ENTECH
ENGINEERING, INC.
505 ELKTON DRIVE
COLORADO SPRINGS, CO 80907
PHONE (719) 531-5599

October 4, 2023

Stimple Family LLLP
14842 Longwall Drive
Colorado Springs, Colorado 80908

Attn: Doug Stimple

Re: Soils and Geology Study
Vollmer Road and Arroya Lane
Parcel No. 52214-00-002
El Paso County, Colorado

Dear Mr. Stimple:

The project consists of platting a 7.65-acre parcel for a proposed single-family residence. The site is located northeast of the intersection of Vollmer Road and Arroya Lane, in El Paso County, Colorado.

GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in a portions of the SE¼ of Section 21 and the SW¼ of Section 22, Township 12 South, Range 65 West of the 6th Principal Meridian in El Paso County, Colorado. The site is located approximately 2 miles northeast of Colorado Springs city limits, northeast of Vollmer Road and Arroya Lane in El Paso County, Colorado. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site is gradually southeast with steeper slopes along the eastern side of the property. Sand Creek is located along the eastern side of the site and flows in a southerly direction. Water was observed flowing in Sand Creek at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included undeveloped grazing and pasture land. The site contains primarily field grasses and weeds with ponderosa pines along the eastern side of the property. Site photographs, taken September 25, 2023, are included in Appendix A.

The lot is 7.65-acres. The new lot will be serviced by an individual well and on-site wastewater treatment system. One test boring and two test pits were completed as part of this investigation. The test boring and test pit locations are indicated on the Site and Exploration Plan, Figure 3. Test Boring and Test Pit Logs are included in Appendix B, and the laboratory testing results are included in Appendix C.

The site was previously investigated as part of the Soil, Geology, and Geologic Hazard Study completed for The Retreat at TimberRidge dated April 17, 2017, Entech Job No 170020 (Reference 1). One test boring (TB-13) was located on the parcel. Information from the previous report was also utilized in preparing this report. The test boring log and laboratory testing result is included in Appendix D.

LAND USE AND ENGINEERING GEOLOGY

This site was found to be suitable for the proposed development. Areas were encountered where the geologic conditions will impose some constraints on development and land use. These include potentially expansive soils, shallow bedrock, and potentially shallow groundwater

areas. Based on the proposed development plan, it appears that these areas will have some minor impacts on the development. These conditions will be discussed in greater detail in the report.

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

SCOPE OF THE REPORT

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

FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS), previously the Soil Conservation Service (SCS) survey was also reviewed to evaluate the site. The position of mappable units within the subject property are shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements, and aerial photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Geology/Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on September 25, 2023.

One test boring and two test pits were completed on the site to determine general suitability for the use of on-site wastewater treatment systems and general soil characteristics. The location of the test borings and test pits are indicated on the Site and Exploration Plan, Figure 3. The Test Boring and Test Pit Logs are presented in Appendix B. Results of this testing will be discussed later in this report.

Laboratory testing was also performed on some of the soils to classify and determine the soils engineering characteristics. Laboratory tests included grain-size analysis, ASTM D-422, and Atterberg Limits, ASTM D-4318. Results of the laboratory testing are included in Appendix C. A Summary of Laboratory Test Results is presented in Table C-1.

SOIL AND GEOLOGIC CONDITIONS

Soil Survey

The Natural Resource Conservation Service (NRCS) (Reference 2, Figure 4), previously the Soil Conservation Service (Reference 3) has mapped one soil type on the site. Complete description of the soil type is presented in Appendix E. In general, the soils consist of sandy loam. The soils are described as follows:

Type	Description
71	Pring coarse sandy loam, 3 – 8% Slopes

The soils have been described to have moderate to rapid permeabilities. The soils are described as well suited for use as homesites. Possible hazards with soils erosion are present on the site. The erosion potential can be controlled with vegetation. The soils have been described to have moderate erosion hazards (Reference 3).

Soils

The soils encountered in the test borings and test pits consisted of a layer of silty sand and sandy clay overlying weathered sandy claystone and sandstone bedrock. Bedrock was encountered at depths ranging from 4 to 8 feet. The upper sands were encountered at medium dense states and moist conditions, the claystone was encountered at hard consistencies and moist conditions, and the sandstone was encountered at very dense states and moist conditions. Swell/Consolidation Testing was performed on a sample of the claystone which resulted in a volume change of 1.4 percent indicating a low to moderate expansion potential. Highly expansive claystone and siltstone lenses are commonly interbedded in the Dawson Formation in the area.

Groundwater

Groundwater or signs of seasonally occurring water were not encountered in the test borings or test pits, which were drilled to 20 feet and excavated to 8 feet. It is anticipated groundwater will not affect shallow foundations on the majority of the site. An area of potential seasonally shallow groundwater has been mapped in northern portion of the site that is discussed in the following sections. Fluctuations in groundwater conditions may occur due to variations in rainfall or other factors not readily apparent at this time. Isolated sand layers within the soil profile can carry water in the subsurface. Contractors should be cognizant of the potential for the occurrence of subsurface water features during construction.

Geology

Approximately 12 miles west of the site is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within a large structural feature known as the Denver Basin. Bedrock in the area is typically gently dipping in a northerly direction (Reference 4). The bedrock underlying the site consists of the Dawson Formation of Cretaceous Age. The Dawson Formation typically consists of coarse-grained arkosic sandstone with interbedded layers claystone or siltstone. The Geology Map for the site is presented in Figure 6. Two mappable units were identified on this site which are described as follows:

Qay2 **Young alluvium two of Holocene Age:** These materials consist of water deposited alluvium, typically classified as a silty to well-graded sand, brown to dark brown in color and of moderate density.

Qc/Tkd **Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:** The materials consist of colluvial or residual soils overlying the bedrock materials on-site. The colluvial soils were deposited by the action of sheetwash and gravity. The residual soils were derived from the in-situ weathering of the bedrock on site. These materials typically consist of silty to clayey sand with

potential areas of sandy clays. The bedrock consists of the Dawson Formation. The Dawson Formation typically consists of coarse-grained, arkosic sandstone with interbedded lenses of fine-grained sandstone, siltstone and claystone.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Falcon NW Quadrangle* distributed by the Colorado Geologic Survey in 2003 (Reference 5, Figure 5), The *Geologic Map of the Colorado Springs-Castle Rock Area,* distributed by the US Geological Survey in 1979 (Reference 6), and the *Geologic Map of the Pueblo 1° x 2° Quadrangle,* distributed by the US Geological Survey in 1978 (Reference 7). The test borings and test pits were used in evaluating the site and is included in Appendices B and C. The Geology Map prepared for the site is presented in Figure 6.

ENGINEERING GEOLOGIC HAZARDS

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

Expansive Soils – Constraint

Expansive soils were encountered in one test boring. Highly expansive claystone and siltstone are commonly interbedded in the sandstone of the Dawson Formation in the area. These clays or claystone, if encountered beneath foundations, can cause differential movement in the structure foundation.

Mitigation: Should expansive soils be encountered beneath the foundation; mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation of 4 feet and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements.

Potential Seasonally Shallow Groundwater Area – Constraint

The site is not mapped within any floodplains according to the FEMA Map No. 08041C0535G, dated December 7, 2018 (Reference 8, Figure 7). It should be noted that the mapping stops at Arroya Lane and Sand Creek is located along the eastern side of the property. Areas of potential seasonally shallow groundwater were observed in the northern portion of the site (Figure 6). In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. These areas lie along the headwaters of Sand Creek and are north of the proposed building area. Water was in Sand Creek at the time of our site investigation. These areas will likely be avoided by development. The potential exists for high groundwater levels during high moisture periods and should structures encroach on these areas the following precautions should be followed.

Mitigation: Foundations must have a minimum 30-inch depth for frost protection. In areas where high subsurface moisture conditions are anticipated periodically, subsurface perimeter drains

are recommended to help prevent the intrusion of water into areas below grade. Typical drain details are presented in Figure 8. If shallow groundwater is encountered, underslab drains or interceptor drains may be necessary Figures 9 and 10. Specific drainage details and recommendations should be made once building locations and plans are finalized. Any grading in these areas should be done to direct surface flow around construction to avoid areas of ponded water. All organic material would be completely removed prior to any fill placement. **Specific drainage studies are beyond the scope of this report.**

Shallow Bedrock – Constraint

Bedrock was encountered in the test borings at depths ranging from the 4 to 8 feet. Where shallow bedrock is encountered, excavation/grading may be difficult requiring track-mounted excavators with ripper attachments. Bedrock will likely be encountered in the proposed building excavations. In areas of shallow bedrock, the potential for perched groundwater conditions exist. Where perched groundwater is encountered, underslab drains or interceptor drains may be necessary Figures 9 and 10.

Faults – Hazard

The closest fault is the Rampart Range Fault, located approximately 12 miles west of the site (Reference 3). No faults are mapped in the site itself. Previously, Colorado was mapped entirely within Seismic Zone 1, a very low seismic risk. Additionally, the International Residential Code (IRC), 2003, currently places this area in Seismic Design Category B, also a low seismic risk. According to a report by the Colorado Geological Survey by Kirkman and Rogers, Bulletin 43 (1981) (Reference 8), this area should be designed for Zone 2 due to more recent data on the potential for movement in this area and any resultant earthquakes.

