

WASTEWATER DISPOSAL REPORT

for

***SMH Consultants
Porcelain Pines Subdivision***

EPC Parcel – Tax ID #: 8322200018

January 2023

Prepared By:



PORCELAIN PINES SUBDIVISION
EPC Parcel – Tax Schedule # 8322200018

WASTEWATER DISPOSAL REPORT

January 2023

Prepared for:

SMH Consultants
411 South Tejon Street
Colorado Springs, CO 80903

Prepared by:

JDS-Hydro a Division of RESPEC
5540 Tech Center Drive, Suite 100
Colorado Springs, CO 80919

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1.0 INTRODUCTION AND EXECUTIVE SUMMARY

The purpose of this report is to address the specific wastewater loads for the proposed residential property located at Parcel # 8322200018 in El Paso County, CO.

EXECUTIVE SUMMARY: The proposed subdivision has adequate water rights, water quality, area, and soils to support the water demands and wastewater production produced by the proposed four (4) lot subdivision on a 300-year basis.

2.0 PROJECTED LAND USES

2.1 Projected Land Uses

This report pertains to the existing 35.16-acre parcel that is proposed to be divided into four (4) lots. Please refer to the *Land Use Exhibit* in **Appendix A** depicting the proposed subdivision.

3.0 WASTEWATER REPORT

3.1 Wastewater Loads

There are four (4) residential units proposed on the subdivided property. There is a total of 4.07 AF/year of projected water demand for the entire four (4) lot development, 1.04 AF/year of which is projected for total household use (estimated at 0.26 AF/year/residence with four [4] total residences at full buildout). At an assumed 90% of household demand being sent to septic through a non-evaporative system, this equates to a total of 0.234 AF/year/SFE, or 0.936 AF/year total, to be sent to septic for treatment. This equates to a total of 836 gallons per day being sent to septic at full buildout. A breakdown of projected wastewater loads is summarized in Table 3-1.

Table 3-1: Summary of Expected Water Demands & Wastewater Loads

# of SFE's	Water					Wastewater
	Annual Indoor Use 0.26 (AF/YR/SFE)	Average Daily Indoor Use (GPD)	Irrigation 0.0566 (AF/1,000 SF)	Domestic Watering 0.011 (AF/Horse/Year)	Total Indoor, Watering, & Irrigation (AF)	ADF (@ 90% Indoor Use) (GPD)
4	Note 1 1.040	928	Note 2 2.943	Note 3 0.088	4.07	836

Note 1: **Per 8.4.7(B)(7)(d) of the EPC Land Development Code**

Note 2: **Per 8.4.7(B)(7)(d) of the EPC Land Development Code, assuming 13,000 ft² of irrigation per lot**

Note 2: **Assuming 2 horses per lot**

3.2 *On-Site Wastewater Treatment Systems (OWTS)*

3.2 *On-Site Wastewater Treatment System*

The proposed single-family homes will be served by individual on-site wastewater treatment systems. The site was evaluated for *on-site wastewater treatment systems* (OWTS) by RMG Architects and Engineers on February 22, 2022. Five (5) test pits were excavated on December 22, 2015, for a report prepared in 2016. An OWTS letter was written to supplement the 2016 report verifying the ability to have OWTS on the proposed subdivision. Test pits were drilled to depths of 20 to 25 feet deep on the site to determine general suitability for the use of OWTS. No groundwater, runoff, or irrigation features were anticipated to cause deleterious effects to treatment system. Also, no restrictive layers were encountered in the test pits. Slopes greater than 20 percent exist on the site. Bedrock was encountered in the test borings.

There were no indications of seasonally shallow groundwater observed in the profile pit excavations.

Soils in the area were also classified from silty to clayey with gravel and bedrock. US Soil Conservation Service identifies the site soils as follows:

26 – Legault-Rock Outcrop Complex with 15 to 65 percent slopes

48 – Tecolote very gravely sandy loam with 15 to 40 percent slopes

Encountered soil and groundwater conditions for the site are suitable for individual treatment systems. If El Paso County Board of Health setback requirements are met for each lot, there are no restrictions on the placement of the individual OWTS systems.

According to RMG's report, each developed lot must achieve the following prior to the construction of any proposed OWTS system:

- 1) All wastewater treatment must be achieved 4' above groundwater or bedrock.
- 2) Each lot will require an OWTS report prepared according to the Regulations of the El Paso County Board of Health. As part of these regulations, two (2) 8' deep test pits must be excavated in the vicinity of the proposed OWTS location.
- 3) The proposed OWTS site must comply with any physical setback requirements established by the El Paso County Department of Health and Environment (EPCHDE).
- 4) All OWTS locations must be located a minimum of 100 feet from of any existing or proposed potable well.
- 5) OWTS must be designed by a professional engineer and approved by El Paso County if the ground slope of the OWTS location is greater than thirty percent.

The *Soil and Geology Study* as well the *Wastewater Study* letter provide by RMG Architects and Engineers, Mountain Road, Guntzelman Porcelain Pines Subdivision, El Paso County, Colorado, March 18, 2022, Amended January 10, 2023 is included in **Appendix B**.

Appendix A

GUNTZELMAN PORCELAIN PINES SUBDIVISION

Final Plat

PART OF THE NORTHWEST 1/4, SECTION 22, TOWNSHIP 13 SOUTH, RANGE 68 WEST OF THE SIXTH PRINCIPAL MERIDIAN, COUNTY OF EL PASO, STATE OF COLORADO

KNOW ALL MEN BY THESE PRESENTS:

That the undersigned, Kristian & Christa Guntzelman, being the owner of the following described tract of land:

TO WIT:

DEED DESCRIPTION: REC. NO. 221114676)
A portion of the parcel described in that Quclaim Deed, recorded January 22, 2020 under Reception No. 220009194, in the Official Public Records of El Paso County, Colorado, located in the Northwest 1/4 of Section 22, Township 13 South, Range 68 West, of the 6th P.M., being more particularly described as follows:

COMMENTS: at the Center 1/4 Corner of said Section 22, thence along the south line of the South 1/4 of said Section 22, 14 feet to said Section 22, N85°27'03"W, 66 feet to the center of the south line of the Southeast 1/4 of said Section 22, monumented at the Center 1/4 Corner of said Section 22 by a 1" iron pipe with a 2-1/2" brass cap stamped "1938 U.S. GENERAL LAND OFFICE SURVEY", 0.5' above grade and monumented at the West Center 1/16 Corner by a 1" iron pipe with a 2-1/2" brass cap stamped "1938 U.S. GENERAL LAND OFFICE SURVEY", flush with grade, having a measured bearing of N88°57'03"W, a distance of 1301.48 feet, a distance of 234.34 feet to the southeast corner of said parcel, being the POINT OF BEGINNING, thence along the south line of said Section 22, N88°57'03"W, a distance of 1087.14 feet to the West 1/16 Corner of said Section 22, thence along the North-South Center line of the Northwest 1/4 of said Section 22, N01°07'31"W, a distance of 932.25 feet, thence leaving said North-South Center line, N88°52'29"E, a distance of 182.97 feet, thence N01°08'07"W, a distance of 353.05 feet, thence N41°48'19"W, a distance of 283.92 feet to a point on south right-of-way line of Nampa Road, thence along the south right-of-way line of said Nampa Road, the following seven (7) courses:

- N48°13'23"E, a distance of 60.11 feet;
- along the arc of a non-tangent curve to the right, whose center bears N48°07'42"E, having a radius of 23.65 feet, a central angle of 115°53'06", a distance of 47.83 feet;
- N73°46'14"E, a distance of 315.39 feet;
- along the arc of a non-tangent curve to the left, whose center bears N16°10'04"W, having a radius of 246.95 feet, a central angle of 38°16'52", a distance of 164.26 feet;
- along the arc of a non-tangent curve to the right, whose center bears S04°35'21"E, having a radius of 303.83 feet, a central angle 140°10'04", a distance of 74.39 feet;
- N49°31'09"E, a distance of 265.03 feet;
- along the arc of a non-tangent curve to the left, whose center bears N40°28'22"W, having a radius of 364.10 feet, a central angle of 23°57'14", a distance of 152.22 feet, to a point on the southeast line of that Right-of-Way Vacation recorded under Book 3122 Page 824 in the Official Public Records of El Paso County, Colorado;

Thence continuing along said southwest line of said Right-of-Way Vacation, N05°35'01"E, a distance of 134.87 feet to a point on the south right-of-way line of Nampa Road, thence along said south right-of-way line, the following five (5) courses:

- Along the arc of a non-tangent curve to the right, whose center bears S64°28'18"E, having a radius of 59.60 feet, a central angle of 95°53'57", a distance of 99.76 feet;
- S35°29'48"E, a distance of 40.03 feet;
- along the arc of a non-tangent curve to the left, whose center bears N31°15'02"E, having a radius of 96.71 feet, a central angle of 48°28'43", a distance of 81.83 feet;
- N72°58'37"E, a distance of 67.62 feet;
- along the arc of a non-tangent curve to the left, whose center bears N12°19'30"W, having a radius of 96.71 feet, a central angle of 22°07'11", a distance of 37.24 feet, to a point on the west line of Pikes Peak Mountain Estates, recorded November 5, 2001 under Reception No. 201161597;

Thence continuing along said west line of Pikes Peak Mountain Estates, the following two (2) courses:

- S18°49'36"E, a distance of 138.79 feet;
- S35°59'27"W, a distance of 515.72 feet, to a point on the west right-of-way line of Pikes Peak Toll Road.

Thence continuing along said west right-of-way line of Pikes Peak Toll Road, the following, thirteen (13) courses:

- Along the arc of a non-tangent curve to the left, whose center bears S11°39'01"E, having a radius of 193.42 feet, a central angle of 64°29'48", a distance of 217.73 feet;
- S13°45'10"W, a distance of 216.22 feet, to the left, whose center bears S76°02'47"E, having a radius of 1095.40 feet, a central angle of 11°10'16", a distance of 186.03 feet;
- S02°43'25"W, a distance of 173.36 feet;
- Along the arc of a non-tangent curve to the left, whose center bears S87°14'50"E, having a radius of 460.30 feet, a central angle of 17°26'00", a distance of 140.06 feet;
- S14°46'15"E, a distance of 167.06 feet;
- Along the arc of a non-tangent curve to the left, whose center bears S74°40'19"E, having a radius of 238.00 feet, a central angle of 31°37'04", a distance of 168.49 feet;
- S45°59'03"E, a distance of 171.85 feet;
- Along the arc of a non-tangent curve to the right, whose center bears S43°26'18"E, having a radius of 238.00 feet, a central angle of 31°14'04", a distance of 128.74 feet;
- S15°27'25"E, a distance of 155.45 feet;
- Along the arc of a non-tangent curve to the right, whose center bears S74°31'58"E, having a radius of 238.00 feet, a central angle of 19°18'37", a distance of 80.21 feet;
- S16°01'18"E, a distance of 467.71 feet;
- Along the arc of a non-tangent curve to the left, whose center bears S86°04'20"E, having a radius of 363.70 feet, a central angle of 09°00'56", a distance of 57.23 feet, to the POINT OF BEGINNING.

SURVEYORS CERTIFICATE:

Tim Sloan, a duly registered Professional Land Surveyor in the State of Colorado, do hereby certify that the above described plat was prepared by me or under my direct supervision and that all monuments and data shown hereon, that mathematical closure errors are less than 1:10,000; and that said plat has been prepared in full compliance with all applicable laws of the State of Colorado dealing with monuments, subdivision, or surveying of land and all applicable provisions of the El Paso County Land Development Code.

I attest on this _____ day of _____, 20____.

Tim Sloan, Professional Land Surveyor _____ Date
Colorado Registered PLS #38374



DEDICATION:

The undersigned, being all the Owners, Mortgagees, Beneficiaries of Deeds of Trust and holders of other interests in the land described herein, have laid out, subdivided, and platted said lands into lots, tracts, streets, and easements as shown hereon under the name and subdivision of "GUNTZELMAN PORCELAIN PINES SUBDIVISION". All public improvements so platted are hereby dedicated to public use and said Owner of El Paso hereby certifies and agrees that the public improvements herein consented to will be paid for by said Owner and will be to the satisfaction of the Board of County Commissioners of El Paso County, Colorado. Upon acceptance by resolution, all public improvements so dedicated will become matters of maintenance by El Paso County, Colorado. The utility easements shown hereon are hereby dedicated for public utilities and communication systems and other purposes as shown hereon. The entities responsible for providing the services for which the easements are established are hereby granted the perpetual right of ingress and egress from and to adjacent properties for installation, maintenance, and replacement of utility lines and related facilities.

IN WITNESS WHEREOF:

The aforementioned Kristian & Christa Guntzelman, have executed this instrument this _____ day of _____, 2022 A.D.

KRISTIAN GUNTZELMAN _____ CHRISTA GUNTZELMAN _____

NOTARIAL:

STATE OF COLORADO)
COUNTY OF EL PASO)

The foregoing instrument was acknowledged before me this _____ day of _____, 2022 A.D. by KRISTIAN & CHRISTA GUNTZELMAN

Witness my hand and seal _____

Address _____

My Commission expires _____

RECORDINGS:

STATE OF COLORADO)
COUNTY OF EL PASO)

I hereby certify that this instrument was filed for record in my office at _____

_____ M. this _____ day of _____,

2022 A.D., and is duly recorded under Reception Number _____

of the records of El Paso County, State of Colorado.

By: _____ Date _____

El Paso County Clerk and Recorder _____

BOARD OF COUNTY COMMISSIONERS CERTIFICATE:

This Plat GUNTZELMAN PORCELAIN PINES SUBDIVISION was approved for filing by the El Paso County, Colorado Board of County Commissioners on the _____ day of _____, 2022, subject to any notes specified hereon and any conditions included in the resolution of approval. The dedications of land to the public streets and easements are accepted, but public improvements thereon will not become the maintenance responsibility of El Paso County until preliminary acceptances of the public improvements thereon will not become the maintenance responsibility of El Paso County until preliminary acceptance of the public improvements in accordance with the requirements of the Land Development Code and Engineering Criteria Manual, and the Subdivision Improvement Agreement.

Chair, Board of County Commissioners _____ Date _____

Director, Planning and Community Development Department _____ Date _____

El Paso County Assessor _____ Date _____

NOTICE:

ACCORDING TO COLORADO LAW YOU MUST COMMENCE ANY LEGAL ACTION BASED UPON ANY DEFECT IN THIS SURVEY WITHIN THREE YEARS AFTER YOU FIRST DISCOVER SUCH DEFECT. IN NO EVENT MAY ANY ACTION BASED UPON ANY DEFECT IN THIS SURVEY BE COMMENCED MORE THAN TEN YEARS FROM THE DATE OF CERTIFICATION SHOWN HEREON.

ENVIRONMENTAL:

DEVELOPER SHALL COMPLY WITH FEDERAL AND STATE LAWS, REGULATIONS, ORDINANCES, REVIEW AND PERMIT REQUIREMENTS, AND OTHER AGENCY REQUIREMENTS, IF ANY, OF APPLICABLE AGENCIES, INCLUDING BUT NOT LIMITED TO, THE COLORADO DEPARTMENT OF AGRICULTURE, THE COLORADO DEPARTMENT OF NATURAL RESOURCES, THE COLORADO DEPARTMENT OF REVENUE, THE COLORADO DEPARTMENT OF U.S. FISH & WILDLIFE SERVICE REGARDING THE ENHANCED SPECIES ACT.

EASEMENTS:

UNLESS OTHERWISE INDICATED, ALL SIDE, FRONT, AND REAR LOT LINES ARE HEREBY PLATTED ON SUBDIVISION BOUNDARIES ARE HEREBY PLATTED WITH A 30-FOOT PUBLIC UTILITY AND DRAINAGE EASEMENT. THE SOLE RESPONSIBILITY FOR THE MAINTENANCE OF THESE EASEMENTS IS HEREBY VESTED WITH THE INDIVIDUAL PROPERTY OWNERS.

NOTES:

- ALL EASEMENTS, RESTRICTIONS, RESERVATIONS, SETBACKS, OR OTHER MATTER OF RECORD, IF ANY, AFFECTING THE TITLE OF THIS PROPERTY, ARE SHOWN, EXCEPT AS PLATTED, AS PER AGREEMENT WITH THE LANDOWNER.
- NO GAPS OR OVERLAPS EXIST.
- THERE ARE NO LINES OF POSSESSION THAT AFFECT THIS SURVEY.
- BASELINE TRACT IS RECORDED AS RECEPTION NO. 201114676, CLERK AND RECORDERS OFFICE, EL PASO COUNTY, COLORADO.
- THERE ARE NO BUILDINGS ON THE SUBJECT PROPERTY.
- ALL BUILDING SETBACK REQUIREMENTS SHALL BE DETERMINED BY THE ZONING DISTRICT, UNLESS OTHERWISE NOTED.
- THIS SURVEY DOES NOT CONSTITUTE A TITLE SEARCH BY SMH CONSULTANTS, TO DETERMINE OWNERSHIP OR EASEMENTS OF RECORD. FOR INFORMATION REGARDING EASEMENTS, RIGHT OF WAY, SMH CONSULTANTS RELIED UPON THE TITLE POLICY PREPARED BY LAND TITLE GUARANTEE COMPANY, ORDER # SMO5106630, DATED JUNE 9, 2022.

- BASEIS OF BEARINGS IS THE SOUTH LINE OF THE SOUTHEAST 1/4 OF THE NORTHWEST 1/4 OF SECTION 22, TOWNSHIP 13 SOUTH, RANGE 68 WEST, MONUMENTED AT THE CENTER 1/4 CORNER OF SAID SECTION 22 BY A 1" IRON PIPE WITH A 2-1/2" BRASS CAP STAMPED "1938 U.S. GENERAL LAND OFFICE SURVEY", 0.5' ABOVE GRADE, AND AT THE WEST 1/16 CENTER CORNER BY A 1" IRON PIPE WITH A 2-1/2" BRASS CAP STAMPED "1938 U.S. GENERAL LAND OFFICE SURVEY" AND ASSUMED TO BEAR NORTH 88 DEGREES 58 MINUTES 46 SECONDS WEST, 1301.48 FEET.

- SEWAGE TREATMENT IS THE RESPONSIBILITY OF EACH INDIVIDUAL PROPERTY OWNER. THE EL PASO COUNTY HEALTH AND ENVIRONMENT DEPARTMENT MUST BE CONTACTED FOR INFORMATION REGARDING SEWAGE TREATMENT. PERMITS AND ENGINEER-DESIGNED SYSTEM PRIOR TO PERMITTING APPROVAL.

- INDIVIDUAL WELLS ARE THE RESPONSIBILITY OF EACH PROPERTY OWNER. PERMITS AND ENGINEER-DESIGNED SYSTEM PRIOR TO PERMITTING APPROVAL. THE EL PASO COUNTY HEALTH AND ENVIRONMENT DEPARTMENT MAY REQUIRE AN ENGINEER-DESIGNED SYSTEM PRIOR TO PERMITTING APPROVAL.

- ALL PROPERTY OWNERS ARE RESPONSIBLE FOR MAKING PROGRESS ESTIMATED DRAINAGE IN AND THROUGH THEIR PROPERTY. PUBLIC DRAINAGE EASEMENTS AS SPECIFICALLY NOTED ON THE PLAT SHALL BE MAINTAINED BY THE INDIVIDUAL LOT OWNERS UNLESS OTHERWISE INDICATED. STRUCTURES, FENCES, NOTED BEARS OR LANDSCAPING WHICH COULD IMPED THE FLOW OF RUNOFF SHALL NOT BE PLACED IN DRAINAGE EASEMENTS.

- DUE TO WILDFIRE CONCERNS, THE PROPERTY OWNER IS ENCOURAGED TO REMOVE ALL BRUSH AND WEEDS FROM THE PROPERTY. THE EL PASO COUNTY FOREST SERVICE SHALL BE CONTACTED FOR INFORMATION REGARDING PERMITS AVAILABLE THROUGH THE STATE FOREST SERVICE.

- NO DRIVEWAYS SHALL BE ESTABLISHED UNLESS AN ACCESS PERMIT HAS BEEN OBTAINED BY EL PASO COUNTY PLANNING AND DEVELOPMENT. INDIVIDUAL LOT PURCHASERS ARE RESPONSIBLE FOR CONSTRUCTING DRIVEWAYS, INCLUDING NECESSARY DRAINAGE CURVES PER LAND DEVELOPMENT CODE SECTION 6.3.3.C.2 AND 6.3.3.C.3, DUE TO THEIR LENGTH. SOME OF THE DRIVEWAYS WILL NEED TO BE SPECIFICALLY APPROVED BY THE COLORADO FIRE PROTECTION DISTRICT.

- NO STRUCTURES OR MAJOR MATERIAL STORAGE ACTIVITIES ARE PERMITTED WITHIN THE DESIGNATED DRAINAGE EASEMENTS, EXCEPT FENCES; FENCES SHALL NOT IMPEDE RUNOFF FROM PRECIPITATING DRAINAGE SWALES.

- ALL STRUCTURAL FOUNDATIONS SHALL BE LOCATED AND DESIGNED BY A PROFESSIONAL ENGINEER CURRENTLY REGISTERED IN THE STATE OF COLORADO. FOUNDATION INVESTIGATIONS SHALL BE CONDUCTED BY A PROFESSIONAL ENGINEER AND SITE-SPECIFIC FOUNDATION/SEPTIC INVESTIGATIONS SHALL BE REQUIRED.

- PROPERTY WITHIN THIS SUBDIVISION IS SUBJECT TO THE TERMS AND PROVISIONS OF THE EL PASO COUNTY SUBDIVISION ACT. THE EL PASO COUNTY ENGINEER SHALL BE PAID IN FULL AT THE TIME OF BUILDING PERMIT ISSUANCE.

