When Recorded Mail To:
American Fork City
51 East Main
American Fork UT 84003

ENT 122955:2022 PG 1 of 79
ANDREA ALLEN
UTAH COUNTY RECORDER
2022 Dec 07 10:54 am FEE 0.00 BY MG
RECORDED FOR AMERICAN FORK CITY

NOTICE OF INTEREST, BUILDING REQUIREMENTS, AND ESTABLISHMENT OF RESTRICTIVE COVENANTS

This Notice is recorded to bind the attached Geotechnical Study dated 12.9.2020 along with the site grading plan to the property generally located at 620 South 700 West (address), American Fork, UT 84003 and therefore mandating that all construction be in compliance with said Geotechnical Study and site grading plan per the requirements of American Fork City ordinances and standards and specification including specifically Ordinance 07-10-47, Section 6-5, Restrictive Covenant Required and 6-2-4, Liquefiable Soils. Said Sections require establishment of a restrictive covenant and notice to property owners of liquefiable soils or other unique soil conditions and construction methods associated with the property.

Exhibit A – Legal Description of Property
Exhibit B – Geotechnical Study
Exhibit C – Site Grading Plan

Dated this 25 day of February, 2022.

OWNER(S):

(Signature)	(Signature)
Matthew Loveland	
(Printed Name)	(Printed Name)
V.P. Land Development	
(Title)	(Title)

STATE OF UTAH)
§
COUNTY OF Salt Lake)

On the 25 day of February, 2022, personally appeared before me Matt Loveland and NA, Owner(s) of said Property, as (individuals and/or authorized representatives of a company), and acknowledged to me that such individuals or company executed the within instrument freely of their own volition and pursuant to the articles of organization where applicable.

KATHLEENE MCCLEARY
Notary Public State of Utah
My Commission Expires on:
January 24, 2024
Comm. Number: 710215

Notary Public
My Commission Expires: Jan 24, 2024

Approved as to form: American Fork City Attorney

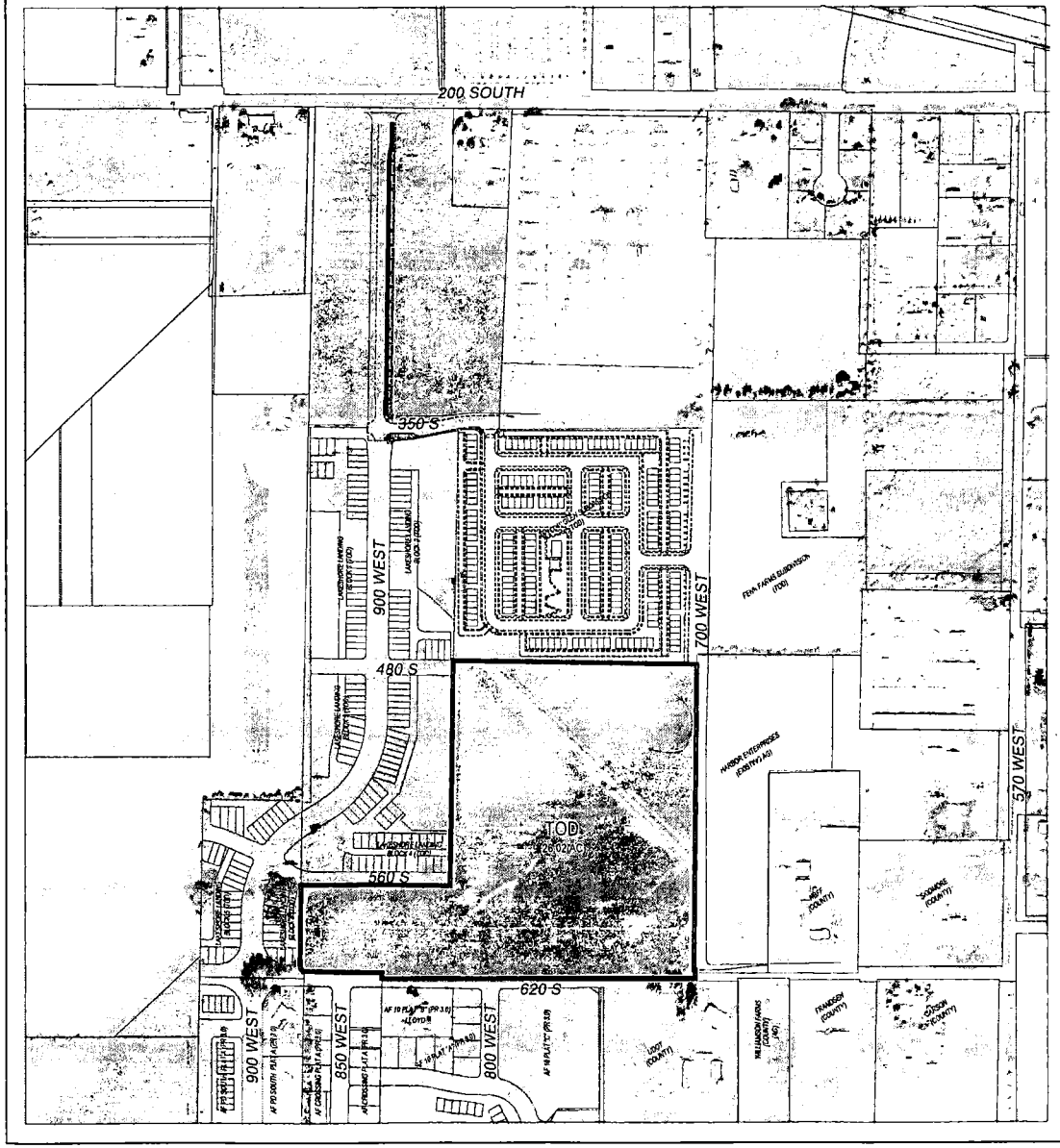
Rev. 12/4/18

OVERALL LEGAL DESCRIPTION

BEGINNING AT A POINT LOCATED NORTH 0°03'33" EAST ALONG SECTION LINE 605.91 FEET AND WEST 1824.15 FEET FROM THE SOUTHEAST CORNER OF SECTION 22, TOWNSHIP 5 SOUTH, RANGE 1 EAST, SALT LAKE BASE AND MERIDIAN;

THENCE WEST 1100.91 FEET; THENCE NORTH 0°58'19" EAST 20.34 FEET; THENCE NORTH 89°01'56" WEST 278.34 FEET; THENCE SOUTH 1°00'15" WEST 4.80 FEET; THENCE NORTH 36°42'37" WEST 23.49 FEET; THENCE NORTH 0°50'17" EAST ALONG THE EASTERLY BOUNDARY OF B.K. PENROD PLAT "A" A DISTANCE OF 292.57 FEET; THENCE ALONG A BOUNDARY LINE AGREEMENT RECORDED AS ENTRY 5099:2019 IN THE OFFICE OF THE UTAH COUNTY RECORDER THE FOLLOWING THREE COURSES AND DISTANCES: 1) NORTH 89°58'32" EAST 287.99 FEET, 2) SOUTH 89°11'42" EAST 239.99 FEET AND 3) NORTH 0°50'18" EAST 164.78 FEET; THENCE NORTH 0°50'20" EAST 637.56 FEET; THENCE SOUTH 89°05'07" EAST ALONG THE SOUTHERLY BOUNDARY OF WILLOW GLEN PHASE 1 A DISTANCE OF 856.93 FEET; THENCE SOUTH 0°37'47" WEST 1088.16 FEET; THENCE SOUTH 89°13'41" EAST 4.15 FEET; THENCE SOUTH 28.78 FEET TO THE POINT OF BEGINNING.