Radon – Hazard

Radon levels for the area have been reported by the Colorado Geologic Survey in the open file, Report No. 91-4 (Reference 9). Average Radon levels for the 80908-zip code is 3.40 pCi/l. The following is a table of radon levels in this area:

80831	
0 < 4 pCi/l	50.00%
4 < 10 pCi/l	50.00%
10 < 20 pCi/l	0.00%
> 20 pCi/l	0.00%

Mitigation:
The potential for high radon levels is present for the site. Build-up of radon gas can usually be mitigated by providing increased ventilation of basement and crawlspace and sealing joints. **Specific requirements for mitigation should be based on site specific testing.**

RELEVANCE OF GEOLOGIC CONDITIONS TO LAND USE PLANNING

The proposed development will be rural-residential utilizing an individual on-site wastewater treatment system and water well. Total acreage involved in the proposed subdivision is 7.56-acres, and one lot is proposed. The existing geologic and engineering geologic conditions will impose minor constraints on development and construction. The geologic conditions on the site include potentially expansive soils, shallow bedrock, and potentially shallow groundwater areas, which can be satisfactorily mitigated through avoidance or proper engineering design and construction practices.

The upper granular soils encountered in the test borings and test pits on the site were encountered at medium dense states, the sandstone was encountered at dense to very dense states. Expansive soils were encountered in one of the test borings that would require mitigation. Highly expansive claystone and siltstone are commonly interbedded in the sandstone of the Dawson Formation. Mitigation of expansive soils will be required if encountered. Overexcavation of 4 feet and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. These soils will not prohibit development.

Areas of potential seasonally shallow groundwater were observed in the northern portion of the site (Figure 6). In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. These areas lie along the headwaters of Sand Creek and are north of the anticipated building area. Water was flowing in Sand Creek at the time of our site investigation. These areas will likely be avoided by development. Subsurface perimeter drains are recommended for the structure. Typical perimeter drain details are presented in Figures 8 – 10. If shallow groundwater is encountered, underslab drains or interceptor drains may be necessary Figures 9 and 10. Specific drainage details and recommendations should be made once building locations and plans are finalized. Any grading in theses areas should be done to direct surface flow around construction to avoid areas of ponded water.

Bedrock was encountered in the test borings at depths ranging from the 4 to 8 feet. Where shallow bedrock is encountered, excavation/grading may be difficult requiring track-mounted excavators with ripper attachments. Bedrock will likely be encountered in the proposed building excavations. In areas of shallow bedrock, the potential for perched groundwater conditions exist. Where perched groundwater is encountered, underslab drains or interceptor drains may be necessary Figures 9 and 10.

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

ECONOMIC MINERAL RESOURCES

Some of the sandy materials on-site could be considered a low-grade sand resource. According to the *El Paso County Aggregate Resource Evaluation Map* (Reference 11), of the area of the site is not mapped with any potential aggregate resources. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 12), the site is not mapped with any resources. According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 13), the area of the site has been mapped as "little or no potential" for industrial minerals.

According to *the Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 13), the site is mapped within the Denver Basin Coal Region. However, the area of the site has been mapped as "Poor" for coal resources. No active or inactive mines have been mapped in the area of the site. No metallic mineral resources have been mapped on the site (Reference 13).

The site has been mapped as "Fair" for oil and gas resources (Reference 13). No oil or gas fields have been discovered in the area of the site. The sedimentary rocks in the area may lack the geologic structure for trapping oil or gas; therefore, it may not be considered a significant resource. Hydraulic fracturing is a new method that is being used to extract oil and gas from rocks. It utilizes pressurized fluid to extract oil and gas from rocks that would not normally be productive. The area of the site has not been explored to determine if the rocks underlying the site would be commercially viable utilizing hydraulic fracturing. The practice of hydraulic fracturing has come under review due to concerns about environmental impacts, health and safety.

EROSION CONTROL

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

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

or in conjunction with the drainage engineer who is more familiar with the flow quantities and velocities.

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

CLOSURE

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

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

This report has been prepared for Stimple Family LLLP, for application to the proposed project in accordance with generally accepted geologic soil and engineering practices. No other warranty expressed or implied is made.

We trust that this report has provided you with all the information that you required. Should you require additional information, please do not hesitate to contact Entech Engineering, Inc.

Respectfully Submitted,

ENTECH ENGINEERING, INC.

Logan L. Langford, P.G.
Geologist

COLORADO REGISTERED JOSEPH COLLIN GOODE JR. 23725 10-4-2023 PROFESSIONAL ENGINEER

Reviewed by:

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

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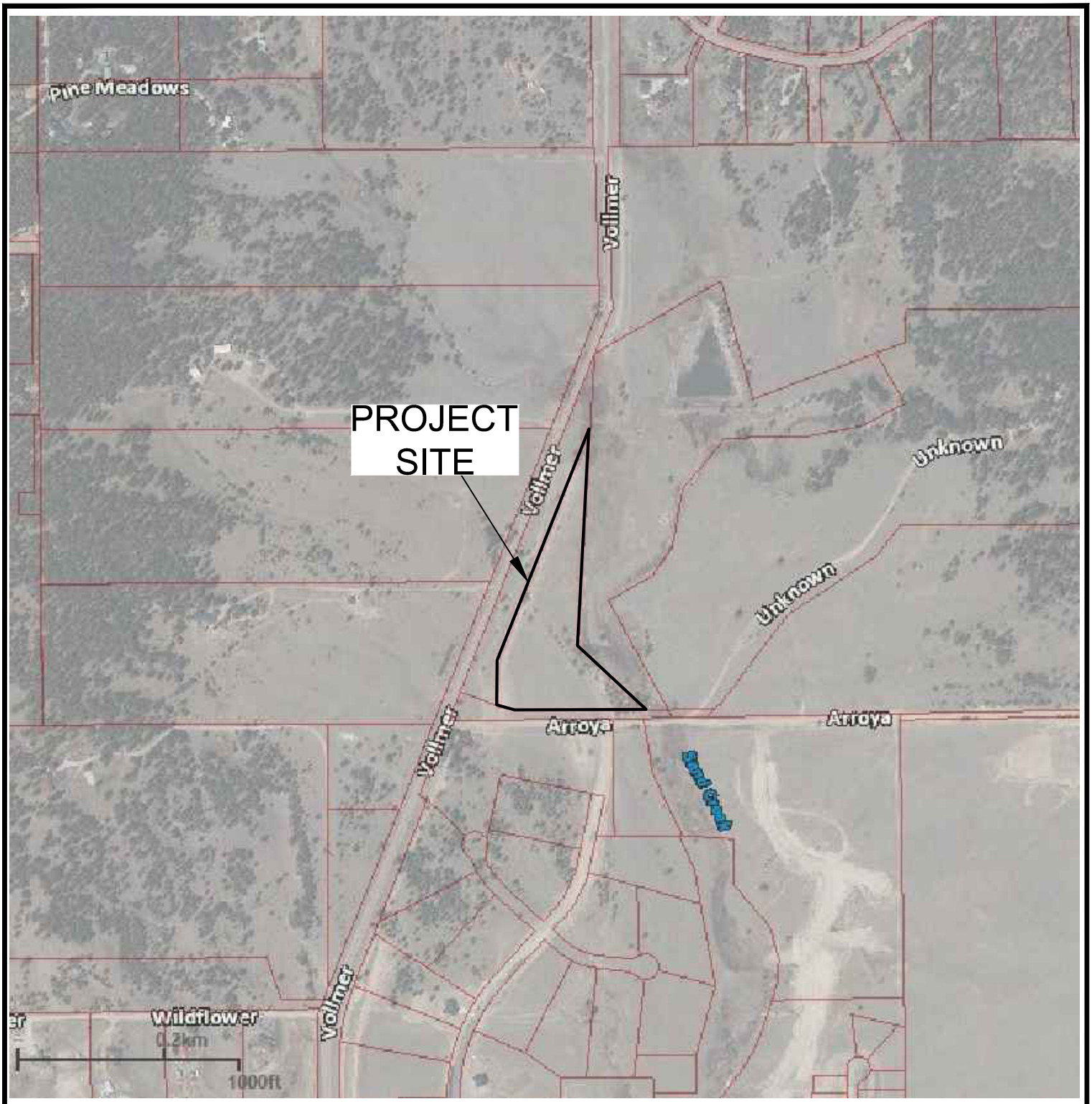
FIGURES