- MAILBOXES SHALL BE INSTALLED IN ACCORDANCE WITH ALL EL PASO COUNTY DEPARTMENT OF TRANSPORTATION AND THE UNITED STATES POSTAL SERVICE REGULATIONS.

- THE ADDRESSES EXHIBITED ON THIS PLAT ARE FOR INFORMATIONAL PURPOSES ONLY. THEY ARE NOT THE LEGAL DESCRIPTION AND ARE SUBJECT TO CHANGE.

- THE FOLLOWING REPORTS HAVE BEEN SUBMITTED AND ARE ON FILE AT THE ENGINEER'S OFFICE: GEOTECHNICAL REPORT, GEOLOGY AND SOILS REPORT, AND FIRE PROTECTION REPORT.

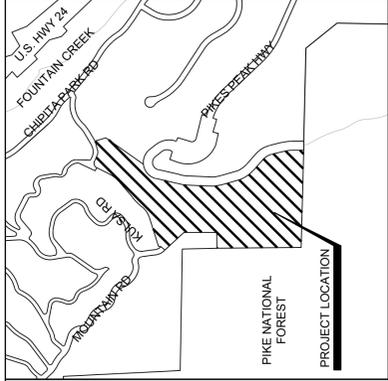
- ANY PERSON WHO KNOWINGLY REMOVES, ALTERS OR DEFACES ANY PUBLIC LAND SURVEY MONUMENT OR LAND BOUNDARY MONUMENT OR ACCESSORY COMBATS A CLASS TWO (2) MISDEMEANOR PURSUANT TO C.R.S. § 18-4-508.

- THERE SHALL BE NO DIRECT LOT ACCESS TO PIKES PEAK HIGHWAY.

FLOODPLAIN NOTE:
FLOOD INSURANCE RATE MAP, MAP NUMBER 06410486G EFFECTIVE DATE DECEMBER 7, 2018, SHOWS THIS PROPERTY IS LOCATED WITHIN FLOOD HAZARD ZONE X (AREAS OF ANIMAL FLOOD HAZARD) AND ZONE D (AREAS IN WHICH FLOOD HAZARDS ARE UNDETERMINED, BUT POSSIBLE).

UTILITY NOTES:

UTILITIES ARE SHOWN ONLY AS APPROXIMATE LOCATIONS. THE UTILITIES SHOWN ON THIS PLAT ARE NOT TO BE CONSIDERED AS A GUARANTEE OF THE LOCATION, OPERATION, OR MAINTENANCE OF ITS FACILITIES. TOGETHER WITH THE RIGHT OF INGRESS TO AND EGRESS FROM THE UTILITY EASEMENT AND CONTIGUOUS LAND SUBJECT TO THIS PLAT FOR THE PURPOSES OF THE UTILITY EASEMENT, THE UTILITIES SHOWN ON THIS PLAT ARE HEREBY DEDICATED, REPLACED, AND WITH OR ENGAGERING THE CONSTRUCTION, OPERATION OR MAINTENANCE OF SAID FACILITIES.



VICINITY MAP
(NOT TO SCALE)

DATE SUBMITTED:	11/28/2022
REVISIONS:	



Civil Engineering • Land Surveying • Landscape Architecture
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Drawn By:JAM Project #2107-0307 DD #1DSB7 PCD File #

DECEMBER 2022

Appendix B

Job No. 188050

March 18, 2022
Amended January 10, 2023

Kristian Guntzelman
5381 Sugar Camp Rd.
Milford, OH 45150

Re: Wastewater Study
Mountain Rd
Guntzelman Porcelain Pines Subdivision
El Paso County, Colorado

Ref: *Final Plat*, prepared by SMH Consultants, last dated November 28, 2022.

Dear Kristian:

As requested, personnel of RMG – Rocky Mountain Group has performed a preliminary investigation and site reconnaissance at the above referenced address. It is our understanding the parcel included in this study is:

- EPC Schedule No. 8322200018: to be addressed as Mountain Road, which consists of 35.16 acres and is zoned R-T, Residential Topographic.

Project Description

The site consists of approximately 35.16 acres and is undeveloped, vacant land. It is our understanding the existing 35.16 acres is to be subdivided into a total of four lots. The lots are to range between approximately 5.06 acres and 12.49 acres each. The Proposed Lot Layout is included as Figure 2.

Each new lot is to be serviced by an on-site wastewater treatment system (OWTS), and all four lots are reportedly to be serviced by a “communal” water supply well. The site is to be accessed from Mountain Road which is to be extended for the proposed subdivision. A Site Vicinity Map is included as Figure 1.

This letter is to provide information for the on-site wastewater report per the On-Site Wastewater Treatment Systems (OWTS) Regulations of the El Paso County Board of Health pursuant to Chapter 8.

The following are also excluded from the scope of this report including (but not limited to) foundation recommendations, site grading/surface drainage recommendations, subsurface drainage recommendations, geologic, natural and environmental hazards such as landslides,

unstable slopes, seismicity, snow avalanches, water flooding, corrosive soils, erosion, radon, wild fire protection, hazardous waste and natural resources.

Previous Studies and Field Investigation

Reports of previous geotechnical engineering/geologic investigations for this site were available for our review and are listed below:

1. *Preliminary Subsurface Soil Investigation and Geology Report*, prepared by RMG-Rocky Mountain Group, Job No. 147611, last dated January 7, 2016.
2. *Soil and Geology Study*, prepared by RMG-Rocky Mountain Group, Job No. 188050, amended January 10, 2023.

SITE CONDITIONS

Personnel of RMG performed a reconnaissance visit on February 22, 2022. The purpose of the reconnaissance visit was to evaluate the site surface characteristics including landscape position, topography, vegetation, natural and cultural features, and current and historic land uses. Five test borings were drilled to depths of approximately 20 to 25 feet below the existing ground surface on December 22, 2015 for the 2016 report referenced above. A Test Boring Location Plan is presented in Figure 3.

The site surface characteristics were observed to consist of tall native grasses, weeds, scrub oak, and dense pine and aspen forestation.

The following conditions were observed with regard to the 35.16-acre parcel:

- A well currently does not exist on the existing 35.16-acre site;
- No runoff or irrigation features anticipated to cause deleterious effects to treatment systems on the site were observed;
- No major waterways exist on the property. The entire site lies outside the designated floodway or floodplain;
- No minor waterways exist on the property. The entire site lies outside the designated floodway or floodplain;
- Slopes greater than 20 percent do exist on the site; and
- Significant man-made cuts do not exist on the site.

Treatment Areas

Treatment areas at a minimum must achieve the following:

- The treatment areas must be 4 feet above groundwater or bedrock as defined by the Definitions 8.3.4 of the Regulations of the El Paso County Board of Health, Chapter 8, *OWTS Regulations*, effective July 7, 2018;
- Each lot (after purchase but prior to construction of an OWTS) will require an OWTS Site Evaluation report prepared per *the Regulations of the El Paso County Board of Health, Chapter 8 OWTS Regulations*. During the site reconnaissance, a minimum of two-8-foot deep test pits will need to be excavated in the vicinity of the proposed treatment area;

- Comply with any physical setback requirements of Table 7-1 of the El Paso County Department of Health and Environment (EPCDHE);
- Treatment areas are to be located a minimum 100 feet from any well (existing or proposed), including those located on adjacent properties per Table 7-2 per the EPCDHE; and
- The systems must be designed by a professional engineer and approved by EPCDHE if the ground slope is in excess of thirty percent.

Treatment areas are to be located a minimum distance of 100 feet from any well location. Treatment areas are also to be located a minimum of 50 feet from any spring, lake, watercourse, irrigation ditch, stream or wetland. Other setbacks for the treatment area include, but are not limited to, a minimum of 10 feet from property lines, dry gulches, cut banks and fill areas (from the crest).

It was determined that the use of test borings instead of test pits was appropriate for this site due to site access limitations, ground surface cover, dense tree stands, steep slopes, and our knowledge and experience with the materials in this area. The observation of test pits would not be anticipated to contribute any additional pertinent information above and beyond what was obtained in the referenced *Preliminary Subsurface Soil Investigation and Geology Report*.

DOCUMENT REVIEW

RMG has reviewed the provided Final Plat (prepared by SMH Consultants) and identified the soil conditions anticipated to be encountered during construction of the proposed OWTS for TBD Mountain Road. Based on our site observations and a review of documented Natural Resource Conservation Service – NRCS Web Soil Survey data provided by websoilsurvey.nrcs.usda.gov the Web Soil Survey Descriptions are presented below. A review of FEMA Map No. 08041C0486G, effective December 7, 2018 indicates that the proposed treatment areas are not located within an identified floodplain.

SOIL EVALUATION

Personnel of RMG performed a soil evaluation to include five approximately 20 to 25 foot deep test borings, on December 22, 2015. Soil laboratory testing was performed as a part of the previous investigation and included moisture content, grain-size analyses and Atterberg Limits. The test borings were drilled in areas that appeared most likely to be used for residential construction per the original concept plan dated September 8, 2021. Since the issuance of this study the lot layout has changed. Additional test borings were not drilled to accommodate the Final Plat lot layout, as the soils encountered onsite were fairly uniform. The test boring logs and laboratory test results are presented in the *Preliminary Subsurface Soil Investigation and the Soils and Geology Study*. A Septic Suitability map is presented in Figure 4.

The soil conditions as indicated by the NRCS data are anticipated to consist of Legault-Rock outcrop complex with 15 to 65 percent slopes and Tecolote very gravelly sandy loam with 15 to 40 percent slopes. Properties of the Legault-Rock outcrop complex include well drained soils, depth of the water table is anticipated to be greater than 80 inches, runoff is anticipated to be very high, frequency of flooding and/or ponding is anticipated to be none, and landforms include

mountain slopes. Properties of the Tecolote very gravelly sandy loam include well drained soils, depth of the water table is anticipated to be more than 80 inches, runoff is anticipated to be medium, frequency of flooding and/or ponding is anticipated to be none, and landforms include mountain slopes.

The USDA Soil Survey Map is presented in Figure 5.

Bedrock was encountered in the test borings performed by RMG. Groundwater was not observed in the test borings at the time of field exploration. Fluctuations in groundwater and subsurface moisture conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Development of the property and adjacent properties may also affect groundwater levels.

CONCLUSIONS

In summary, it is our opinion the site is suitable for individual on-site wastewater treatment systems within the cited limitations. Contamination of surface and subsurface water resources should not occur if the treatment areas are evaluated and installed according to El Paso County Health Department and state guidelines in conjunction with proper maintenance.

LIMITATIONS

The information provided in this report is based upon the subsurface conditions observed from drilling five test borings and accepted engineering procedures. The subsurface conditions encountered in the test borings for the treatment area may vary from those encountered in the test pit excavations. Therefore, depth to limiting or restrictive conditions, bedrock, and groundwater may be different from the results reported in this letter. The proposed residences and OWTS should be located outside of the no-build area slopes as indicated in the Proposed Lot Layout included as Figure 2.

Individual wastewater treatment systems are proposed for each new lot. Additional OWTS site evaluations for the proposed lots will need to be performed in accordance with the applicable health department codes prior to construction.

I hope this provides the information you have requested. Should you have questions, please feel free to contact our office.

Cordially,

Reviewed by,

RMG – Rocky Mountain Group

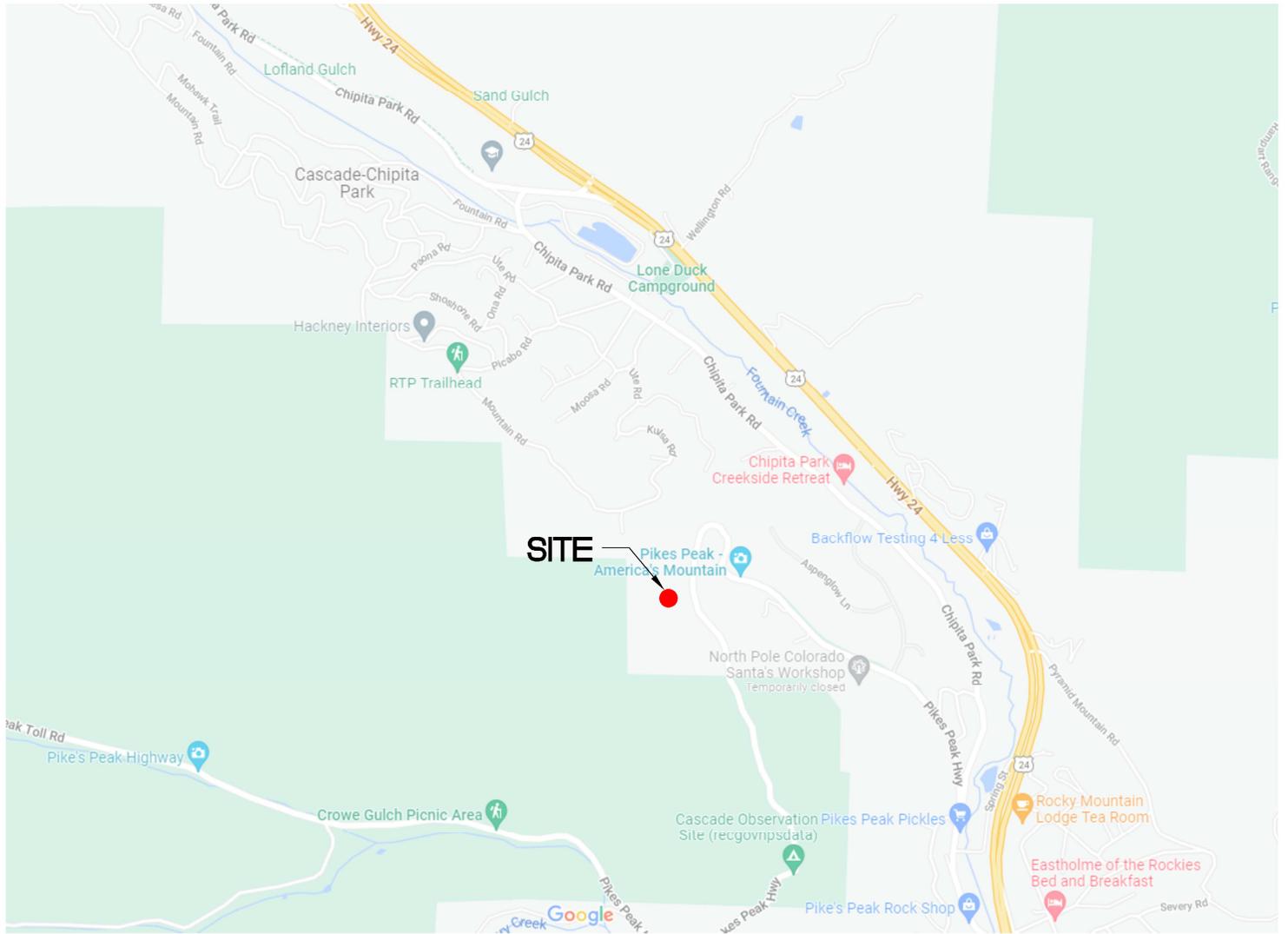
RMG – Rocky Mountain Group



Kelli Zigler
Project Geologist

Tony Munger, P.E.
Geotechnical Project Manager





NOT TO SCALE

Architecture
Structural
Geotechnical



Engineers / Architects

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SOUTHERN COLORADO, DENVER METRO, NORTHERN COLORADO

Materials Testing
Forensics
Civil / Planning

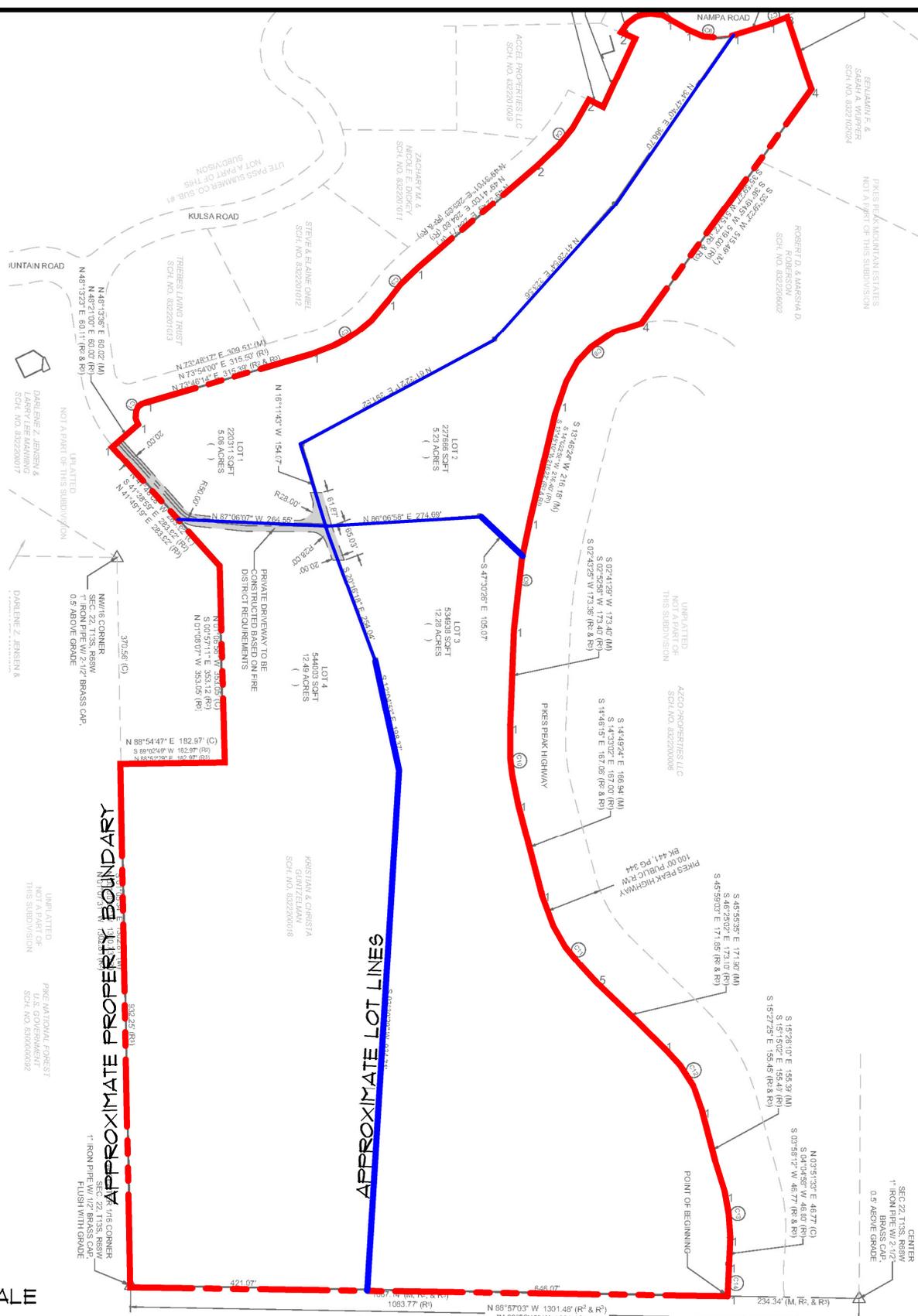
SITE VICINITY MAP

MOUNTAIN ROAD
GUNTZELMAN PORCELAIN
PINES SUBDIVISION
EL PASO COUNTY, COLORADO
KRISTIAN GUNTZELMAN

JOB No. 188050

FIG No. 1

DATE 3-18-2022



APPROXIMATE PROPERTY BOUNDARY

APPROXIMATE LOT LINES



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Structural
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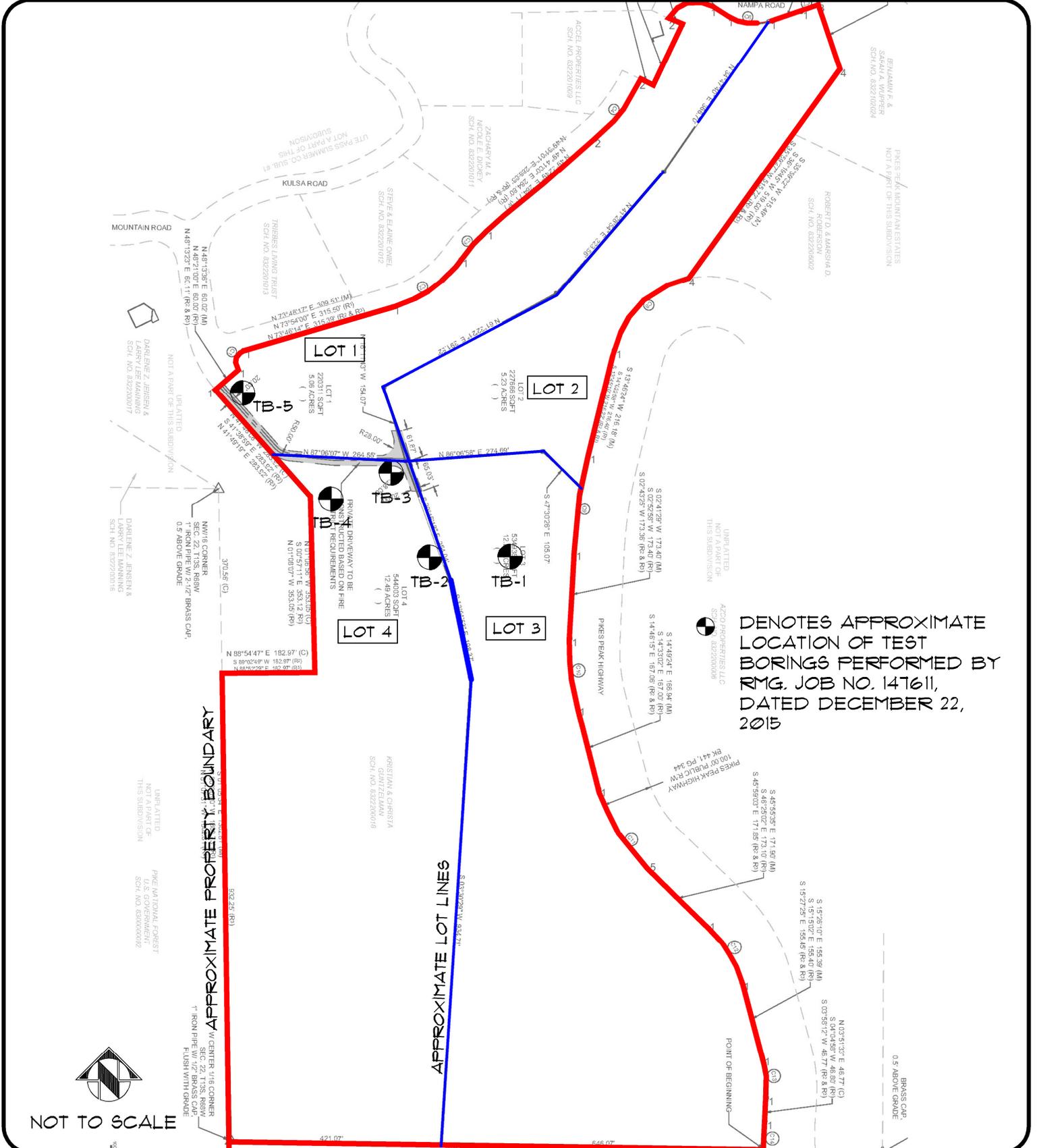
PROPOSED LOT LAYOUT