AREA = 26.02 ACRES



OVERALL LEGAL DESCRIPTION

BEGINNING AT A POINT LOCATED NORTH 0°03'33" EAST ALONG SECTION LINE 605.91 FEET AND WEST 1824.15 FEET FROM THE SOUTHEAST CORNER OF SECTION 22, TOWNSHIP 5 SOUTH, RANGE 1 EAST, SALT LAKE BASE AND MERIDIAN;

THENCE WEST 1100.91 FEET; THENCE NORTH 0°58'19" EAST 20.34 FEET; THENCE NORTH 89°01'56" WEST 278.34 FEET; THENCE SOUTH 1°00'15" WEST 4.80 FEET; THENCE NORTH 36°42'37" WEST 23.49 FEET; THENCE NORTH 0°50'17" EAST ALONG THE EASTERLY BOUNDARY OF B.K. PENROD PLAT "A" A DISTANCE OF 292.57 FEET; THENCE ALONG A BOUNDARY LINE AGREEMENT RECORDED AS ENTRY 5099:2019 IN THE OFFICE OF THE UTAH COUNTY RECORDER THE FOLLOWING THREE COURSES AND DISTANCES: 1) NORTH 89°58'32" EAST 287.99 FEET, 2) SOUTH 89°11'42" EAST 239.99 FEET AND 3) NORTH 0°50'18" EAST 164.78 FEET; THENCE NORTH 0°50'20" EAST 637.56 FEET; THENCE SOUTH 89°05'07" EAST ALONG THE SOUTHERLY BOUNDARY OF WILLOW GLEN PHASE 1 A DISTANCE OF 856.93 FEET; THENCE SOUTH 0°37'47" WEST 1088.16 FEET; THENCE SOUTH 89°13'41" EAST 4.15 FEET; THENCE SOUTH 28.78 FEET TO THE POINT OF BEGINNING.

AREA = 26.02 ACRES

NO BASEMENT IS ALLOWED PER SENSITIVE LANDS ORDINANCE.
a "high" liquefaction potential zone

ENT 122955:2022 PG 3 of 79

Woodside® Homes
WOODSIDE HOMES OF UTAH
460 West 50 North, Suite 300
Salt Lake City, UT 84101
801.869.4000

DEVELOPMENT
MEADOWBROOK TOD

N
0 100 200 400 600
SCALE: 1"= 200'

berg
CIVIL ENGINEERING
1018 N. DEER CREST LANE
ALPINE, UT. 84004
office (801) 492-1277
cell (801) 616-1877

REVISIONS

#	DATE	DESCRIPTION

SEAL
STATE OF UTAH
R. BERG
04/19/2022
343002
REGISTERED PROFESSIONAL ENGINEER

ACTION	DATE
PRELIM BLOCK	04/19/2022

PROJECT
PRELIMINARY BLOCK PLAN

DESCRIPTION
LEGAL DESCRIPTION

SHEET NAME	SHEET NUMBER
EXHIBIT	1

1497 West 40 South
Lindon, Utah - 84042
Phone (801) 225-5711

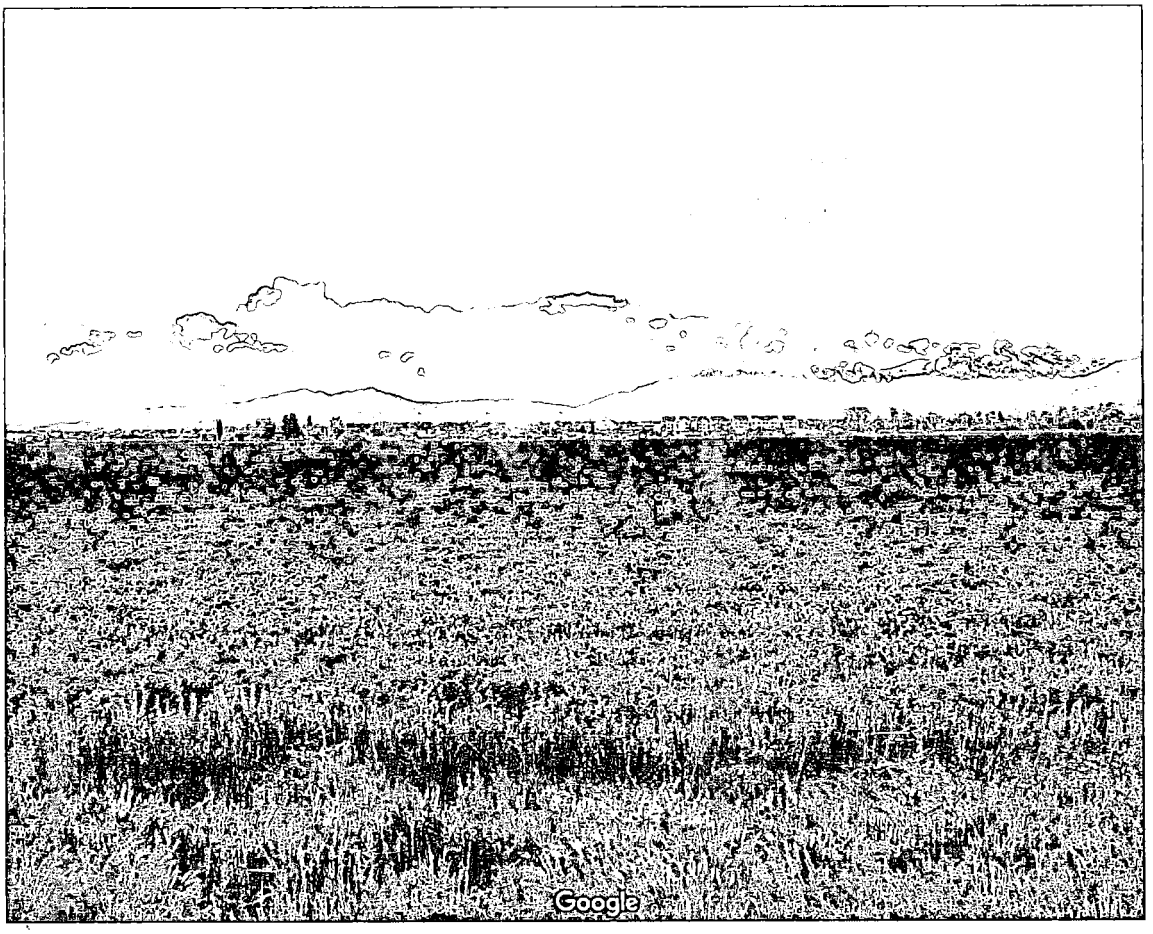
840 West 1700 South #10
Salt Lake City, Utah - 84104
Phone (801) 787-9138

1596 W. 2650 S. #108
Ogden, Utah - 84401
Phone (801) 399-9516

Geotechnical Study
Meadow Brook
approximately 600 South 6600 West
American Fork, Utah

Project No. 228636

July 8, 2022



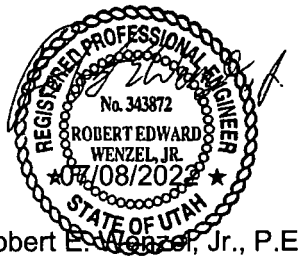
Prepared For:

Woodside Homes of Utah, LLC
Attention: Ms. Ginger Romriell
460 West 50 North, Suite 300
Salt Lake City, UT 84101

ENT 122955:2022 PG 4 of 79

CERTIFICATE

I hereby certify that I am a licensed professional engineer, as defined in the "Sensitive Lands Ordinance" Section of American Fork City Ordinances. I have examined this report to which this certificate is attached, and the information and conclusions contained therein are, without any reasonable reservation not stated therein, accurate and complete. Procedures and tests used in this report meet minimum applicable professional standards.



Robert E. Wenzel, Jr., P.E.
Vice President

TABLE OF CONTENTS

ATTACHED FIGURES

APPENDIX A

1.0 SUMMARY

This entire report presents the results of Earthtec Engineering's completed geotechnical study for the Meadow Brook in American Fork, Utah. This summary provides a general synopsis of our recommendations and findings. Details of our findings, conclusions, and recommendations are provided within the body of this report.