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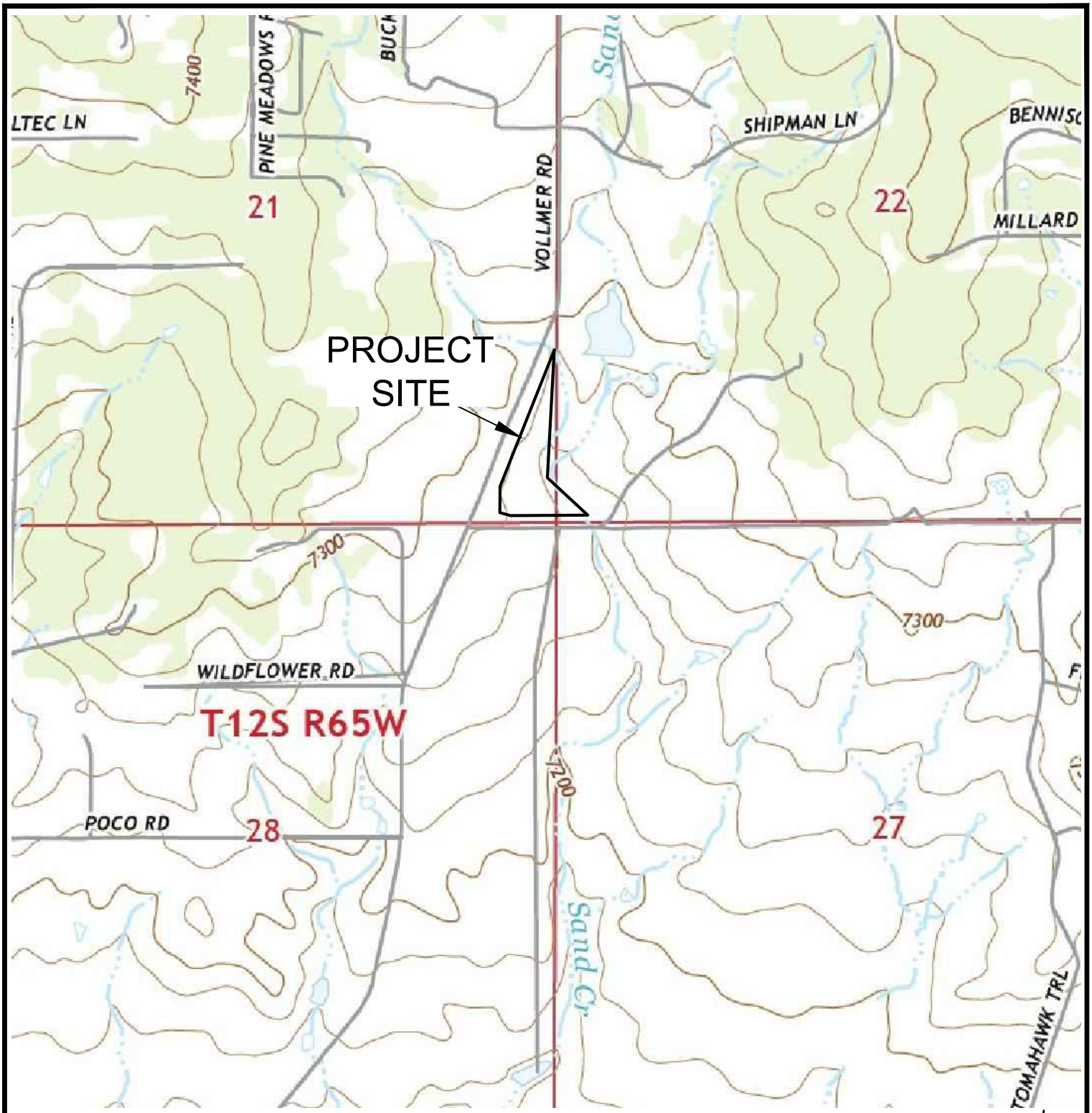
ENTECH ENGINEERING, INC.

VICINITY MAP
VOLLMER ROAD AND ARROYA LANE
PARCEL NO. 52214-00-002
STIMPLE FAMILY LLLP

JOB NO.
231494

FIG. 1

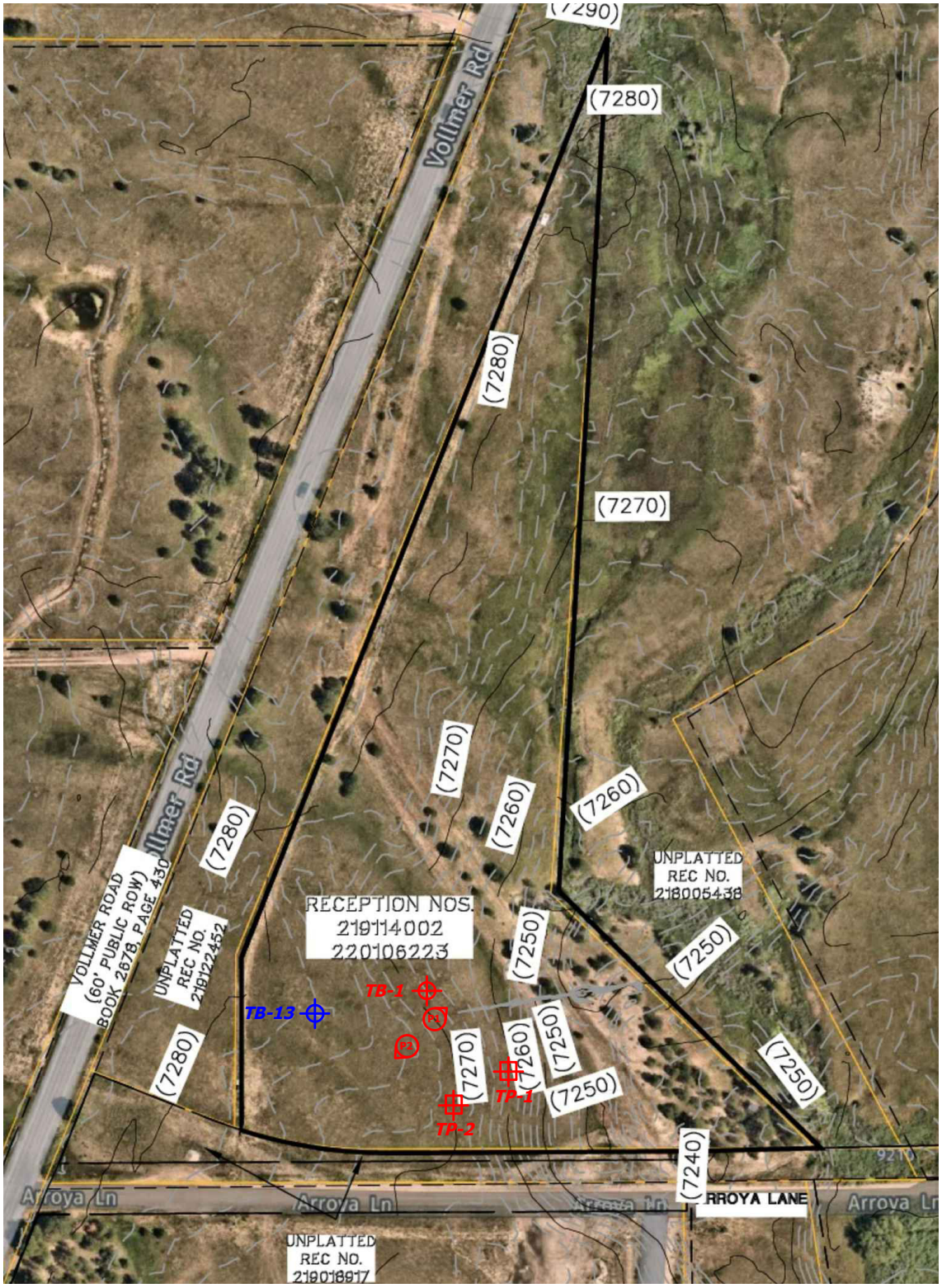


ENTECH ENGINEERING, INC.

USGS TOPOGRAPHY MAP
VOLLMER ROAD AND ARROYA LANE
PARCEL NO. 52214-00-002
STIMPLE FAMILY LLLP

JOB NO.
231494

FIG. 2



- APPROXIMATE TEST BORING LOCATION AND NUMBER
- APPROXIMATE TEST PIT LOCATION AND NUMBER
- APPROXIMATE TEST BORING LOCATION AND NUMBER (EEI Job No. 170020
- APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER

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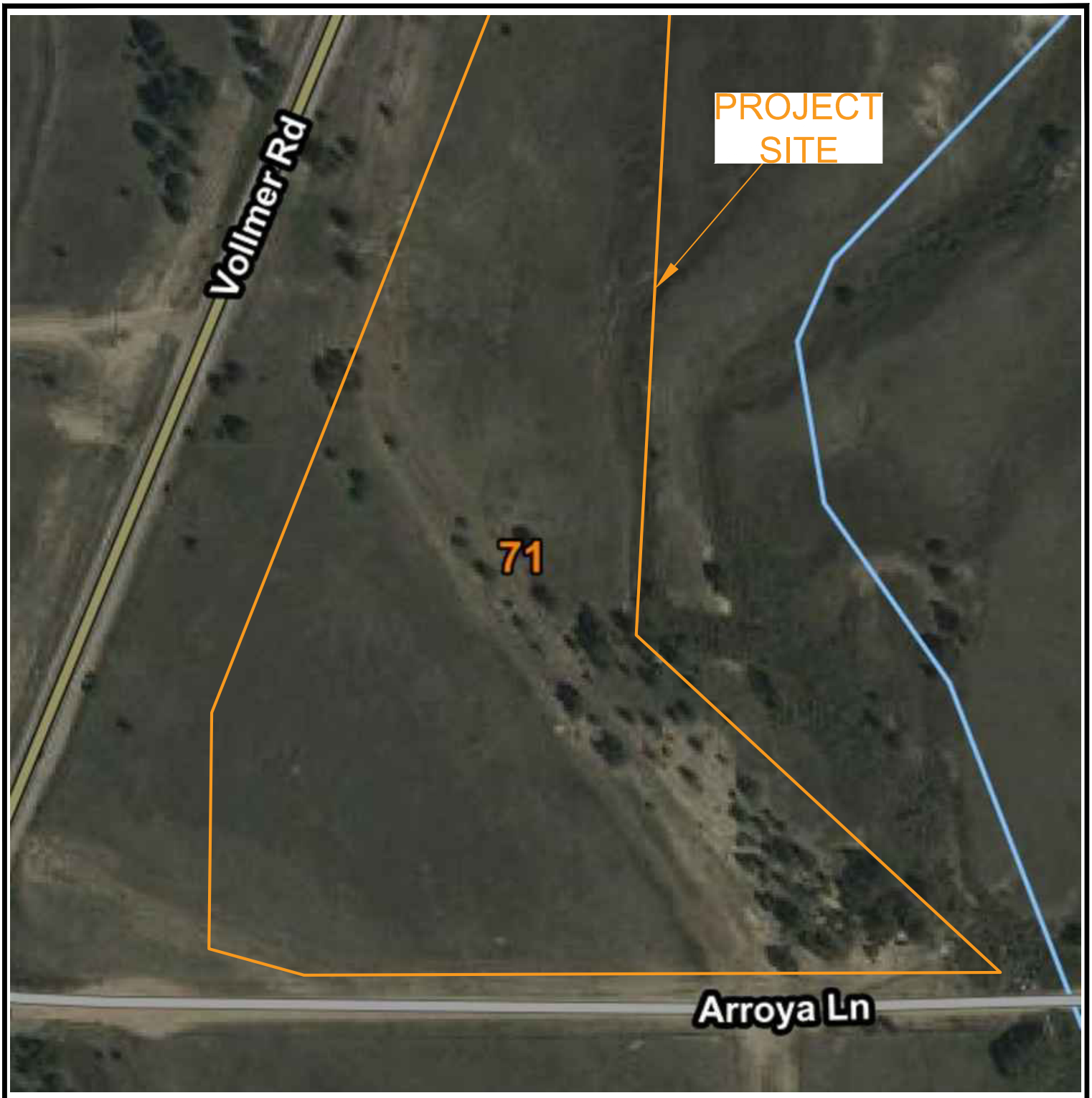
ENTECH ENGINEERING, INC.

SITE AND EXPLORATION PLAN

VOLLMER ROAD AND ARROYA LANE
PARCEL NO. 52214-00-002
STIMPLE FAMILY LLLP

JOB NO.
231494

FIG. 3



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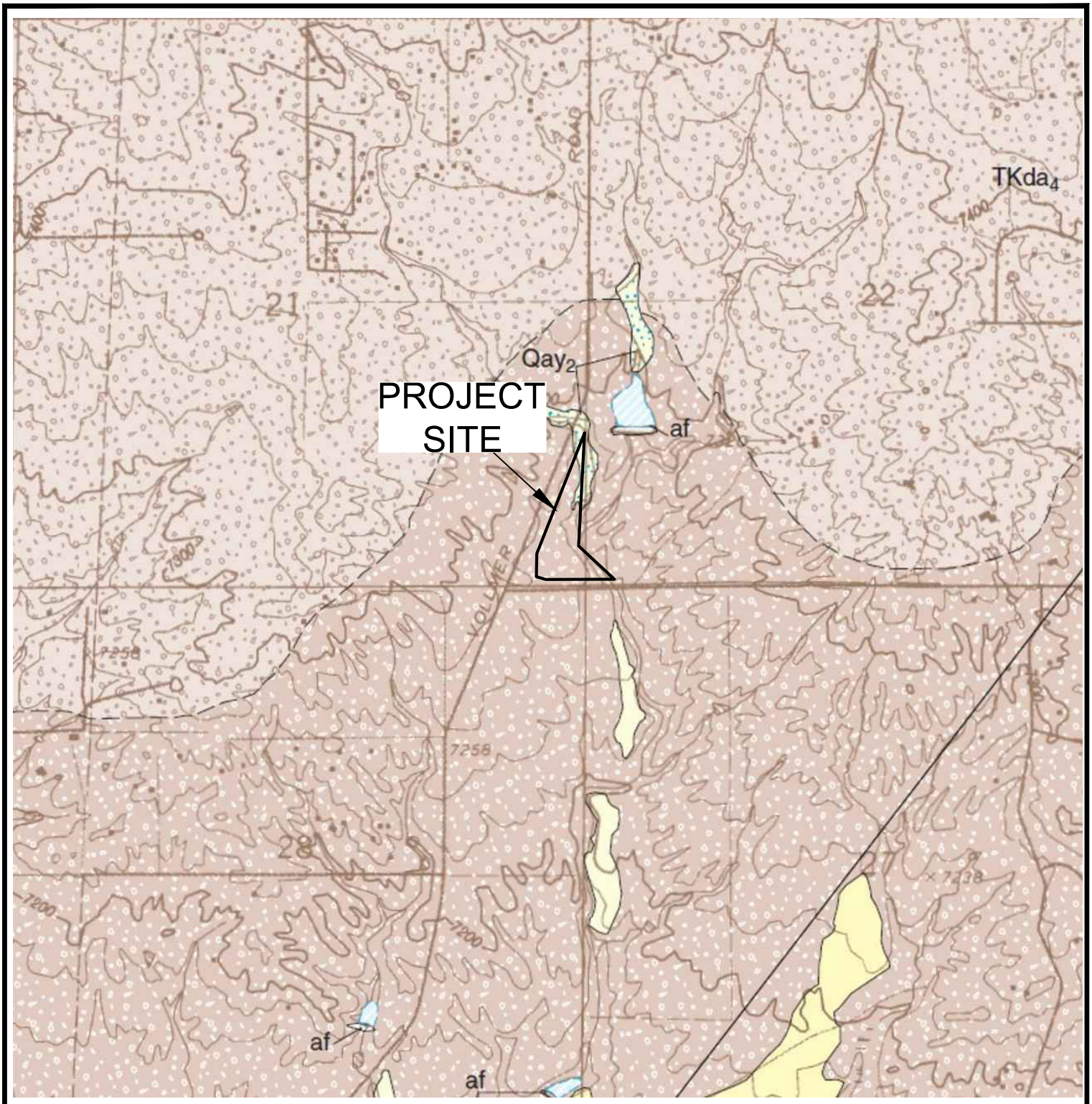
ENTECH ENGINEERING, INC.

