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SOIL, GEOLOGY, AND GEOLOGIC HAZARD STUDY
WINSOME SUBDIVISION – PHASE I
A PORTION OF PARCEL NO. 51000-00-493
17480 MERIDIAN ROAD NORTH
EL PASO COUNTY, COLORADO

Prepared for

Winsome, LLC
1864 Woodmoor Drive, Suite 100
Monument, Colorado 80132

Attn: Joe DesJardin

January 22, 2020

Respectfully Submitted,

ENTECH ENGINEERING, INC.

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Encl.

Entech Job No. 200032
AAprojects/2020/181459 countysoil/geo/ww

PCD Fil No. SF-20-___

1.0 SUMMARY

Project Location

The project site lies in a portion of the S½ of Section 24, Township 11 South, Range 65 West of the 6th Principal Meridian in the northeastern portion of El Paso County, Colorado. The site is located approximately 12 miles east of Monument, Colorado, northwest of Hodgen Road and Meridian Road North.

Project Description

Total acreage involved in phase one of the project is 163.34 acres. The proposed site development consists of forty-seven single-family rural residential lots. The development will utilize individual wells and on-site wastewater treatment systems.

Scope of Report

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

Land Use and Engineering Geology

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

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

2.0 GENERAL SITE CONDITIONS AND PROJECT DESCRIPTION

The site is located in S½ of Section 24, Township 11 South, Range 65 West of the 6th Principal Meridian in the northeastern portion of El Paso County, Colorado. The site is located approximately 12 miles east of Monument, Colorado, northwest of Hodgen Road and Meridian Road North. The location of the site is as shown on the Vicinity Map, Figure 1.

The topography of the site consists of rolling hills that vary from gradually to moderately sloping generally to the northwest, with moderately steep slopes located along portions of the drainages on site. West Kiowa Creek bisects the site and is located to the northwest and north of phase one of the proposed subdivision. A tributary to West Kiowa Creek is located in the eastern portion of Winsome Subdivision Phase I. The drainages on site flow in a northerly and northeasterly directions through the central portion of the site. Water was observed in the drainages at the time of this investigation. The site boundaries are indicated on the USGS Map, Figure 2. Previous land uses have included grazing and pasture land. The site contains primarily field grasses and weeds. Site photographs, taken January 14 and 15, 2020, are included in Appendix A.

Total acreage involved in the proposed development is 163.34 acres. Forty-seven single-family rural residential lots are proposed. The proposed residential lots are approximately 2.5 to 3.5 acres each. The area will be serviced by individual wells and on-site wastewater treatment systems. The proposed Site Plan/Testing Location Map is presented in Figure 3.

The site was previously investigated as part of a Preliminary Soils, Geology, Geologic Hazard and Wastewater Study, Entech Job No. 181459 (Reference 1). Five (5) test borings, and ten (10) tactile test pits were performed on the site to determine general suitability of the site for the use of on-site wastewater treatment systems. The previous report/investigation was used as part of this investigation. More specifically previous Test Boring Nos. (TB-1 and TB-3) and Test Pit Nos. (TP-4, TP-5 and TP-6) were used as part of the Winsome Subdivision Phase I investigation.

3.0 SCOPE OF THE REPORT

The scope of the report includes:

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

4.0 FIELD INVESTIGATION

Our field investigation consisted of the preparation of a geologic map of any bedrock features and significant surficial deposits. The Natural Resource Conservation Service (NRCS), previously the Soil Conservation Service (SCS) survey was also reviewed to evaluate the site. The position of mappable units within the subject property are shown on the Geologic Map. Our mapping procedures involved both field reconnaissance and measurements and air photo reconnaissance and interpretation. The same mapping procedures have also been utilized to produce the Geology/Engineering Geology Map which identified pertinent geologic conditions affecting development. The field mapping was performed by personnel of Entech Engineering, Inc. on January 14 and 15, 2020.

Previous Test Boring Nos. (TB-1 and TB-3) and Test Pit Nos. (TP-4, TP-5 and TP-6) were used as part of the Winsome Subdivision Phase I investigation. Three (3) test borings, and seven (7) tactile test pits were performed on the site to determine general suitability of the site for the use of on-site wastewater treatment systems. The locations of the test borings, and test pits are indicated on the Site Plan/Testing Location Map, 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 1. A Summary of Laboratory Test Results, Test Boring and Test Pit Logs from the previous investigation are included in Appendix D.

5.0 SOIL, GEOLOGY AND ENGINEERING GEOLOGY

5.1 General Geology

Physiographically, the site lies in the western portion of the Great Plains Physiographic Province, north of the Palmer Divide. Approximately 16 miles to the west is a major structural feature known as the Rampart Range Fault. This fault marks the boundary between the Great Plains Physiographic Province and the Southern Rocky Mountain Province. The site exists within the southeastern edge of a large structural feature known as the Denver Basin. Bedrock in the area tends to be very gently dipping in a northwesterly direction (Reference 1). The rocks in the area of the site are sedimentary in nature and typically Tertiary to Upper Cretaceous in age. The bedrock underlying the site consists of the Dawson Arkose Formation. Overlying this formation are unconsolidated deposits of residual soils, man-made, and alluvial soils of the Quaternary Age. The residual soils are produced by the in-situ action of weathering of the bedrock on site. The alluvial soils were deposited by water in the major drainage on the site and as stream terrace deposits. Man-made soils exist as erosion berms. The site's stratigraphy will be discussed in more detail in Section 5.3.

5.2 Soil Conservation Survey

The Natural Resource Conservation Service (Reference 2), previously the Soil Conservation Service (Reference 3) has mapped ten soil types on the site (Figure 4). In general, they vary from loam, loamy sands, and sandy loam. The soils are described as follows:

Type	Description
1	Alamosa Loam, 1-3% slopes
25	Elbeth Sandy Loam, 3 to 8% slopes
26	Elbeth Sandy Loam, 8 to 15% slopes
67	Peyton Sandy Loam, 5-9% slopes
92	Tomah-Crowfoot Loamy Sands, 3 to 8% slopes

Complete descriptions of each soil type are presented in Appendix D. The soils have generally been described to typically have slow to rapid permeabilities. The majority of the soils have moderate permeabilities. Limitations described for the soils include shrink-swell potential on Soil

Type Nos. 25, and 26, slope on Soil Type No. 26, and the hazard of flooding on Soil Type No. 1. Soil Type No. 1 is mapped in the floodplain zone that is designated as open space. Roads may need to be designed to minimize frost-heave potential. Possible hazards with soil erosion are present on the site. The erosion potential can be controlled with vegetation. The majority of the soils have been described to have moderate erosion hazards.

5.3 Site Stratigraphy

The Eastonville Quadrangle Geology Map showing the site is presented in Figure 5 (Reference 4). The Geology Map prepared for the site is presented in Figure 6. Four mappable units were identified on this site which are described as follows:

Qp **Piney Creek Alluvium (Alluvium One and Two) of Early Holocene Age:** These materials consist of low stream-terrace deposits above the current stream channel. The materials typically consist of silty to well graded sand.

Qb **Broadway Alluvium (Alluvium Three) of Late Pleistocene Age:** These materials consist of middle steam terrace deposits. The materials typically consist of silty to clayey gravelly sands.

Qsw **Sheetwash Deposits of Holocene to Late Pleistocene Age:** These materials consist of silty to clayey sands with some cobbles and boulders. The material was deposited by the action of sheetwash and gravity.

Qc/Tkd **Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:** The Dawson Formation typically consists of arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone. Overlying this formation is a variable layer of residual soil. The residual soils were derived from the in-situ weathering of the bedrock materials on-site. These soils consisted of silty to clayey sands, sandy clays and sandy silts.

The soils listed above were mapped from site-specific mapping, the *Geologic Map of the Eastonville Quadrangle* distributed by the Colorado Geological Survey in 2012 (Reference 4), and the *Geologic Map of the Denver 1^0 x 2^0 Quadrangle*, distributed by the US Geological Survey in

1981 (Reference 5). The Test Pits and Profile Holes were also used in evaluating the site and are included in Appendix B. The Geology Map prepared for the site is presented in Figure 6.

5.4 Soil Conditions

The soils encountered in the Test Borings and Test Pits can be grouped into three general soil and rock types. The Test Boring soils were classified using the Unified Soil Classification System (USCS). The soils encountered in the Test Pits can be grouped into three general soil types. The test pit soils were classified using the USDA Textural Soil Classification.

Soil Type 1 is a slightly silty to silty sand (SM-SW, SM). This material was encountered in the test borings and in the ten test pits. The sand was encountered at depths ranging from the existing surface to 12 to 15 feet bgs and extended to the termination of the Test Boring Nos. 2 and 3 of this investigation, and Test Boring No. 3 from the previous investigation (20 feet). These soils were encountered at loose to medium dense states and at dry to moist conditions. Samples tested had 7 to 26 percent of the soil sized particles passing the No. 200 Sieve. Atterberg Limits Testing resulted in the sand being non-plastic. FHA Swell Testing on a sample of the sand resulted in an expansion of 30 psf, indicating a low expansion potential. Swell/Consolidation Testing resulted in a consolidation of 0.2 percent, indicating a low consolidation potential.

Soil Type 2 is a sandy claystone (CL). This material was encountered Test Boring No. 1 at 14 feet bgs and extended to the termination of the boring (20 feet). The claystone was encountered at hard consistencies and moist conditions. Samples tested had 74 percent of the soil sized particles passing the No. 200 sieve. Swell/Consolidation Testing resulted in a volume change of 0.9 percent, indicating a low to moderate expansion potential.

Soil Type 3 is a silty to clayey sandstone (SM, SM-SW, SC). This material was encountered Test Pit Nos. 2, 3, 6, 7 and 8. The sandstone was encountered at depths ranging from 2.5 to 4 feet bgs and extended to the termination of the and pits (5.5 to 7.5 feet). The sandstone was encountered at dense to very dense states and moist conditions. Samples tested had 10 to 13 percent of the soil sized particles passing the No. 200 sieve. Highly expansive clayey sandstone and claystone are commonly interbedded in the sandstone in the area.

The Test Boring Logs and Test Pit Logs are presented in Appendix B. Laboratory Test Results are presented in Appendix C. A Summary of Laboratory Test Results is presented in Table 1.

5.5 Groundwater

Groundwater was encountered in Test Boring No. 3 at 16.5 feet. Groundwater was not encountered in the remaining test borings which were drilled to 20 feet. Areas of seasonal and potentially seasonal shallow groundwater have been mapped in low-lying areas and in the drainages on-site. These areas are discussed in the following section. Fluctuation in groundwater conditions may occur due to variations in rainfall and other factors not readily apparent at this time.

It should be noted that in the sandy materials on site, some groundwater conditions might be encountered due to the variability in the soil profile. Isolated sand and gravel layers within the soils, sometimes only a few feet in thickness and width, can carry water in the subsurface. Groundwater may also flow on top of the underlying bedrock. Builders and planners should be cognizant of the potential for the occurrence of such subsurface water features during construction on-site and deal with each individual problem as necessary at the time of construction.

6.0 ENGINEERING GEOLOGY – IDENTIFICATION AND MITIGATION OF GEOLOGIC HAZARDS

As mentioned previously, detailed mapping has been performed on this site to produce an Geology/Engineering Geology Map (Figure 6). This map shows the location of various geologic conditions of which the developers should be cognizant during the planning, design and construction stages of the project. These hazards and the recommended mitigation techniques are as follows:

Artificial Fill

These are man-made fill deposits associated with erosion berms on-site.

Mitigation: The small erosion berms can easily be removed or penetrated by foundations. Should any uncontrolled fill be encountered beneath foundations, removal and recompaction at 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 will be required.

Loose or Collapsible Soils

Loose soils were encountered in one of the test borings. Any loose or collapsible soils encountered beneath foundations or floor slabs will require mitigation.

Mitigation: Any loose or collapsible soils encountered beneath foundations or floor slabs should be overexcavated 2 to 3 feet, moisture-conditioned and recompacted. The soils should be recompacted to 95 percent of the soils maximum Modified Proctor Dry Density ASTM D-1557 at ± 2 percent of optimum moisture content. The reconditioned soils on this site should be observed and tested to verify adequate compaction. Areas requiring recompaction should be determined during the excavation observation.

Expansive Soils

Expansive soils were encountered in the test borings drilled and test pits excavated on–site. Expansive claystone is commonly encountered within the Dawson Formation. These occurrences are typically sporadic; therefore, none have been indicated on the maps. These expansive soils, if encountered beneath foundations, can cause differential movement in the structure foundation. These occurrences should be identified and mitigated on an individual basis.

Mitigation: Should expansive soils be encountered beneath the foundation, mitigation will be necessary. Mitigation of expansive soils will require special foundation design. Overexcavation and replacement with non-expansive soils at a minimum of 95% of its maximum Modified Proctor Dry Density, ASTM D-1557 is a suitable mitigation, which is common in the area. Another alternative in areas of highly expansive soils is the use of drilled pier foundation systems. Typical minimum pier depths are on the order of 25 feet or more and require penetration into the bedrock material a minimum of 4 to 6 feet, depending upon building loads. Floor slabs on expansive soils should be expected to experience movement. Overexcavation and replacement has been successful in minimizing slab movements. The use of structural floors should be considered for

basement construction on highly expansive clays. Final recommendations should be determined after additional investigation of each building site.