- The native clay, sand, and silt soils have a negligible to slight potential for collapse (settlement) or expansion (heave) and a slight to high potential for compression under increased moisture contents and anticipated load conditions. (see Section 6)
- Conventional strip and spread footings may be used to support the structures, with foundations placed entirely on a minimum of 24 inches of properly placed, compacted, and tested structural fill extending to undisturbed native soils for structural loads up to 4,000 pounds per linear foot for bearing walls and up to 30,000 pounds for column loads. If loads exceed these see Section 10 for further recommendations.

Based on the results of our field exploration, laboratory testing, and engineering analyses, it is our opinion that the subject site may be suitable for the proposed development, provided the recommendations presented in this report are followed and implemented during design and construction.

Failure to consult with Earthtec Engineering (Earthtec) regarding any changes made during design and/or construction of the project from those discussed herein relieves Earthtec from any liability arising from changed conditions at the site. We also strongly recommend that Earthtec observes the building excavations to verify the adequacy of our recommendations presented herein, and that Earthtec performs materials testing and special inspections for this project to provide continuity during construction.

2.0 INTRODUCTION

The project is located at approximately approximately 600 South 6600 West in American Fork, Utah. The general location of the site is shown on Figure No. 1, *Vicinity Map* and Figure No. 2, *Aerial Photograph Showing Location of Boring and Test Pits* at the end of this report. The purposes of this study are to evaluate the subsurface soil conditions at the site, assess the engineering characteristics of the subsurface soils, and provide geotechnical recommendations for general site grading and the design and construction of foundations, concrete floor slabs, miscellaneous concrete flatwork, and asphalt paved residential streets.

The scope of work completed for this study included field reconnaissance, subsurface exploration, field and laboratory soil testing, geotechnical engineering analysis, and the preparation of this report.

3.0 PROPOSED CONSTRUCTION

We understand that the proposed project, as described to us by Ms. Ginger Romriell with Woodside Homes, consists of developing the approximately 25-acre existing parcel with a new residential subdivision. The proposed structures will consist of conventionally framed, two- to three-story, slab-on-grade townhomes, and one- to two-story houses with basements. We have based our recommendations in this report that the anticipated foundation loads for the proposed structures will not exceed 4,000 pounds per linear foot for bearing walls, 30,000 pounds for column loads, and 100 pounds per square foot for floor slabs. If structural loads will be greater Earthtec should be notified so that we may review our recommendations and make modifications, if necessary.

In addition to the construction described above, we anticipate that utilities will be installed to service the proposed buildings, exterior concrete flatwork will be placed in the form of curb, gutter, sidewalks, driveways, and asphalt paved residential streets will be constructed.

4.0 GENERAL SITE DESCRIPTION

4.1 Site Description

At the time of our subsurface exploration the site was an agricultural field used for growing alfalfa or hay. The northwest corner of the field was partially fenced in and being used as a concrete washout area for the nearby subdivision developments. The ground surface appears to be relatively flat; we anticipate less than 3 feet of cut and fill may be required for site grading. The lot was bounded on all sides by residential subdivision development, both single- and multi-family, and by 620 South Street on the south.

4.2 Geologic Setting

The subject property is located in the north-central portion of Utah Valley near the northern shore of Utah Lake. Utah Valley is a deep, sediment-filled basin that is part of the Basin and Range Physiographic Province. The valley was formed by extensional tectonic processes during the Tertiary and Quaternary geologic time periods. The valley is bordered by the Wasatch Mountain Range on the east and the Lake Mountains on the west. Much of northwestern Utah, including Utah Valley, was previously covered by the Pleistocene age Lake Bonneville. Utah Lake, which currently covers much of the western portion of the valley, is a remnant of this ancient freshwater lake. The surficial geology of much of the eastern margin of the valley has been mapped by Constenius, 2011[1]. The surficial geology at the location of the subject site and adjacent properties is mapped as "fine-grained lacustrine deposits" (Map Unit Qlf) and as "Younger alluvial fan deposits" (Map Unit Qafy) dated to the Holocene and upper Pleistocene. These soil or deposits are generally described in the referenced mapping as "silt and clay with some fine-grained sand;"

[1] Constenius, K.N., Clark, D.L., King, J.K., Ehler, J.B., 2011, Interim Geologic Map of the Provo Quadrangle, Utah, Wasatch and Salt Lake Counties, Utah; U.S. Geological Survey, Open-File 586DM, Scale 1: 62,500

and as "Mostly sand, silt, and gravel that is poorly stratified and poorly sorted;" respectively. However, a geologic hazard study was not performed for the subject site during this study.

5.0 SUBSURFACE EXPLORATION

5.1 Soil Exploration

Under the direction of a qualified member of our geotechnical staff, subsurface explorations were conducted at the site on June 17, 2022 by the excavation of eight (8) test pits to depths of 7 to 10 feet below the existing ground surface using a a track-mounted mini excavator, and on June 27, 2022 by the boring of one (1) boring to a depth of 41½ feet below the existing ground surface use a truck-mounted hydraulic drill rig. The approximate locations of the boring and test pits are shown on Figure No. 2, *Aerial Photograph Showing Location of Boring and Test Pits*. Graphical representations and detailed descriptions of the soils encountered are shown on Figure Nos. 3 through 11, *Boring and Test Pit Log* at the end of this report. The stratification lines shown on the logs represent the approximate boundary between soil units; the actual transition may be gradual. Due to potential natural variations inherent in soil deposits, care should be taken in interpolating between and extrapolating beyond exploration points. A key to the symbols and terms on the logs is presented on Figure No. 12, *Legend*.

Samples of the subsurface soils were collected in the borings at depth intervals of approximately 2½ to 5 feet. Relatively undisturbed samples were collected by pushing thin-walled "Shelby" tubes into undisturbed soils below the augers. Disturbed samples were collected with a 1⅜ inch inside diameter split spoon sampler. The split spoon sampler was driven 18 inches into undisturbed soil with a 140-pound hammer free-falling through a distance of 30 inches. The blows required to drive the sampler through the final 12 inches of penetration is called the "N-value" or "blow count," and is recorded as "blows per foot" on the attached boring logs at the respective sample depths. The blow count provides a reasonable indication of the in-place relative density of sandy soils but provides only a limited indication of the relative stiffness of cohesive (clayey) materials, since the penetration resistance for these soils is a function of the moisture content.

Disturbed bag samples and relatively undisturbed block samples were collected at various depths in each test pit.

The soil samples collected were classified by visual examination in the field following the guidelines of the Unified Soil Classification System (USCS). The samples were transported to our Lindon, Utah laboratory where they will be retained for 30 days following the date of this report and then discarded, unless a written request for additional holding time is received prior to the 30-day limit.

6.0 LABORATORY TESTING

Representative soil samples collected during our field exploration were tested in the laboratory to

assess pertinent engineering properties and to aid in refining field classifications, if needed. Tests performed included natural moisture contents, dry density tests, liquid and plastic limits determinations, mechanical (partial) gradation analyses, and one-dimensional consolidation tests. The laboratory test results are also included on the attached *Boring and Test Pit Logs* at the respective sample depths, and on Figure Nos. 13 through 18, *Consolidation-Swell Test.*

As part of the consolidation test procedure, water was added to the samples to assess moisture sensitivity when the samples were loaded to an equivalent pressure of approximately 1,000 psf. The native clay, sand, and silt soils have a negligible to slight potential for collapse (settlement) or expansion (heave) and a slight to high potential for compressibility under increased moisture contents and anticipated load conditions.