SOIL SURVEY MAP
VOLLMER ROAD AND ARROYA LANE
PARCEL NO. 52214-00-002
STIMPLE FAMILY LLLP

JOB NO.
231494

FIG. 4



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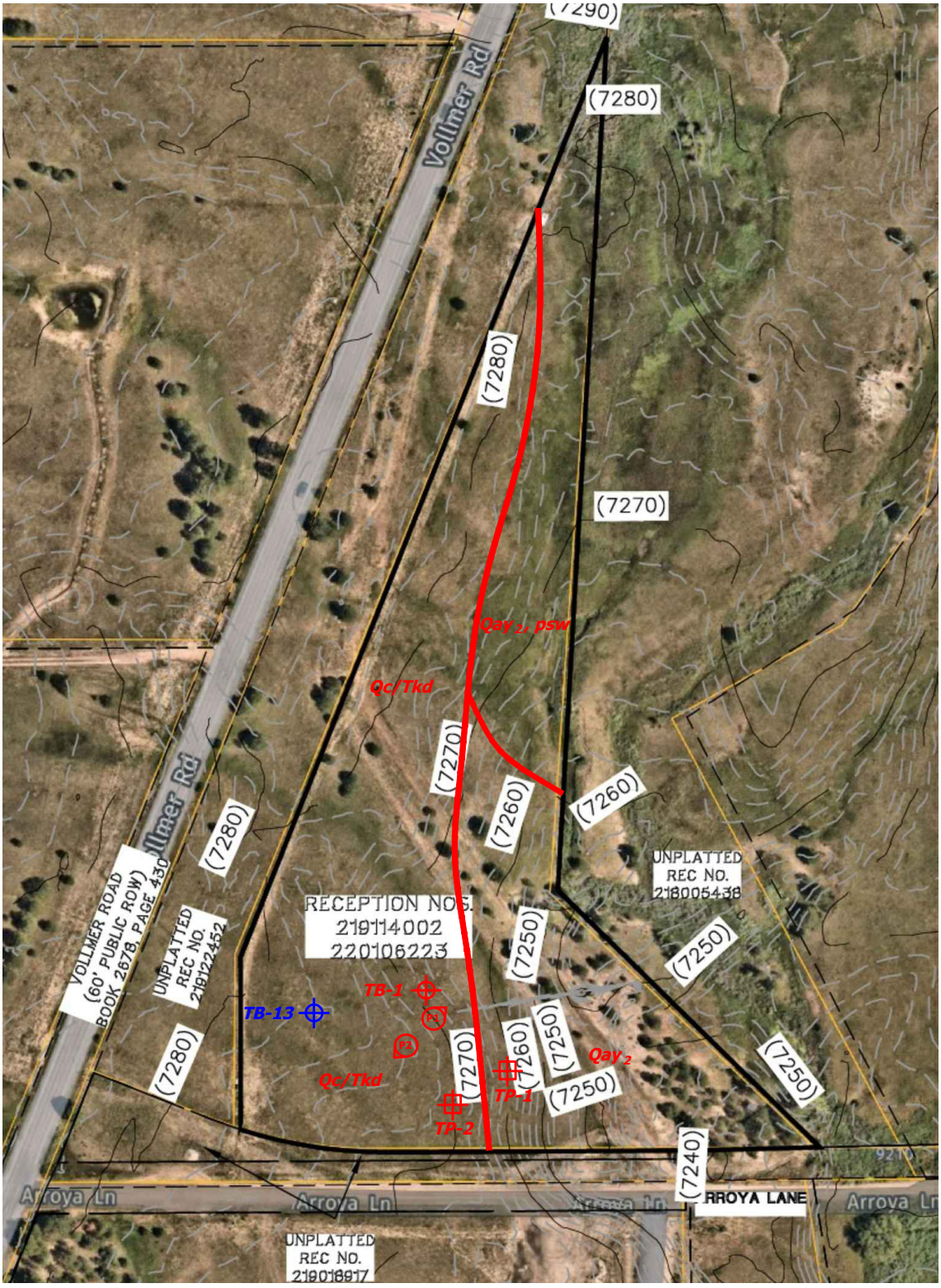
ENTECH ENGINEERING, INC.

FALCON NW QUADRANGLE GEOLOGIC MAP
VOLLMER ROAD AND ARROYA LANE
PARCEL NO. 52214-00-002
STIMPLE FAMILY LLLP

JOB NO. 231494

FIG. 5



Legend:

Qay_2 - Young Alluvium Two of Holocene Age: water deposited sands and clays

Qc/Tkd - Colluvium of Quaternary Age ovelrying The Dawson Formation of Tertiary to Cretaceous Age: sheetwash and residual soil deposits overlying arkosic sandstone with interbedded claystone and siltstone

psw - potentially shallow groundwater area

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ENTECH ENGINEERING, INC.

GEOLOGY/ENGINEERING GEOLOGY MAP

VOLLMER ROAD AND ARROYA LANE
PARCEL NO. 52214-00-002
STIMPLE FAMILY LLLP

JOB NO. 231494

FIG. 6

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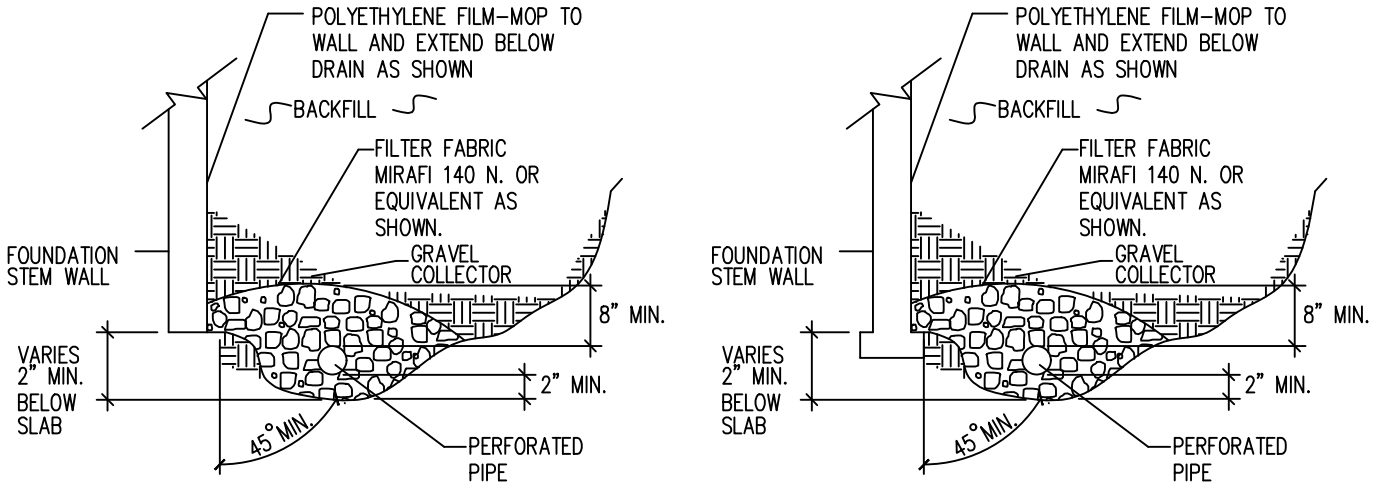
ENTECH ENGINEERING, INC.

FEMA FLOODPLAIN MAP
VOLLMER ROAD AND ARROYA LANE
PARCEL NO. 52214-00-002
STIMPLE FAMILY LLLP

JOB NO.
231494

FIG. 7



NOTES:

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

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

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

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

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

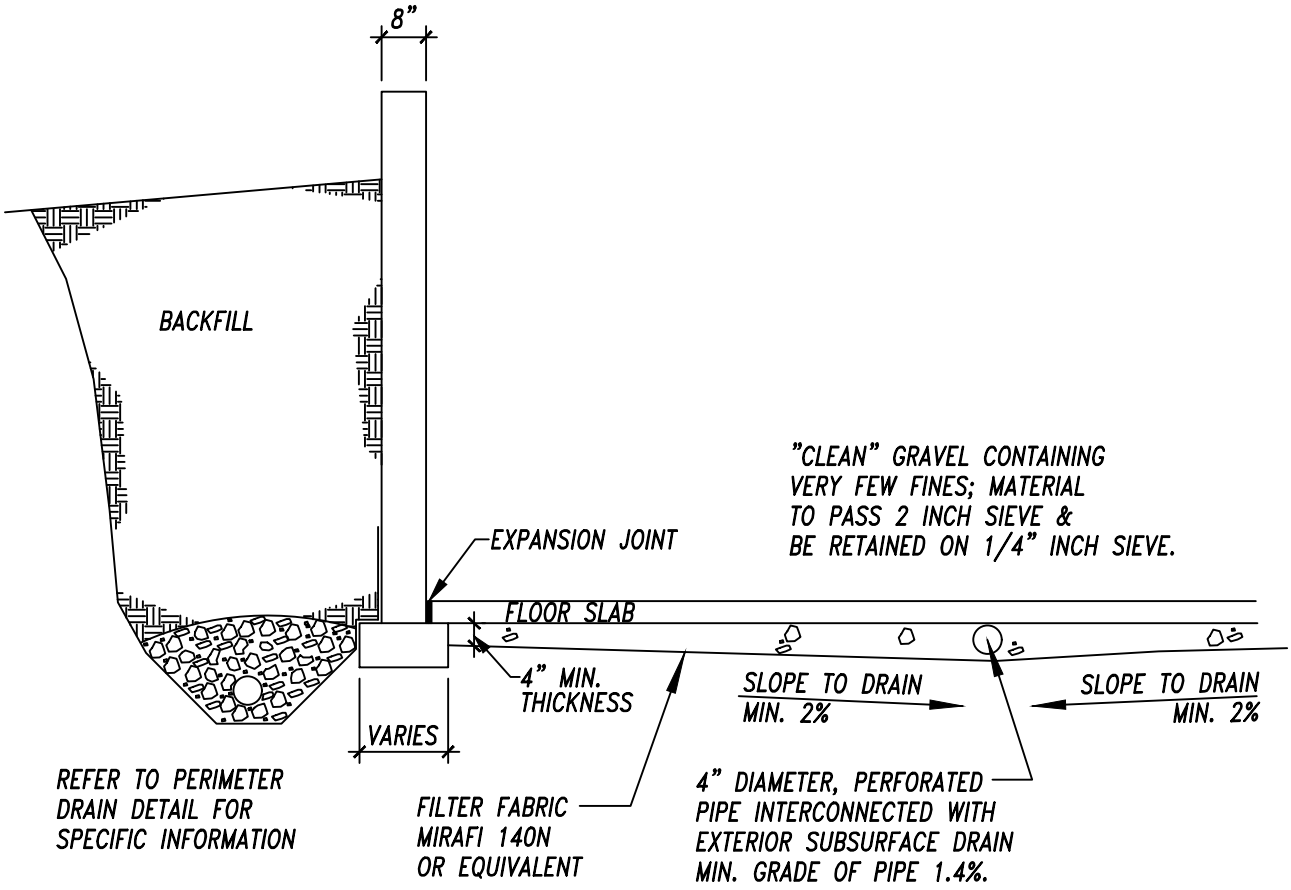
–DRAIN TO BE PROVIDED WITH A FREE GRAVITY OUTFALL, IF POSSIBLE. A SUMP AND PUMP MAY BE USED IF GRAVITY OUT FALL IS NOT AVAILABLE.