Floodplain and Drainage Areas

Portions of the site associated with the West Kiowa Creek drainage are mapped within a floodplain zone according to the FEMA Map No. 08041CO350G, dated December 7, 2018 (Figure 7, Reference 6). Water was observed flowing in West Kiowa Creek. The floodplain areas have been designated as open space and/or can be avoided by construction and is located outside of Phase I of the development. Additionally, areas of seasonal and potentially seasonal shallow groundwater were observed across the site. In these areas, we would anticipate the potential for periodically high subsurface moisture conditions and frost heave potential. These areas lie within low-lying areas along the drainage in the southeastern portion of the site and in the low-lying areas and minor drainages across the site. Water was not observed in any of the minor drainages at the time of our site investigation. These areas can likely be avoided or properly mitigated by development. The floodplain should be avoided by construction unless site-specific floodplain determination and drainage studies are performed. 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. Some of the minor drainage swales can be avoided or regraded. The main drainage that bisects the site is designated as open space and will be avoided. Any grading in these areas should be done to direct surface flow around construction to avoid areas of ponded water. Finished floors must be located at least one foot above floodplain levels. Specific drainage studies and exact floodplain locations are beyond the scope of this report.

6.1 Relevance of Geologic Conditions to Land Use Planning

The development will consist of rural residential lots. It is our opinion that the existing geologic and engineering geologic conditions will impose some constraints on the proposed development and construction. The most significant problems affecting development will be those associated with the drainages on site that can be avoided or properly mitigated during construction on each lot. Other hazards on site may be satisfactorily mitigated through proper engineering design and construction practices or avoidance.

The upper materials are typically at medium dense to dense states. Areas of loose soils were encountered that may require recompaction. The medium dense to dense granular soils encountered in the upper soil profiles of the test borings and test pits should provide good support for foundations. Loose soils, if encountered beneath foundations or slabs, will require removal of the upper 2 to 3 feet of loose material and recompaction. Expansive soils, although sporadic, were encountered. Expansive clayey sandstone and claystone are common in the Dawson Formation, and may require mitigation. Foundations anticipated for the site are standard spread footings possibly in conjunction with overexcavation in areas of expansive soils or loose soils. Areas of artificial fill, if encountered beneath foundations will require penetration or recompaction. Areas containing arkosic sandstone will have high allowable bearing conditions. Expansive layers may also be encountered in the soil and bedrock on this site. Expansive soils, if encountered, will require special foundation design and/or overexcavation. These soils will not prohibit development.

Areas of seasonal shallow groundwater and potentially seasonal shallow groundwater were encountered on site. Additionally, areas northeast of the site have been mapped in a floodplain zone associated with West Kiowa Creek. The floodplain area is in the designated open space area and will be avoided by development. The site is not mapped in the floodplain zone (Figure 7, Reference 7). A drainage is located in the eastern portion of Phase I that is mapped as seasonal shallow groundwater. Additionally, minor drainage swales exist on the site that are mapped as potentially seasonal shallow groundwater. Water was observed in the West Kiowa Creek floodplain, and was also observed in portions of the minor drainage in the eastern portion of the site during our site investigation. The drainage area in the eastern portion of the site is designated as open space. Due to the size of the lots and the proposed development, the majority of these areas can be avoided by construction on the lots. Regrading can also mitigate some

minor drainage swales on some of the lots. Structures should not block drainages. Any site grading should be done in such a manner as to not create areas of ponded water around structures or septic fields. Finished floor levels must be a minimum of one foot above the floodplain level. Septic fields should not be located in drainage areas due to the potential for periodic high groundwater conditions. Specific floodplain locations and drainage studies are beyond the scope of this report.

In summary, development of the site can be achieved if the items mentioned above are mitigated. These items can be mitigated through proper design and construction or through avoidance. Investigation on each lot is recommended prior to construction.

7.0 ECONOMIC MINERAL RESOURCES

Some of the sandy materials on-site could be considered a low-grade sand resource. According to the *El Paso County Aggregate Resource Evaluation Map* (Reference 7), the area is mapped with floodplain, valley fill and upland deposits. According to the *Atlas of Sand, Gravel and Quarry Aggregate Resources, Colorado Front Range Counties* distributed by the Colorado Geological Survey (Reference 8), areas of the site are mapped with upland and floodplain deposits: sand and probable aggregate resource (U3, U4 and F4). According to the *Evaluation of Mineral and Mineral Fuel Potential* (Reference 9), the area of the site has been mapped as "Good" for industrial minerals. However, considering the abundance of similar materials through the region and the close proximity to developed land, they would be considered to have little significance as an economic resource.

According to *the Evaluation of Mineral and Mineral Fuel Potential of El Paso County State Mineral Lands* (Reference 9), 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 9).

The site has been mapped as "Fair" for oil and gas resources (Reference 9). No oil or gas fields have been discovered in the area of the site. The sedimentary rocks in the area may lack the

geologic structure for trapping oil or gas; therefore, it may not be considered a significant resource. Hydraulic fracturing is a new method that is being used to extract oil and gas from rocks. It utilizes pressurized fluid to extract oil and gas from rocks that would not normally be productive. The area of the site has not been explored to determine if the rocks underlying the site would be commercially viable utilizing hydraulic fracturing. The practice of hydraulic fracturing has come under review due to concerns about environmental impacts, health and safety.

8.0 EROSION CONTROL

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

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

Cut and fill slope areas will be subjected primarily to sheetwash and rill erosion. Unchecked rill erosion can eventually lead to concentrated flows of water and gully erosion. The best means to

combat this type of erosion is, where possible, the adequate re-vegetation of cut and fill slopes. Cut and fill slopes having gradients more than three (3) horizontal to one (1) vertical become increasingly more difficult to revegetate successfully. Therefore, recommendations pertaining to the vegetation of the cut and fill slopes may require input from a qualified landscape architect and/or the Soil Conservation Service.

9.0 CLOSURE

It is our opinion that the existing geologic engineering and geologic conditions will impose some 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 is consistent with anticipated geologic and engineering geologic conditions.

It should be pointed out that because of the nature of data obtained by random sampling of such variable and non-homogeneous materials as soil and rock, it is important that we be informed of any differences observed between surface and subsurface conditions encountered in construction and those assumed in the body of this report. Individual investigations for building sites and septic systems will be required prior to construction. Construction and design personnel should be made familiar with the contents of this report. 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 Winsome, LLC for application to the proposed project in accordance with generally accepted geologic soil and engineering practices. No other warranty expressed or implied is made.

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

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TABLES

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT WINSOME, LLC
PROJECT HODGEN ROAD
JOB NO. 200032

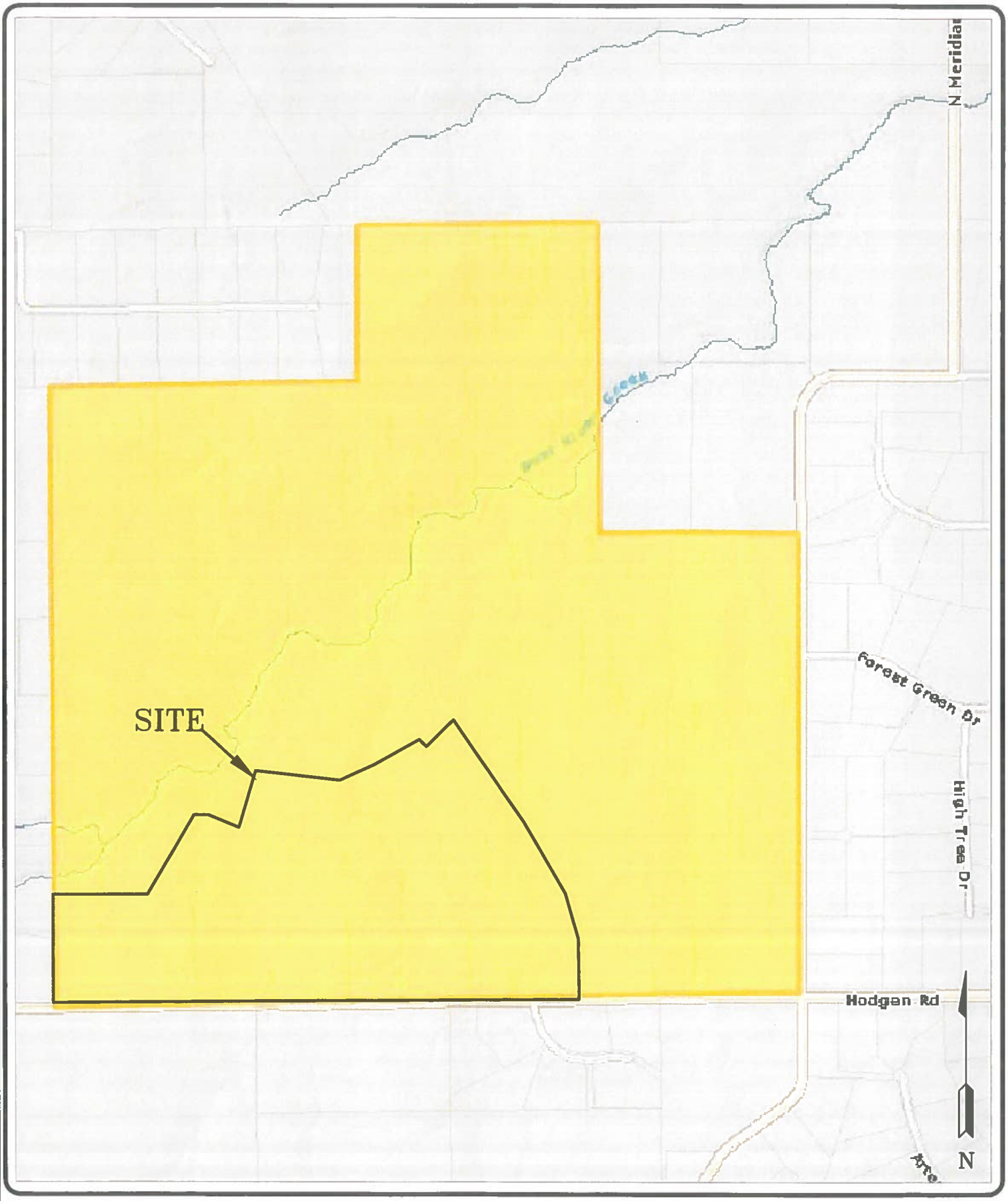
SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	1	2-3			16.4			<0.01			SM	SAND, SILTY
1	2	10	9.0	116.1	25.3					-0.2	SM	SAND, SILTY
1	3	5			11.3	NV	NP				SM-SW	SAND, SLIGHTLY SILTY
1	TP-1	2-3			23.8						SM	SAND, SILTY
1	TP-2	5-6			13.3						SM	SAND, SILTY
1	TP-4	2-3			7.9						SM-SW	SAND, SLIGHTLY SILTY
1	TP-5	5-6			6.7						SM-SW	SAND, SLIGHTLY SILTY
1	TP-7	2-3			26.3						SM	SAND, SILTY
2	1	20	15.7	117.4	74.3	42	17	0.00		0.9	CL	CLAY, SANDY
3	TP-3	3-4			13.0						SM	SANDSTONE, SILTY
3	TP-6	5-6			9.5						SM-SW	SANDSTONE, SLIGHTLY SILTY

Table 2: Summary Tactile Test Pit Results

Test Pit No.	USDA Soil Type	LTAR Value	Depth to Bedrock (ft.)	Depth to Seasonally Occurring Groundwater (ft.)
1	3A*	0.30*	3.5*	6'
2	2A	0.50	N/A	N/A
3	3A*	0.30*	2*	N/A
4	2A	0.50	N/A	N/A
5	3A*	0.30*	4*	6'
6	4A*	0.15*	2.5*	N/A
7	4A*	0.15*	3.5*	N/A
4**	4A*	0.15*	N/A	N/A
5**	1	0.80	N/A	N/A
6**	3	0.35	N/A	N/A

*- Conditions that will require an engineered OWTS
**- Preliminary Soils, Geology, and Wastewater Study prepared by Entech Job No. 181459