MOUNTAIN ROAD
GUNTZELMAN PORCELAIN
PINES SUBDIVISION
EL PASO COUNTY, COLORADO

JOB No. 188050

FIG No. 2

DATE 3-18-2022
REV 1-05-2023



 DENOTES APPROXIMATE LOCATION OF TEST BORINGS PERFORMED BY RMG, JOB NO. 147611, DATED DECEMBER 22, 2015

NOT TO SCALE

Architecture
 Structural
 Geotechnical

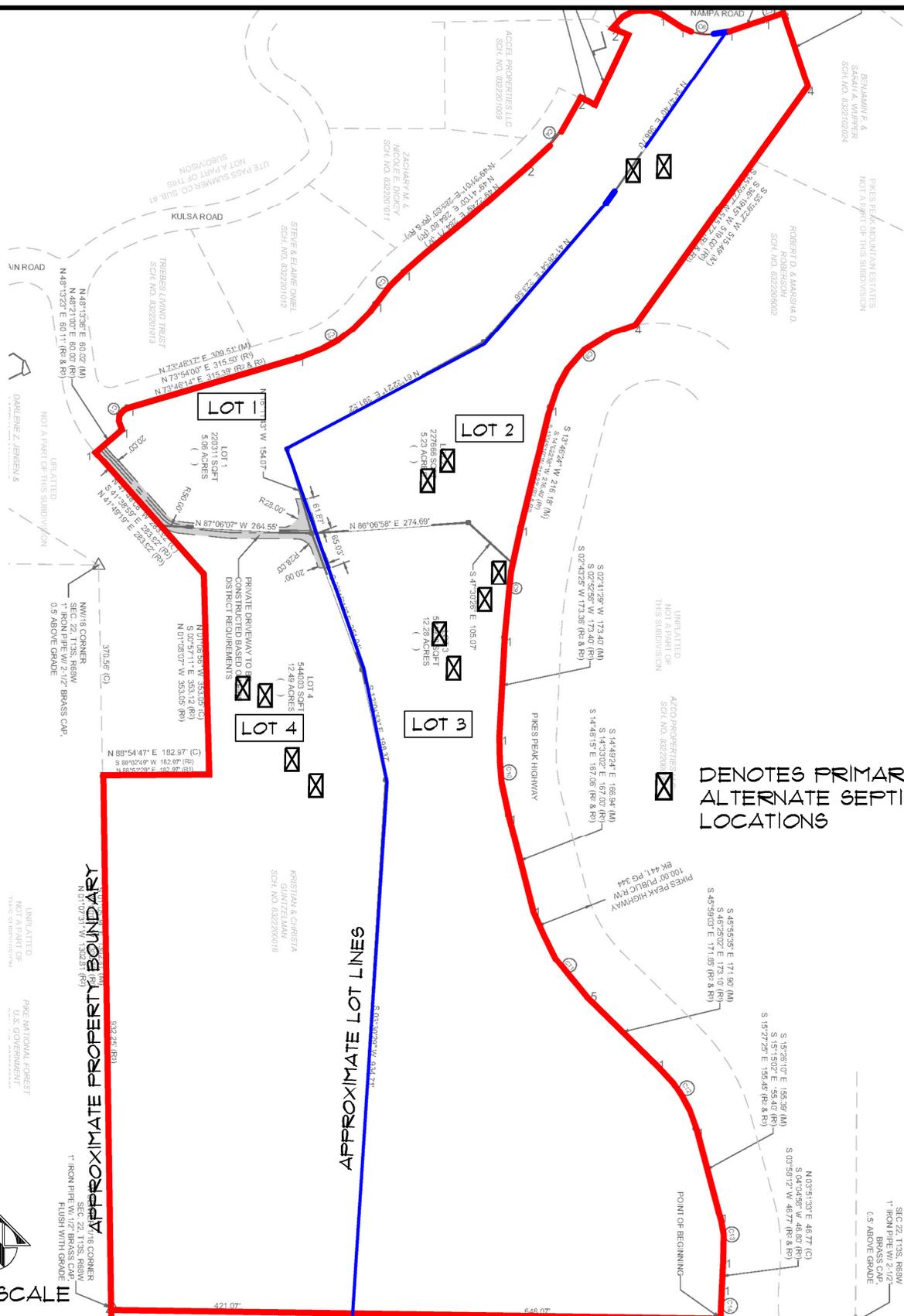


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**TEST BORING
 LOCATION PLAN**
 MOUNTAIN ROAD
 GUNTZELMAN PORCELAIN
 PINES SUBDIVISION
 EL PASO COUNTY, COLORADO
 KRISTIAN GUNTZELMAN

JOB No. 188050
 FIG No. 3
 DATE 3-18-2022
 REV 1-05-2023



X DENOTES PRIMARY AND ALTERNATE SEPTIC LOCATIONS

APPROXIMATE PROPERTY BOUNDARY

APPROXIMATE LOT LINES



NOT TO SCALE

Architecture
Structural
Geotechnical

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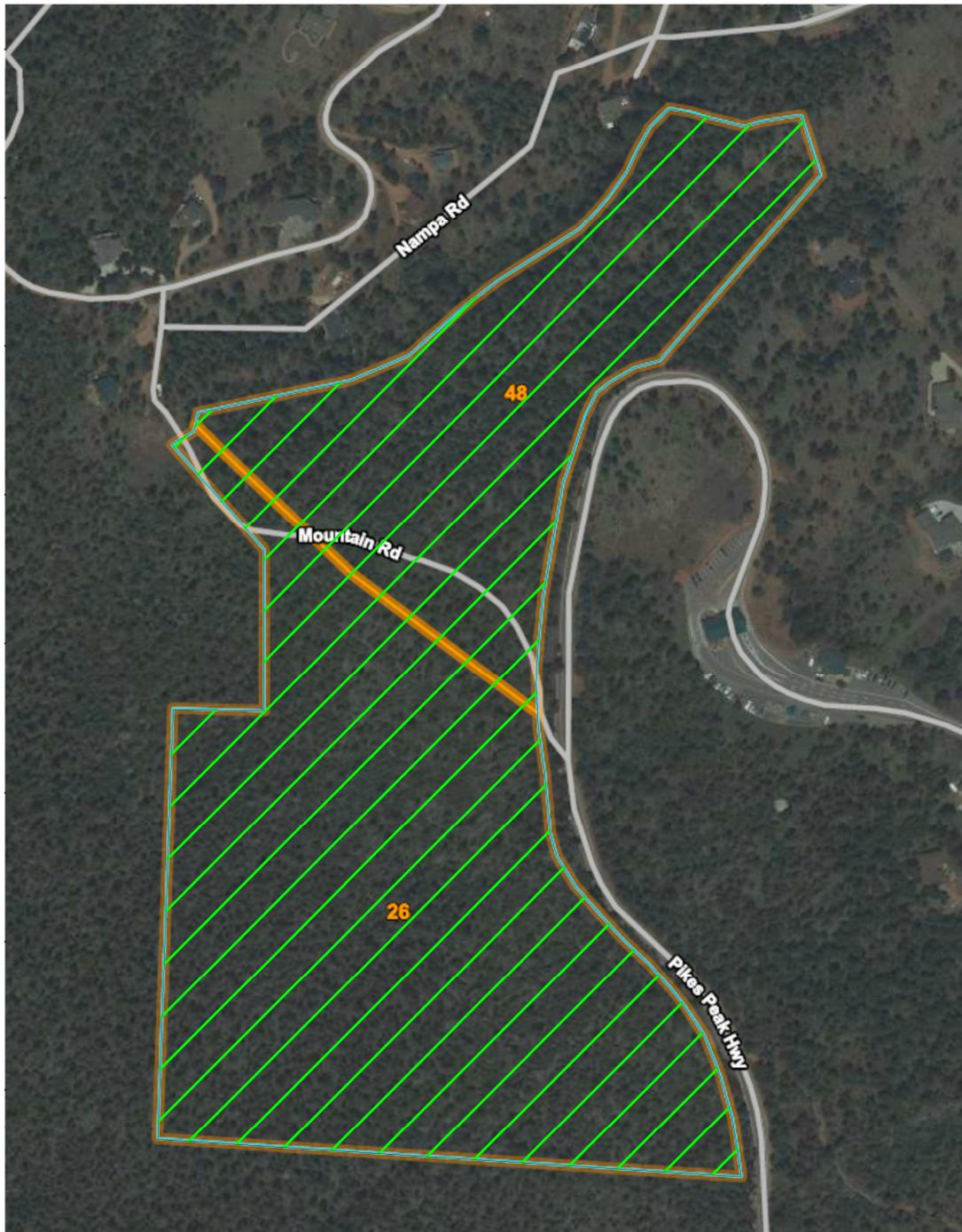
SEPTIC SUITABILITY MAP

MOUNTAIN ROAD
GUNTZELMAN PORCELAIN
PINES SUBDIVISION
EL PASO COUNTY, COLORADO
KRISTIAN GUNTZELMAN

JOB No. 188050

FIG No. 4

DATE 3-18-2022
REV 1-05-2023



26 - Legault-Rock Outcrop Complex, 15 to 65 percent slopes

48 - Tecolote very gravelly sandy loam, 15 to 40 percent slopes, very stony



NOT TO SCALE

Architecture
Structural
Geotechnical



Engineers / Architects

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Materials Testing
Forensics
Civil / Planning

USDA SOIL SURVEY MAP

MOUNTAIN ROAD
GUNTZELMAN PORCELAIN
PINES SUBDIVISION
EL PASO COUNTY, COLORADO
KRISTIAN GUNTZELMAN

JOB No. 188050

FIG No. 5

DATE 3-18-2022

Architectural
Structural
Geotechnical



Materials Testing
Forensic
Civil/Planning

SOIL AND GEOLOGY STUDY

**Mountain Road
Guntzelman Porcelain Pines Subdivision
El Paso County, Colorado**

PREPARED FOR:

**Kristian Guntzelman
5381 Sugar Camp Rd.
Milford, OH 45150**

JOB NO. 188050

**March 18, 2022
Amended January 10, 2023**

Respectfully Submitted,

RMG – Rocky Mountain Group

A handwritten signature in blue ink that reads 'Kelli Zigler'.

**Kelli Zigler
Project Geologist**

Reviewed by,

RMG – Rocky Mountain Group

**Tony Munger, P.E.
Geotechnical Project Manager**



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Appendix A – Additional Reference Documents

Appendix B – *Preliminary Subsurface Soil Investigation and Geology Report*, Jensen Subdivision, El Paso County, Colorado, prepared by RMG – Rocky Mountain Group, Job No. 147611, dated January 7, 2016

1.0 GENERAL SITE AND PROJECT DESCRIPTION

1.1 Project Location

The project lies in Section 22, Township 13 South, Range 68 West of the 6th Principal Meridian in El Paso County, Colorado, and is generally located southeast of Chipita Park, Colorado near the intersection of Mountain Road and Kulsa Road. The approximate location of the site is shown on the Site Vicinity Map, Figure 1.

1.2 Existing and Proposed Land Use

The site currently consists of one parcel (per the El Paso County Assessor's website) of approximately 35.16 acres:

- Schedule No. 8322200018, current land use is classified as vacant land

The current zoning is "*R-T*" – *Residential Topographic*. The future zoning designation is to remain "*R-T*" - *Residential Topographic*.

1.3 Project Description

The site is currently undeveloped. It is our understanding the existing 35.16 acres is to be subdivided into a total of four lots. The lots are to range between approximately 5.06 acres and 12.49 acres. Each of the new lots is to contain a single-family residence with an on-site wastewater treatment system. A "communal" domestic water supply well is to be installed which will service all four new lots. The Proposed Lot Layout is presented in Figure 2.

2.0 QUALIFICATIONS OF PREPARERS

This Soil and Geology Study was prepared by a professional geologist as defined by Colorado Revised Statutes section 34-1-201(3) and by a qualified geotechnical engineer as defined by policy statement 15, "Engineering in Designated Natural Hazards Areas" of the Colorado State Board of Registration for Professional Engineers and Professional Land Surveyors. (Ord. 96-74; Ord. 01-42)

The principle investigators for this study are Kelli Zigler P.G., and Tony Munger, P.E. Ms. Zigler is a Professional Geologist as defined by State Statute (C.R.S 34-1-201) with over 21 years of experience in the geological and geotechnical engineering field. Ms. Kelli Zigler holds a B.S. in Geology from the University of Tulsa. Ms. Zigler has supervised and performed numerous geological and geotechnical field investigations throughout Colorado.

Tony Munger, P.E. is a licensed professional engineer with over 21 years of experience in the construction engineering (residential) field. Mr. Munger holds a B.S. in Architectural Engineering from the University of Wyoming

3.0 STUDY OVERVIEW

The purpose of this investigation is to characterize the general geotechnical, geologic site conditions, and onsite wastewater treatment system (OWTS) feasibility and present our opinions of the potential effect of these conditions on the proposed development within El Paso County, Colorado. As such, our services exclude evaluation of the environmental and/or human, health related work products or recommendations previously prepared, by others, for this project.

Revisions to the conclusions presented in this report may be issued based upon submission of the Development Plan. This study has been prepared in accordance with the requirements outlined in the El Paso County Land Development Code (LDC) specifically Chapter 8, last updated August 27, 2019. Applicable sections include 8.4.8 and 8.4.9, and the El Paso County Engineering Criteria Manual (ECM), specifically Appendix C last updated July 9, 2019.

3.1 Scope and Objective

The scope of this study is to include a physical reconnaissance of the site and a review of pertinent, publically available documents including, but not limited to, previous geologic and geotechnical reports, overhead and remote sensing imagery, published geology and/or hazard maps, design documents, etc.

The objectives of our study are to:

- Identify geologic conditions present on the site
- Analyze potential negative impacts of these conditions on the proposed site development
- Analyze potential negative impacts to surrounding properties and/or public services resulting from the proposed site development as it relates to existing geologic conditions
- Provide our opinion of suitable techniques that may be utilized to mitigate any potential negative impacts identified herein

This report presents the findings of the study performed by RMG-Rocky Mountain Group relating to the geologic conditions of the above-referenced site. Revisions and modifications to this report may be issued subsequently by RMG, based upon:

- Additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report
- Review of pertinent documents (development plans, plat maps, drainage reports/plans, etc.) not available at the time of this study
- Comments received from the governing jurisdiction and/or their consultants subsequent to submission of this document

3.2 Site Evaluation Techniques

The information included in this report has been compiled from several sources, including:

- Field reconnaissance
- Geologic and topographic maps
- Review of selected publicly available, pertinent engineering reports
- Available aerial photographs
- Subsurface exploration

- Visual and tactile characterization of representative site soil and rock samples
- Geologic research and analysis
- Site Concept Plan prepared by SMH Consultants
- *Preliminary Subsurface Soil Investigation and Geology Report*, prepared by RMG-Rocky Mountain Group, RMG Job No. 147611, last dated January 7, 2016.

Geophysical investigations were not considered necessary for characterization of the site geology. Monitoring programs, which typically include instrumentation and/or observations for changes in groundwater, surface water flows, slope stability, subsidence, and similar conditions, are not known to exist and were not considered applicable for the scope of this report.

3.3 Additional Documents

Additional documents reviewed during the performance of this study are included in Appendix A.

4.0 SITE CONDITIONS

4.1 Existing Site Conditions

The site is undeveloped. The site is generally located southeast of the intersection of Mountain Road and Kulsa Road in El Paso County, Colorado and comprises approximately 35.16 acres. The site is zoned R-T, residential topographic and is to remain residential topographic, in the future. Adjacent properties to the north, west, and south are zoned R-T, residential topographic. Adjacent properties to the east are zoned PUD, planned unit development and R-T, residential topographic.

4.2 Topography

Based on our site reconnaissance on February 22, 2022 and USGS 2019 topographic map of the Cascade Quadrangle, the site generally slopes down to the north and east with an overall elevation change of approximately 830 feet across the site.

4.3 Vegetation

The site vegetation primarily consists of tall native grasses, weeds, scrub oak, and dense pine and aspen forestation.

4.4 Aerial Photographs and Remote-Sensing Imagery

Personnel of RMG reviewed aerial photos available through Google Earth Pro dating back to 1999, CGS surficial geologic mapping, and historical photos by historicaerials.com dating back to 1947. Historically, the site has remained undeveloped, vacant land.

5.0 FIELD INVESTIGATION AND LABORATORY TESTING

5.1 Field and Laboratory Testing

The subsurface conditions below the subject site were investigated by RMG December 21, 2015 as part of the *Preliminary Subsurface Soil Investigation and Geology Report*, included in Appendix B.

5.2 Groundwater

Groundwater was not encountered in the test borings performed by RMG for the report referenced above.

Fluctuations in groundwater and subsurface moisture conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Development of the property and adjacent properties may also affect groundwater levels.

6.0 SOIL, GEOLOGY, AND ENGINEERING GEOLOGY

The site is located within the western flank of the Colorado Piedmont section of the Great Plains physiographic province. The Colorado Piedmont, formed during the late tertiary and Early Quaternary time (approximately 2,000,000 years ago), is a broad, erosional trench which separates the Southern Rocky Mountains from the High Plains. During the Late Mesozoic and Early Cenozoic Periods (approximately 70,000,000 years ago), intense tectonic activity occurred, causing the uplifting of the Front Range and associated downwarping of the Denver Basin to the East. Relatively flat uplands and broad valleys characterize the present-day topography of the Colorado Piedmont in this region. A major structural feature known as the Ute Pass Fault traverses through the property from southeast to northwest.

6.1 Subsurface Soil Conditions

The subsurface materials encountered in the test borings for the previous report were described as silty to clayey sand with gravel, and granite bedrock.

The classifications shown on the logs are based upon the engineer's classification of the samples at the depths indicated. Stratification lines shown on the logs represent the approximate boundaries between material types and the actual transitions may be gradual and vary with location.

6.2 Bedrock Conditions

Bedrock (as defined by USDA Soil Structure and Grade) was encountered in the test borings performed for the previous investigation. In general, the bedrock beneath the site is considered to be part of the Pikes Peak Granite and Windy Point Granite formations.

6.3 U.S. Soil Conservation Service

The U.S. Soil Conservation Service along with the United States Department of Agriculture (USDA) identifies the site soils as:

- 26 – Legault-Rock outcrop complex, 15 to 65 percent slopes. Properties of the outcrop complex include well drained soils, depth of the water table is anticipated to be greater than 80 inches,

runoff is anticipated to be very high, frequency of flooding and ponding is none, and landforms include mountain slopes.

- 48 – Tecolote very gravelly sandy loam, 15 to 40 percent slopes. Properties of the sandy loam include well drained soils, depth of the water table is anticipated to be greater than 80 inches, runoff is anticipated to be medium, frequency of flooding is frequent to none and ponding is none, and landforms include mountain slopes.

The USDA Soil Survey Map is presented in Figure 4.

6.4 General Geologic Conditions

Based on our field observations and review of relevant geologic maps, we identified the geologic conditions (listed below) affecting the development, as shown on the Engineering and Geology Map, Figure 5.

The site generally consists of older fan deposits, alluvial and colluvial soils, and granite bedrock. Six geologic units were mapped at the site as:

- *Qf* – Alluvial fan deposits (Holocene to late Pleistocene) – Poorly sorted to moderately sorted, matrix-supported, gravelly, sandy silt to clast-supported, pebble and cobble gravel in a sandy silt or silty sand matrix. The maximum estimated thickness for fans along Fountain Creek locally exceeds 50 ft.
- *Ypp* – Pikes Peak Granite (Middle Proterozoic) - Resistant, red, pink, and locally pinkish-gray and greenish-gray, coarse-grained granite intrusions. Classified as granite according to the IUGS classification. On the basis of thin section petrography, the unit is characterized by generally equigranular but locally porphyritic textures made up mostly of microcline crystals, commonly about 1 in. long, subordinate quartz, moderate plagioclase, low hornblende, and low (about 3 percent) amounts of biotite. The Pikes Peak Granite commonly weathers to grus, especially on north-facing slopes; deeper weathering, through processes described by Blair (1976), can result in a residuum cover as much as 150 ft thick. The age of the Pikes Peak Granite is about 1.08 to 1.02 Ga.
- *Ywp* – Windy Point Granite (Middle Proterozoic) - Resistant, red and pink, fine- to coarse-grained granitic and quartz monzonitic intrusions. These intrusions have the form of dikes, sills, and irregularly shaped plugs that intrude the Pikes Peak Granite in a north-trending belt that occupies the central to eastern part of the mapped area.
- *csk* – Grus, crystalline-clast colluvium, alluvium, and rock outcrop
- *SS* – Steep Slopes – Slopes exceeding 30%, designated as “no-build” zones
- *DW* – Drainageway – low lying areas that may collect seasonal surface run-off water

6.5 Engineering Geology

One engineering geology unit was mapped at the site as:

- *4C* – Old debris fan deposits along mountain front and along Fountain Creek above Manitou Springs

The map unit description for this unit is provided by Charles Robinson and Associates (1977).