ENTECH ENGINEERING, INC.

PERIMETER DRAIN DETAIL
VOLLMER ROAD AND ARROYA LANE
PARCEL NO. 52214-00-002
STIMPLE FAMILY LLLP

JOB NO. 231494

FIG. 8



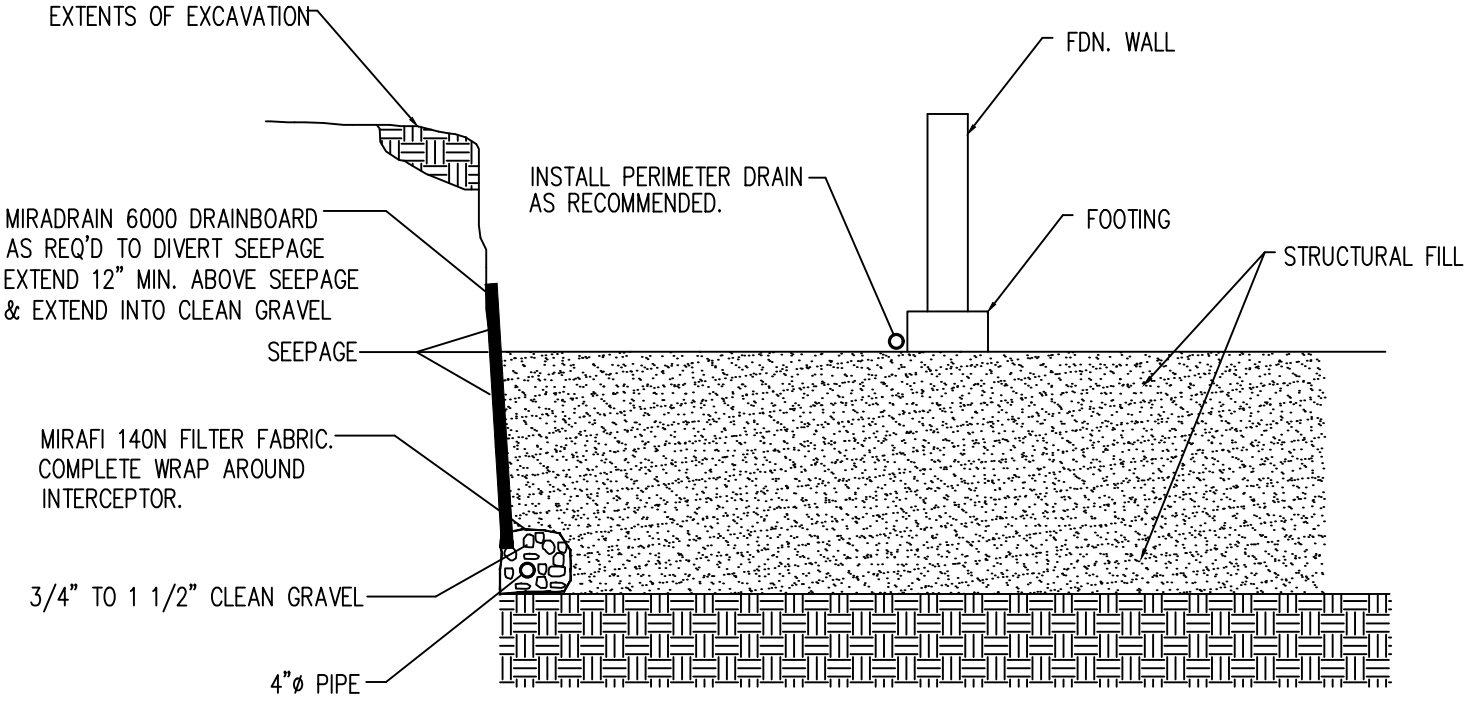
ENTECH ENGINEERING, INC.

TYP. UNDERSLAB DRAINAGE LAYER (CAPILLARY BREAK)

VOLLMER ROAD AND ARROYA LANE
PARCEL NO. 52214-00-002
STIMPLE FAMILY LLLP

JOB NO. 231494

FIG. 9



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

INTERCEPTOR DRAIN DETAIL

N.T.S.

ENTECH ENGINEERING, INC.

INTERCEPTOR DRAIN DETAIL
VOLLMER ROAD AND ARROYA LANE
PARCEL NO. 52214-00-002
STIMPLE FAMILY LLLP

JOB NO.
231494

FIG. 10

APPENDIX A: Photographs

1

Looking northeast from the central portion of the site.

September 25, 2023

2

Looking southwest from the central portion of the site.

September 25, 2023

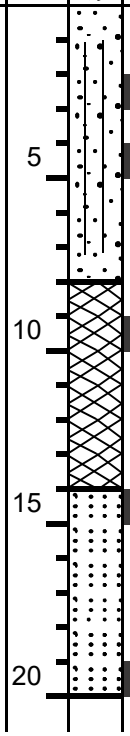
Job No. 231494

APPENDIX B: Test Boring & Test Pit Logs

TEST BORING 1
DATE DRILLED 9/25/2023

REMARKS

DRY TO 20', 9/25/23



Depth (ft)	Samples	Blows per foot	Watercontent %	Soil Type
		22	9.7	1
5		39	10.1	1
10		50/11"	11.8	3
15		50/7"	10.9	2
20		50/4"	6.4	2

12" TOPSOIL, SAND, SILTY, BROWN, MEDIUM DENSE to DENSE, MOIST

CLAYSTONE, WEAK, OLIVE, HIGHLY WEATHERED, (CLAY, SANDY, HARD, MOIST)

SANDSTONE, WEAK, TAN to OLIVE, HIGHLY WEATHERED, (SAND, CLAYEY, VERY DENSE, MOIST)

ENTECH ENGINEERING, INC.

TEST BORING LOGS

VOLLMER & ARROYA
STIMPLE FAMILY

JOB NO. 231494

FIG. B-1

TEST PIT 1
DATE EXCAVATED 9/25/2023

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	Soil Type
TOPSOIL 0-12", SANDY CLAY LOAM, DARK BROWN	1					
SANDY CLAY, FINE TO COARSE GRAINED, DARK BROWN, MOIST	2			GR	W	4A
	3					
LOAMY SAND, FINE TO COARSE GRAINED, LIGHT BROWN, VERY MOIST	4			SG	L	1
	5					
	6					
	7					
	8					
	9					
	10					

TEST PIT 2
DATE EXCAVATED 9/25/2023

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	Soil Type
TOPSOIL 0-12", SANDY CLAY LOAM, DARK BROWN	1					
SANDY CLAY, FINE TO COARSE GRAINED, DARK BROWN	2			GR	W	4A
	3					
HIGHLY WEATHERED SILTY TO CLAYEY SANDSTONE, FINE TO COARSE GRAINED, BLUE GRAY TO OLIVE, VERY MOIST	4			MA	M	4A
	5					
	6					
	7					
	8					
	9					
	10					

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

Soil Structure Grade
weak - w
moderate - m
strong - s
loose - l

ENTECH ENGINEERING, INC.

TEST PIT LOGS

VOLLMER & ARROYA
STIMPLE FAMILY

JOB NO.
231494

FIG. B-2

APPENDIX C: Laboratory Test Results

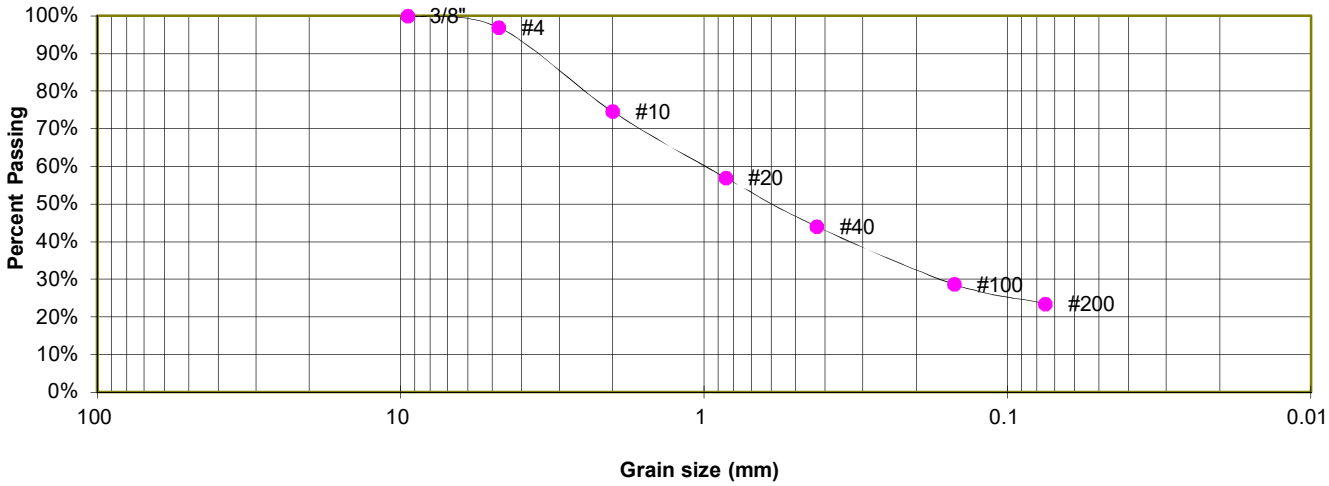
ENTECH ENGINEERING, INC.