A water-soluble sulfate test was performed on a representative sample obtained during our field exploration which indicated a value of 253 parts per million. Based on this result, the risk of sulfate attack to concrete appears to be "moderate" according to American Concrete Institute standards. Therefore, we recommend that Type II Portland cement be used for concrete in contact with on-site soils. The results can be found in Appendix A.

7.0 SUBSURFACE CONDITIONS

7.1 Soil Types

On the surface of the site, we encountered fill and topsoil which is estimated to extend about 6 to 18 inches in depth at the boring and test pit locations. Below the fill and topsoil we encountered layers of clay, silt, sand, and gravel extending to depths of 7 to 41½ feet below the existing ground surface. Graphical representations and detailed descriptions of the soils encountered are shown on Figure Nos. 3 through 11, *Boring and Test Pit Log* at the end of this report. Based on the blow counts obtained and our experience and observations during field exploration, the clay and silt soils ranged from soft to very stiff in consistency and the sand and gravel soils had a relative density varying from loose to medium dense.

It should be considered that a limited number of small diameter soil borings and test pits were used during the course of our subsurface exploration. Topsoil and fill material composition and contacts are difficult to determine from boring and test pit sampling. Variation in topsoil and fill depths may occur at the site.

7.2 Collapsible Soils

Collapsible soils are typically characterized by a pinhole structure and relatively low unit weights. Foundations, floor slabs, and roadways supported on these soils may be susceptible to large settlements and structural distress when wetted. Significantly collapsible soils were not encountered in our explorations.

7.3 Groundwater Conditions

Groundwater was encountered at depths of approximately 4½ to 10 feet below the existing ground surface. In addition, we did observe oxidation or other indicators within the soils which could indicate possible past water or seepage levels at a depth of about 3 feet below the existing ground surface. Note that groundwater levels will fluctuate in response to the season, precipitation, snow melt, irrigation, and other on and off-site influences. Quantifying these fluctuations would require long term monitoring, which is beyond the scope of this study. The contractor should be prepared to dewater excavations as needed.

ENT 122955:2022 PG 11 of 79

8.0 SITE GRADING

8.1 General Site Grading

All surface vegetation and unsuitable soils (such as topsoil, organic soils, undocumented fill, soft, loose, or disturbed native soils, collapsible, and any other inapt materials) should be removed from below foundations, floor slabs, exterior concrete flatwork, and pavement areas. We encountered fill and topsoil on the surface of the site. The fill encountered on the site is considered undocumented (untested). The fill and topsoil (including soil with roots larger than about ¼ inch in diameter) should be completely removed, even if found to extend deeper, along with any other unsuitable soils that may be encountered. Over-excavations below footings and slabs also may be needed, as discussed in Section 10.0.

Fill placed over large areas, even if only a few feet in depth, can cause consolidation in the underlying native soils resulting in settlement of the fill. Because the site is relatively flat, we anticipate that less than 3 feet of grading fill will be placed. If more than 3 feet of grading fill will be placed above the existing surface (to raise site grades), Earthtec should be notified so that we may provide additional recommendations, if required. Such recommendations will likely include placing the fill several weeks (or possibly more) prior to construction to allow settlement to occur.

8.2 Temporary Excavations

Temporary excavations that are less than 4 feet in depth and above groundwater should have side slopes no steeper than ½H:1V (Horizontal:Vertical). Temporary excavations where water is encountered in the upper 4 feet or that extend deeper than 4 feet below site grades should be sloped or braced in accordance with OSHA[2] requirements for Type B soils.

8.3 Fill Material Composition

The soils within the upper 18 inches are not suitable for use as placed and compacted engineered fill. Excavated soils, including clay and silt, may be stockpiled for use as fill in landscape areas.

Structural fill is defined as imported fill material that will ultimately be subjected to any kind of

[2] OSHA Health and Safety Standards, Final Rule, CFR 29, part 1926.

structural loading, such as those imposed by footings, floor slabs, pavements, etc. Gradation requirements stated below shall be verified in intervals not exceeding 1,000 tons. We recommend that imported structural fill consist of sandy/gravelly soils meeting the following requirements in the table below:

Table 1: Imported Structural Fill Recommendations

Sieve Size/Other	Percent Passing (by weight)
4 inches	100
3/4 inches	70 – 100
No. 4	40 – 80
No. 40	15 – 50
No. 200	0 – 20
Liquid Limit	35 maximum
Plasticity Index	15 maximum

Engineered fill is defined as reworked granular (sands or gravels), native material that will ultimately be subjected to any kind of structural loading, such as those imposed by footings, floor slabs, pavements. Native clay and silt soils are not suitable for use as engineered fill. We recommend that a professional engineer or geologist verify that the engineered fill to be used on this project meets the requirements. Engineered fill should be clear of all organics, have a maximum particle size of 4 inches, less than 70 percent retained on the ¾-seive, a maximum Liquid Limit of 35, and a maximum Plasticity Index of 15.

In some situations, particles larger than 4 inches and/or more than 30 percent coarse gravel may be acceptable but would likely make compaction more difficult and/or significantly reduce the possibility of successful compaction testing. Consequently, stricter quality control measures than normally used may be required, such as using thinner lifts and increased or full-time observation of fill placement.

We recommend that utility trenches below any structural load be backfilled using structural fill or engineered fill. Local governments or utility companies required specification for backfill should be followed unless our recommendations stricter.

If native soil is used as fill material, the contractor should be aware that native clay and silt soils (as observed in the explorations) may be time consuming to compact due to potential difficulties in controlling the moisture content needed to obtain optimum compaction and changes proctor values.

If required (i.e. fill in submerged areas), we recommend that free draining granular material (clean sand and/or gravel) meet the following requirements in the table below:

Table 2: Free-Draining Fill Recommendations

Sieve Size/Other	Percent Passing (by weight)
3 inches	100
No. 10	0 – 25
No. 40	0 – 15
No. 200	0 – 5
Plasticity Index	Non-plastic

Three-inch minus washed rock (sometimes called river rock or drain rock) and pea gravel materials usually meet these requirements and may be used as free draining fill. If free draining fill will be placed adjacent to soil containing a significant amount of sand or silt/clay, precautions should be taken to prevent the migration of fine soil into the free draining fill. Such precautions should include either placing a filter fabric between the free draining fill and the adjacent soil material, or using a well-graded, clean filtering material approved by the geotechnical engineer.

8.4 Fill Placement and Compaction

The thickness of each lift should be appropriate for the compaction equipment that is used. We recommend a maximum lift thickness prior to compaction of 4 inches for hand operated equipment, 6 inches for most "trench compactors" and 8 inches for larger rollers, unless it can be demonstrated by in-place density tests that the required compaction can be obtained throughout a thicker lift. The full thickness of each lift of structural fill placed should be compacted to at least the following percentages of the maximum dry density, as determined by ASTM D-1557:

- In landscape and other areas not below structurally loaded areas: 90%
- Less than 5 feet of fill below structurally loaded areas: 95%
- 5 feet or greater of fill below structurally loaded areas: 98%

Generally, placing and compacting fill at moisture contents within ±2 percent of the optimum moisture content, as determined by ASTM D-1557, will facilitate compaction. Typically, the further the moisture content deviates from optimum the more difficult it will be to achieve the required compaction.

Fill should be tested frequently during placement, and we recommend early testing to demonstrate that placement and compaction methods are achieving the required compaction. The contractor is responsible to ensure that fill materials and compaction efforts are consistent so that tested areas are representative of the entire fill.

ENT 122955:2022 PG 13 of 79

8.5 Stabilization Recommendations

Near surface layers of clay and silt soils may rut and pump during grading and construction. The likelihood of rutting and/or pumping, and the depth of disturbance, is proportional to the moisture content in the soil, the load applied to the ground surface, and the frequency of the load. Consequently, rutting and pumping can be minimized by avoiding concentrated traffic, minimizing the load applied to the ground surface by using lighter equipment, partially loaded equipment, tracked equipment, by working in dry times of the year, and/or by providing a working surface for

equipment. However, because of the relatively shallow depth of groundwater, it is likely that rutting and pumping may not be avoidable.