FIGURES



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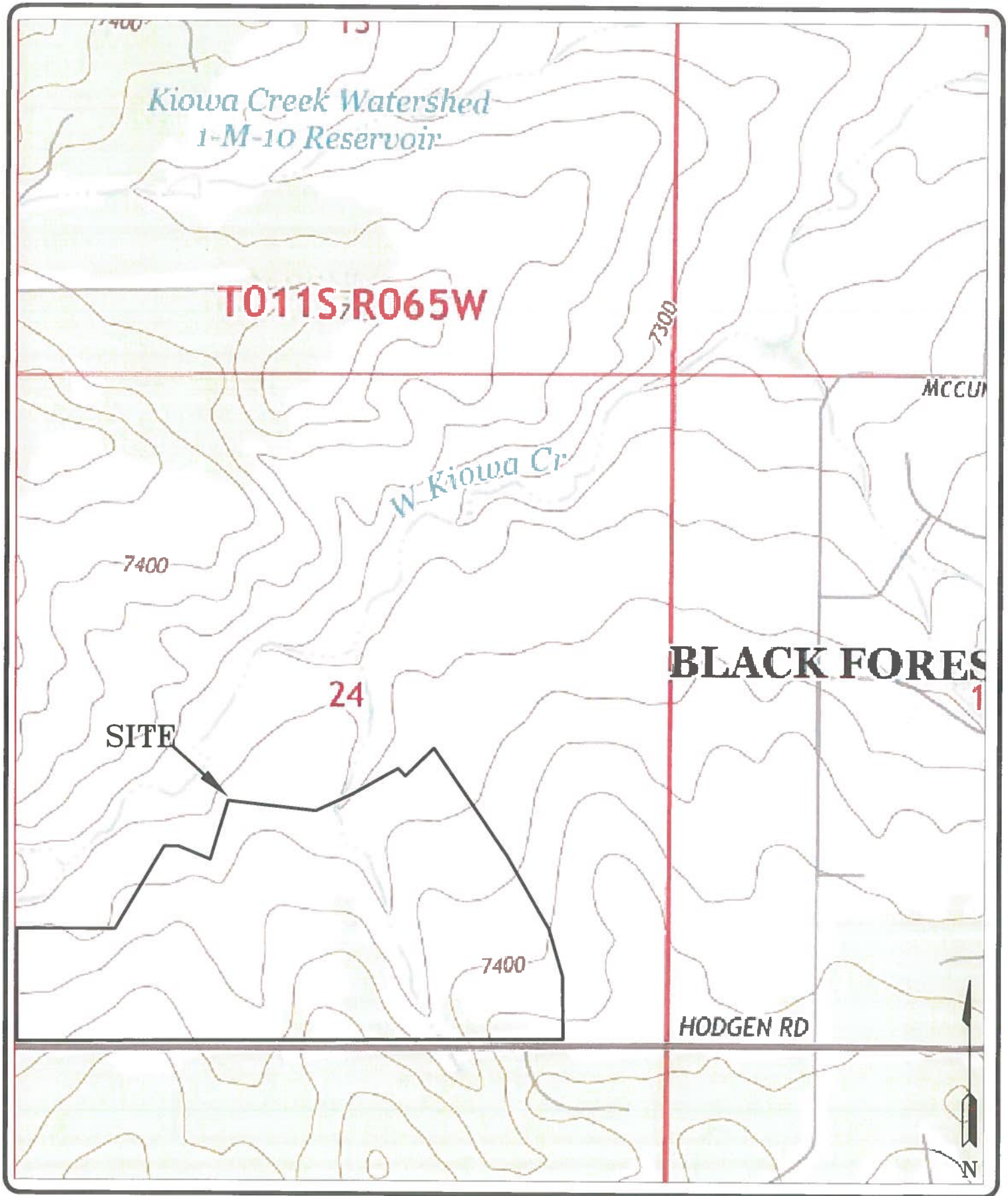
COLORADO SPRINGS, CO. 80907 (719) 531-5599

VICINITY MAP
WINSOME SUBDIVISION – PHASE I
HODGEN ROAD & MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: WINSOME, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	1/17/20		

JOB NO.: 200032

FIG NO.: 1



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

USGS MAP
WINSOME RANCH SUBDIVISION – PHASE I
HODGEN ROAD & MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: WINSOME, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	1/17/20		

JOB NO.: 200032

FIG NO.: 2

LEGEND:

- TB- APPROXIMATE TEST BORING LOCATION AND NUMBER
- TP- APPROXIMATE TEST PIT LOCATION AND NUMBER
- TB- APPROXIMATE TEST BORING LOCATION AND NUMBER (ENTECH JOB NO. 181459)
- TP- APPROXIMATE TEST PIT LOCATION AND NUMBER (ENTECH JOB NO. 181459)
- P2 - APPROXIMATE PHOTOGRAPH LOCATION AND NUMBER

HODGEN ROAD

CLOVE HITCH CT

MOSEY TRAIL

WINSOME WAY

OPEN SPACE

BISON MEADOWS CT

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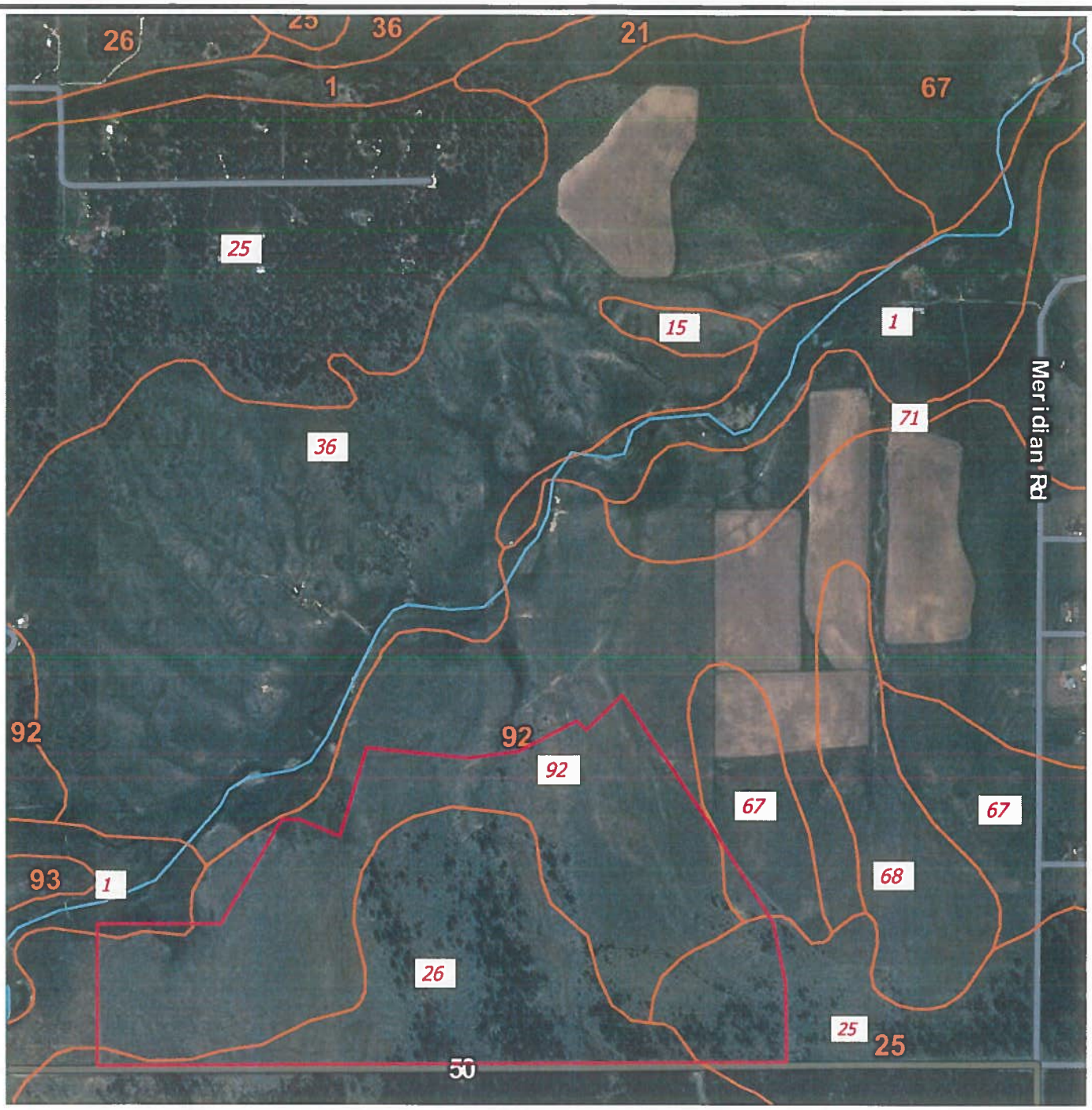
505 ELKTON DRIVE (719) 531-5599
COLORADO SPRINGS, CO. 80907

SITE PLAN/TEST BORING LOCATION MAP
WINSOME SUBDIVISION – PHASE I
HODGEN ROAD & MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: WINSOME, LLC

DRAWN	LLL
CHECKED	
DATE	1/17/20
SCALE	AS SHOWN
JOB NO.	200032
FIGURE No.	3



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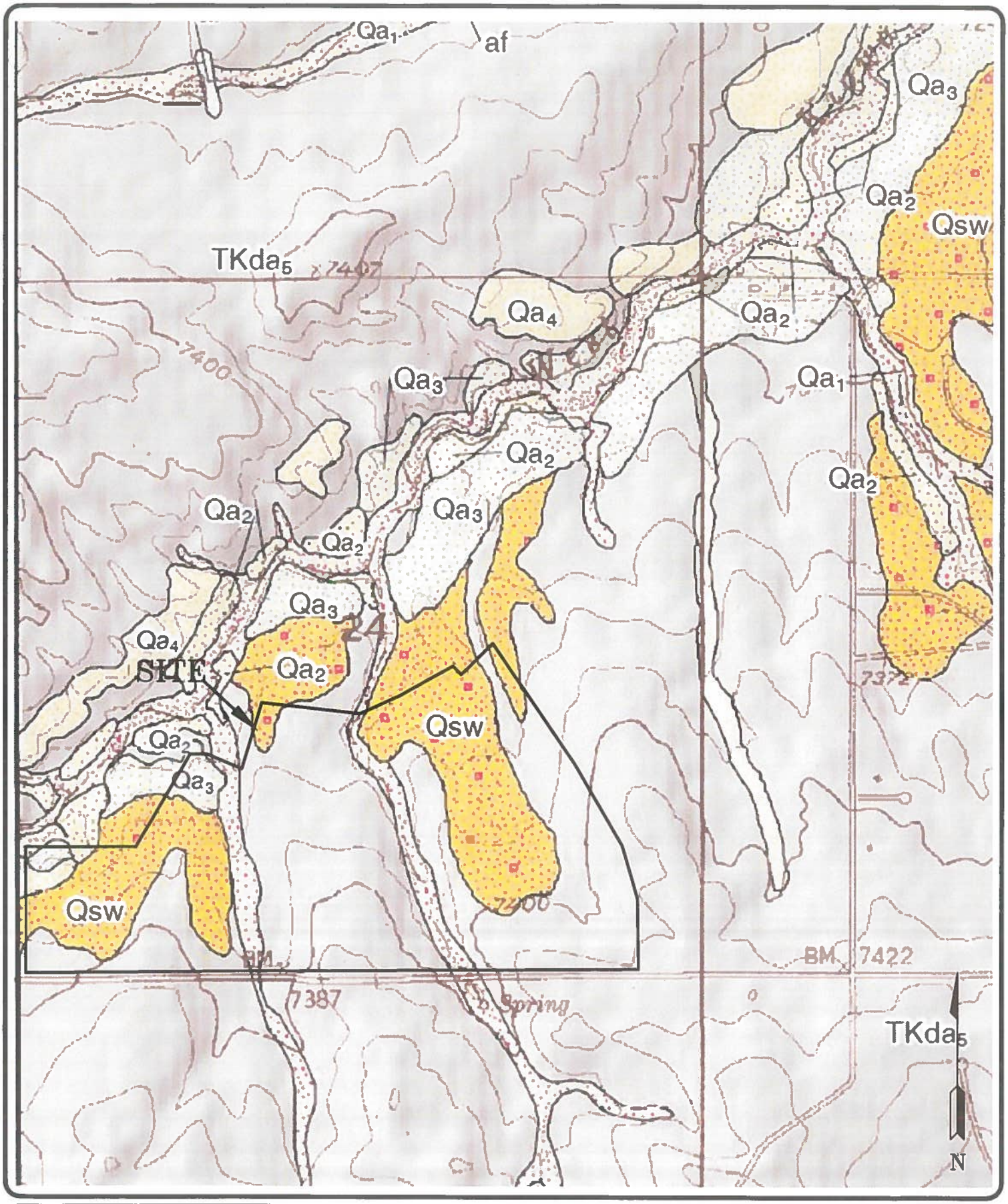
SOIL SURVEY MAP
WINSOME SUBDIVISION - PHASE I
HODGEN ROAD & MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: WINSOME, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	1/17/20		

JOB NO.: 200032

FIG NO.: 4



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EASTONVILLE QUADRANGLE GEOLOGIC MAP
WINSOME SUBDIVISION – PHASE I
HODGEN ROAD & MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: WINSOME, LLC

DRAWN:	DATE:	CHECKED:	DATE:
LLL	1/17/20		

JOB NO.: 200032

FIG NO.: 5

LEGEND:

Qp - Piney Creek Alluvium Two of Early Holocene Age:
low stream terrace deposits above current stream channel

Qb - Broadway Alluvium of Late Pleistocene Age:
stream terrace deposited sands

Qsw - Sheetwash of Holocene to Late Pleistocene Age:
silty to clayey sand sheetwash deposits

