gravelly loamy sand

Properties and qualities

Slope: 8 to 15 percent

Depth to restrictive feature: More than 80 inches

Drainage class: Well drained

Runoff class: Low

Capacity of the most limiting layer to transmit water (Ksat): High
(2.00 to 6.00 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Available water supply, 0 to 60 inches: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified

Land capability classification (nonirrigated): 4e

Hydrologic Soil Group: B

Ecological site: R049XY214CO - Gravelly Foothill

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 21, Aug 24, 2023