During grading the soil in any obvious soft spots should be removed and replaced with granular material. If rutting or pumping occurs traffic should be stopped in the area of concern. The soil in rutted areas should be removed and replaced with granular material. In areas where pumping occurs the soil should either be allowed to sit until pore pressures dissipate (several hours to several days) and the soil firms up or be removed and replaced with granular material. Typically, we recommend removal to a minimum depth of 24 inches.

For granular material, we recommend using angular well-graded gravel, such as pit run, or crushed rock with a maximum particle size of four inches. We suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor. A finer granular material such as sand, gravelly sand, sandy gravel or road base may also be used. Materials which are more angular and coarse may require thinner lifts in order to achieve compaction. We recommend that the fines content (percent passing the No. 200 sieve) be less than 15%, the liquid limit be less than 35, and the plasticity index be less than 15.

Using a geosynthetic fabric, such as Mirafi 600X or equivalent, may also reduce the amount of material required and avoid mixing of the granular material and the subgrade. If a fabric is used, following removal of disturbed soils and water, the fabric should be placed over the bottom and up the sides of the excavation a minimum of 24 inches. The fabric should be placed in accordance with the manufacturer's recommendations, including proper overlaps. The granular material should then be placed over the fabric in compacted lifts. Again, we suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor.

9.0 SEISMIC AND GEOLOGIC CONSIDERATIONS

9.1 Seismic Design

The State of Utah has adopted the 2015 International Residential Code (IRC) and residential structures should be designed in accordance with the 2015 IRC. The IRC designates this area as a seismic design class D_2.

The site is located at approximately 40.366 degrees latitude and -111.819 degrees longitude from the approximate center of the site. The IRC site value for this property is 0.989 g. The design spectral response acceleration parameters are given below.

Table 3: Design Acceleration for Short Period

S_S	F_a	Site Value (S_{DS})
		2/3 S_S*F_a
1.236 g	1.2	0.989 g

9.2 Faulting

The subject property is located within the Intermountain Seismic Belt where the potential for active faulting and related earthquakes is present. Based upon published geologic maps[3], no active faults traverse through or immediately adjacent to the site and the site is not located within local fault study zones. The nearest mapped fault trace is part of a group of faults beneath Utah Lake located about 2¼ miles southeast of the site.

9.3 Liquefaction Potential

According to current liquefaction maps[4] for Utah County, the site is located within an area designated as "High" in liquefaction potential. Liquefaction can occur when saturated subsurface soils below groundwater lose their inter-granular strength due to an increase in soil pore water pressures during a dynamic event such as an earthquake. Loose, saturated sands are most susceptible to liquefaction, but some loose, saturated gravels and relatively sensitive silt to low-plasticity silty clay soils can also liquefy during a seismic event. Subsurface soils encountered were composed of saturated clay and sand soils.

As part of this study, the potential for liquefaction to occur in the soils we encountered was assessed using Youd *et al*[5] and Boulanger & Idriss[6]. Potential liquefaction-induced movements were evaluated using Tokimatsu & Seed[7] and Youd, Hansen & Bartlett[8]. Our analysis indicates that approximately up to 2 inches of liquefaction-induced settlement and possibly up to 1 foot of lateral spreading could occur during a moderate to large earthquake event. Given the small amount of movement, it is our opinion that liquefaction mitigation is not needed at the site

[3] U.S. Geological Survey, Quaternary Fault and Fold Database of the United States, November 3, 2010.
[4] Christenson, G.E., Shaw, L.M., 2008, Liquefaction Special Study Areas, Wasatch and Nearby Areas, Utah; Utah Geological Survey, Map to Circular 106, Scale 1:250,000
[5] Youd, T.L. (Chair), Idriss, I.M. (Co-Chair), and 20 other authors, 2001, Liquefaction Resistance of Soils: Summary Report from the 1996 NCEER and 1998 NCEER/NSF Workshops on Evaluation of Liquefaction Resistance of Soils, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, October 2001, p. 817-833.
[6] Boulanger, R.W. and Idriss, I.M., 2006, Liquefaction Susceptibility Criteria for Silts and Clays, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, November 2006, p. 1413-1426.
[7] Tokimatsu, K. and Seed, H.B., 1987, Evaluation of Settlements in Sands due to Earthquake Shaking, Journal of Geotechnical Engineering, ASCE, p. 861-878.
[8] Youd, T.L., Hansen, C.M. and Bartlett, S.F., 2002, Revised Multilinear Regression Equations for Prediction of Lateral Spread Displacement, Journal of Geotechnical and Geoenvironmental Engineering, ASCE, December 2002, p. 1007-1017.

10.0 FOUNDATIONS

ENT 122955:2022 PG 16 of 79

10.1 General

The foundation recommendations presented in this report are based on the soil conditions encountered during our field exploration, the results of laboratory testing of samples of the native soils, the site grading recommendations presented in this report, and the foundation loading conditions presented in Section 3.0, *Proposed Construction*, of this report. If loading conditions and assumptions related to foundations are significantly different, Earthtec should be notified so that we can re-evaluate our design parameters and estimates (higher loads may cause more settlement), and to provide additional recommendations if necessary.

Conventional strip and spread footings may be used to support the proposed structures after appropriate removals as outlined in Section 8.1. Foundations should not be installed on topsoil, undocumented fill, debris, combination soils, organic soils, frozen soil, or in ponded water. If foundation soils become disturbed during construction, they should be removed or compacted.

10.2 Strip/Spread Footings

We recommend that conventional strip and spread foundations be constructed entirely on a minimum of 24 inches of properly placed, compacted, and tested structural fill extending to undisturbed native soils for structural loads up to 4,000 pounds per linear foot for bearing walls and up to 30,000 pounds for column loads. If loads exceed 4,000 pounds per linear foot for bearing walls, 30,000 pounds for column loads, please contact Earthtec for further recommendations. For foundation design we recommend the following:

- Footings founded on a minimum of 24 inches of structural fill extending to undisturbed native soil may be designed using a maximum allowable bearing capacity of 2,000 pounds per square foot. The values for vertical foundation pressure can be increased by one-third for wind and seismic conditions per Section 1806 when used with the Alternative Basic Load Combinations found in Section 1605.3.2 of the 2018 International Building Code.
- Continuous and spot footings should be uniformly loaded and should have a minimum width of 20 and 30 inches, respectively.
- Exterior footings should be placed below frost depth which is determined by local building codes. In general, 30 inches of cover is adequate for most sites; however local code should be verified by the end design professional. Interior footings, not subject to frost (heated structures), should extend at least 18 inches below the lowest adjacent grade.
- Foundation walls and footings should be properly reinforced to resist all vertical and lateral loads and differential settlement.
- The bottom of footing excavations should be compacted with at least 4 passes of an approved non-vibratory roller prior to erection of forms or placement of structural fill to densify soils that may have been loosened during excavation and to identify soft spots. If soft areas are encountered, they should be stabilized as recommended in Section 8.5.

- Footing excavations should be observed by the geotechnical engineer prior to beginning fill placement or footing construction if fill is not required to evaluate whether suitable bearing soils have been exposed and whether excavation bottoms are free of loose or disturbed soils.
- Because of shallow groundwater conditions encountered at the site, we anticipate of structural fill may be required below the proposed structure to provide a firm surface upon which to construct the proposed structure.
- In lieu of traditional structural fill, clean 1- to 2-inch clean gravel may be used in conjunction with a stabilization fabric, such as Mirafi 600X or equivalent, which should be placed between the native soils and the clean gravel (additional recommendations for placing clean gravel and stabilization fabric are given in Section 8.5 of this report).
- Structural fill used below foundations should extend laterally a minimum of 6 inches for every 12 vertical inches of structural fill placed. For example, if 24 inches of structural fill is required to bring the excavation to footing grade, the structural fill should extend laterally a minimum of 12 inches beyond the edge of the footings on both sides.