Qc/TKda - Colluvium of Quaternary Age overlying Dawson Formation of Tertiary to Cretaceous Age:
colluvium and residual soils overlying arkosic sandstone with interbedded fine-grained sandstone, siltstone and claystone

fp - floodplain

psw - potentially seasonal shallow groundwater area

sw - seasonal shallow groundwater area

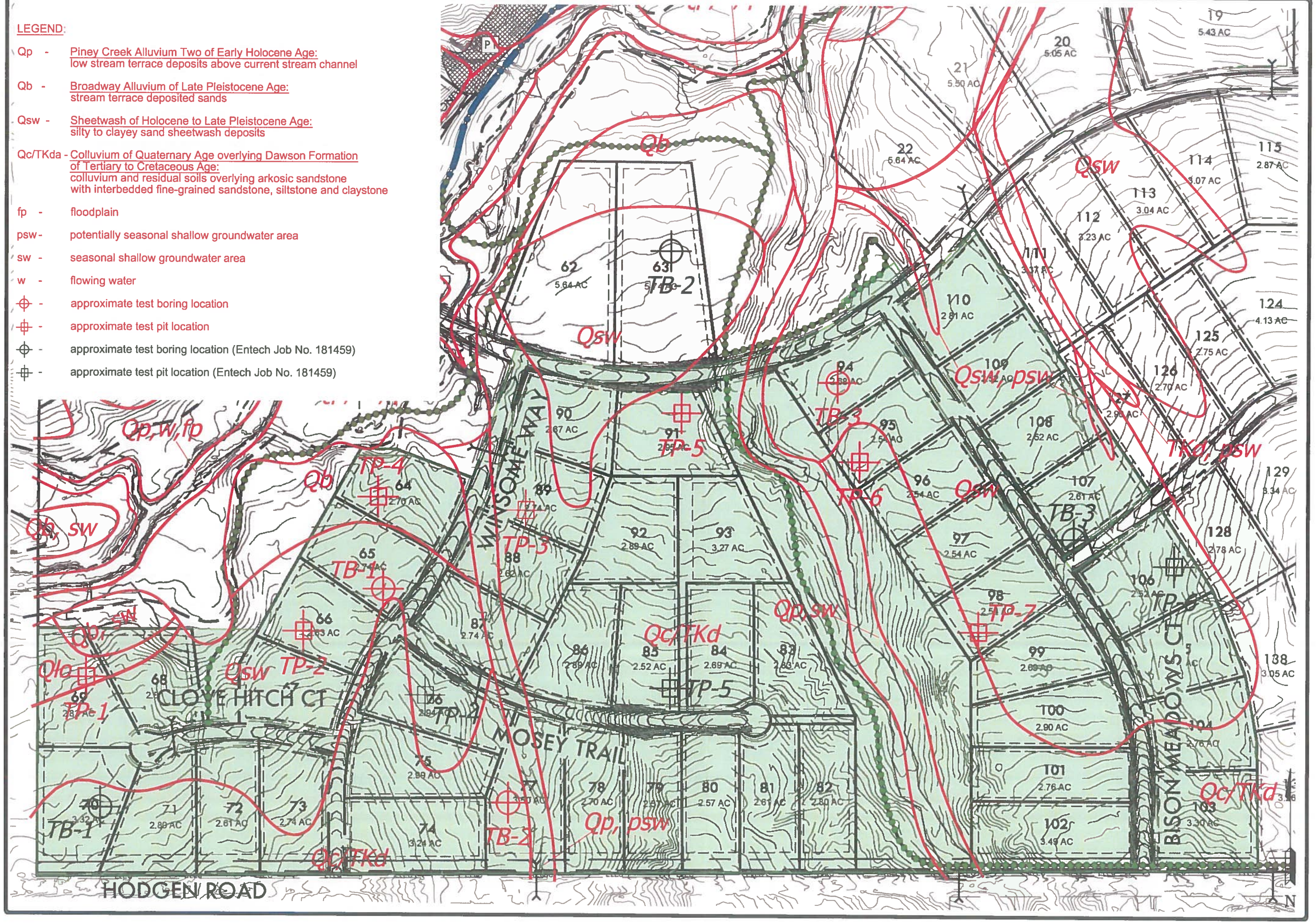
w - flowing water

⊕ - approximate test boring location

⊕ - approximate test pit location

⊕ - approximate test boring location (Entech Job No. 181459)

⊕ - approximate test pit location (Entech Job No. 181459)



REVISION	BY

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COLORADO SPRINGS, CO. 80907

GEOLOGY/ENGINEERING GEOLOGY MAP
WINSOME SUBDIVISION – PHASE I
HODGEN ROAD & MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: WINSOME, LLC

DRAWN	I.I.I.
CHECKED	
DATE	1/7/19
SCALE	AS SHOWN
JOB NO.	200032
FIGURE No.	6

LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

*Referenced to the National Geodetic Vertical Datum of 1929

A A	Cross section line
23 23	Transect line
97°07'30", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
4276000 M	1000-meter Universal Transverse Mercator grid tick values, zone 4
600000 FT	5000-foot grid tick values: Hawaii State Plane coordinate system, zone 3 (FIPSZONE 5103), Transverse Mercator projection
DX5510 X	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M 2	Coastal Mile marker

MAP REPOSITORY

Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

November 20, 2000

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 30, 2004 – to change Special Flood Hazard Areas, to update map format, to reflect revised shoreline and to incorporate previously issued Letters of Map Revision.

REVISION	BY

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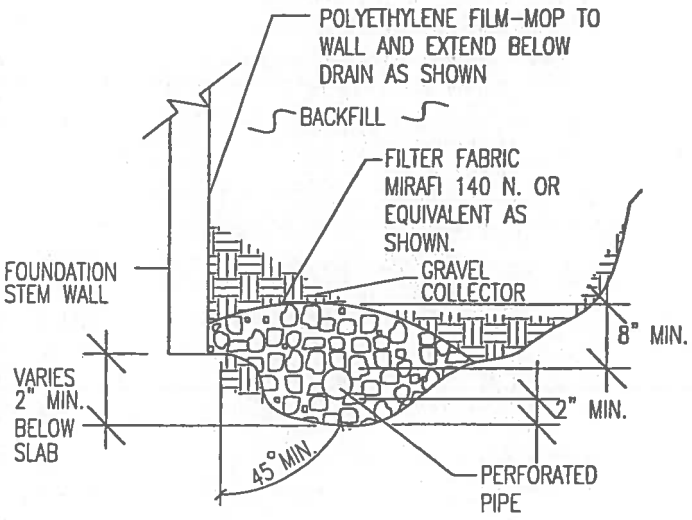
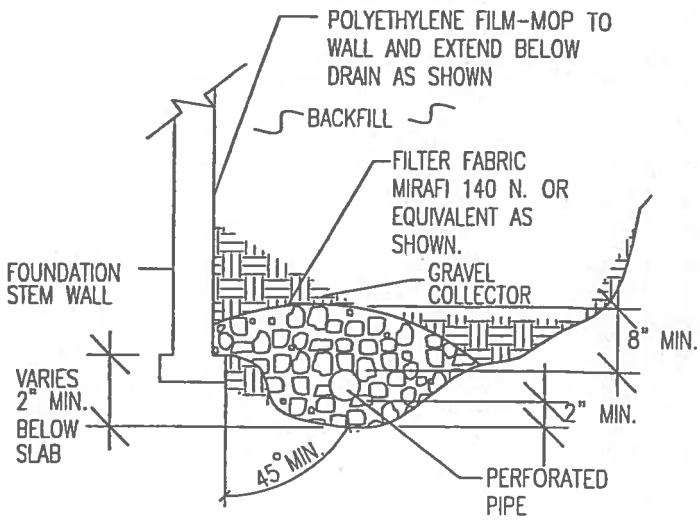
FLOODPLAIN MAP
WINSOME SUBDIVISION – PHASE I
HODGEN ROAD & MERIDIAN ROAD
EL PASO COUNTY, CO.
FOR: WINSOME, LLC

DRAWN	LLL
CHECKED	
DATE	1/17/20
SCALE	AS SHOWN
JOB NO.	200032
FIGURE No.	7





NOTES:

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

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

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

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

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

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

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PERIMETER DRAIN DETAIL

DRAWN:	DATE:	DESIGNED:	CHECKED:
		DS	LLL

JOB NO.: 200032

FIG NO.: 8

APPENDIX A: Site Photographs

1

Looking northeast from the southern portion of the site.

January 14, 2020

2

Looking northwest from the northeastern portion of the site.

January 14, 2020

Job No. 200032

3

Looking northeast from the central portion of the site.

January 15, 2020

4

Looking east along drainage in the northeastern portion of the site.

January 15, 2020

Job No. 200032

5

Looking southeast from the central eastern portion of the site.

January 15, 2020

6

Looking northwest eastern side of the site.

January 15, 2020

Job No. 200032

APPENDIX B: Test Boring Logs and Test Pit Logs

TEST BORING NO. 1
DATE DRILLED 1/14/2020
Job # 200072

REMARKS

DRY TO 20', 1/15/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SILTY, FINE TO COARSE GRAINED, BROWN, DENSE TO MEDIUM DENSE, MOIST			31	4.2	1
5			30	4.6	1
10			14	12.2	1
CLAYSTONE, SANDY, GRAY BROWN, HARD, MOIST 15			50/11"	7.0	2
20			50/6"	6.8	2

TEST BORING NO. 2
DATE DRILLED 1/14/2020
CLIENT WINSOME, LLC
LOCATION HODGEN ROAD

REMARKS

DRY TO 20', 1/15/20

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type
SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE, MOIST			23	5.0	1
5			29	6.5	1
10			27	7.4	1
15			18	8.1	1
20			19	7.4	1

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COLORADO SPRINGS, COLORADO 80907

TEST BORING LOG

DRAWN:	DATE:	CHECKED: LLL	DATE: 1/16/20

JOB NO.: 200072
FIG NO.: B-1

TEST BORING NO. 3
DATE DRILLED 1/14/2020
Job # 200072

TEST BORING NO.
DATE DRILLED
CLIENT WINSOME, LLC
LOCATION HODGEN ROAD

REMARKS

WATER @ 19', 1/15/20

REMARKS

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	Description
			17	2.6	1	SAND, SILTY, FINE TO COARSE GRAINED, BROWN, MEDIUM DENSE TO DENSE, MOIST
5			22	8.7	1	
10			19	5.6	1	
15			35	5.9	1	
20			13	6.5	1	

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

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TEST BORING LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/16/20

JOB NO.: 200072
FIG NO.: B-2

TEST PIT NO. 1
DATE EXCAVATED 1/14/2020
Job # 200032

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, tan	2			gr	w	2A
	3					
weathered to formational silty sandstone fine to coarse grained, tan	4			ma		3A
	5					
*signs of seasonally occurring groundwater at 6'	6					
	7					
	8					
	9					
	10					

TEST PIT NO. 2
DATE EXCAVATED 1/14/2020
CLIENT WINSOME, LLC
LOCATION WINSOME SUBDIVISION

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy clay loam, brown	1					
sandy loam, fine to coarse grained, tan	2			gr	w	2A
	3					
gravelly sandy loam, fine to coarse grained, tan	4			gr	w	2A
	5					
	6					
	7					
	8					
	9					
	10					

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

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

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/17/20

JOB NO.: 200032
FIG NO.: B-3

TEST PIT NO. 3
DATE EXCAVATED 1/14/2020
Job # 200032

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, tan	2			gr	w	2A
weathered to formational silty sandstone, tan	3			ma		3A
	4					
	5					
	6					
	7					
	8					
	9					
	10					

TEST PIT NO. 4
DATE EXCAVATED 1/14/2020
CLIENT WINSOME, LLC
LOCATION WINSOME SUBDIVISION

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy clay loam, brown	1					
gravelly sandy clay loam, tan	2			gr	w	2A
	3					
loamy sand, fine to coarse grained, tan	4			sg		1
	5					
	6					
	7					
	8					
	9					
	10					

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

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

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/17/20

JOB NO.: 200032
FIG NO.: B-4

TEST PIT NO. 5
DATE EXCAVATED 1/14/2020
Job # 200032

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, tan	2			gr	w	2A
	3					
	4					
weathered to formational silty sandstone, tan	5					3A
*signs of seasonally occurring groundwater at 6'	6					
	7					
	8					
	9					
	10					

TEST PIT NO. 6
DATE EXCAVATED 1/14/2020
CLIENT WINSOME, LLC
LOCATION WINSOME SUBDIVISION

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy clay loam, brown	1					
gravelly sandy clay loam, tan	2			gr	w	3A
weathered to formational silty to clayey sandstone, fine to coarse grained, tan to gray	3			ma		4A
	4					
	5					
	6					
	7					
	8					
	9					
	10					

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

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

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TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLC	1/17/20

JOB NO.: 200032
FIG NO.: B-5

TEST PIT NO. 7
DATE EXCAVATED 1/14/2020
Job # 200032

CLIENT WINSOME, LLC
LOCATION WINSOME SUBDIVISION

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown	1					
sandy loam, fine to coarse grained, tan	2			gr	w	3A
	3					
weathered to formational clayey sandstone, tan	4			ma		4A
	5					
	6					
	7					
	8					
	9					
	10					