TABLE C-1
SUMMARY OF LABORATORY TEST RESULTS

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT	PLASTIC LIMIT	PLASTIC INDEX	SWELL/ CONSOL (%)	USCS	SOIL DESCRIPTION
1	1	2-3			23.5	NV	NP	NP		SM	SAND, SILTY
1	1	5			30.8	NV	NP	NP		SM	SAND, SILTY
2	1	15			36.9	26	15	11		SC	SANDSTONE, (SAND, CLAYEY)
3	1	10	12.8	114.9	58.4	31	13	18	1.3	CL	CLAYSTONE, (CLAY, SANDY)

Project: Voller & Arroya
Client: Stimple Family
Job No: 231494

TEST BORING	1	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	2-3	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	96.9%
10	74.6%
20	57.0%
40	44.0%
100	28.7%
200	23.5%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

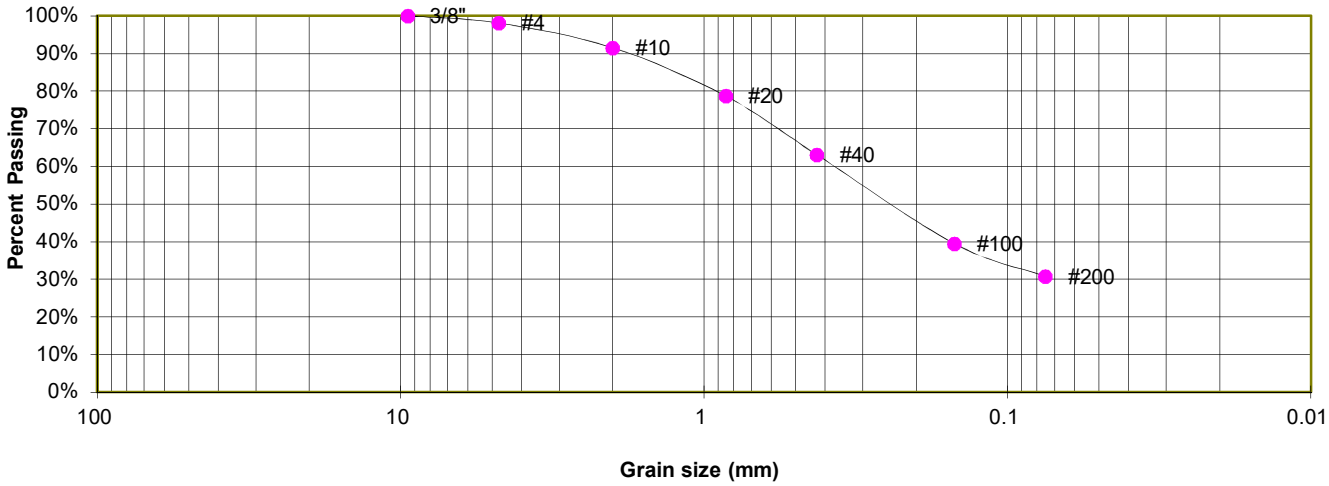
LABORATORY TEST RESULTS

VOLLMER & ARROYA
STIMPLE FAMILY

JOB NO. 231494

FIG. C-1

TEST BORING	1	SOIL DESCRIPTION	SAND, SILTY
DEPTH (FT)	5	SOIL TYPE	1



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	98.1%
10	91.5%
20	78.7%
40	63.1%
100	39.5%
200	30.8%

ATTERBERG LIMITS

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

SOIL CLASSIFICATION

USCS CLASSIFICATION: SM

ENTECH ENGINEERING, INC.

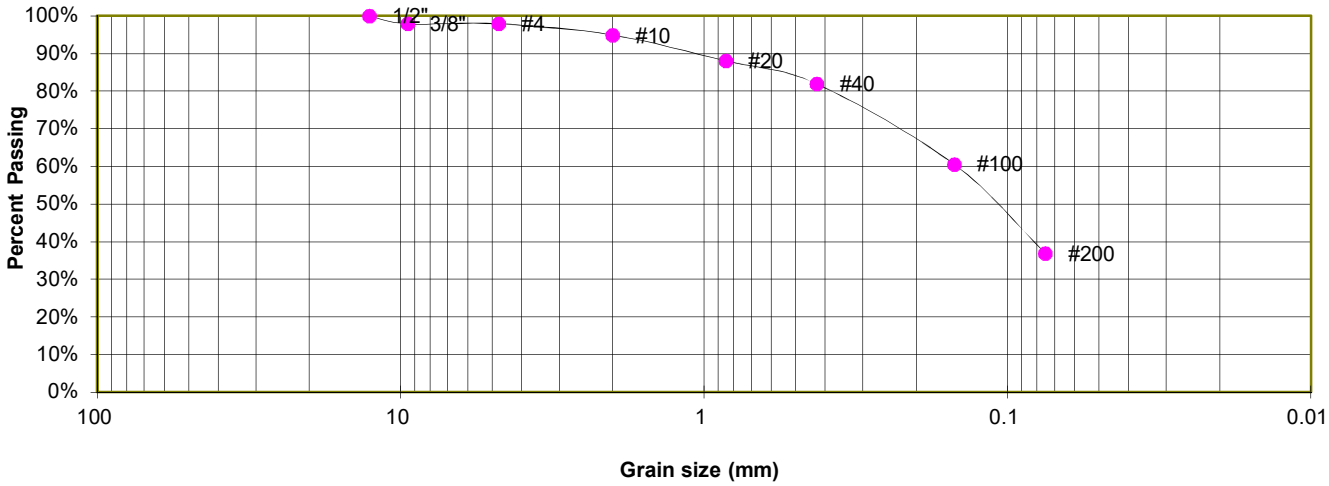
LABORATORY TEST RESULTS

VOLLMER & ARROYA
STIMPLE FAMILY

JOB NO. 231494

FIG. C-2

TEST BORING	1	SOIL DESCRIPTION	SANDSTONE, (SAND, CLAYEY)
DEPTH (FT)	15	SOIL TYPE	2



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.9%
4	97.9%
10	94.9%
20	88.1%
40	81.9%
100	60.6%
200	36.9%

ATTERBERG LIMITS

Plastic Limit	15
Liquid Limit	26
Plastic Index	11

SOIL CLASSIFICATION

USCS CLASSIFICATION: SC

ENTECH ENGINEERING, INC.

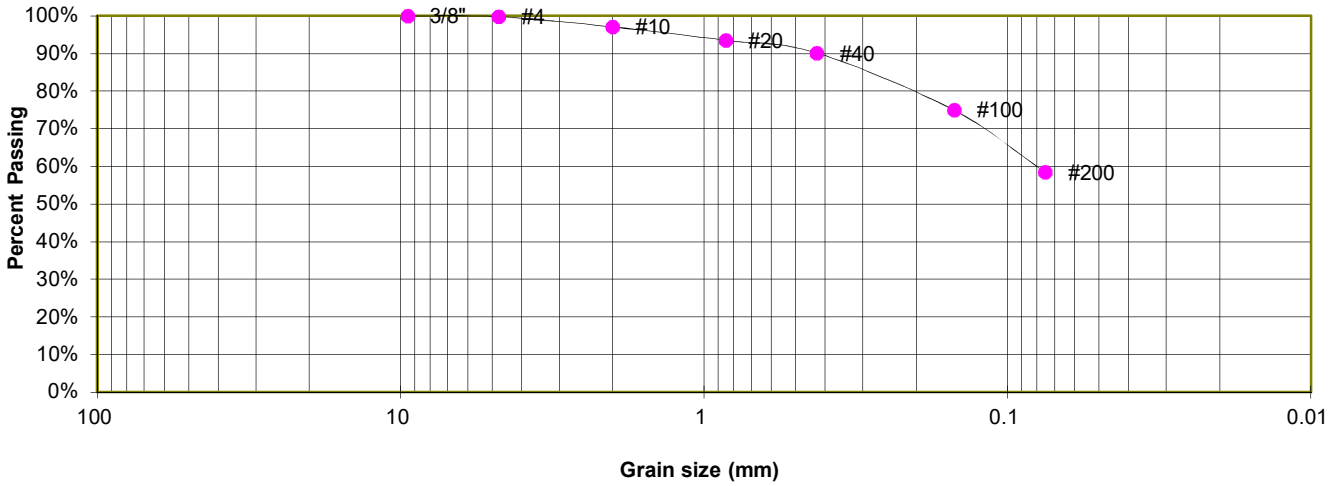
LABORATORY TEST RESULTS

VOLLMER & ARROYA
STIMPLE FAMILY

JOB NO. 231494

FIG. C-3

TEST BORING	1	SOIL DESCRIPTION	CLAYSTONE, (CLAY, SANDY)
DEPTH (FT)	10	SOIL TYPE	3



GRAIN SIZE ANALYSIS

U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	99.8%
10	97.1%
20	93.5%
40	90.2%
100	74.9%
200	58.4%

ATTERBERG LIMITS

Plastic Limit	13
Liquid Limit	31
Plastic Index	18

SOIL CLASSIFICATION

USCS CLASSIFICATION: CL

ENTECH ENGINEERING, INC.