10.3 Estimated Settlements

If the proposed foundations are properly designed and constructed using the parameters provided above, we estimate that total settlements should not exceed one inch and differential settlements should be one-half of the total settlement over a 25-foot length of continuous foundation, for non-earthquake conditions. Additional settlement could occur during a seismic event due to ground shaking, if more than 3 feet of grading fill is placed above the existing ground surface, if loading conditions are greater than anticipated in Section 2, and/or if foundation soils are allowed to become wetted.

10.4 Lateral Earth Pressures

Below grade walls act as soil retaining structures and should be designed to resist pressures induced by the backfill soils. The lateral pressures imposed on a retaining structure are dependent on the rigidity of the structure and its ability to resist rotation. Most retaining walls that can rotate or move slightly will develop an active lateral earth pressure condition. Structures that are not allowed to rotate or move laterally, such as subgrade basement walls, will develop an at-rest lateral earth pressure condition. Lateral pressures applied to structures may be computed by multiplying the vertical depth of backfill material by the appropriate equivalent fluid density. Any surcharge loads in excess of the soil weight applied to the backfill should be multiplied by the appropriate lateral pressure coefficient and added to the soil pressure. For static conditions the resultant forces are applied at about one-third the wall height (measured from bottom of wall). For seismic conditions, the resultant forces are applied at about two-third times the height of the wall both measured from the bottom of the wall. The lateral pressures presented in the table below are based on drained, horizontally placed native clay and silt soils as backfill material using a 32° friction angle and a dry unit weight of 108 pcf.

Table 4: Lateral Earth Pressures (Static and Dynamic)

Condition	Case	Lateral Pressure Coefficient	Equivalent Fluid Pressure (pcf)
Active	Static	0.31	33
	Seismic	0.53	57
At-Rest	Static	0.47	51
	Seismic	0.74	80
Passive	Static	3.25	351
	Seismic	4.30	464

*Seismic values combine the static and dynamic values

These pressure values do not include any surcharge and are based on a relatively level ground surface at the top of the wall and drained conditions behind the wall. It is important that water is not allowed to build up (hydrostatic pressures) behind retaining structures. Retaining walls should incorporate drainage behind the walls as appropriate, and surface water should be directed away from the top and bottom of the walls.

Lateral loads are typically resisted by friction between the underlying soil and footing bottoms. Resistance to sliding may incorporate the friction acting along the base of foundations, which may be computed using a coefficient of friction of soils against concrete of 0.55 for clean gravel, or structural fill meeting the recommendations presented herein. Concrete or masonry walls shall be selected and constructed in accordance with Section R404 of the 2015 International Residential Code or sections referenced therein. Retaining wall lateral resistance design should further reference Section R404.4 for reference of Safety Factors.

11.0 FLOOR SLABS AND FLATWORK

Due to shallow groundwater encountered at the site, lowest floor slab depths should be limited to 1½ feet below existing site grades. This is intended to provide a minimum of 3 feet of separation between the observed groundwater condition and the bottom of the floor slab.

Concrete floor slabs and exterior flatwork may be supported on a minimum of 6 inches properly placed, compacted, and tested engineered fill or imported structural fill extending to undisturbed native soils after appropriate removals and grading as outlined in Section 8.1 are completed. We recommend placing a minimum of 4 inches of free-draining fill material (see Section 8.3) beneath floor slabs to facilitate construction, act as a capillary break, and aid in distributing floor loads. For exterior flatwork, we recommend placing a minimum of 4 inches of road-base material. Prior to placing the free-draining fill or road-base materials, the native sub-grade should be proof-rolled to identify soft spots, which should be stabilized as discussed above in Section 8.5.

For slab design, we recommend using a modulus of sub-grade reaction of 120 pounds per cubic inch. The thickness of slabs supported directly on the ground shall not be less than 3½ inches. A 6-mil polyethylene vapor retarder with joints lapped not less than 6 inches shall be placed between the ground surface and the concrete, as per Section R506 of the 2015 International Residential

Code.

To help control normal shrinkage and stress cracking, we recommend that floor slabs have adequate reinforcement for the anticipated floor loads with the reinforcement continuous through interior floor joints, frequent crack control joints, and non-rigid attachment of the slabs to foundation and bearing walls. Special precautions should be taken during placement and curing of all concrete slabs and flatwork. Excessive slump (high water-cement ratios) of the concrete and/or improper finishing and curing procedures used during hot or cold weather conditions may lead to excessive shrinkage, cracking, spalling, or curling of slabs. We recommend all concrete placement and curing operations be performed in accordance with American Concrete Institute (ACI) codes and practices.

12.0 DRAINAGE

12.1 Surface Drainage

As part of good construction practice, precautions should be taken during and after construction to reduce the potential for water to collect near foundation walls. Accordingly, we recommend the following:

- The contractor should take precautions to prevent significant wetting of the soil at the base of the excavation. Such precautions may include: grading to prevent runoff from entering the excavation, excavating during normally dry times of the year, covering the base of the excavation if significant rain or snow is forecast, backfill at the earliest possible date, frame floors and/or the roof at the earliest possible date, other precautions that might become evident during construction.
- Adequate compaction of foundation wall backfill must be provided i.e. a minimum of 90% of ASTM D-1557. Water consolidation methods should not be used.
- The ground surface should be graded to drain away from the building in all directions. We recommend a minimum fall of 8 inches in the first 10 feet.
- Roof runoff should be collected in rain gutters with down spouts designed to discharge well outside of the backfill limits, or at least 10 feet from foundations, whichever is greater.
- Sprinkler nozzles should be aimed away, and all sprinkler components kept at least 5 feet, from foundation walls. A drip irrigation system may be utilized in landscaping areas within 10 feet of foundation walls to minimize water intrusion of foundation backfill. Also, sprinklers should not be placed at the top or on the face of slopes. Sprinkler systems should be designed with proper drainage and well maintained. Over-watering should be avoided.
- Any additional precautions which may become evident during construction.

12.2 Subsurface Drainage

Groundwater or indicators of past groundwater levels were encountered/observed at depths of

4½ to 10 feet below the existing ground surface. Due to the presence of shallow groundwater throughout property, basements for residences may be difficult to construct. The depth of basements will depend greatly on-site grading and drainage. Based on current site conditions, basements may be constructed no deeper than 2 feet below existing site grades. Basement depths can be increased if a land drain system is constructed for the subdivision. The depth of the land drain will then control the allowable depth of the basements. Additionally, we recommend that a perimeter foundation drain be utilized for each structure.

Section R405.1 of the 2015 International Residential Code states, "Drains shall be provided around all concrete and masonry foundations that retain earth and enclose habitable or usable spaces located below grade." Section R310.2.3.2 of the 2015 International Residential Code states, "Window wells shall be designed for proper drainage by connecting to the building's foundation drainage system." An exception is allowed when the foundation is installed on well drained ground consisting of Group 1 soils, which include those defined by the Unified Soil Classification System as GW, GP, SW, SP, GM, and SM. The soils observed in the explorations at the depth of foundation consisted primarily of clays and silts (CL, ML, CL-ML) which are not Group 1 soils.

13.0 PAVEMENT RECOMMENDATIONS

We understand that asphalt paved residential streets will be constructed as part of the project. The native soils encountered beneath the fill and topsoil during our field exploration were predominantly composed of silts. To account for variability in the subsurface, we estimate that a California Bearing Ratio (CBR) value of 3 is appropriate for these soils. If the fill and topsoil is left beneath concrete flatwork and pavement areas, increased maintenance costs over time should be anticipated.