REMARKS

Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

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

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

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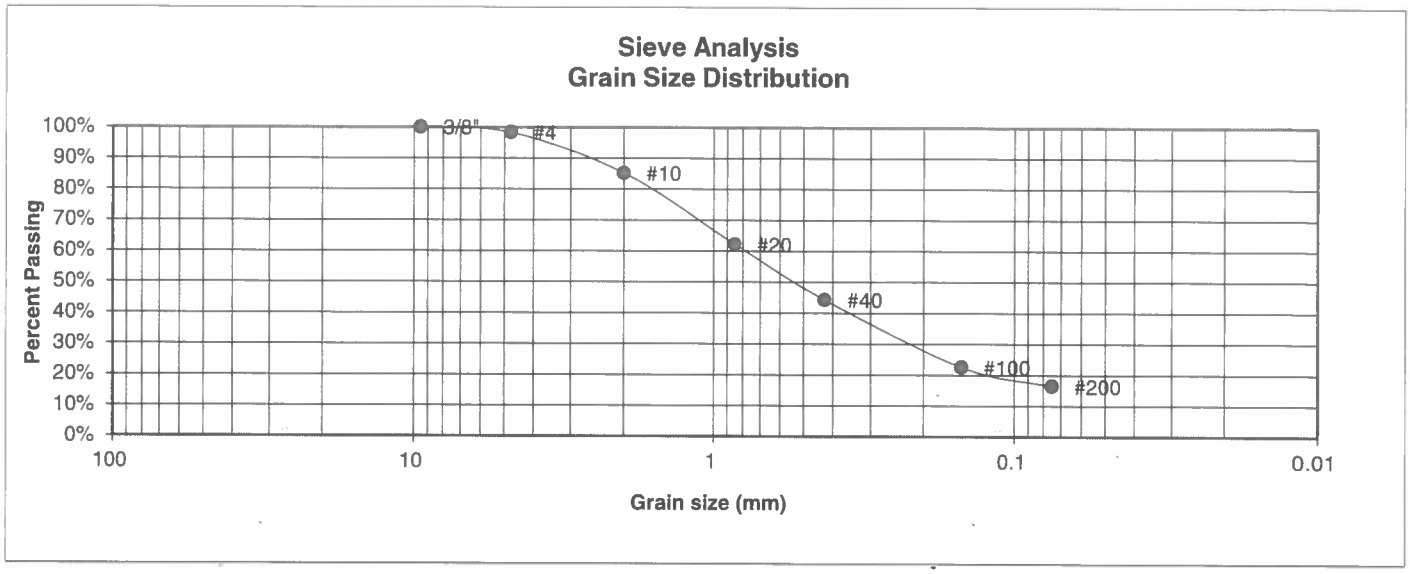
TEST PIT LOG

DRAWN:	DATE:	CHECKED: LLL	DATE: 1/17/20

JOB NO.: 200032
FIG NO.: B-6

APPENDIX C: Laboratory Test Results

UNIFIED CLASSIFICATION	SM	CLIENT	WINSOME, LLC
SOIL TYPE #	1	PROJECT	HODGEN ROAD
TEST BORING #	1	JOB NO.	200032
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	98.3%
10	85.2%
20	62.2%
40	44.3%
100	22.5%
200	16.4%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

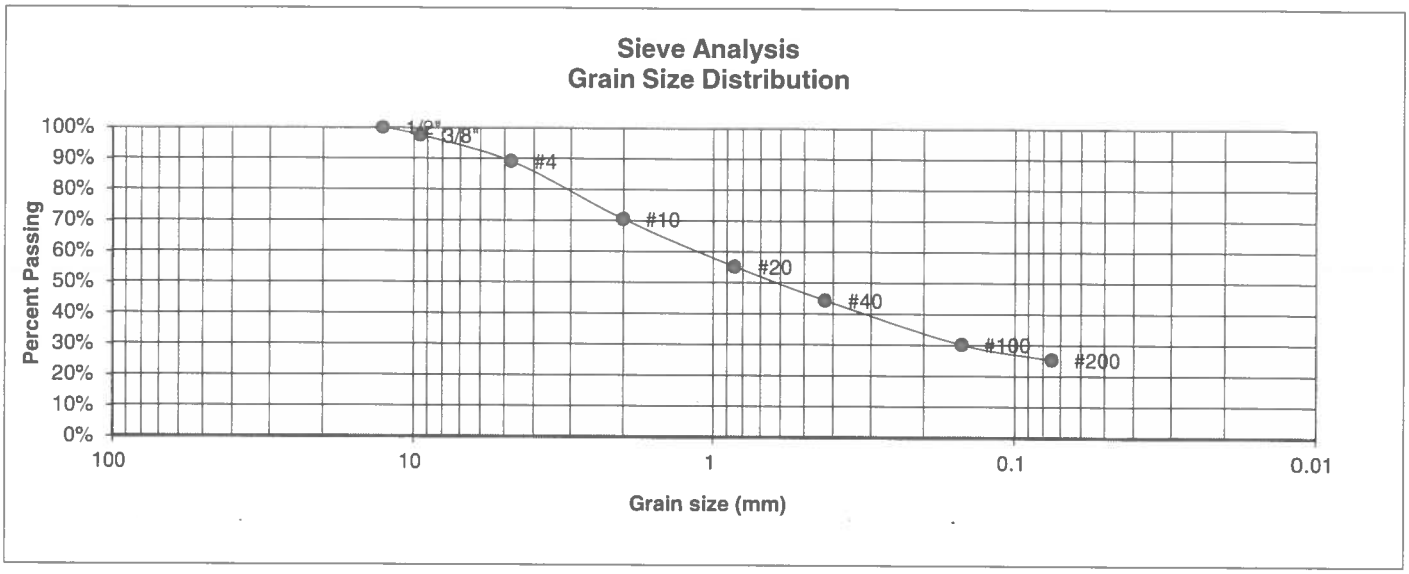
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032

FIG NO.: C-1

UNIFIED CLASSIFICATION	SM	CLIENT	WINSOME, LLC
SOIL TYPE #	1	PROJECT	HODGEN ROAD
TEST BORING #	2	JOB NO.	200032
DEPTH (FT)	10	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	97.5%
4	89.1%
10	70.5%
20	55.2%
40	44.3%
100	30.1%
200	25.3%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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COLORADO SPRINGS, COLORADO 80907

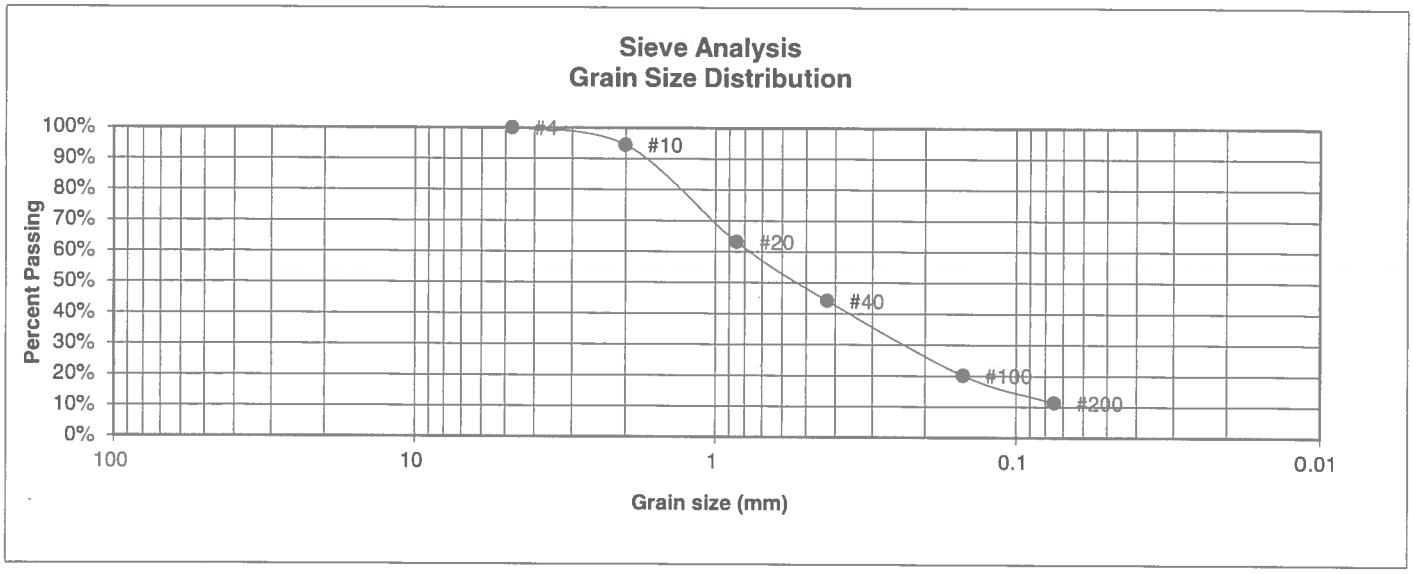
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032

FIG NO.: C-2

UNIFIED CLASSIFICATION	SM-SW	CLIENT	WINSOME, LLC
SOIL TYPE #	1	PROJECT	HODGEN ROAD
TEST BORING #	3	JOB NO.	200032
DEPTH (FT)	5	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	94.4%
20	63.1%
40	44.1%
100	20.1%
200	11.3%

Atterberg Limits

Plastic Limit	NP
Liquid Limit	NV
Plastic Index	NP

Swell

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

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COLORADO SPRINGS, COLORADO 80907

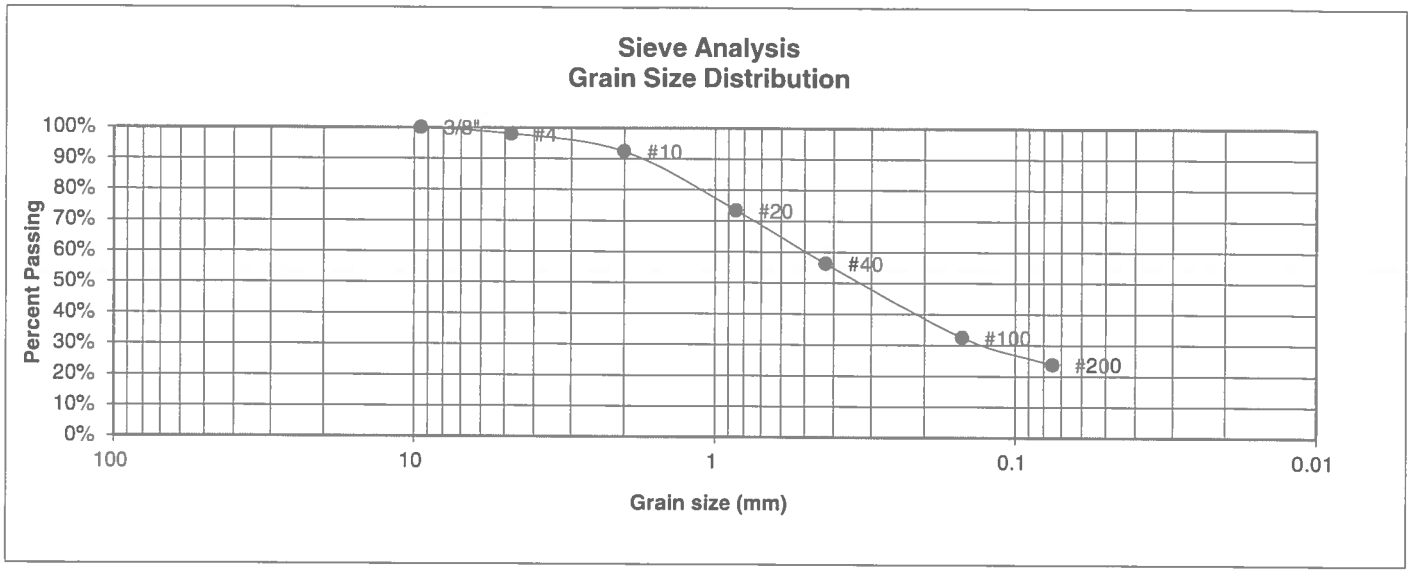
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032

FIG NO.: C-3

UNIFIED CLASSIFICATION	SM	CLIENT	WINSOME, LLC
SOIL TYPE #	1	PROJECT	HODGEN ROAD
TEST BORING #	TP-1	JOB NO.	200032
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	98.0%
10	92.4%
20	73.4%
40	56.3%
100	32.5%
200	23.8%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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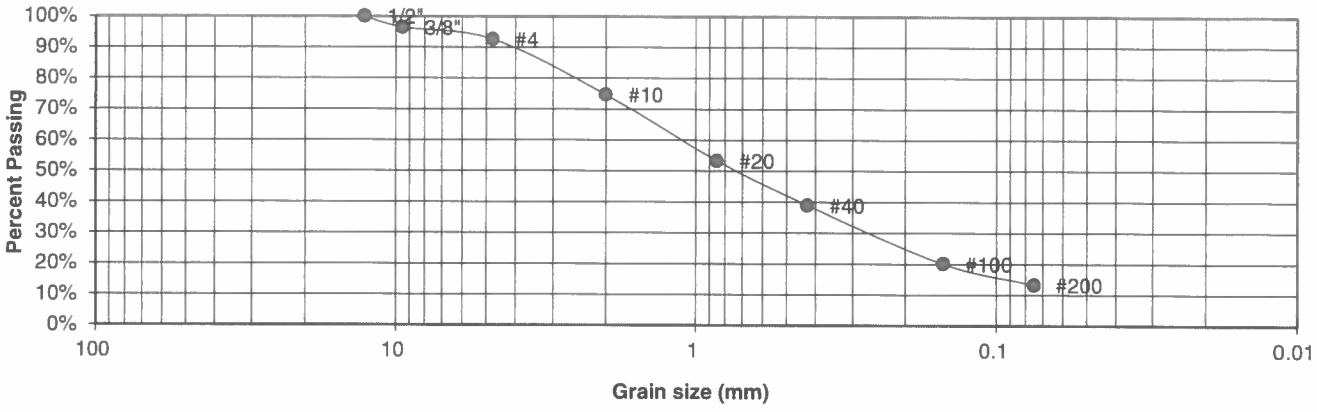
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032

FIG NO.: C-4

UNIFIED CLASSIFICATION	SM	CLIENT	WINSOME, LLC
SOIL TYPE #	1	PROJECT	HODGEN ROAD
TEST BORING #	TP-2	JOB NO.	200032
DEPTH (FT)	5-6	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	96.4%
4	92.6%
10	74.7%
20	53.4%
40	38.9%
100	20.1%
200	13.3%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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505 ELKTON DRIVE
COLORADO SPRINGS, COLORADO 80907