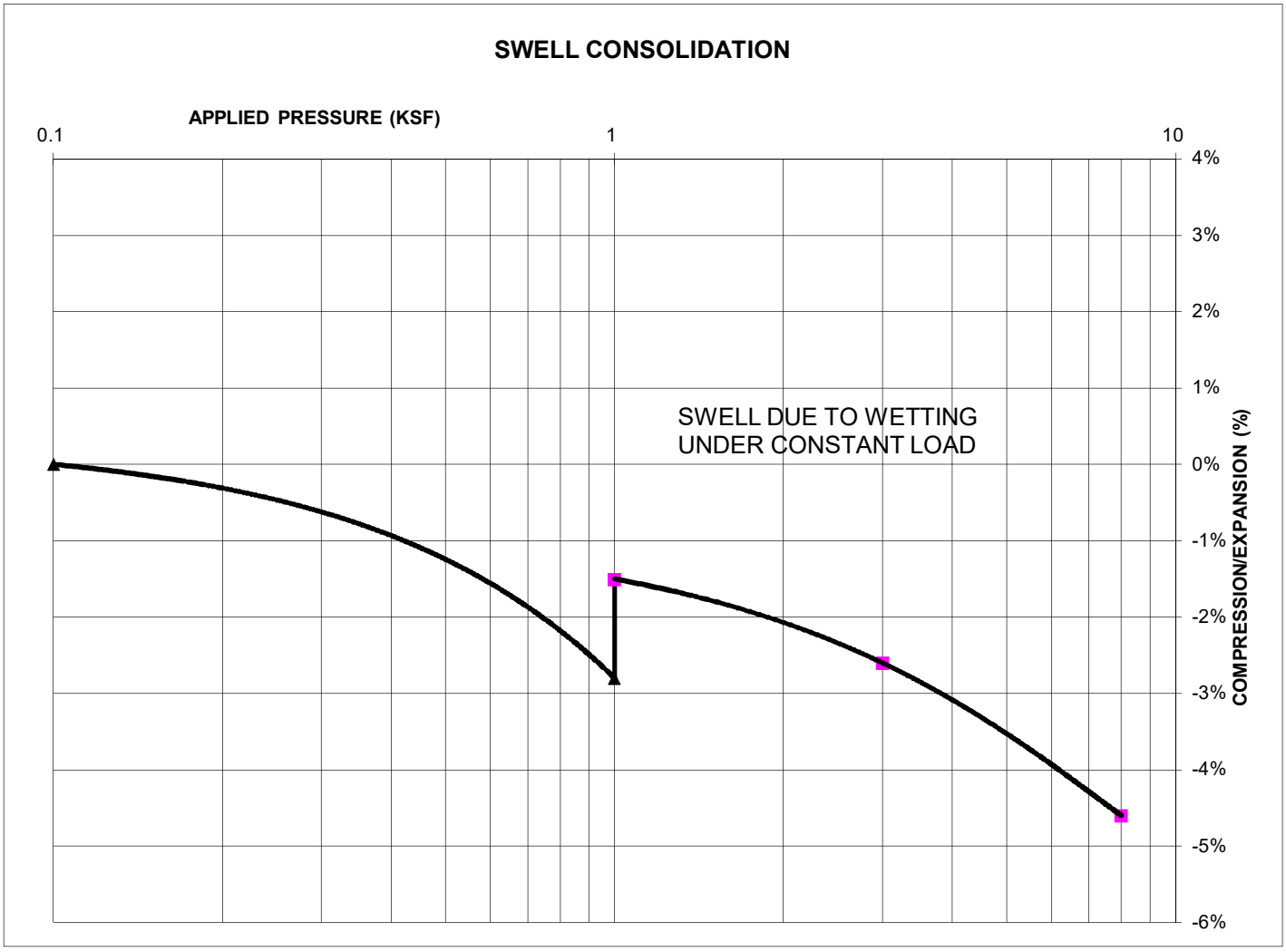
LABORATORY TEST RESULTS

VOLLMER & ARROYA
STIMPLE FAMILY

JOB NO. 231494

FIG. C-4

TEST BORING	1	SOIL DESCRIPTION	CLAYSTONE, (CLAY, SANDY)
DEPTH (FT)	10	SOIL TYPE	3



SWELL/CONSOLIDATION TEST RESULTS

NATURAL UNIT DRY WEIGHT (PCF): 115
NATURAL MOISTURE CONTENT: 12.8%
SWELL/CONSOLIDATION (%): 1.3%

ENTECH ENGINEERING, INC.

SWELL/CONSOLIDATION TEST RESULTS

VOLLMER & ARROYA
STIMPLE FAMILY

JOB NO. 231494

FIG. C-5

APPENDIX D: Test Boring Log and Lab Testing, Entech Job No. 170020

TEST BORING NO. 13
DATE DRILLED 1/12/2017
Job # 170020

TEST BORING NO.
DATE DRILLED
CLIENT ARROYA INVESTMENTS
LOCATION THE RETREAT AT TIMBER RIDGE

REMARKS

STAKE 3512

DRY TO 18.5',
1/23/17

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Description
			18	11.9	1	SAND, SILTY WITH SLIGHTLY CLAYEY LENSES, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
5			50/11"	7.8	3	SANDSTONE, SILTY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
10			50/6"	10.8	3	
15			50/5"	8.4	3	
20			50/6"	9.4	3	

REMARKS

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

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

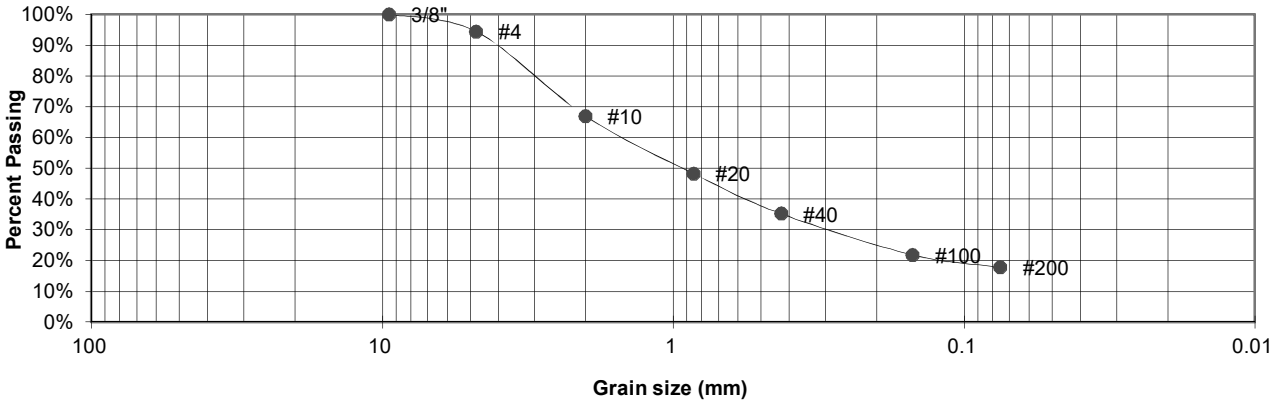
TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:

JOB NO.: 170020

FIG NO.: B-7

UNIFIED CLASSIFICATION	SM	CLIENT	ARROYA INVESTMENTS
SOIL TYPE #	1	PROJECT	THE RETREAT AT TIMBER RIDGE
TEST BORING #	13	JOB NO.	170020
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	94.4%
10	67.0%
20	48.2%
40	35.2%
100	21.8%
200	17.8%

Atterberg Limits

Plastic Limit

Liquid Limit

Plastic Index

Swell

Moisture at start

Moisture at finish

Moisture increase

Initial dry density (pcf)

Swell (psf)

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

LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:

JOB NO.: 170020

FIG NO.:

APPENDIX E: Soil Survey Descriptions

El Paso County Area, Colorado

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

Map Unit Setting

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

Map Unit Composition

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

Description of Pring

Setting

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

Typical profile

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

Properties and qualities

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

Interpretive groups

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

Minor Components

Pleasant

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

Other soils

Percent of map unit:
Hydric soil rating: No

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 21, Aug 24, 2023