6.6 Structural Features

Structural features such as schistosity, folds, zones of contortion or crushing, joints, shear zones or faults were not observed on the site, in the surrounding area, or in the soil samples collected for laboratory testing.

6.7 Surficial (Unconsolidated) Deposits

Lake and pond sediments, swamp accumulations, sand dunes, marine terrace deposits, talus accumulations, creep, or slope wash were not observed on the site. Slump and slide debris were also not observed on the site.

6.8 Features of Special Significance

Features of special significance such as accelerated erosion, (advancing gully head, badlands, or cliff reentrants) were not observed on the property. Features indicating settlement or subsidence such as fissures, scarplets, and offset reference features were not observed on the study site or surrounding areas. Features indicating creep, slump, or slide masses in bedrock and surficial deposits were not observed on the property.

6.9 Drainage of Water and Groundwater

The overall topography of the site slopes down to the north and east. It is anticipated the direction of surface water and groundwater likely flow in the same direction. Groundwater was not encountered in the test borings performed for the previous investigation, and is not anticipated to affect shallow foundations.

6.10 Flooding and Surface Drainage

Based on our review of the Federal Emergency Management Agency (FEMA) Community Panel No. 08041C0486 and the online ArcGIS El Paso County Risk Map, the entire site lies outside of identified 100 or 500-year floodplains. The site lies in Zone X and Zone D. Zone X is defined by FEMA as an area of minimal flood hazard that is determined to be outside the Special Flood Hazard Area and higher than the elevation of the 0.2-percent-annual-chance (or 500-year) flood. Zone D is defined by FEMA as an Area of Undetermined Flood Hazard. The FEMA Map is presented in Figure 6.

7.0 ECONOMIC MINERAL RESOURCES

Under the provision of House Bill 1529, it was made a policy by the State of Colorado to preserve for extraction commercial mineral resources located in a populous county. Review of the *El Paso Aggregate Resource Evaluation Map, Master Plan for Mineral Extraction, Map 1* indicates the site is identified as granite and fine-grained granite. The granite is described as granite and granitic type rocks such as quartz, monzonite, and granodiorite underlying mountainous areas. The fine-grained granite is described as granite and granitic type rocks with small crystal structure generally dense and requiring blasting for excavation.

According to the *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands*, the site is mapped within the Denver Basin Coal Region, the tract identifier is 41-31. However, the

area of the site has been mapped “little or no potential” for coal resources. In this part of the Denver coal region, the area lacks strata that may contain coal. According to an entry in the MRDS database from the U.S. Geological Survey, a small gold deposit is located about 0.7 miles south of the tract in an area underlain by Precambrian granite. The gold is said to possibly occur in a vein within the granite. There was never any significant gold production from this area. The tract has minimal potential for hosting metallic resources. No oil and gas wells are drilled in the area. This tract lacks all the essential elements of hydrocarbon accumulation. The tract is in an area consisting of Precambrian crystalline rocks. The Pikes Peak Granite, where weathered, can contain resources of grus (decomposed granite), which is used for basic construction purposes such as fill material. The Sawatch Quartzite, which overlies the Pikes Peak Granite in the far eastern part of this tract, has been used for dimension stone. The quartzite has been mined in the past from quarries in the area. In general, the tract is mostly underlain by granite of the Pikes Peak batholith. The Ute Pass Fault, a major reverse fault with thousands of feet of vertical displacement, transects the tract in a northwesterly direction. A small area of lower Paleozoic sedimentary rock is exposed in the southeastern corner of the tract.

8.0 IDENTIFICATION AND MITIGATION OF POTENTIAL GEOLOGIC CONDITIONS

The El Paso County Engineering Criteria Manual recognizes and delineates the difference between geologic hazards and constraints. A *geologic hazard* is one of several types of adverse geologic conditions capable of causing significant damage or loss of property and life. Geologic hazards are defined in Section C.2.2 Sub-section E.1 of the ECM. A *geologic constraint* is one of several types of adverse geologic conditions capable of limiting or restricting construction on a particular site. Geologic constraints are defined in Section C.2.2 Sub-section E.2 of the ECM (1.15 Definitions of Specific Terms and Phrases). The following geologic constraints were considered in the preparation of this report and are not anticipated to pose a significant risk to the proposed development:

- Avalanches
- Compressible Soils
- Expansive Soils
- Ground Subsidence
- Landslides
- Rockfall
- Ponding water
- Steeply Dipping Expansive Bedrock
- Scour, Erosion, accelerated erosion along creek banks and drainageways
- Corrosive Minerals

The following sections present the geologic conditions that have been identified on the property:

8.1 Debris Flows and Debris Fans

Debris flows consist of water with a high sediment load of sand, cobbles and boulders flowing down a stream, ravine, canyon, arroyo or gully, and are typically activated by heavy or long-term rains or snowmelts which cause rapid erosion and transport of surficial materials down slope of drainages. Debris

fans are created when debris flows reach a valley with a much lower gradient. As the energy level drops, the sediment load is deposited creating the fan shape.

The presence of old debris fan deposits along the mountain front and along Fountain Creek above Manitou Springs was mapped in the area by Robinson and Associates. Alluvial fan deposits were also mapped in the area by Colorado Geological Survey.

Mitigation

Terrain features consistent with the formation of debris flows and debris fans were not present on the subject property site. However, debris fans were identified in the vicinity of the subject property site. The gradients and source materials on the subject property site are, in general, not conducive for generation of debris flows.

8.2 Potentially Unstable Slopes

No obvious signs of slope failures or unstable slopes were identified on the site during the course of this investigation or the previous investigation referenced above. Our review of publically available documents did not reveal any known landslides within or directly adjacent to this site. However, slopes greater than 30% currently exist on all of the proposed new lots. Slopes greater than 30% are considered potentially unstable and are generally designated as “no-build” zones.

Mitigation

Based on our review of the Site Concept Plan provided by SMH Consultants, it is not anticipated at this time that any structures are to be built within the designated “no-build” zones. The proposed structures should not encroach within 20 feet of the toe or 30 feet of the crest of potentially unstable slopes, unless a specific slope stability analysis has been performed to verify the long-term stability of the slope.

8.3 Faults and Seismicity

Based on review of the Earthquake and Late Cenozoic Fault and Fold Map Server provided by CGS located at <http://dnrwebmapgdev.state.co.us/CGSOnline/> and the recorded information dating back to November of 1900, Colorado Springs has not experienced a recorded earthquake with a magnitude greater than 1.6 during that period. The nearest recorded earthquakes over 1.6 occurred in December of 1995 in Manitou Springs, which experienced magnitudes ranging between 2.8 to 3.5. Additional earthquakes over 1.6 occurred between 1926 and 2001 in Woodland Park, which experienced magnitudes ranging from 2.7 to 3.3. Both of these locations are located near the Ute Pass Fault, which traverses the subject site from southeast to northwest. The Rampart Range Fault is located approximately 5 miles to the east of the subject site. Earthquakes felt at this site will most likely result from minor shifting of the granite mass within the Pikes Peak Batholith, which includes pull from minor movements along faults found in the Denver basin. It is our opinion that ground motions resulting from minor earthquakes are more likely to affect structures at this site and will likely only affect slope stability to a minimal degree.

Mitigation

The Pikes Peak Regional Building Code, 2017 Edition, indicates maximum considered earthquake spectral response accelerations of 0.234g for a short period (S_s) and 0.062g for a 1-second period (S_1). Based on the results of our experience with similar subsurface conditions, we recommend the site be classified as Site Class B, with average shear wave velocities ranging from 2,500 to 5,000 feet per second for the materials in the upper 100 feet.

Structures spanning faults may experience differential movements and damage associated with relatively minor movements of the land masses on either side of the fault. Based upon information provided by CGS, relatively recent faults and folds have not been identified. However, the subject site is located near areas of a relic fault zone. If fault zones are identified during excavation, structures should be oriented such that they do not span the fault.

8.4 Radon

"Radon Act 51 passed by Congress set the natural outdoor level of radon gas (0.4 pCi/L) as the target radon level for indoor radon levels".

Western El Paso County and the 80809 zip code in which the site is located, has an EPA assigned Radon Zone of 1. A radon Zone of 1 predicts an average indoor radon screening level greater than 0.4 pCi/L (picocuries per liter), which is above the recommended levels assigned by the EPA. *The EPA recommends corrective measures to reduce exposure to radon gas.*

All of the State of Colorado is considered EPA Zone 1 based on the information provided at https://county-radon.info/CO/El_Paso.html. Elevated hazardous levels of radon from naturally occurring sources are not anticipated at this site.

Mitigation

Radon hazards are best mitigated at the building design and construction phases. Providing increased ventilation of basements, crawlspaces, creating slightly positive pressures within structures, and sealing of joints and cracks in the foundations and below-grade walls can help mitigate radon hazards. Passive radon mitigation systems are also available.

Passive and active mitigation procedures are commonly employed in this region to effectively reduce the buildup of radon gas. Measures that can be taken after the residence is enclosed during construction include installing a blower connected to the foundation drain and sealing the joints and cracks in concrete floors and foundation walls. If the occurrence of radon is a concern, it is recommended that the residence be tested after they are enclosed and commonly utilized techniques are in place to minimize the risk.

9.0 BEARING OF GEOLOGIC CONDITIONS UPON PROPOSED DEVELOPMENT

Geologic hazards (as described in section 8 of this report) found to be present at this site include faults/seismicity and radon. Geologic constraints (as described in section 8 of this report) found to be present at this site include debris flows and debris fans and potentially unstable slopes. It is our opinion that the existing geologic and engineering conditions can be satisfactorily mitigated through proper engineering, design, and construction practices.

10.0 ADDITIONAL STUDIES

The findings, conclusions, and recommendations presented in this report were provided to evaluate the suitability of the site for future development. Unless indicated otherwise, the test borings, laboratory test results, conclusions and recommendations presented in this report are not intended for use for design and construction. A site-specific subsurface soil investigation will be required for all proposed structures.

11.0 CONCLUSIONS

Based upon our evaluation of the geologic conditions, it is our opinion that the proposed development is feasible. The geologic conditions identified are considered typical for the Front Range region of Colorado. Mitigation of geologic conditions is most effectively accomplished by avoidance. However, where avoidance is not a practical or acceptable alternative, geologic conditions should be mitigated by implementing appropriate planning, engineering, and suitable construction practices.

In addition to the previously identified mitigation alternatives, surface and subsurface drainage systems should be considered. Exterior, perimeter foundation drains should be installed around below-grade habitable or storage spaces. A typical perimeter drain detail is presented in Figure 7. Surface water should be efficiently removed from the building area to prevent ponding and infiltration into the subsurface soil.

We believe the sand soils will classify as Type C materials as defined by OSHA in 29 CFR Part 1926. OSHA requires that temporary excavations made in C materials be laid back at ratios no steeper than ½:1 (horizontal to vertical), unless the excavation is shored and braced. Excavations deeper than 20 feet, or when water is present, should always be braced or the slope designed by a professional engineer.

Long term cut slopes in the upper soil should be limited to no steeper than 3:1 (horizontal to vertical). Flatter slopes will likely be necessary should groundwater conditions occur. It is recommended that long term fill slopes be no steeper than 3:1 (horizontal to vertical).

Revisions and modifications to the conclusions and recommendations presented in this report may be issued subsequently by RMG based upon additional observations made during grading and construction, which may indicate conditions that require re-evaluation of some of the criteria presented in this report.

It is important for the Owner(s) of the property to read and understand this report, and to carefully familiarize themselves with the geologic hazards associated with construction in this area. This report only addresses the geologic constraints contained within the boundaries of the site referenced above.

The foundation systems for the proposed single-family residential structures and any retention/detention facilities should be designed and constructed based upon recommendations developed in a site-specific subsurface soil investigation.

12.0 CLOSING

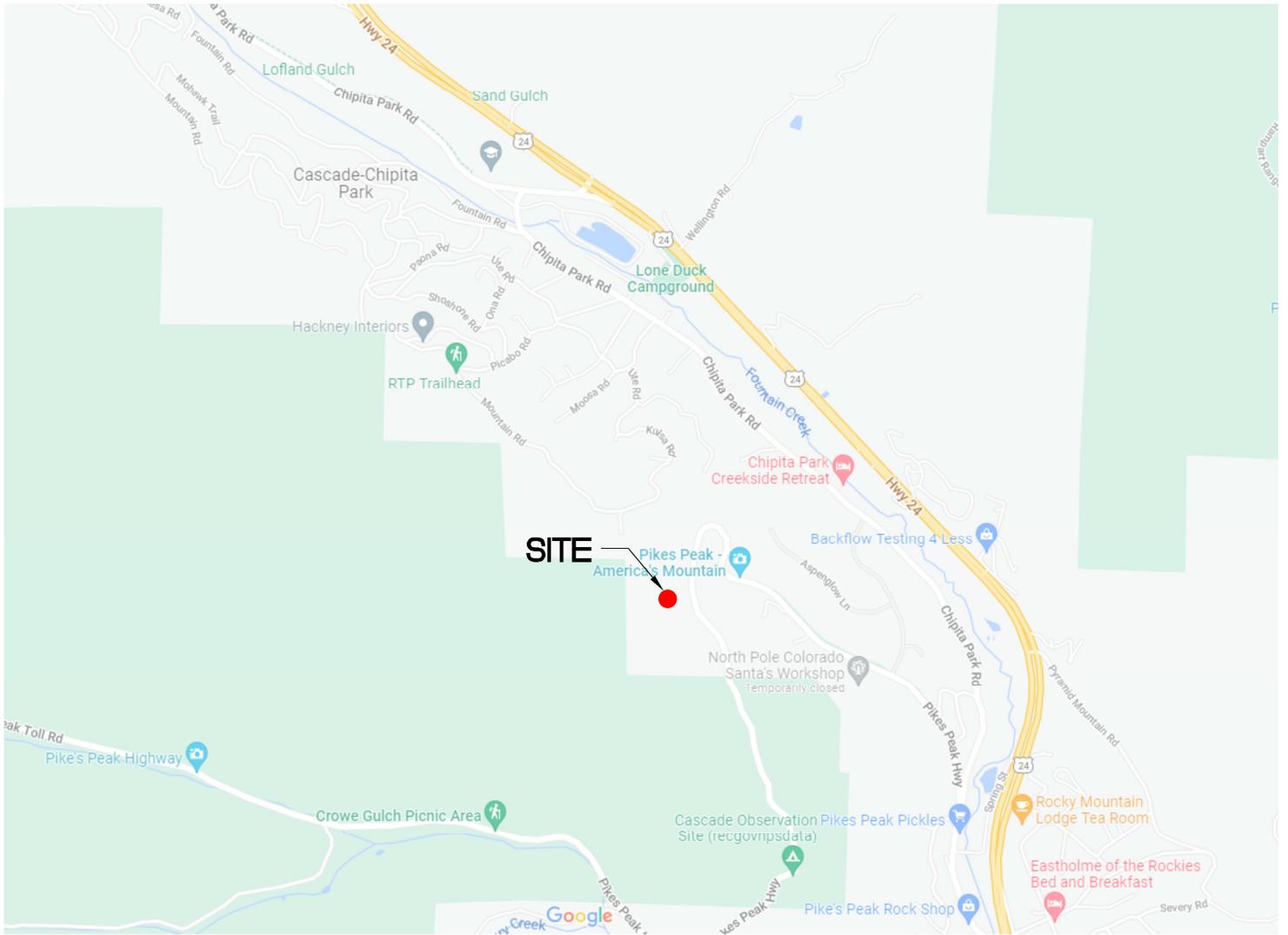
This report is for the exclusive purpose of providing geologic hazards information and preliminary geotechnical engineering recommendations. The scope of services did not include, either specifically or by implication, evaluation of wild fire hazards, environmental assessment of the site, or identification of contaminated or hazardous materials or conditions. Development of recommendations for the mitigation of environmentally related conditions, including but not limited to, biological or toxicological issues, are beyond the scope of this report. If the owner is concerned about the potential for such contamination or conditions, other studies should be undertaken.

This report has been prepared for **Kristian Guntzelman** in accordance with generally accepted geotechnical engineering and engineering geology practices. The conclusions and recommendations in this report are based in part upon data obtained from review of available topographic and geologic maps,

review of available reports of previous studies conducted in the site vicinity, a site reconnaissance, and research of available published information, soil test borings, soil laboratory testing, and engineering analyses. The nature and extent of variations may not become evident until construction activities begin. If variations then become evident, RMG should be retained to re-evaluate the recommendations of this report, if necessary.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by geotechnical engineers and engineering geologists practicing in this or similar localities. RMG does not warrant the work of regulatory agencies or other third parties supplying information which may have been used during the preparation of this report. No warranty, express or implied, is made by the preparation of this report. Third parties reviewing this report should draw their own conclusions regarding site conditions and specific construction techniques to be used on this project.

FIGURES



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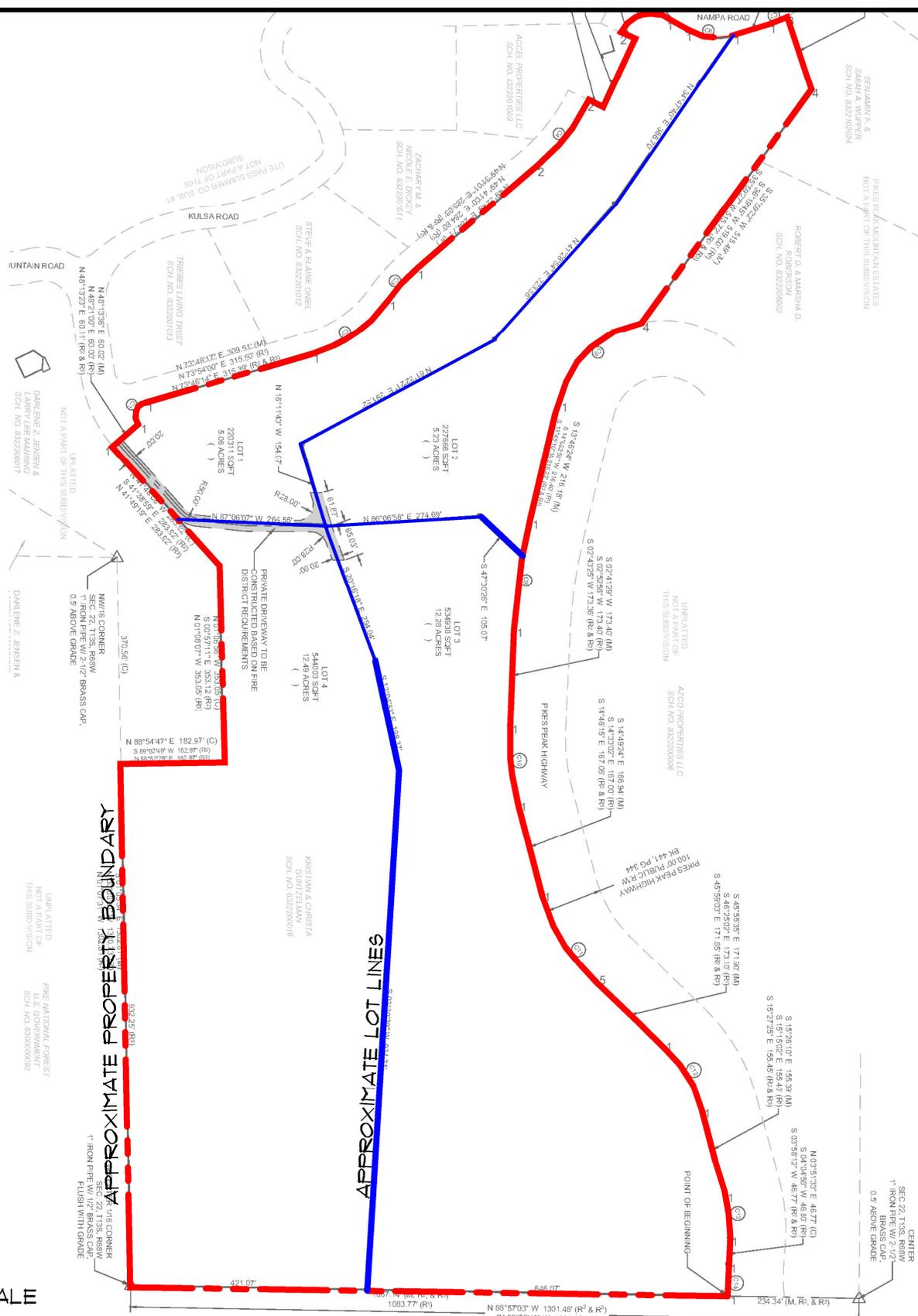
SITE VICINITY MAP