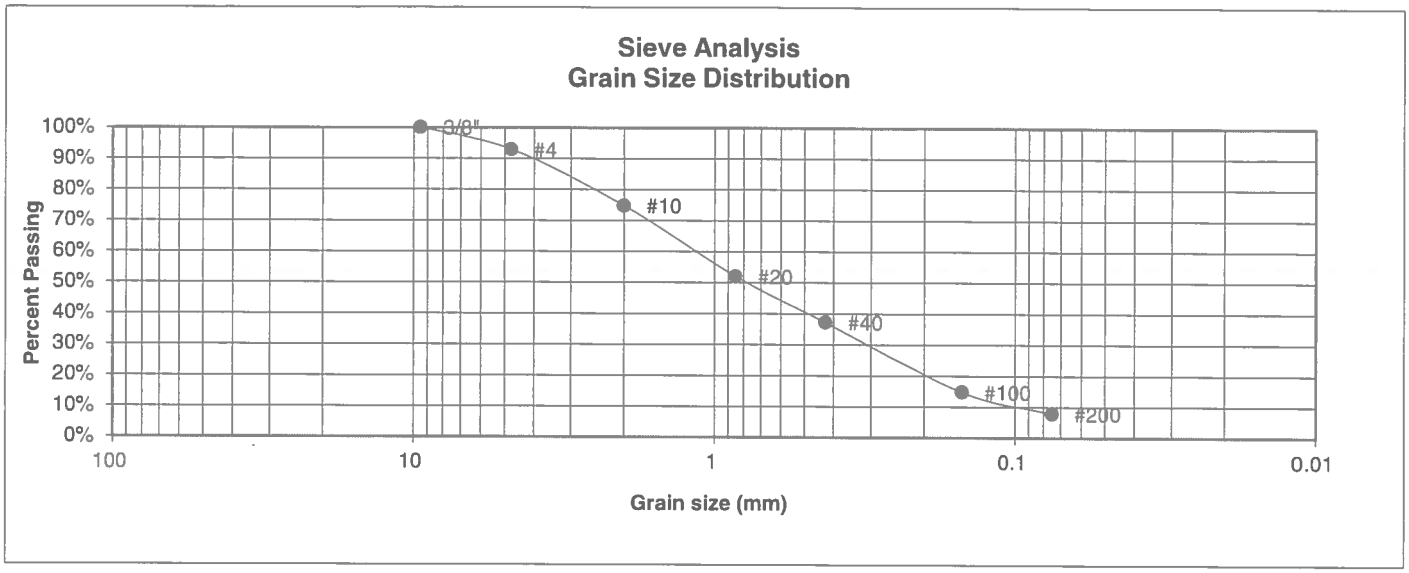
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032

FIG NO.: C-5

UNIFIED CLASSIFICATION	SM-SW	CLIENT	WINSOME, LLC
SOIL TYPE #	1	PROJECT	HODGEN ROAD
TEST BORING #	TP-4	JOB NO.	200032
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	92.9%
10	74.8%
20	52.0%
40	37.2%
100	14.8%
200	7.9%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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

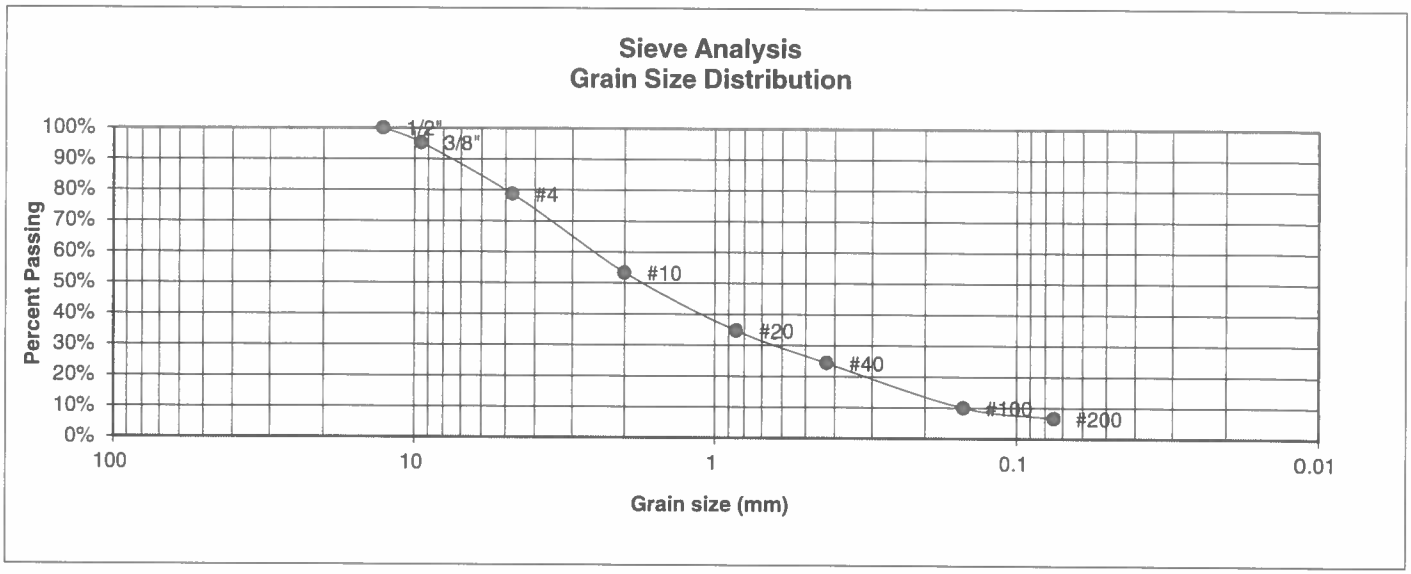
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032

FIG NO.: L-6

UNIFIED CLASSIFICATION	SM-SW	CLIENT	WINSOME, LLC
SOIL TYPE #	1	PROJECT	HODGEN ROAD
TEST BORING #	TP-5	JOB NO.	200032
DEPTH (FT)	5-6	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	95.2%
4	78.7%
10	53.3%
20	34.7%
40	24.3%
100	10.0%
200	6.7%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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

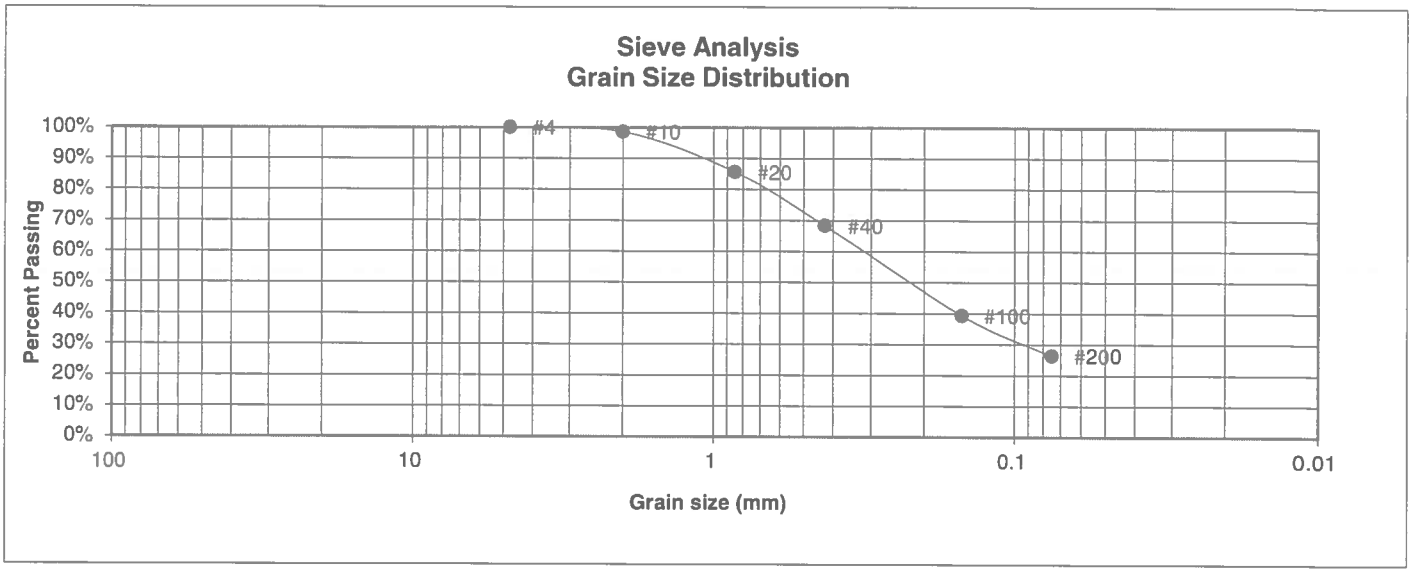
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032

FIG NO.: C-7

UNIFIED CLASSIFICATION	SM	CLIENT	WINSOME, LLC
SOIL TYPE #	1	PROJECT	HODGEN ROAD
TEST BORING #	TP-7	JOB NO.	200032
DEPTH (FT)	2-3	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	98.6%
20	85.6%
40	68.3%
100	39.3%
200	26.3%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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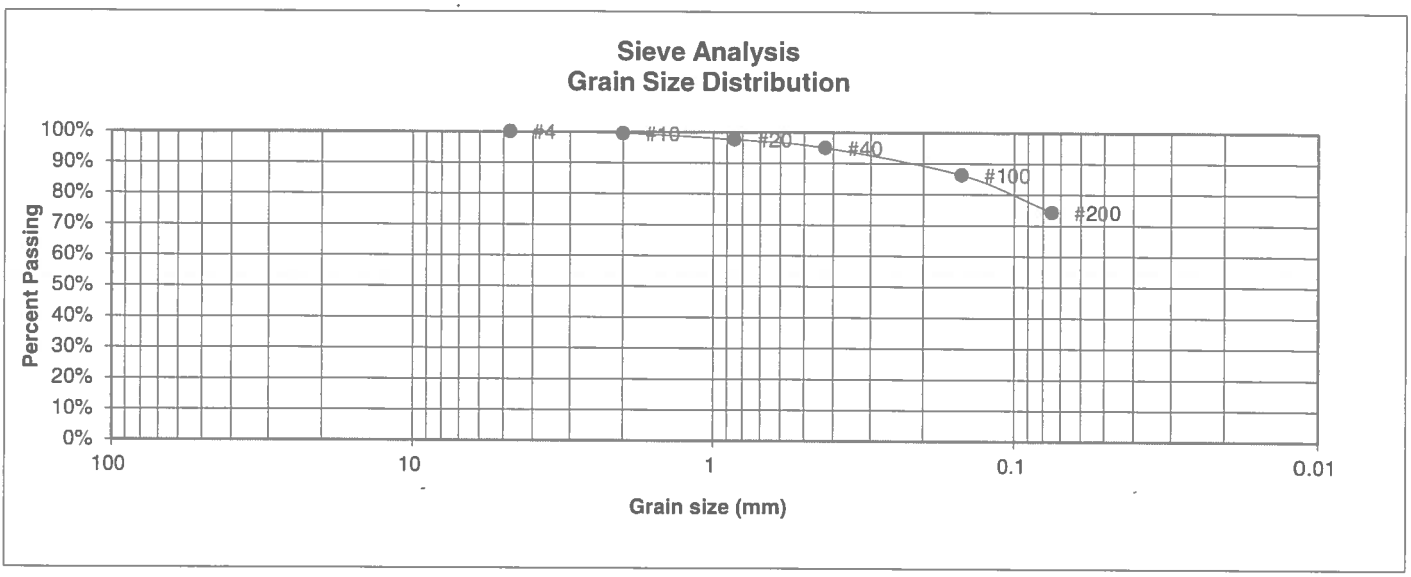
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032

FIG NO.: C-8

UNIFIED CLASSIFICATION	CL	CLIENT	WINSOME, LLC
SOIL TYPE #	2	PROJECT	HODGEN ROAD
TEST BORING #	1	JOB NO.	200032
DEPTH (FT)	20	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	
4	100.0%
10	99.5%
20	97.6%
40	95.0%
100	86.4%
200	74.3%