We anticipate that the traffic volume will be about 1,300 vehicles per day (7.5 ESAL/day) or fewer for the residential streets, consisting of mostly cars and pickup trucks, with a daily delivery truck and a weekly garbage truck. Based on these traffic parameters, the estimated CBR given above, a 20-year life expectancy, and the procedures and typical design inputs outlined in the UDOT Pavement Design Manual (2008), we recommend the minimum asphalt pavement section presented below. The pavement section should meet the minimum values are required by the jurisdiction or the values below, whichever is greater.

Table 5: Pavement Section Recommendations

Asphalt Thickness (in)	Compacted Aggregate Base Thickness (in)	Compacted Subbase Thickness (in)
3	16*	0
3	12	6*
3	8	8*

* Stabilization may be required

If the pavement will be required to support excessive construction traffic (such as dump trucks hauling soil to raise or lower the site), more than an occasional semi-tractor or fire truck, or more traffic than listed above, our office should be notified so that we can re-evaluate the pavement section recommendations. The following also apply:

- The subgrade should be prepared by proof rolling to a firm, non-yielding surface, with any identified soft areas stabilized as discussed above in Section 8.5.
- Site grading fills below the pavements should meet structural fill composition and placement recommendations per Sections 8.3 and 8.4 herein.
- Asphaltic concrete, aggregate base and sub-base material composition should meet local, APWA, or UDOT requirements. Gradation requirements and frequency shall be followed as required by local, APWA, or UDOT requirements, but not to exceed 500 tons.
- Aggregate base and sub-base is compacted to local, APWA, or UDOT requirements, or to at least 95 percent of maximum dry density (ASTM D 1557).
- The aggregate base shall have a CBR value to 70 percent or greater and the subbase shall have a CBR value of 10 percent or greater.
- Asphaltic concrete is compacted to local or UDOT requirements, or to at least 96 percent of the laboratory Marshall density (ASTM D 6927).

14.0 GENERAL CONDITIONS

The exploratory data presented in this report was collected to provide geotechnical design recommendations for this project. The explorations may not be indicative of subsurface conditions outside the study area or between points explored and thus have a limited value in depicting subsurface conditions for contractor bidding. Variations from the conditions portrayed in the explorations may occur and which may be sufficient to require modifications in the design. If during construction, conditions are different than presented in this report, Earthtec should be advised immediately so that the appropriate modifications can be made.

The findings and recommendations presented in this geotechnical report were prepared in accordance with generally accepted geotechnical engineering principles and practice in this area of Utah at this time. No warranty or representation is intended in our proposals, contracts, letters, or reports. Failure to consult with Earthtec regarding any changes made during design and/or construction of the project from those discussed herein relieves Earthtec from any liability arising from changed conditions at the site.

This geotechnical report is based on relatively limited subsurface explorations and laboratory testing. Subsurface conditions may differ in some locations of the site from those described herein, which may require additional analyses and possibly modified recommendations. Thus, we strongly recommend consulting with Earthtec regarding any changes made during design and construction of the project from those discussed herein. Failure to consult with Earthtec regarding

any such changes relieves Earthtec from any liability arising from changed conditions at the site.

To maintain continuity, Earthtec should also perform materials testing and special inspections for this project. The recommendations presented herein are based on the assumption that an adequate program of tests and observations will be followed during construction to verify compliance with our recommendations. We also assume that we will review the project plans and specifications to verify that our conclusions and recommendations are incorporated and remain appropriate (based on the actual design). Earthtec should be retained to review the final design plans and specifications so comments can be made regarding interpretation and implementation of our geotechnical recommendations in the design and specifications. Earthtec also should be retained to provide observation and testing services during grading, excavation, foundation construction, and other earth-related construction phases of the project.

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please contact Earthtec at your convenience.

Respectfully;