MOUNTAIN ROAD
GUNTZELMAN PORCELAIN
PINES SUBDIVISION
EL PASO COUNTY, COLORADO
KRISTIAN GUNTZELMAN

JOB No. 188050

FIG No. 1

DATE 3-18-2022



APPROXIMATE PROPERTY BOUNDARY

APPROXIMATE LOT LINES



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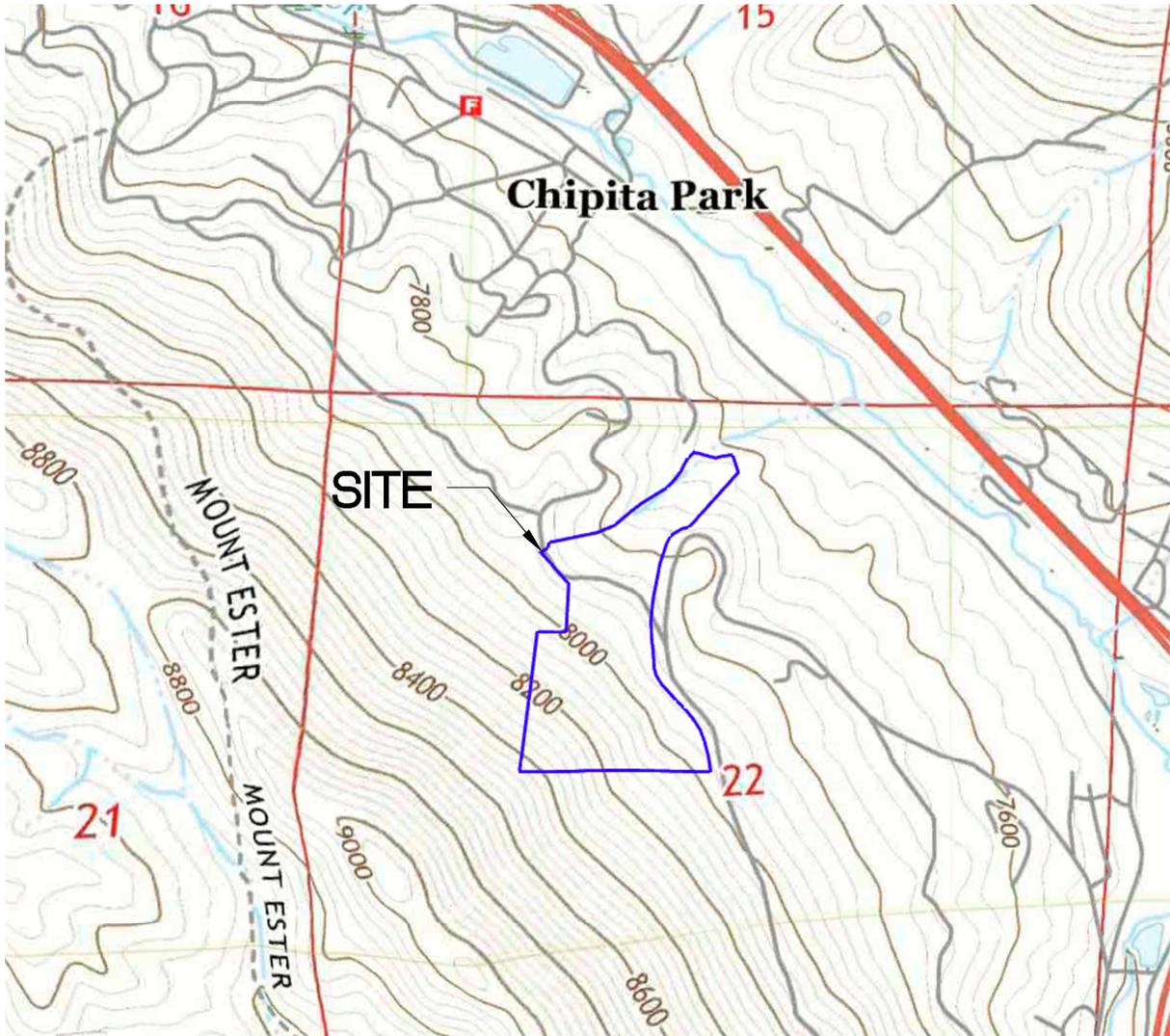
PROPOSED LOT LAYOUT

**MOUNTAIN ROAD
GUNTZELMAN PORCELAIN
PINES SUBDIVISION
EL PASO COUNTY, COLORADO**

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FIG No. 2

**DATE 3-18-2022
REV 1-05-2023**



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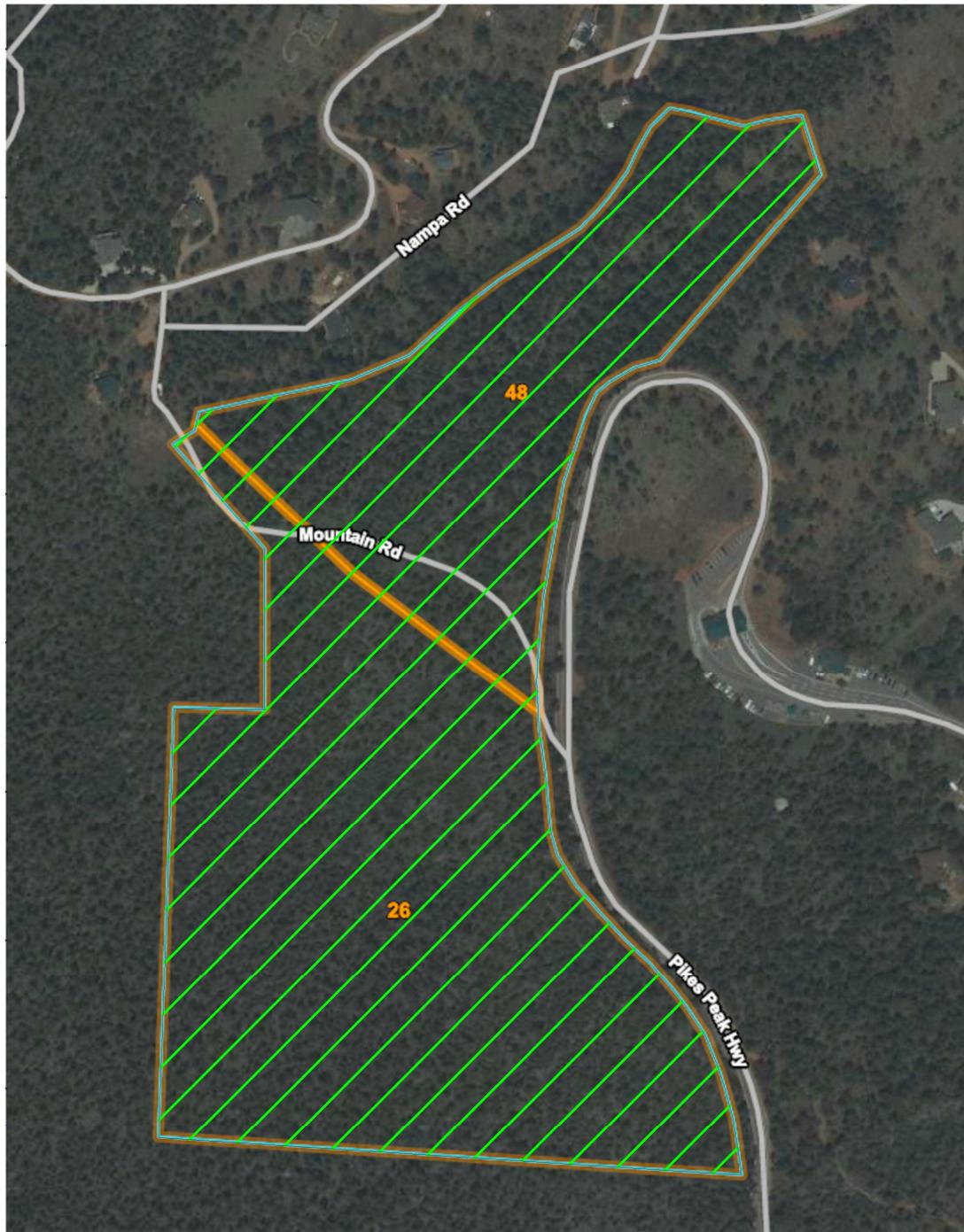
USGS TOPO MAP

MOUNTAIN ROAD
GUNTZELMAN PORCELAIN
PINES SUBDIVISION
EL PASO COUNTY, COLORADO
KRISTIAN GUNTZELMAN

JOB No. 188050

FIG No. 3

DATE 3-18-2022



26 - Legault-Rock Outcrop Complex, 15 to 65 percent slopes

48 - Tecolote very gravelly sandy loam, 15 to 40 percent slopes, very stony



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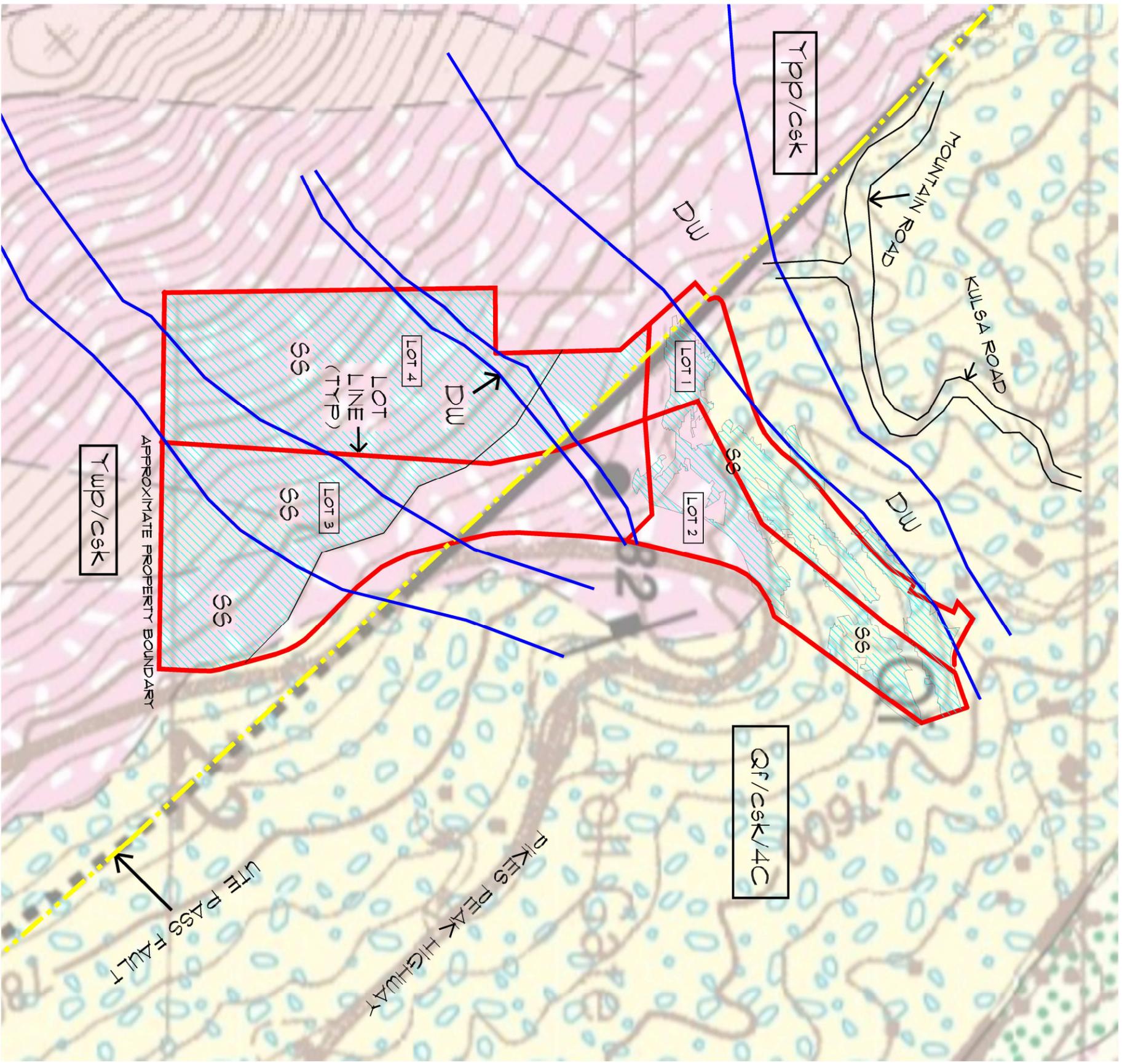
USDA SOIL SURVEY MAP

MOUNTAIN ROAD
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EL PASO COUNTY, COLORADO
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FIG No. 4

DATE 3-18-2022



Geologic Conditions

- QR - Alluvial fan deposits (Holocene to late Pleistocene)
- Twp - Pikes Peak Granite (Middle Proterozoic)
- Twp - Windy Point Granite (Middle Proterozoic)
- csk - Gneiss, crystalline-class colluvium, alluvium, and rock outcrop
- SS - Steep Slopes, in excess of 30%, designated as "no-build" zones
- DW - Drainageway

Engineering Conditions

4C - Old debris fan deposits along mountain front and along Fountain Creek above Manitou Springs

 Denotes approximate area of steep slopes, "no-build" zones

 Denotes approximate location of the Ute Pass Fault

MOUNTAIN ROAD
GUNTZELMAN PORCELAIN
PINES SUBDIVISION

EL PASO COUNTY, COLORADO
KRISTIAN GUNTZELMAN

ENGINEER:	TMH
DRAWN BY:	KOR
CHECKED BY:	TMH
ISSUED:	3-18-2022
AMENDED TO UPDATE LOT LAYOUT	1-05-2023

ENGINEERING AND
GEOLOGY MAP

SHEET NO.
FIG-5

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National Flood Hazard Layer FIRMette



104°59'25"W 38°54'45"N



0 250 500 1,000 1,500 2,000 Feet 1:6,000

Basemap: USGS National Map; Orthoimagery; Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS		Without Base Flood Elevation (BFE) Zone A, X, AE, AH
		With BFE or Depth Zone AE, AO, AH, VE, AR
		Regulatory Floodway
OTHER AREAS OF FLOOD HAZARD		0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
		Future Conditions 1% Annual Chance Flood Hazard Zone X
		Area with Reduced Flood Risk due to Levee. See Notes. Zone X
		Area with Flood Risk due to Levee Zone D
OTHER AREAS		NO SCREEN Area of Minimal Flood Hazard Zone X
		Effective LOMRs
		Area of Undetermined Flood Hazard Zone D
GENERAL STRUCTURES		Channel, Culvert, or Storm Sewer
		Levee, Dike, or Floodwall
OTHER FEATURES		Cross Sections with 1% Annual Chance Water Surface Elevation 20.2 17.6
		Coastal Transect
		Base Flood Elevation Line (BFE)
		Limit of Study
MAP PANELS		Jurisdiction Boundary
		Coastal Transect Baseline
		Profile Baseline
		Hydrographic Feature
		Digital Data Available
		No Digital Data Available
		Unmapped

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards.

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 3/8/2022 at 4:55 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.



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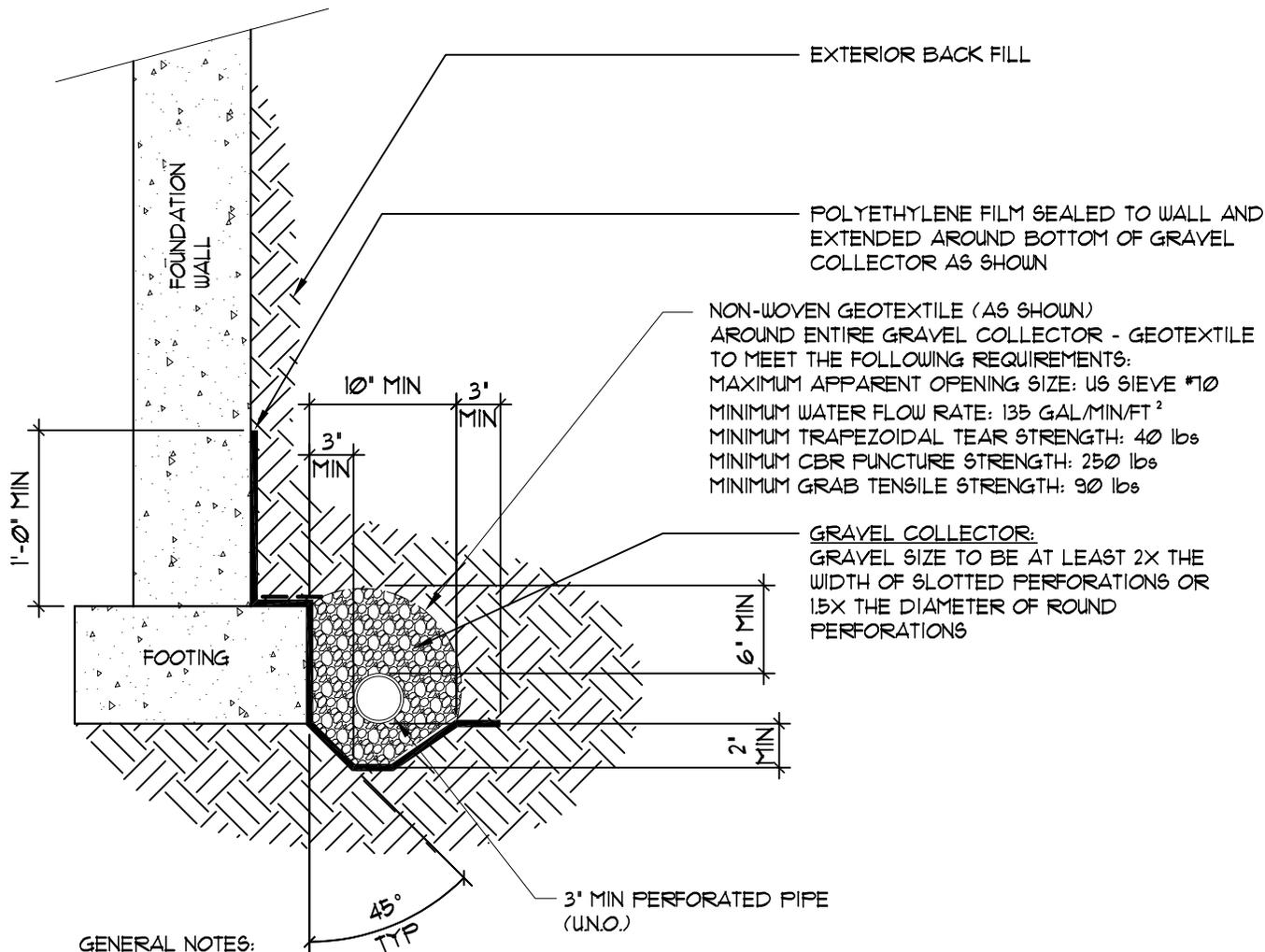
FEMA MAP

MOUNTAIN ROAD
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PINES SUBDIVISION
EL PASO COUNTY, COLORADO
KRISTIAN GUNTZELMAN

JOB No. 188050

FIG No. 6

DATE 3-18-2022



GENERAL NOTES:

1. BOTTOM OF DRAIN PIPE SHALL BE AT OR BELOW BOTTOM OF FOOTING AT ALL LOCATIONS
2. ALL DRAIN PIPE SHALL BE PERFORATED PLASTIC, WITH THE EXCEPTION OF THE DISCHARGE PORTION WHICH SHALL BE SOLID, NON-PERFORATED PIPE.
3. DRAIN PIPE SHALL HAVE POSITIVE FALL THROUGHOUT.
4. DRAIN PIPE SHALL BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. IF A GRAVITY OUTFALL CANNOT BE ACHIEVED, THEN A SUMP PIT AND PUMP SHALL BE USED. THE OUTFALL SHOULD EXTEND PAST BACKFILL ZONES AND DISCHARGE TO A LOCATION THAT IS GRADED TO DIRECT WATER OFF-SITE.
5. ALL DRAIN COMPONENTS SHALL BE RATED/APPROVED BY THE MANUFACTURER FOR THE INSTALLED DEPTH AND APPLICATION
6. DRAIN SYSTEM, INCLUDING THE OUTFALL OF THE DRAIN, SHALL BE OBSERVED BY QUALIFIED PERSONNEL PRIOR TO BACKFILLING TO VERIFY INSTALLATION.
7. A VERTICAL SEGMENT OF PERFORATED DRAIN PIPE, CAPPED AT THE TOP, SHALL EXTEND TO FINISH GRADE WITHIN ALL WINDOW WELLS.

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PERIMETER DRAIN

FIG No. 7

APPENDIX A

Additional Reference Documents

1. *Final Plat, Guntzelman Porcelain Pines Subdivision, Cascade, Colorado*, prepared by SMH Consultants, dated November 28, 2022.
2. *Site Concept Plan, Guntzelman Porcelain Pines Subdivision, Cascade, Colorado*, prepared by SMH Consultants, Project No. 2107-0307, dated September 8, 2021.
3. *Preliminary Subsurface Soil Investigation and Geology Report*, Jensen Subdivision, El Paso County, Colorado, prepared by RMG – Rocky Mountain Group, Job No. 147611, dated January 7, 2016
4. *Flood Insurance Rate Map, El Paso County, Colorado and Unincorporated Areas, Community Panel No. 08041C0486G*, Federal Emergency Management Agency (FEMA), effective December 7, 2018.
5. *Environmental and Engineering Geologic Map for Land Use*, compiled by Dale M. Cochran, Charles S. Robinson & Associates, Inc., Golden, Colorado, 1977.
6. *Geologic Map of the Cascade Quadrangle, El Paso County, Colorado*, Morgan, M.L., Siddow, C.S., Rowley, P.D., Temple, J., Keller, J.W., Archuleta, B.H., and Himmelreich, J.W., Colorado Geological Survey, Open-File Report OF03-18, 2004.
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8. El Paso County Assessor Website
<https://property.spatalest.com/co/elpaso/#/property/8322200018>
Schedule No. 8322200018
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18. Mason, G. T., and Arndt, R. E., 1996, Mineral resource data system (MRDS): U.S. Geological Survey Digital Data Series DDS-20 (CD-ROM).
19. *Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands*
20. *The El Paso Aggregate Resource Evaluation Map, Master Plan for Mineral Extraction, Map 1*
21. Generalized surficial geologic map of the Pueblo 1 degree X 2 degree quadrangle, Colorado. Moore, D.W., Straub, A.W., Berry, M.E., Baker, M.L, and Brandt, T.R. , U.S. Geological Survey, Miscellaneous Field Studies Map MF-2388, 2002.