Atterberg Limits

Plastic Limit	25
Liquid Limit	42
Plastic Index	17

Swell

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

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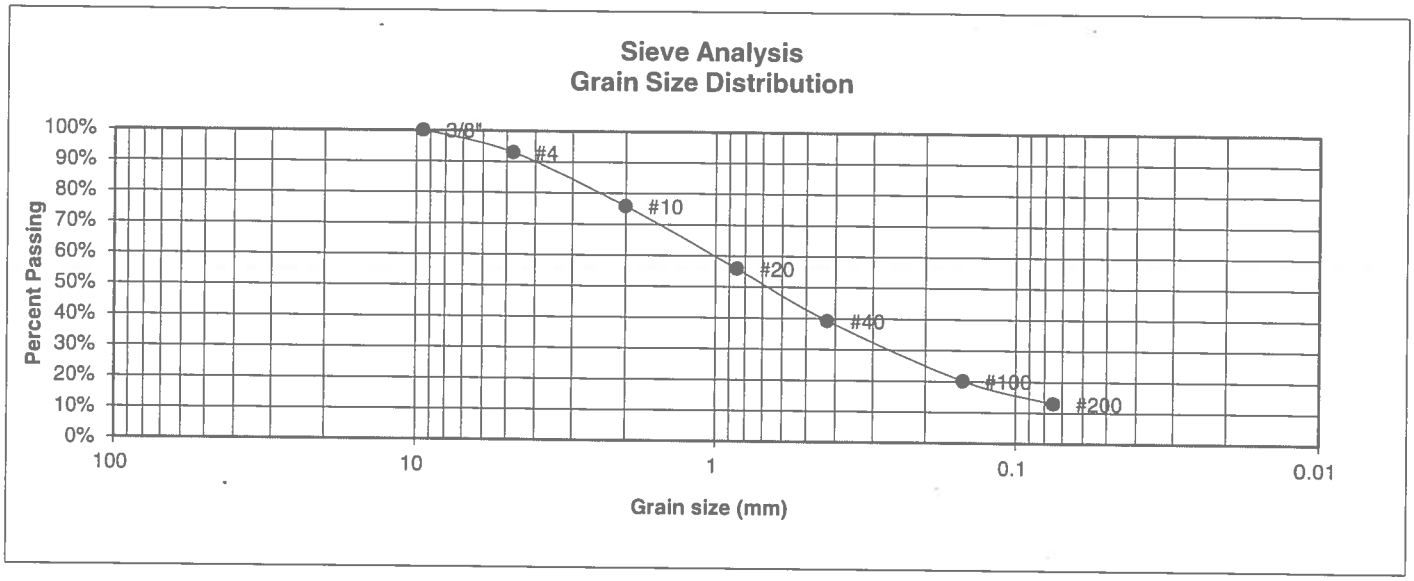
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032

FIG NO.: C-9

UNIFIED CLASSIFICATION	SM	CLIENT	WINSOME, LLC
SOIL TYPE #	3	PROJECT	HODGEN ROAD
TEST BORING #	TP-3	JOB NO.	200032
DEPTH (FT)	3-4	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	
3/8"	100.0%
4	93.0%
10	75.9%
20	55.9%
40	39.2%
100	20.2%
200	13.0%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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

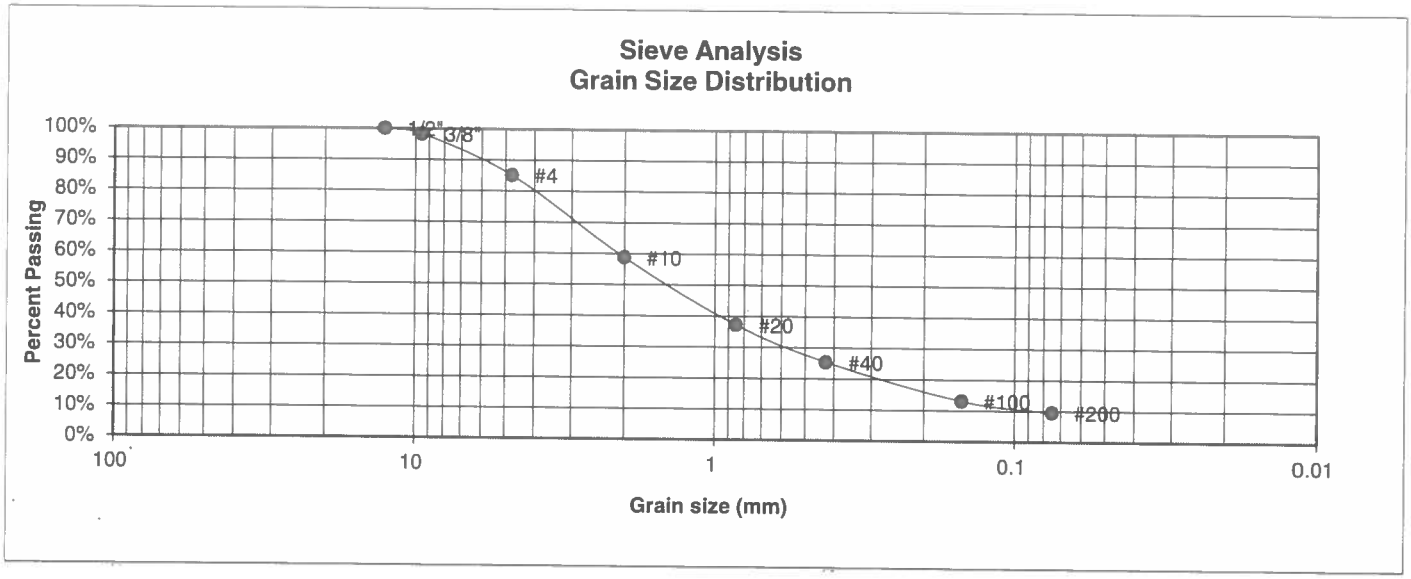
LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032

FIG NO.: C-10

UNIFIED CLASSIFICATION	SM-SW	CLIENT	WINSOME, LLC
SOIL TYPE #	3	PROJECT	HODGEN ROAD
TEST BORING #	TP-6	JOB NO.	200032
DEPTH (FT)	5-6	TEST BY	BL



U.S. Sieve #	Percent Finer
3"	
1 1/2"	
3/4"	
1/2"	100.0%
3/8"	98.3%
4	85.1%
10	58.8%
20	37.2%
40	25.3%
100	13.1%
200	9.5%

Atterberg Limits
Plastic Limit
Liquid Limit
Plastic Index

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

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LABORATORY TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

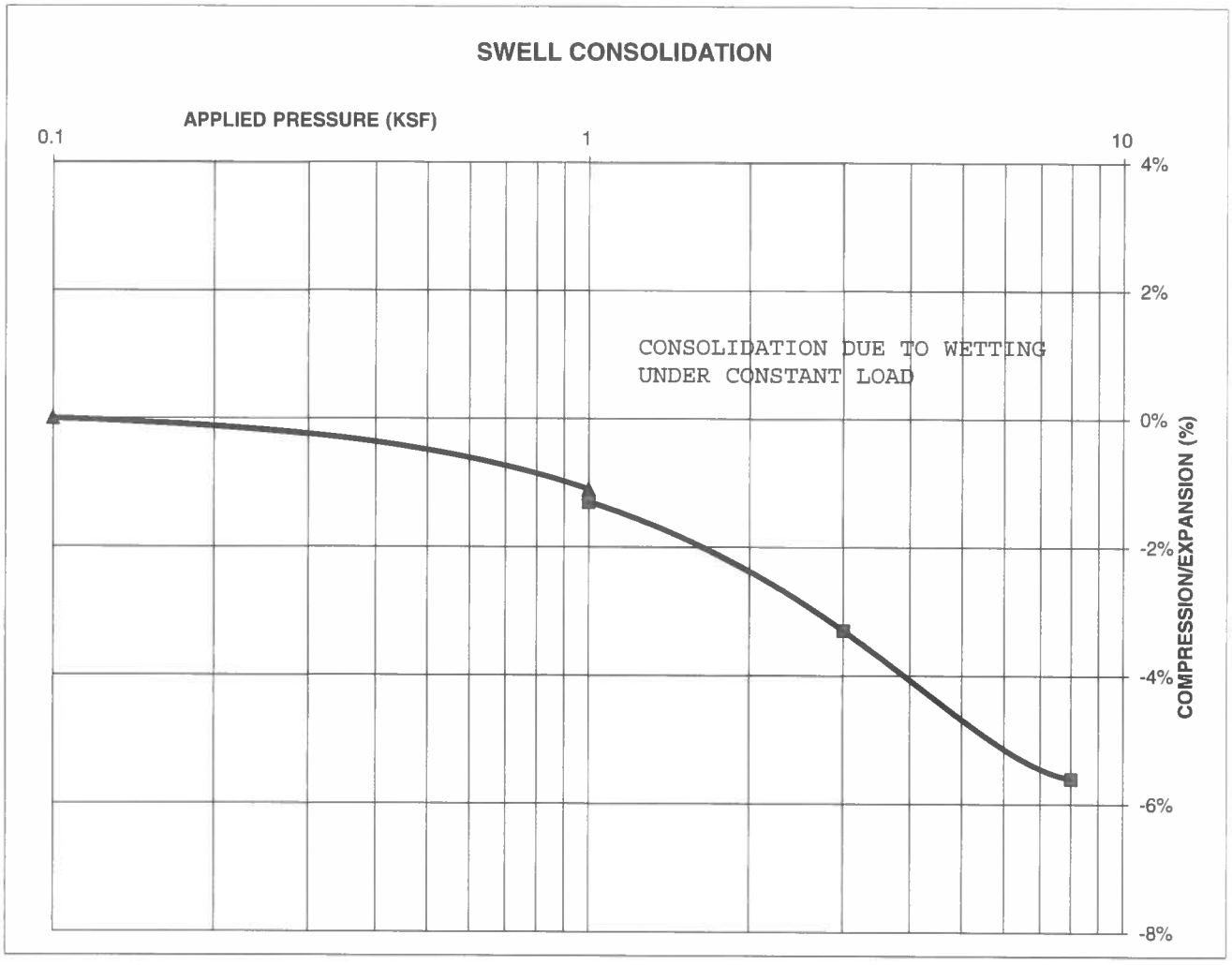
JOB NO.: 200032

FIG NO.: C-11

CONSOLIDATION TEST RESULTS

TEST BORING #	2	DEPTH(ft)	10
DESCRIPTION	SM	SOIL TYPE	1
NATURAL UNIT DRY WEIGHT (PCF)			116
NATURAL MOISTURE CONTENT			9.0%
SWELL/CONSOLIDATION (%)			-0.2%

JOB NO. 200032
CLIENT WINSOME, LLC
PROJECT HODGEN ROAD



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COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

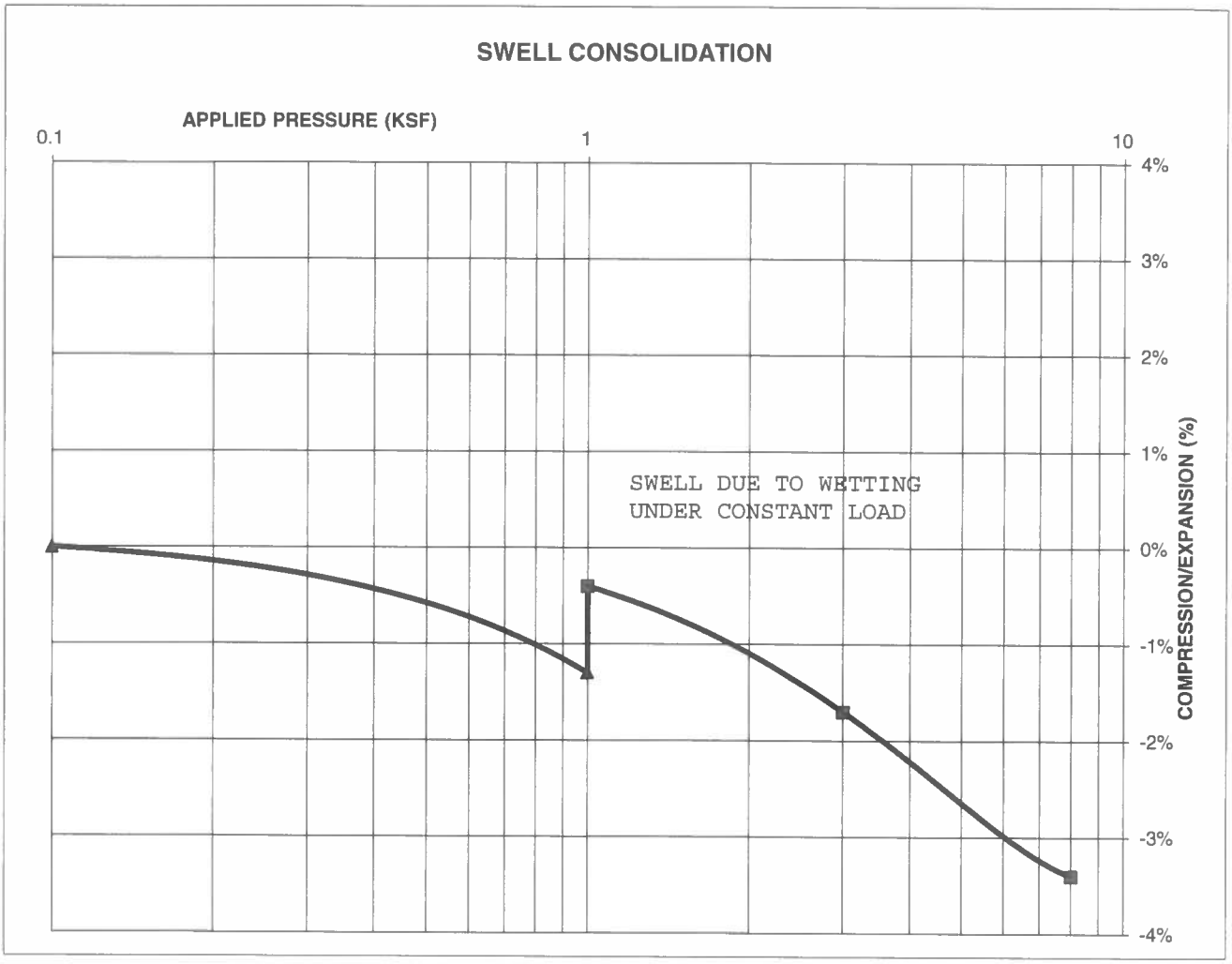
DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/22/20