APPENDIX B

Preliminary Subsurface Soil Investigation and Geology Report, Jensen Subdivision, El Paso County, Colorado, prepared by RMG – Rocky Mountain Group, Job No. 147611, dated January 7, 2016



ROCKY MOUNTAIN GROUP

PRELIMINARY SUBSURFACE SOIL INVESTIGATION AND GEOLOGY REPORT

**Jensen Subdivision
El Paso County, Colorado**

PREPARED FOR:

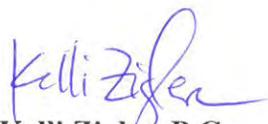
**Darlene Jensen
9005 Mountain Rd.
Cascade, CO 80809**

JOB NO. 147611

January 7, 2016

**Respectfully Submitted,
RMG – Rocky Mountain Group**

Reviewed by


**Kelli Zigler, P.G.
Professional Geologist**

**Tony Munger, P.E.
Geotechnical Project Engineer**



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GENERAL SITE AND PROJECT DESCRIPTION

Project Location

The project lies in Section 22, Township 13 South, Range 68 West of the 6th Principal Meridian in El Paso County, Colorado. The site is generally located southeast of Chipita Park, Colorado near the intersection of Mountain Road and Kulsa Road. The approximate location of the site is shown on the Site Vicinity Map, Figure 1 (Ref. 1).

Project Description

Currently, a two story wood framed single family residence is located on the northwest portion of the site. The site consists of an approximately 41.71 acre parcel. There is an existing storage shed located east of the existing residence. The existing 41.71 acres is to be subdivided into lots approximately 5.00 to 7.86 acres each (with on-site waste water treatment systems) and one empty tract of approximately 0.77 acres. The existing residence will remain on a 5.03 acre lot to be known as Lot 1.

Qualifications of Preparers

The principle investigators for this study are Kelli Zigler, P.G. and Tony Munger, P.E. Ms. Zigler is a professional Geologist with over 15 years of experience in the geological and geotechnical engineering field. Ms. Kelli Zigler holds a B.S. in Geology from the University of Tulsa. Ms. Zigler has supervised and performed numerous geological and geotechnical field investigations in Colorado.

Mr. Tony Munger, P.E. is a licensed professional engineer with over 15 years of experience in the construction engineering (residential) field. Mr. Munger holds a Bachelor of Science in Architectural Engineering from the University of Wyoming.

STUDY OVERVIEW

The purpose of this investigation is to characterize the general and site-specific geologic site conditions and mineral resources, and present our opinions of the potential effect of these conditions on the proposed residential development within El Paso County, Colorado. As such, our services exclude evaluation of the environmental and/or human, health-related work products or recommendations previously prepared, by others, for this project.

Revisions to the conclusions presented in this report may be issued based upon submission of the development plan. This study has been prepared in general accordance with the requirements outlined in the El Paso County Land Development Code (LDC) and Engineering Criteria Manual (ECM), (References 2 and 3, respectively).

Scope and Objective

The purpose of our report is to evaluate the occurrence of potential geologic hazards and our opinions of the observed conditions on the proposed development with the respect to the intended usage.

This report presents the findings of the study performed by RMG Engineers Group (RMG) relating to the geotechnical and geologic conditions of the above-referenced site.

Revisions and modifications to the conclusions and recommendations presented in this report may be issued subsequently by RMG based upon additional observations made during grading and construction which may indicate conditions that require re-evaluation of some of the criteria presented in this report.

Site Evaluation Techniques

The information included in this report has been compiled from:

- Field reconnaissance
- Geologic and topographic maps
- Review of selected publicly available, pertinent reports
- Review of available aerial photographs
- Exploratory borings
- Laboratory testing of representative site soil and rock samples
- Geologic research and analysis
- Site development plans prepared by others

Geophysical investigations were not considered necessary for characterization of the site geology. Monitoring programs, which typically include instrumentation and/or observations for changes in groundwater, surface water flows, slope stability, subsidence, and similar conditions, are not known to exist on this site and were not considered applicable for the scope of this report.

SITE CONDITIONS

Land Use and Zoning

Based upon our review of the Public Record Real Estate Property Search provided by El Paso County Assessors web-site (Reference 1), the site is zoned "R-T – Residential Topographic." Adjacent properties to the east, west and south are zoned "PUD – Planned Unit Development". Adjacent properties to the north contain single-family residences.

Topography

The existing topography is presented in Figure 2, the Topographic Test Boring Location Plan (Ref. 4). In general, the site is considered to be moderately steep to steep. The site slopes generally to the north and east with approximately 800 feet of elevation difference from the southwest corner to the northeast corner of the site.

Vegetation

Most of the site consists of tall native grasses, weeds and deciduous trees and pine.

Previous Studies and Field Investigation

Reports of previous geotechnical engineering/geologic investigations for this site were not available for our review.

FIELD INVESTIGATION AND LABORATORY TESTING

Drilling

The subsurface conditions on the site were investigated by drilling five exploratory test borings. Due to site access limitations at the time of our investigation, we were only able to perform test borings within a small portion of the site. The approximate location of the test borings are presented in the Topographic Test Boring Location Plan, Figure 2.

The test borings were advanced with a power-driven, continuous-flight auger drill rig to depths of about 20 to 25 feet below the existing ground surface. Samples were obtained in general accordance with the Standard Penetration Test ASTM D-1586, utilizing a 2-inch OD split-barrel sampler. An Explanation of Test Boring Logs is presented in Figure 3. The Test Boring Logs are presented in Figures 4 through 6.

Laboratory Testing

Soil laboratory testing was performed as part of this investigation. The laboratory tests included moisture content, grain-size analyses and Atterberg Limits. A Summary of Laboratory Test Results is presented in Figure 7. Soils Classification Data is presented in Figures 8 and 9.

GEOLOGIC AND SUBSURFACE CONDITIONS

General Physiographic Setting

The site is located within the western flank of the Colorado Piedmont section of the Great Plains physiographic province. The Colorado Piedmont, formed during Late Tertiary and Early Quaternary time (approximately 2,000,000 years ago), is a broad, erosional trench which separates the Southern Rocky Mountains from the High Plains. During the Late Mesozoic and Early Cenozoic Periods (approximately 70,000,000 years ago), intense tectonic activity occurred, causing the uplifting of the Front Range and associated downwarping of the Denver Basin to the east. Relatively flat uplands and broad valleys characterize the present-day topography of the Colorado Piedmont in this region.

General Geology

In general, the geology at the site consists of older fan deposits and alluvium soils. A General Engineering Geology Map is presented in Figure 10. One geologic unit and one environmental engineering unit were mapped at the site as:

- Qf – Alluvial Fan Deposits (Upper Holocene) – sand with gravels, cobbles and boulders on steep slopes along the mountain front and Fountain Creek.
- 4C – Older debris fan deposits along the mountain front and Fountain Creek above Manitou Springs.

The Alluvial Fan deposits are underlain by the Pikes Peak Granite. The Pikes Peak Granite was encountered in four of the test borings drilled for this investigation.

The U.S. Soil Conservation Service (Reference 11) has identified the soils on the property as Tecolote, very gravelly sandy loam and Legault, rock outcrop complex. These soils are anticipated to drain well and have a high runoff rate with high infiltration rates. Depth to bedrock is anticipated to be greater than 5 feet and groundwater is anticipated to be greater than 7 feet.

Subsurface Conditions

The subsurface materials encountered in the test borings were classified using the Unified Soils Classification System (USCS) and the materials were grouped into the general categories of silty to clayey sand with gravel and granite bedrock.

Additional descriptions and the interpreted distribution (approximate depths) of the subsurface materials are presented on the Test Boring Logs. The classifications shown on the logs are based upon the engineer's classification of the samples at the depths indicated. Stratification lines shown

on the logs represent the approximate boundaries between material types and the actual transitions may be gradual and vary with location.

Groundwater

Groundwater was not observed in the test borings at the time of field exploration or when checked one day subsequent to drilling. Fluctuations in groundwater and subsurface moisture conditions may occur due to variations in rainfall and other factors not readily apparent at this time. Development of the property and adjacent properties may also affect groundwater levels.

Recoverable Resources

Under the provision of House Bill 1529, it was made a policy by the State of Colorado to preserve for extraction commercial mineral resources located in a populous county. Review of the *Master Plan for Mineral Extraction* (Ref. 5), indicate the site is identified as granite and granitic type rocks. The test borings indicated alluvial fan deposits were encountered from the ground surface to approximately 12 to 25 feet. Extraction of the granite resources are not considered to be economical compared to materials available elsewhere within the county.

Permeability

The permeability of a soil measures how well air and water can flow within the soil. Soil permeability varies according to the type of soil and other factors.

The infiltration rate of a soil refers to how much water a type of soil can absorb over a specific time period. Infiltration rates are determined by soil permeability and surface conditions, and usually are measured in inches per hour.

The soils encountered in the test borings were silty to clayey sand with gravel at the existing surface extending to depths of 12 feet or greater, overlying granite bedrock. The permeability of the sands is anticipated to be high.

POTENTIAL GEOLOGIC HAZARDS

The following sections discuss potential geologic hazards that commonly exist within El Paso County, Colorado.

Landslides

Landslides are a form of mass wasting slope failure that consists of relatively rapid downward sliding, falling, or flowing of a mass of soil, rock, or a mixture of the two. Landslides typically have one or more distinct failure surfaces. They typically occur on slope sides where the shear

strength of a material is exceeded by the driving mass or weight of the material and may be induced by the presence of groundwater, heavy precipitation, and seismic events.

The subject site is not located within a mapped area of landslide susceptibility according to the Colorado Geological Survey (Map of 2006).

Unstable and Potentially Unstable Slopes

In general, the site slopes moderately to steeply from the southwest to the northeast with approximately 800 feet of elevation difference from the northeast corner to the southwest corner of the property. No existing slope failures were observed on the site at the time of our investigation.

Rockfall

Rockfall is the falling of a newly detached mass of rock from a cliff or down a very steep slope, and is considered to be a type of landslide with a very rapid rate of down-slope movement. It usually occurs on mountainside or other steep slopes during periods of abundant moisture and frequent freeze-thaw cycles, and is caused by the loss of support from underneath or detachment from a larger rock mass. Ice wedging, root growth, or ground shaking, erosion or chemical weathering may start the fall. The rocks may freefall, bounce, tumble, roll, or slide down slope and can vary considerably in size.

The subject site does not have exposed cliffs or very steep slopes above it to generate rockfall. The subject property is not considered to be prone to rockfall.

Debris Flows and Debris Fans

Debris flows consist of water with a high sediment load of sand, cobbles and boulders flowing down a stream, ravine, canyon, arroyo or gully, and are typically activated by heavy or long-term rains or snowmelts which cause rapid erosion and transport of surficial materials down slope of drainages. Debris fans are created when debris flows reach a valley with a much lower gradient. As the energy level drops, the sediment load is deposited creating the fan shape.

Debris flows and fans have not been identified on the property. However, debris fans were identified in the immediate proximity to the subject property site. The gradients and source materials on the property are, in general, not conducive for generation of debris flows.

Faults

There are several geologic faults in the vicinity of the site associated with the Ute Pass Fault complex. However, according to the CGS these faults are not considered to be recently active.

Seismicity

The Rampart Range Fault Zone is located less than ¼-mile west of the site. The fault generally extends northwest-southeast.

Ground Subsidence

Review of the Colorado Springs Subsidence Investigation report (Dames and Moore, 1985) reveals that underground mining has not previously occurred beneath the site.

Hydrocompactive and Potentially Expansive Soils

Potentially expansive (swelling or heaving) clays and shale were not encountered during the field investigation.

Hydrocompactive soils are prone to collapse (settlement) when exposed to increases in moisture content and/or loads from foundations. Based upon the general geology of the area, the soils are anticipated to generally exhibit low hydrocompactive characteristics and low expansion potential.

Erosion and Corrosion

The sands encountered at the site are susceptible to erosion by wind and flowing water. The sands at this site typically have low resistivity values (less than 1,000 ohm-cm) and are not likely to be corrosive to buried, ferrous metal piping and other structures.

Radioactivity/Radon Gas

There is not believed to be an unusual hazard from naturally occurring sources of radon activity (Ref. 7). However, most of Colorado is generally considered to have the potentially elevated levels of radon gas.

Flooding and Surface Drainage

The site is located outside the 500-year floodplain of Fountain Creek (Zone X) as indicated on the Revised Federal Emergency Management Agency (FEMA) Community Panel No. 08041C0467F dated March 17, 1997, Figure 11 (Ref. 9).

BEARING OF GEOLOGIC FACTORS UPON PROPOSED DEVELOPMENT

Landslides

The subject site has no known landslides that have been mapped on the Cascade Quadrangle according to the CGS. (Ref. 15)

Unstable or Potentially Unstable Slopes

No obvious signs of slope failures or unstable slopes were identified on the site during the course of this investigation. Our review of publically available documents did not reveal any known landslides within or directly adjacent to this site. However, areas of the site with a slope greater than 30% are considered potentially unstable. The proposed structures should not encroach within 20 feet of the toe or 30 feet of the crest of potentially unstable slopes, unless a specific slope stability analysis has been performed to verify the long-term stability of the slope.

Rockfall

The subject site does not have exposed cliffs or very steep slopes above it to generate rockfall. The subject property is not considered to be prone to rockfall.

Debris Flows and Debris Fans

Terrain features consistent with the formation of debris flows and debris fans are not present on the vicinity of the property.

Faults

Structures spanning faults may experience differential movements and damage associated with relatively minor movements of the land masses on either side of the fault. Based upon information provided by the CGS (Ref. 15), relatively recent faults and folds have not been identified. However, the subject site is located near areas of a relic fault zone. If fault zones are identified during excavation, structures should be oriented such that it does not span the fault.

Seismicity

The Rampart Range Fault Zone is located less than ¼-mile south of the site. The fault generally extends northwest-southeast.

Earthquakes felt at this site will most likely result from minor shifting of the granite mass within the Pikes Peak Batholith which includes pull from minor movements along faults found in the

Denver basin (Kirkham and Rodgers, 1981). Ground motions resulting from small earthquakes are more likely to affect structures at this site and will likely only affect slopes stability to a minimal degree.

The Pikes Peak Building Code, 2011 Edition, indicates maximum considered earthquake spectral response accelerations of 0.185g for a short period (S_s) and 0.059g for a 1-second period (S_1). Based on the results of our experience with similar subsurface conditions, we recommend the site be classified as Site Class B, with an average shear wave velocity ranging from 600 to 1,200 feet per second for the materials in the upper 100 feet.

Ground Subsidence

The subject site is located outside of known mined coal deposits. Subsurface conditions at the site are not consistent with soils and bedrock susceptible to ground subsidence.

Hydrocompactive and Potentially Expansive Soils

The potential for settlement and heave resulting from hydrocompaction and expansion, respectively, are typically addressed in a site-specific geotechnical engineering investigations and open excavation observations for each proposed structure. However, it is anticipated that the hydrocompactive and expansion potential will be low at this site.

Shallow foundations are anticipated for structures within this development. Foundation design and construction are typically adjusted for hydrocompactive and expansive soils. Subexcavation and replacement with moisture-conditioned excavated soils or overexcavation and replacement with imported structural fill are common construction practices and have been implemented successfully in nearby residential developments.

Erosion and Corrosion

Good surface drainage practices should be established to remove surface water efficiently without erosion. Surface water and snowmelt runoff should be controlled by appropriate drainage structures.

Radioactivity/Radon Gas

Based upon a Map of Radon Zones by the Colorado Department of Public Health and Environment (CDPHE) (Ref. 7), two zones of radon potential are indicated in Colorado, Zone 1 - High Radon Potential (probable indoor radon average >4 pCi/L) and Zone 2 -Moderate Radon Potential (probable indoor radon average 2-4 pCi/L). El Paso County is located within Zone 1.

Potential radon hazards are best mitigated at the building design and construction phases. Providing increased ventilation of basements, crawlspaces, creating slightly positive pressures

within structures, and sealing of joints and cracks in the foundations and below-grade walls can help mitigate radon hazards.

Flooding and Surface Drainage

In addition to help preventing erosion, good surface drainage practices should be established to remove surface water efficiently without damaging existing and proposed structures. Surface water and snowmelt runoff should be controlled by appropriate drainage structures.

On-site Waste Water Treatment Systems

Based on our investigation, we anticipate percolation rates ranging from 16 to 25 minutes per inch or a long term acceptance rate (LTAR) of 0.60 for the Engineering of a Treatment Level 1 OWTS. If on-site wastewater treatment systems are used, they shall comply with the El Paso County Department of Health and Environment (EPCDHE) regulations and the CDPHE guideline, as applicable.

Evaluation of the soils for the OWTS is typically addressed in a site-specific report for each lot. The site-specific evaluation should include a minimum of two 8-foot deep test pits excavated within the vicinity of each proposed system.

Site Grading

Grading plans were not provided at the time the report was issued. It is assumed based on the test borings for this investigation that the excavations will encounter silty to clayey sand with gravel, cobbles and occasional boulders overlying granite. The granite bedrock at this site is hard to very hard and may require the use of specialized heavy-duty equipment facilitate rock break-up and removal. It is assumed the on-site soils can be used as site grading fill.

New grading (cut or fill) on this site should not exceed a 3:1 slope, unless a specific slope stability analysis is performed. Fill slopes should be compacted and benched per the guidelines presented herein.

Prior to placement of overlot fill or removal and recompaction of the existing materials, topsoil, low-density native soil, fill, and organic matter should be removed from the fill area. The subgrade should be scarified, moisture conditioned to within 2% of the optimum moisture content, and recompacted to the same degree as the overlying fill to be placed. The placement and compaction of fill should be periodically observed and tested by a representative of RMG Engineers during construction.

Guideline Site Grading Specifications are included in Appendix A.

Buried Utilities

Based upon the conditions encountered in the exploratory test borings, we anticipate that the soils encountered in the utility trench excavations will consist of silty to clayey sand with gravel, cobbles and occasional boulders. It is anticipated that the sands will be encountered at loose to medium dense relative densities. Depending on the depth of excavation, high-powered excavation equipment may be required to advance excavations to the desired depths.

We believe the sand will classify as Type C materials as defined by OSHA in 29 CFR Part 1926. OSHA requires that temporary excavations be laid back at ratios no steeper than 1½:1 (horizontal to vertical, approximately 34 degrees) unless the excavation is shored and braced. Excavations deeper than 20 feet, or when water is present, should always be braced or the slope should be designed by a professional engineer.

Utility mains such as water and sanitary sewer lines are typically placed beneath paved roadways. The settlement of the utility trench backfill can have a detrimental effect on pavements and roadway surfaces. We recommend that utility trench backfill be placed in thin loose lifts, moisture conditioned as required and compacted to the recommendations outlined in the **Structural Fill** section of this report. The placement and compaction of utility trench backfill should be observed and tested by a representative of RMG Engineers during construction.

It is a common local practice for underdrains to be placed at the bottom of sanitary sewer trenched within drive lanes. Underdrains placed in the sanitary sewer trenches in areas where groundwater is anticipated will likely be the "active" type, which uses a perforated drain pipe. In areas where groundwater is not anticipated, "passive" type underdrains may be used. The outfall for the sanitary sewer trench underdrain was not known at the time of this investigation because the development plan and grading plan were not available for our review. Typical underdrain details are presented in Figures 12 and 13.

Pavements

Preliminary plans by Westworks Engineering dated October 16, 2015 were provided prior to the report issue date. Roadways throughout the proposed development are anticipated to be classified as Minor Residential Collectors in accordance with Appendix D of the El Paso County Engineering Criteria Manual. The actual pavement section design for individual streets will be completed following overlot grading and rough cutting of the street subgrade.

For preliminary planning purposes, minimum asphalt pavement sections have been evaluated based on current design criteria. For purposes of this report, we anticipate the subgrade soils will primarily have American Association of State Highway and Transportation Officials (AASHTO) Soil Classifications of A-1-b, A-2-4, A-2-6 and A-6 with an estimated design subgrade "R-values" on the order of approximately 25 to 35.

Estimated Pavement Section	
Classification	Asphalt + Base Course, in.
Minor Residential Collector	3.0 or greater + 6 or greater ¹

¹Minimum section thicknesses per El Paso County Engineering Criteria Manual

The above value is for preliminary planning purposes and may vary upon final design, dependent upon the soil material used for subgrade construction.

Anticipated Foundation Systems

Based on the information presented previously, conventional shallow foundation systems consisting of standard spread footings/stemwalls are anticipated to be suitable for the proposed residential structures. It is assumed that the deepest excavation cuts will be approximately 6 to 8 feet below the final ground surface not including overexcavation, which is not anticipated.

If loose sands are encountered, they may require additional compaction to achieve the allowable bearing pressure indicated in this report. In some cases, removal and recompaction may be required for loose soils. Similarly, if shallow groundwater conditions were encountered and resulted in unstable soils, these soils may require stabilization prior to construction of foundation components.

The foundation system for each lot should be designed and constructed based upon recommendations developed in a detailed Subsurface Soils Investigation completed after site development activities are complete. The recommendations presented in the Subsurface Soils Investigation should be verified following the open excavation observation on each lot and evaluation of the building loads.

Structural Fill

Areas to receive structural fill should have topsoil, organic material, or debris removed. The upper 6 inches of the exposed surface soils should be scarified and moisture conditioned to facilitate compaction (usually within 2 percent of the optimum moisture content) and compacted to a minimum of 95 percent of the maximum dry density as determined by the Standard Proctor test (ASTM D-698) or to a minimum of 92 percent of the maximum dry density as determined by the Modified Proctor test (ASTM D-1557) prior to placing structural fill.

Structural fill placed on slopes should be benched into the slope. Maximum bench heights should not exceed 4 feet, and bench widths should be wide enough to accommodate compaction equipment.

Structural fill shall consist of granular, non-expansive material. It should be placed in loose lifts not exceeding 8 to 12 inches, moisture conditioned to facilitate compaction (usually within 2 percent of the optimum moisture content) and compacted to a minimum of 92 percent of the

maximum dry density as determined by the Modified Proctor test, ASTM D-1557. The materials should be compacted by mechanical means.

Materials used for structural fill should be approved by RMG prior to use. Structural fill should not be placed on frozen subgrade or allowed to freeze during moisture conditioning and placement.

Design Parameters

The allowable bearing pressure of the on-site soils should be determined after recommended detailed Subsurface Soils Investigation is completed.

Conclusions

Based upon the geologic and physiographic conditions observed and encountered, the site is considered to be suitable for the proposed development. The geologic hazards identified on this site are relatively common to this portion of El Paso County and can be mitigated by implementing appropriate planning, engineering, and local construction practices.

Additional Investigations

The findings, conclusions and recommendations presented in this report were provided to evaluate the suitability of the site for mineral extraction and future development. Unless indicated otherwise, the test borings, laboratory test results, conclusions and recommendations presented in this report are not intended for use for design and construction. We recommend that specific Subsurface Soil Investigations be performed for the proposed structures.

These investigations should consider the proposed structure type, anticipated foundation loading conditions, location within the property, and local construction methods. Recommendations resulting from the investigations should be used for design and confirmed by on-site observation and testing during development and construction.

CLOSING

This report is for the exclusive purpose of providing geologic hazards information and preliminary geotechnical engineering recommendations. The scope of services did not include, either specifically or by implication, evaluation of wild fire hazards, environmental assessment of the site, or identification of contaminated or hazardous materials or conditions. Development of recommendations for the mitigation of environmentally related conditions, including but not limited to, biological or toxicological issues, are beyond the scope of this report. If the owner is concerned about the potential for such contamination or conditions, other studies should be undertaken.

This report has been prepared for **Darlene Jensen** in accordance with generally accepted geotechnical engineering and engineering geology practices. The conclusions and recommendations in this report are based in part upon data obtained from review of available topographic and geologic maps, review of available reports of previous studies conducted in the site vicinity, a site reconnaissance, and research of available published information, soil test borings, soil laboratory testing, and engineering analyses. The nature and extent of variations may not become evident until construction activities begin. If variations then become evident, RMG should be retained to re-evaluate the recommendations of this report, if necessary.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by geotechnical engineers and engineering geologists practicing in this or similar localities. RMG does not warrant the work of regulatory agencies or other third parties supplying information which may have been used during the preparation of this report. No warranty, express or implied, is made by the preparation of this report. Third parties reviewing this report should draw their own conclusions regarding site conditions and specific construction techniques to be used on this project.

If we can be of further assistance in discussing the contents of this report or analysis of the proposed development, from a geotechnical engineering and/or geologic hazards point-of-view, please feel free to contact us.

REFERENCES

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APPENDIX A
GUIDELINE SITE GRADING SPECIFICATIONS

Guideline Site Grading Specifications

Description: Unless specified otherwise by local or state regulatory agencies, these guideline specifications are for the excavation, placement and compaction of material from locations indicated on the plans, or staked by the Engineer, as necessary to achieve the required elevations. These specifications shall also apply to compaction of materials that may be placed outside of the project.

General: The Geotechnical Engineer shall approve fill materials, method of placement, moisture contents and percent compactions, and shall give written approval of the compacted fill.

Clearing Site: The Contractor shall remove trees, brush, rubbish, vegetation, topsoil and existing structures before excavation or fill placement is commenced. The Contractor shall dispose of the cleared material to provide the Owner with a clean job site. Cleared material shall not be placed in areas to receive fill or where the material will support structures. Clearing shall also include removal of existing fills that do not meet the requirements of this specification and existing structures.

Preparation of Slopes or Drainage Areas to Receive Fill: Natural slopes or slopes of drainage gullies where grades are 20 percent (5:1, horizontal to vertical) or steeper shall be benched prior to fill placement. Benches shall be at least 10 feet wide. Benches may require additional width to accommodate excavation or compaction equipment. At least one bench shall be provided for each 5 feet or less of vertical elevation difference. The bench surface shall be essentially horizontal perpendicular to the slope or at a slight incline into the slope.

Scarifying: Topsoil and vegetation shall be removed from the ground surface in areas to receive fill. The surface shall be plowed or scarified a minimum of 12 inches until the surface is free from ruts, hummocks or other uneven features which would prevent uniform compaction by the equipment to be used.

Compacting Area to Receive Fill: After the area to receive fill has been cleared and scarified, it shall be disked or bladed until it is free from large clods, moisture conditioned to a proper moisture content and compacted to the maximum density as specified for the overlying fill. Areas to receive fill shall be worked, stabilized, or removed and replaced, if necessary, in accordance with the Geotechnical Engineer's recommendations in preparation for fill.

Fill Materials: Fill material shall be free from organic material or other deleterious substances, and shall not contain rocks or lumps having a diameter greater than six inches. Fill materials shall be obtained from cut areas shown on the plans or staked in the field by the Engineer or imported to the site and shall be approved by the Geotechnical Engineer prior to placement. It is recommended that the fill materials have nil to low expansion potential, i.e., consist of silty to slightly clayey sand.

Moisture Content: Fill materials shall be moisture conditioned to within limits of optimum moisture content specified. Sufficient laboratory compaction tests shall be made to determine the optimum moisture content for the various soils encountered in borrow areas or imported to the site.

The contractor may be required to add moisture to the excavation materials in the borrow area if, in the opinion of the Geotechnical Engineer, it is not possible to obtain uniform moisture content by adding water to the fill material during placement. The Contractor may be required to rake or disk the fill soils to provide uniform moisture content through the soils.

The application of water to embankment materials shall be made with watering equipment, approved by the Geotechnical Engineer, which will give the desired results. Water jets from the spreader shall not be directed at the embankment with such force that fill materials are eroded.

Should too much water be added to the fill, such that the material is too wet to permit the desired compaction to be obtained, compacting and work on that section of the fill shall be delayed until the material has been allowed to dry to the required moisture content. The Contractor will be permitted to rework the wet material in an approved manner to hasten its drying.

Compaction of Fill Areas: Selected fill material shall be placed and mixed in evenly spread layers. After each fill layer has been placed, it shall be uniformly compacted to not less than the specified percentage of maximum density. Fill materials shall be placed such that the thickness of loose material does not exceed 10 inches and the compacted lift thickness does not exceed 6 inches.

Compaction, as specified above, shall be obtained by the use of sheepsfoot rollers, multiple-wheel pneumatic-tired rollers, or other equipment approved by the Geotechnical Engineer. Granular fill shall be compacted using vibratory equipment or other equipment approved by the Geotechnical Engineer. Compaction shall be accomplished while the fill material is at the specified moisture content. Compaction of each layer shall be continuous over the entire area.

Moisture Content and Density Criteria:

Compaction for structural fills, supporting utilities, roadway, buildings and general grading fills shall conform to the specifications for El Paso County.

Compaction of Slopes: Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compaction operations shall be continued until slopes are stable, but not too dense for planting, and such that there is no appreciable amount of loose soil on the slopes. Compaction of slopes may be done progressively in increments of three to five feet in height or after the fill is brought to its total height. Permanent fill slopes shall not exceed 3:1 (horizontal to vertical).

Density Testing: Field density testing shall be performed by the Geotechnical Engineer at locations and depths of his choosing. Where sheepfoot rollers are used, the soil may be disturbed to a depth of several inches. Density tests shall be taken in compacted material below the disturbed surface. When density tests indicate the density or moisture content of any layer of fill or portion thereof is below that required, the particular layer or portion shall be reworked until the required density or moisture content has been achieved.

Observation and Testing of Fill: Observation by the Geotechnical Engineer shall be sufficient during the placement of fill and compaction operations so that he can declare the fill was placed in general conformance with Specifications. All observations necessary to test the placement of fill and observe compaction operations will be at the expense of the Owner.

Seasonal Limits: No fill material shall be placed, spread or rolled while it is frozen, thawing, or during unfavorable weather conditions. When work is interrupted by heavy precipitation, fill operations shall not be resumed until the Geotechnical Engineer indicates the moisture content and density of previously placed materials are as specified.

Reporting of Field Density Tests: Density tests made by the Geotechnical Engineer shall be submitted progressively to the Owner. Dry density, moisture content, percent compaction, and approximate location shall be reported for each test taken.

FIGURES



SITE



NOT TO SCALE



ROCKY MOUNTAIN GROUP

Southern Office
 Colorado Springs, CO
 80918
 (719) 548-0600
Central Office:
 Englewood, CO 80112
 (303) 688-9475
Northern Office:
 Greeley / Evans, CO 80620
 (970) 330-1071

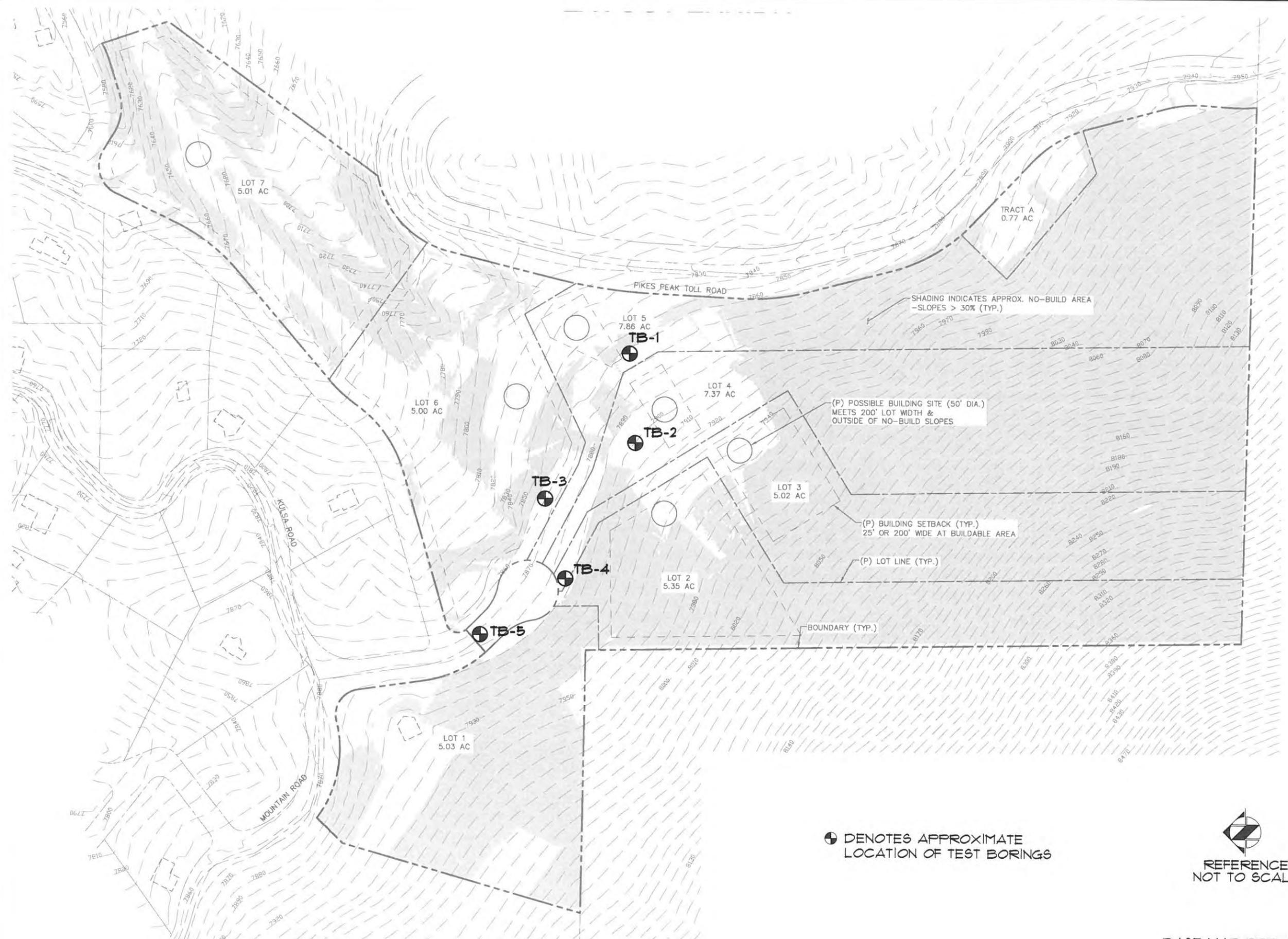
SITE VICINITY MAP

JENSON SUBDIVISION
 EL PASO COUNTY, CO
 DARLENE JENSON

JOB No. 147611

FIG No. 1

DATE 1-6-2015



⊕ DENOTES APPROXIMATE LOCATION OF TEST BORINGS



BASE MAP PROVIDED BY WESTWORKS ENGINEERING

Southern Office
 Colorado Springs, CO 80918
 (719) 548-0600
Central Office:
 Englewood, CO 80112
 (303) 688-9475
Northern Office:
 Greeley / Evans, CO 80620
 (970) 330-1071
Woodland Park Office:
 (719) 687-6077
Monument Office:
 (719) 488-2145
Pueblo / Canon City:
 (719) 544-7750

JENSEN
SUBDIVISION
 EL PASO COUNTY, CO
 DARLENE JENSON

ENGINEER:	TM
DRAWN BY:	KZ
CHECKED BY:	TM
ISSUED:	1-26-2016
REVISION:	DATE: JOB #:

TOPOGRAPHIC
TEST BORING
LOCATION PLAN

SOILS DESCRIPTION



GRANITE



SAND, SILTY TO CLAYEY, WITH GRAVEL

SYMBOLS AND NOTES



XX

STANDARD PENETRATION TEST - MADE BY DRIVING A SPLIT-BARREL SAMPLER INTO THE SOIL BY DROPPING A 140 LB. HAMMER 30", IN GENERAL ACCORDANCE WITH ASTM D-1586. NUMBER INDICATES NUMBER OF HAMMER BLOWS PER FOOT (UNLESS OTHERWISE INDICATED).



XX

UNDISTURBED CALIFORNIA SAMPLE - MADE BY DRIVING A RING-LINED SAMPLER INTO THE SOIL BY DROPPING A 140 LB. HAMMER 30", IN GENERAL ACCORDANCE WITH ASTM D-3550. NUMBER INDICATES NUMBER OF HAMMER BLOWS PER FOOT (UNLESS OTHERWISE INDICATED).



FREE WATER TABLE



BULK DISTURBED BULK SAMPLE



AUG AUGER "CUTTINGS"

1

RMG SOIL TYPE - SEE REPORT TEXT FOR DESCRIPTION

4.5

WATER CONTENT (%)

Colorado Springs, (Corporate Office)
2910 Austin Bluffs Parkway
Colorado Springs, CO 80918
Voice (719) 548-0600
Fax (719) 548-0223



EXPLANATION OF TEST BORING LOGS

JOB No. 147611

FIGURE No. 3

DATE 1/6/16

TEST BORING: 1 DATE DRILLED: 12/21/15 REMARKS: NO GROUNDWATER ON 12/22/15	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %	TEST BORING: 2 DATE DRILLED: 12/21/15 REMARKS: NO GROUNDWATER ON 12/22/15	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
SAND, SILTY TO CLAYEY, with gravel, reddish brown, medium dense to very dense, moist	5		-	50/6"	4.8	SAND, SILTY TO CLAYEY, with gravel, reddish brown, medium dense, moist	5		-	23	3.6
GRANITE, reddish brown, very hard, moist	10		-	18	3.3		10		-	22	3.9
	15		-	50/6"	3.3		15		-	11	7.6
			-	50/0"	2.7		20		-	16	5.8
			-				25		-	28	3.9

Colorado Springs (Corporate Office)
 2310 Austin Bluffs Parkway
 Colorado Springs, CO 80918
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TEST BORING LOGS

JOB No. 147611

FIGURE No. 4

DATE 1/6/16

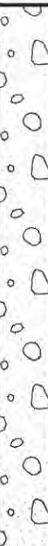
TEST BORING: 3 DATE DRILLED: 12/21/15 REMARKS: NO GROUNDWATER ON 12/22/15	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %	TEST BORING: 4 DATE DRILLED: 12/21/15 REMARKS: NO GROUNDWATER ON 12/22/15	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
SAND, SILTY TO CLAYEY, with gravel, reddish brown, medium dense, moist	5		23	6.5		SAND, SILTY TO CLAYEY with gravel, reddish brown, loose to medium dense, moist	5		24	3.9	
GRANITE, reddish brown, medium hard to very hard, moist	10		10	10.0			10		9	12.3	
	15		49	10.4		GRANITE, reddish brown, hard to very hard, moist	15		11	8.7	
	20		50/7"	6.0			20		50	9.4	
							25		50/7"	9.8	

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TEST BORING LOGS

JOB No. 147611
FIGURE No. 5
DATE 1/6/16

TEST BORING: 5 DATE DRILLED: 12/21/15 REMARKS: NO GROUNDWATER ON 12/22/15	DEPTH (FT)	SYMBOL	SAMPLES	BLOWS PER FT.	WATER CONTENT %
SAND, SILTY TO CLAYEY, with gravel, reddish brown, medium dense, moist	5			14	7.4
GRANITE, reddish brown, medium hard to very hard, moist	10			23	9.0
	15			42	6.0
	20			50/5"	4.5

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TEST BORING LOGS

JOB No. 147611
FIGURE No. 6
DATE 1/6/16

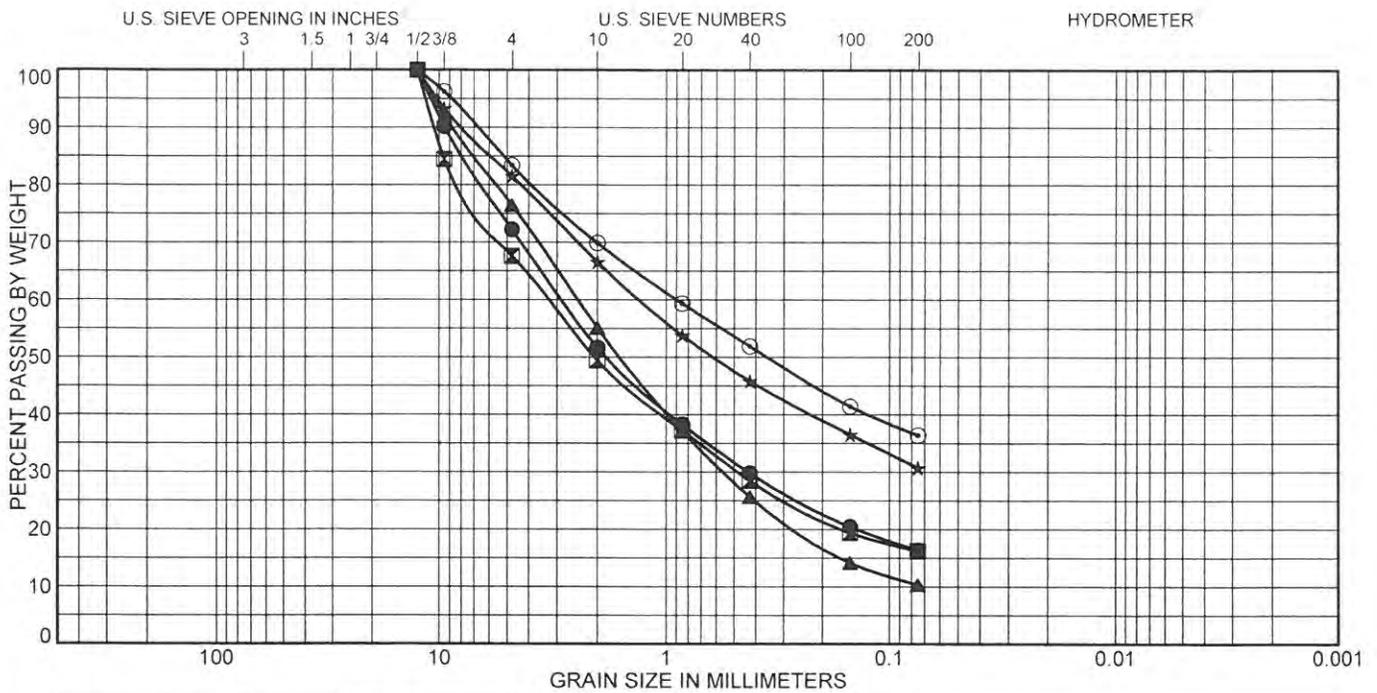
Test Boring No.	Depth	Water Content (%)	Dry Density (pcf)	Liquid Limit	Plasticity Index	% Retained No.4 Sieve	% Passing No. 200 Sieve	% Swell/ Collapse	FHA Expansion Pressure (psf)
1	4.0	4.8							
1	9.0	3.3		NP	NP	27.8	16.3		
1	14.0	3.3							
1	19.0	2.7							
2	4.0	3.6							
2	9.0	3.9							
2	14.0	7.6		NP	NP	32.4	16.2		
2	19.0	5.8							
2	24.0	3.9		NP	NP	23.5	10.4		
3	4.0	6.5		NP	NP	18.5	30.7		
3	9.0	10.0		39	26	16.6	36.4		
3	14.0	10.4							
3	19.0	6.0							
4	4.0	3.9							
4	9.0	12.3		36	23	20.8	38.3		
4	14.0	8.7		NP	NP	8.3	24.4		
4	19.0	9.4							
4	24.0	9.8							
5	4.0	7.4		34	21	27.6	31.4		
5	9.0	9.0							
5	14.0	6.0							
5	19.0	4.5							

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**SUMMARY OF
LABORATORY TEST
RESULTS**