JOB NO.: 200032
FIG NO.: C-12

CONSOLIDATION TEST RESULTS

TEST BORING #	1	DEPTH(ft)	20
DESCRIPTION	CL	SOIL TYPE	2
NATURAL UNIT DRY WEIGHT (PCF)			117
NATURAL MOISTURE CONTENT			15.7%
SWELL/CONSOLIDATION (%)			0.9%

JOB NO. 200032
CLIENT WINSOME, LLC
PROJECT HODGEN ROAD



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COLORADO SPRINGS, COLORADO 80907

SWELL CONSOLIDATION
TEST RESULTS

DRAWN:	DATE:	CHECKED:	DATE:

JOB NO.: 200032
FIG NO.:

CLIENT	WINSOME, LLC	JOB NO.	200032
PROJECT	HODGEN ROAD	DATE	1/16/2020
LOCATION	HODGEN ROAD	TEST BY	BL

BORING NUMBER	DEPTH, (ft)	SOIL TYPE NUMBER	UNIFIED CLASSIFICATION	WATER SOLUBLE SULFATE, (wt%)
TB-1	2-3	1	SM	<0.01
TB-1	20	2	CL	0.00

QC BLANK PASS

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LABORATORY TEST SULFATE RESULTS

DRAWN:	DATE:	CHECKED:	DATE:

JOB NO.: 200032

FIG NO.:

APPENDIX D: Laboratory Testing Summary Table, Test Boring and Test Pit Logs – Entech Job No. 181495

TABLE 1

SUMMARY OF LABORATORY TEST RESULTS

CLIENT PROTERRA PROPERTIES
PROJECT WINSOME SUBDIVISION
JOB NO. 181459

SOIL TYPE	TEST BORING NO.	DEPTH (FT)	WATER (%)	DRY DENSITY (PCF)	PASSING NO. 200 SIEVE (%)	LIQUID LIMIT (%)	PLASTIC INDEX (%)	SULFATE (WT %)	FHA SWELL (PSF)	SWELL/ CONSOL (%)	UNIFIED CLASSIFICATION	SOIL DESCRIPTION
1	2	2-3			12.1	NV	NP				SM	SAND, SILTY
1	3	10			6.5			<0.01			SM-SW	SAND, SLIGHTLY SILTY
1	5	5			17.3						SM	SAND, SILTY
1	TP-3	2-3			23.7						SM	SAND, SILTY
1	TP-4	5-6			15.3						SM	SAND, SILTY
1	TP-5	2-3			19.2						SM	SAND, SILTY
1	TP-7	2-3			33.5						SM	SAND, SILTY
1	TP-9	5-6			21.3				30		SM	SAND, SILTY
1	TP-10	2-3			32.0						SM	SAND, SILTY
2	TP-1	5-6			74.8	30	10				CL	CLAY, SANDY
3	TP-2	5-6			14.0	30	9				SM	SANDSTONE, SILTY
3	TP-8	5-6			21.1	33	14				SC	SANDSTONE, CLAYEY
3	TP-6	5-6			54.2				350		CL-SC	SANDSTONE, VERY CLAYEY
3	4	20			18.6	21	7	<0.01			SC-SM	SANDSTONE, SILTY, CLAYEY
4	1	15	13.4	120.4	73.2	35	13	<0.01		2.5	CL	CLAYSTONE, SANDY

TEST BORING NO 1
DATE DRILLED 9/18/2018
Job # 181459

REMARKS

DRY TO 20', 9/19/18

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			29	3.7	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
5			17	4.7	1	
						SAND, CLAYEY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
10			15	11.1	1	
						CLAYSTONE, SANDY, TAN, HARD, MOIST
15			50/11"	12.4	4	
20			50/7"	12.8	4	

TEST BORING NO 2
DATE DRILLED 9/18/2018
CLIENT PROTERRA PROPERTIES
LOCATION WINSOME SUBDIVISION

REMARKS

DRY TO 17.5', 9/19/18

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
			12	1.5	1	SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, DRY TO MOIST
5			16	2.4	1	
10			24	3.3	1	
15			25	3.1	1	
20			13	13.2	2	CLAY, SANDY, BROWN, FIRM, MOIST

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TEST BORING LOG

DRAWN:	DATE	CHECKED: LLL	DATE: 1/7/19

JOB NO. 181459
FIG NO. D-1

TEST BORING NO 3
DATE DRILLED 9/18/2018
Job # 181459

REMARKS

WATER @ 16.5', 9/19/18

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, SILTY TO SLIGHTLY SILTY, FINE TO COARSE GRAINED, TAN, DENSE TO MEDIUM DENSE, DRY TO WET
			35	1.7	1	
5			16	3.0	1	
10			28	3.9	1	
15			24	3.6	1	
						▼
20			17	10.7	1	

TEST BORING NO 4
DATE DRILLED 9/18/2018
CLIENT PROTERRA PROPERTIES
LOCATION WINSOME SUBDIVISION

REMARKS

DRY TO 20', 9/19/18

Depth (ft)	Symbol	Samples	Blows per foot	Watercontent %	Soil Type	
						SAND, SILTY, FINE TO COARSE GRAINED, TAN, MEDIUM DENSE, MOIST
			29	2.5	1	
5			26	5.0	1	
10			16	3.7	1	
15			27	6.9	1	
						SANDSTONE, SILTY, CLAYEY, FINE TO COARSE GRAINED, TAN, VERY DENSE, MOIST
20			50/10"	6.2	3	

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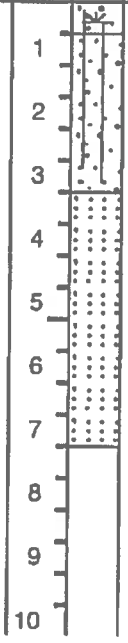
TEST BORING LOG

DRAWN:	DATE:	CHECKED	DATE
		LLL	1/7/19

JOB NO: 181459
FIG NO.: D-2

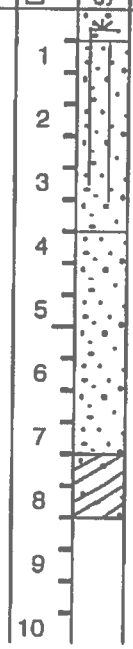
TEST PIT NO. 3
DATE EXCAVATED 9/12/2018
Job # 181459

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown						
very sandy loam, fine to coarse grained, tan	1–2			gr	m	2
weathered to formational clayey sandstone	3–4			ma		4A
	5–10					



TEST PIT NO. 4
DATE EXCAVATED 9/12/2018
CLIENT PROTERRA PROPERTIES, LLC
LOCATION WINSOME SUBDIVISION

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown						
sandy loam fine to coarse grained, tan	1–3			gr	m	2
sand, fine to coarse grained, tan	4–7			sg		1
sandy clay, tan to gray	7–8			ma		4A
*signs of seasonally occuring groundwater at 7'	9–10					



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

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

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COLORADO SPRINGS, COLORADO 80907

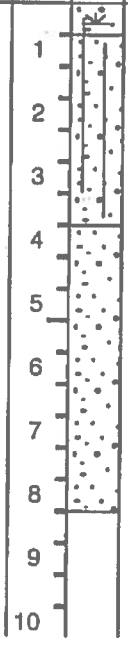
TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/7/19

JOB NO. 181459
FIG NO. 0-3

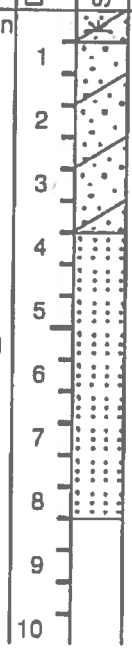
TEST PIT NO. 5
DATE EXCAVATED 9/12/2018
Job # 181459

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy loam, brown						
loamy sand, fine to coarse grained, tan	1–3			sg		1
sand, fine to coarse grained, tan	4–8			sg		1



TEST PIT NO. 6
DATE EXCAVATED 9/12/2018
CLIENT PROTERRA PROPERTIES, LLC
LOCATION WINSOME SUBDIVISION

REMARKS	Depth (ft)	Symbol	Samples	Soil Structure Shape	Soil Structure Grade	USDA Soil Type
topsoil sandy clay loam, brown						
sandy clay loam, tan	1–3					3
weathered to formational clayey sandstone, tan to gray *signs of seasonally occurring groundwater at 7'	4–8					4A



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

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

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COLORADO SPRINGS, COLORADO 80907

TEST PIT LOG

DRAWN:	DATE:	CHECKED:	DATE:
		LLL	1/7/19

JOB NO: 181459
FIG NO: D-4

APPENDIX E: Soil Survey Descriptions

El Paso County Area, Colorado

1—Alamosa loam, 1 to 3 percent slopes

Map Unit Setting

National map unit symbol: 3670
Elevation: 7,200 to 7,700 feet
Farmland classification: Prime farmland if irrigated and reclaimed of excess salts and sodium

Map Unit Composition

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

Description of Alamosa

Setting

Landform: Flood plains, fans
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 6 inches: loam
Bt - 6 to 14 inches: clay loam
Btk - 14 to 33 inches: clay loam
Cg1 - 33 to 53 inches: sandy clay loam
Cg2 - 53 to 60 inches: sandy loam

Properties and qualities

Slope: 1 to 3 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Poorly drained
Runoff class: Very high
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: About 12 to 18 inches
Frequency of flooding: Frequent
Frequency of ponding: None
Calcium carbonate, maximum in profile: 5 percent
Salinity, maximum in profile: Very slightly saline to strongly saline (2.0 to 16.0 mmhos/cm)
Available water storage in profile: High (about 10.2 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 5w
Hydrologic Soil Group: D
Ecological site: Mountain Meadow (R048AY241CO)
Hydric soil rating: Yes

Minor Components

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 15, Oct 10, 2017

El Paso County Area, Colorado

25—Elbeth sandy loam, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 367x
Elevation: 7,300 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Elbeth

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from arkose

Typical profile

A - 0 to 3 inches: sandy loam
E - 3 to 23 inches: loamy sand
Bt - 23 to 68 inches: sandy clay loam
C - 68 to 74 inches: sandy clay loam

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

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 15, Oct 10, 2017

El Paso County Area, Colorado

26—Elbeth sandy loam, 8 to 15 percent slopes

Map Unit Setting

National map unit symbol: 367y
Elevation: 7,300 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Elbeth

Setting

Landform: Hills
Landform position (three-dimensional): Side slope
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from arkose

Typical profile

A - 0 to 3 inches: sandy loam
E - 3 to 23 inches: loamy sand
Bt - 23 to 68 inches: sandy clay loam
C - 68 to 74 inches: sandy clay loam

Properties and qualities

Slope: 8 to 15 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.1 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Pleasant

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

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 15, Oct 10, 2017

El Paso County Area, Colorado

67—Peyton sandy loam, 5 to 9 percent slopes

Map Unit Setting

National map unit symbol: 369d
Elevation: 6,800 to 7,600 feet
Mean annual air temperature: 43 to 45 degrees F
Frost-free period: 115 to 125 days
Farmland classification: Not prime farmland

Map Unit Composition

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

Description of Peyton

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 and/or arkosic residuum weathered from sedimentary rock

Typical profile

A - 0 to 12 inches: sandy loam
Bt - 12 to 25 inches: sandy clay loam
BC - 25 to 35 inches: sandy loam
C - 35 to 60 inches: sandy loam

Properties and qualities

Slope: 5 to 9 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high (0.20 to 0.60 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Moderate (about 7.3 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Sandy Divide (R049BY216CO)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Pleasant

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

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 15, Oct 10, 2017

El Paso County Area, Colorado

92—Tomah-Crowfoot loamy sands, 3 to 8 percent slopes

Map Unit Setting

National map unit symbol: 36b9
Elevation: 7,300 to 7,600 feet
Farmland classification: Not prime farmland

Map Unit Composition

Tomah and similar soils: 50 percent
Crowfoot and similar soils: 30 percent
Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Tomah

Setting

Landform: Alluvial fans, hills
Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium derived from arkose and/or residuum weathered from arkose

Typical profile

A - 0 to 10 inches: loamy sand
E - 10 to 22 inches: coarse sand
C - 48 to 60 inches: coarse sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Sandy Divide (R049BY216CO)
Hydric soil rating: No

Description of Crowfoot

Setting

Landform: Alluvial fans, hills

Landform position (three-dimensional): Side slope, crest
Down-slope shape: Linear
Across-slope shape: Linear
Parent material: Alluvium

Typical profile

A - 0 to 12 inches: loamy sand
E - 12 to 23 inches: sand
Bt - 23 to 36 inches: sandy clay loam
C - 36 to 60 inches: coarse sand

Properties and qualities

Slope: 3 to 8 percent
Depth to restrictive feature: More than 80 inches
Natural drainage class: Well drained
Runoff class: Medium
Capacity of the most limiting layer to transmit water (Ksat): Moderately high to high (0.60 to 2.00 in/hr)
Depth to water table: More than 80 inches
Frequency of flooding: None
Frequency of ponding: None
Available water storage in profile: Low (about 4.7 inches)

Interpretive groups

Land capability classification (irrigated): None specified
Land capability classification (nonirrigated): 4e
Hydrologic Soil Group: B
Ecological site: Sandy Divide (R049BY216CO)
Hydric soil rating: No

Minor Components

Other soils

Percent of map unit:
Hydric soil rating: No

Pleasant

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

Data Source Information

Soil Survey Area: El Paso County Area, Colorado
Survey Area Data: Version 15, Oct 10, 2017