JOB No. 147611
FIGURE No. 7
PAGE 1 OF 1
DATE 1/6/16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Test Boring	Depth (ft)	Classification	LL	PL	PI
● 1	9.0	SILTY SAND with GRAVEL(SM)	NP	NP	NP
⊠ 2	14.0	SILTY SAND with GRAVEL(SM)	NP	NP	NP
▲ 2	24.0	WELL-GRADED SAND with SILT and GRAVEL(SW-SM)	NP	NP	NP
★ 3	4.0	SILTY SAND with GRAVEL(SM)	NP	NP	NP
⊙ 3	9.0	CLAYEY SAND with GRAVEL(SC)	39	13	26

Test Boring	Depth (ft)	%Gravel	%Sand	%Silt	%Clay
● 1	9.0	27.8	55.9	16.3	
⊠ 2	14.0	32.4	51.4	16.2	
▲ 2	24.0	23.5	66.1	10.4	
★ 3	4.0	18.5	50.8	30.7	
⊙ 3	9.0	16.6	47.0	36.4	

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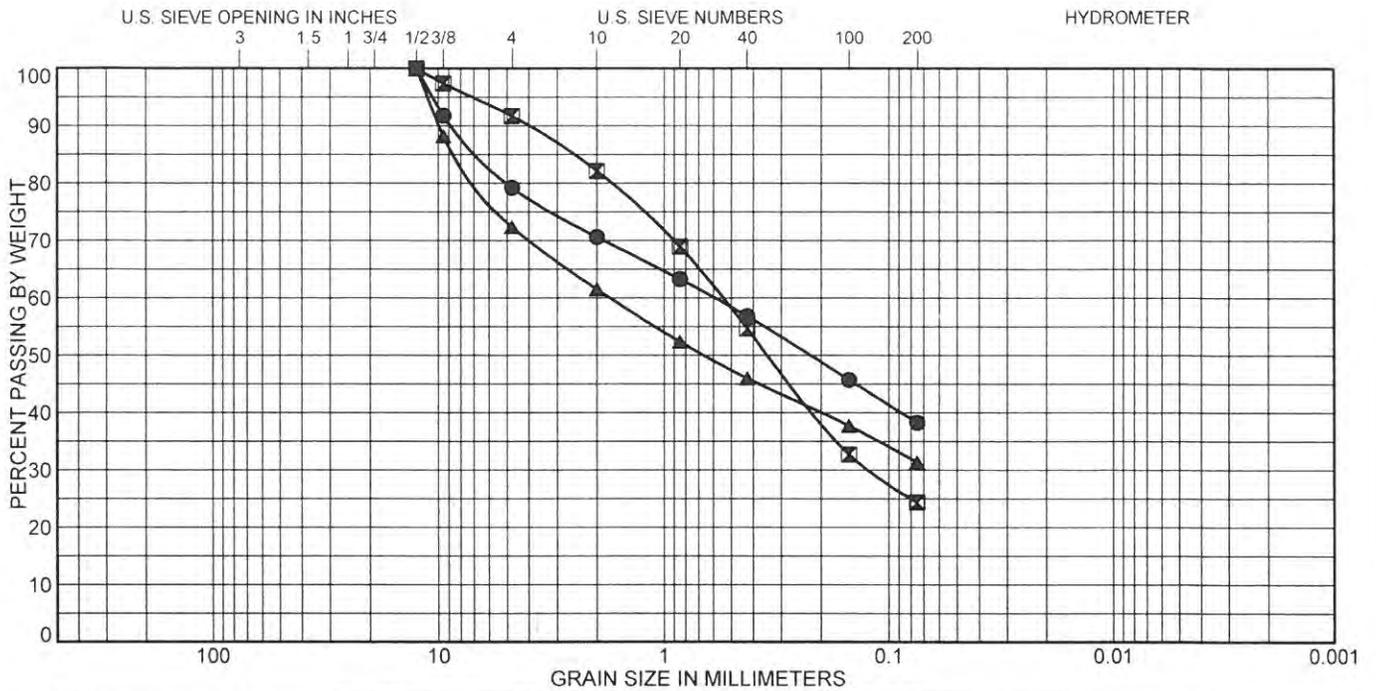


SOIL CLASSIFICATION DATA

JOB No. 147611

FIGURE No. 8

DATE 1/6/16



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

Test Boring	Depth (ft)	Classification	LL	PL	PI
● 4	9.0	CLAYEY SAND with GRAVEL(SC)	36	13	23
☒ 4	14.0	SILTY SAND(SM)	NP	NP	NP
▲ 5	4.0	CLAYEY SAND with GRAVEL(SC)	34	13	21

Test Boring	Depth (ft)	%Gravel	%Sand	%Silt	%Clay
● 4	9.0	20.8	41.0	38.3	
☒ 4	14.0	8.3	67.3	24.4	
▲ 5	4.0	27.6	41.0	31.4	

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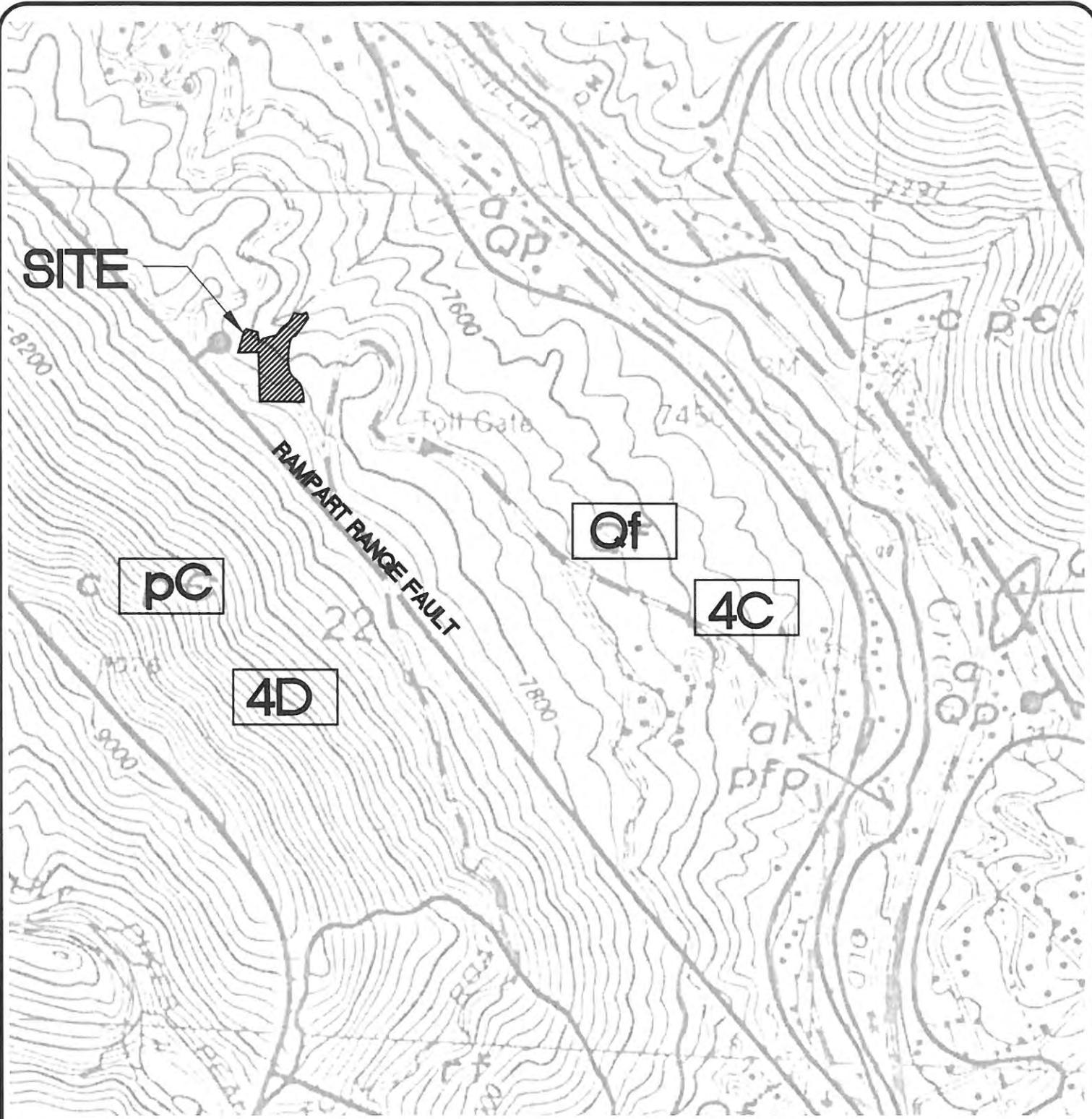


SOIL CLASSIFICATION DATA

JOB No. 147611

FIGURE No. 9

DATE 1/6/16



NOT TO SCALE

BASE MAP PROVIDED BY:
USGS



ROCKY MOUNTAIN GROUP

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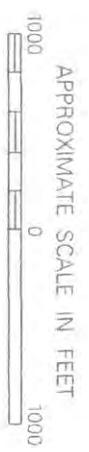
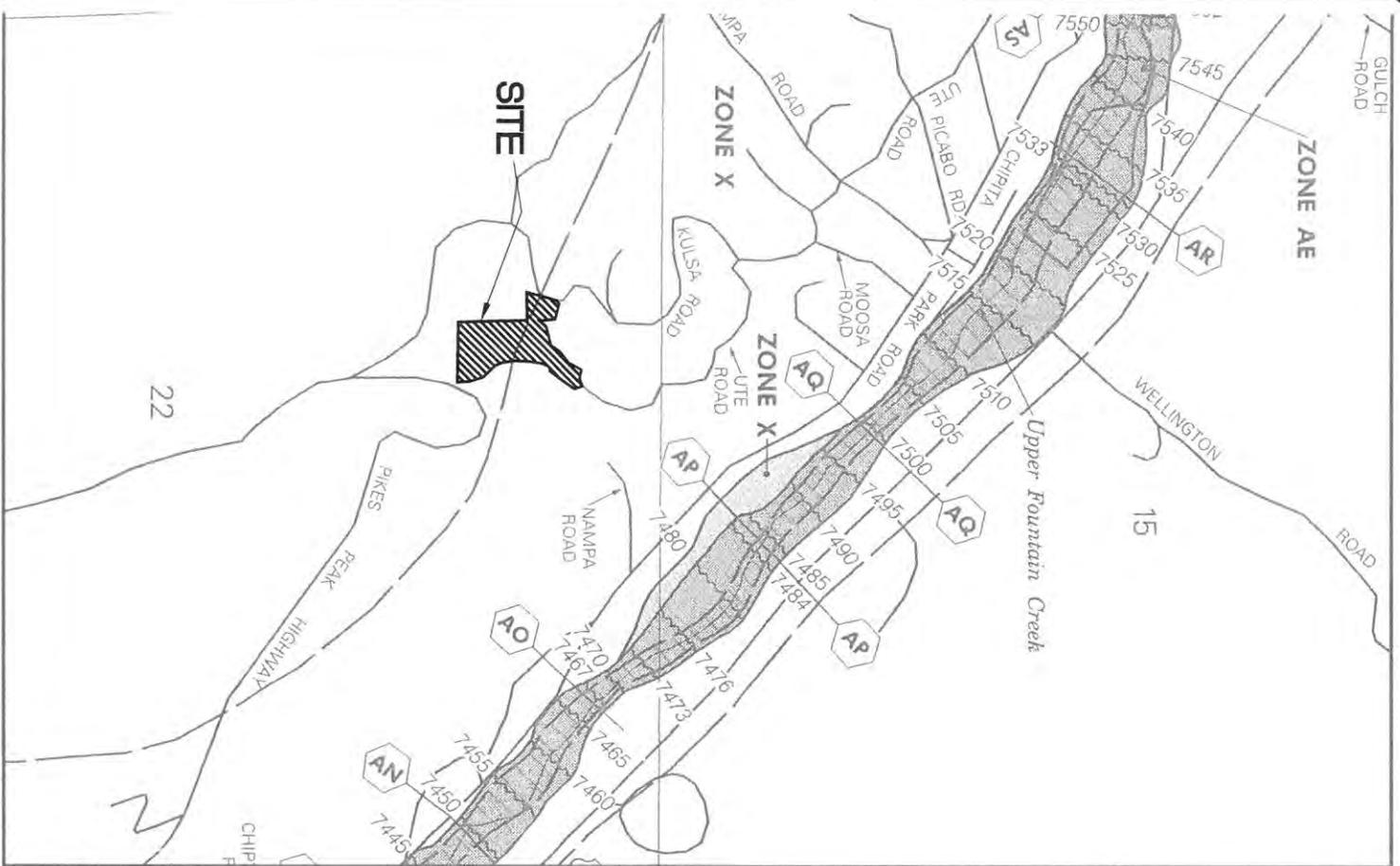
ENGINEERING GEOLOGY MAP

JENSON SUBMISION
EL PASO COUNTY, CO
DARLENE JENSON

JOB No. 147611

FIG No. 10

DATE 1-6-2015



NATIONAL FLOOD INSURANCE PROGRAM

FIRM
FLOOD INSURANCE RATE MAP
 EL PASO COUNTY,
 COLORADO AND
 INCORPORATED AREAS

PANEL 490 OF 1300
 (SEE MAP INDEX FOR PANELS NOT PRINTED)

CONTAINS COMMUNITY	NUMBER	PANEL	SUFFIX
EL PASO COUNTY UNINCORPORATED AREAS	080490	490	F

MAP NUMBER
 08041C0490 F

EFFECTIVE DATE:
 MARCH 17, 1997

Federal Emergency Management Agency

This is an official copy of a portion of the above referenced flood map was extracted using F-MIT On-Line. This map does not reflect any amendments which may have been made subsequent to the date of this block. For the latest product information about National Flood Program flood maps check the FEMA Flood Map Store at www.fema.gov

NOT TO SCALE

ARCHITECTS
RMG
 ENGINEERS
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FEMA MAP

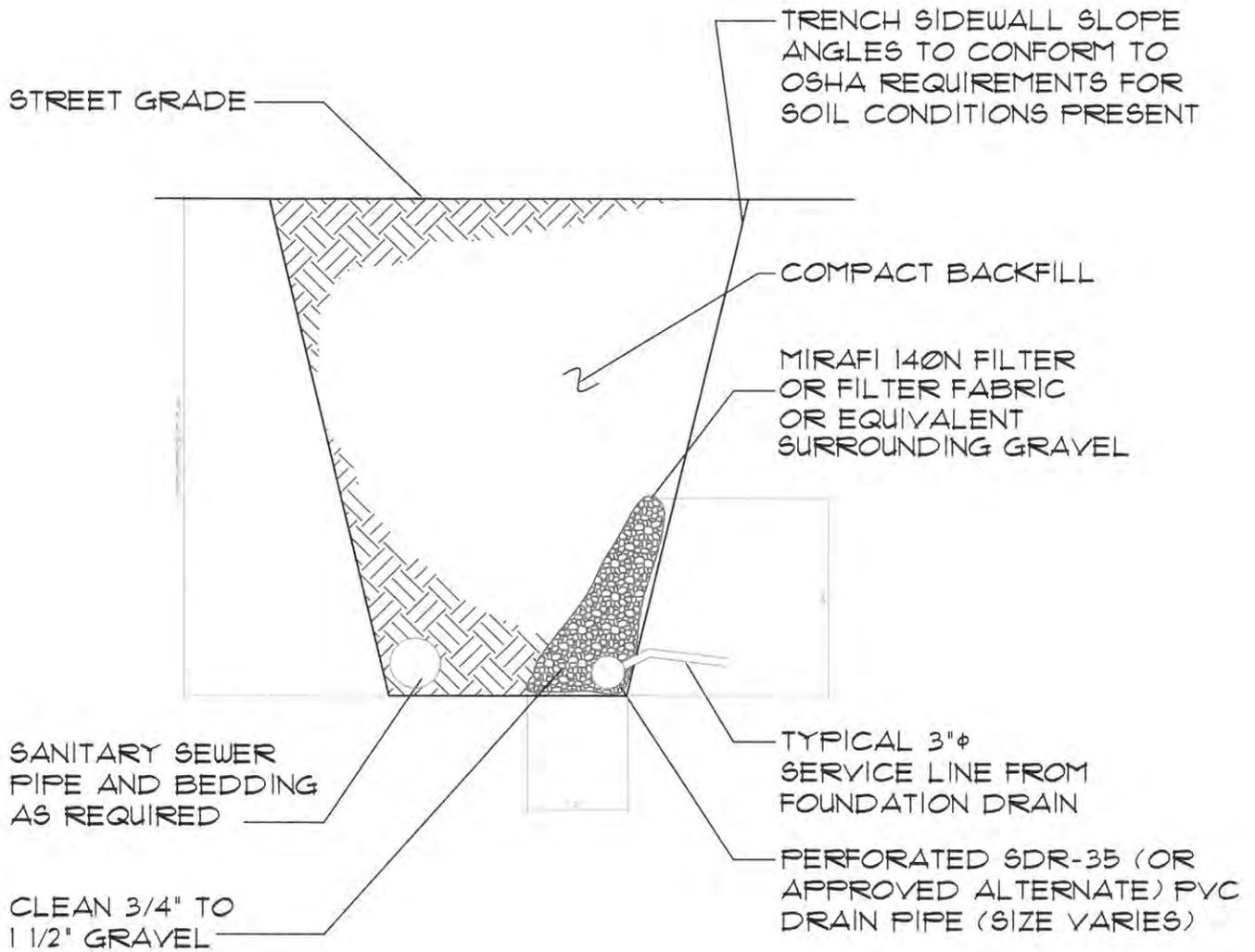
JENSON SUBDIVISION
 EL PASO COUNTY, CO
 DARLENE JENSON

JOB No. 147611

FIG No. 11

DATE 1-6-2015

NOTE: TO BE USED IN CASES WHERE
GROUNDWATER IS FOUND DURING
TRENCHING OR WHERE SHALLOW
GROUNDWATER IS KNOWN TO EXIST



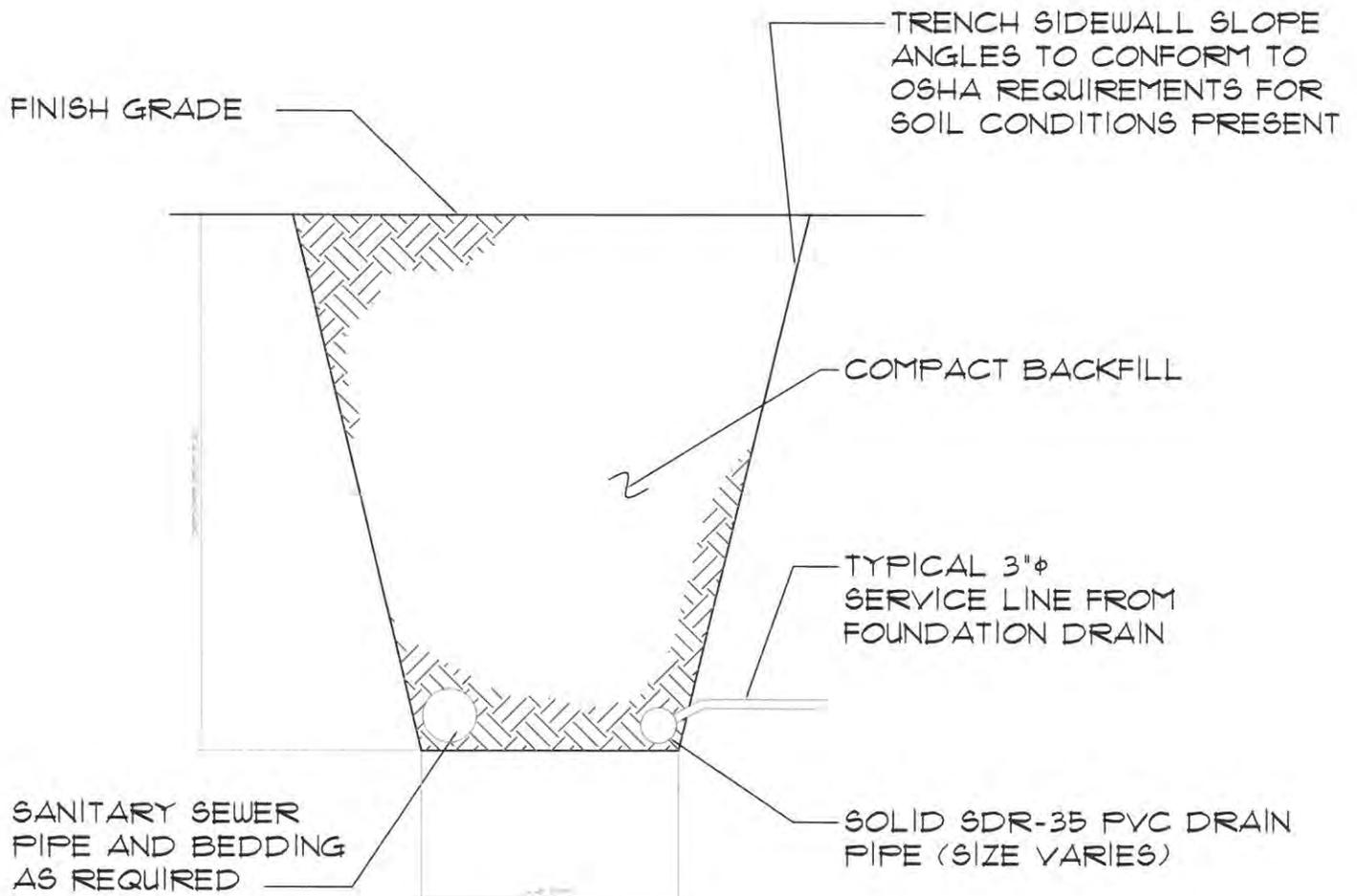
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ACTIVE DRAIN IN
SEWER UTILITY TRENCH

FIG No. 12

NOTE: TO BE USED WHERE NO
SHALLOW GROUNDWATER IS KNOWN TO
EXIST



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PASSIVE DRAIN IN
SANITARY SEWER TRENCH

FIG No. 13