EARTHTEC ENGINEERING

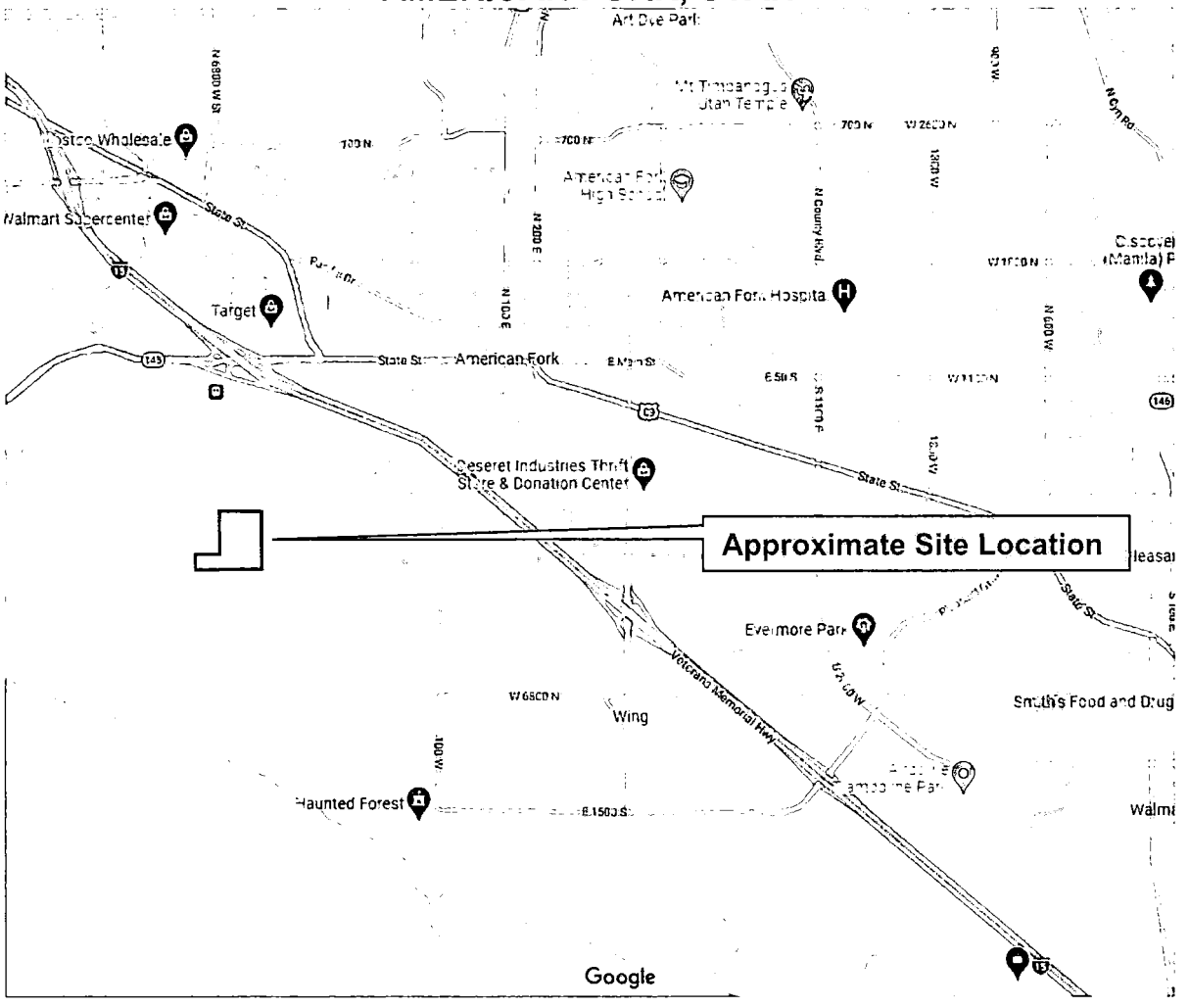
Michael S. Schedel
Staff Geologist

REGISTERED PROFESSIONAL ENGINEER
No. 343872
ROBERT EDWARD WENZEL, JR.
07/08/2022
STATE OF UTAH

Robert E. Wenzel, Jr., P.E.
Vice President

VICINITY MAP

MEADOW BROOK
APPROXIMATELY 600 SOUTH 6600 WEST
AMERICAN FORK, UTAH



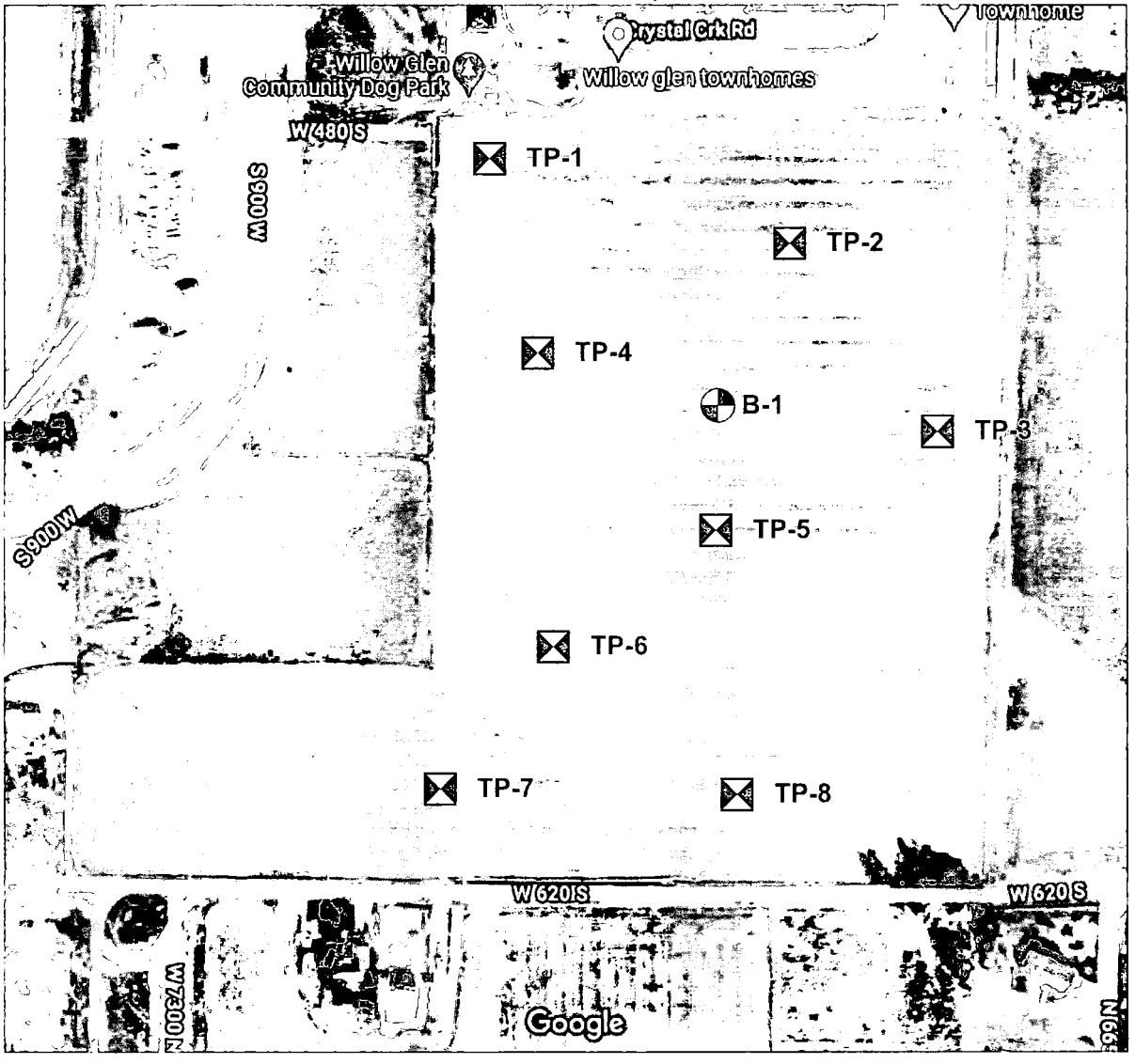
N

Not to Scale

PROJECT NO.: 228636	EARTHTEC ENGINEERING	FIGURE NO.: 1

AERIAL PHOTOGRAPH SHOWING LOCATION OF BORING AND TEST PITS

MEADOW BROOK
APPROXIMATELY 600 SOUTH 6600 WEST
AMERICAN FORK, UTAH



*Aerial photograph from Google Maps

Approximate Boring Locations

Approximate Test Pit Locations

N

Not to Scale

PROJECT NO.: 228636	EARTHTEC ENGINEERING	FIGURE NO.: 2

BORING LOG

NO.: B-1

PROJECT: Meadow Brook
CLIENT: Woodside Homes of Utah, LLC
LOCATION: See Figure 2
OPERATOR: Great Basin Drilling
EQUIPMENT: CME-55, 7" H.S.A.
DEPTH TO WATER; INITIAL ▽ : 8 ft.

PROJECT NO.: 228636
DATE: 06/27/22
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Test
0			TOPSOIL, silt with sand, dry, dark grey, organics										
		ML	Sandy SILT, medium stiff, slightly moist, brown, roots		7								
3													
6						10	104	26	4	1	33	66	C
			▽		4								
9		CL	Lean CLAY with sand, soft, very moist, grey, iron oxide stains, organics		6								
12		SM	Silty SAND, loose, wet, grey, organics										
15		CL	Lean CLAY, medium stiff, wet, light grey, iron oxide stains		8	30		43	21	1	10	86	
18													
21			...stiff, grey, organics		12								

Notes:

Tests Key

CBR = California Bearing Ratio
C = Consolidation
R = Resistivity/Nitrates/PH
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

PROJECT NO.: 228636

EARTHTEC ENGINEERING

FIGURE NO.: 3a

LOG OF TESTHOLE LOGS.GPJ EARTHTEC.GDT 7/8/22

BORING LOG

NO.: B-1

PROJECT: Meadow Brook
CLIENT: Woodside Homes of Utah, LLC
LOCATION: See Figure 2
OPERATOR: Great Basin Drilling
EQUIPMENT: CME-55, 7" H.S.A.
DEPTH TO WATER; INITIAL ▽ : 8 ft.

PROJECT NO.: 228636
DATE: 06/27/22
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Test
24		CL	Lean CLAY, medium stiff, wet, light grey, iron oxide stains										
			...dark grey, silty sand lenses		12								
27													
30			...grading to with sand, medium stiff, dark grey to black		6	40		39	18	0	21	79	
33		SP-SM	Poorly Graded SAND with silt, medium dense, wet, dark grey, some gravels encountered										
36			...11 feet of flowing sand after 35 ft. sample retrieved		18	22				9	83	8	
			Boring Terminated at 36½ Feet due to Heaving Sands										
39													
42													
45													

Notes:

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity/Nitrates/PH
DS = Direct Shear
SS = Soluble Sulfates
UC = Unconfined Compressive Strength

PROJECT NO.: 228636

EARTHTEC ENGINEERING

FIGURE NO.: 3b

LOG OF TESTHOLE LOGS.GPJ EARTHTEC.GDT 7/8/22

TEST PIT LOG
NO.: TP-1

PROJECT: Meadow Brook
CLIENT: Woodside Homes of Utah, LLC
LOCATION: See Figure No. 2
OPERATOR: D. Judd
EQUIPMENT: Track Mounted Mini-Excavator
DEPTH TO WATER; INITIAL ▽ : 9.5 ft.

PROJECT NO.: 228636
DATE: 06/17/22
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			FILL, sandy lean clay, dry, dark grey, organics, debris, cobbles									
2		CL	Lean CLAY with sand and gravel, very stiff (estimated), dry, dark grey, roots									
3				■								SS
4												
5		SM	Silty SAND, medium dense (estimated), moist, brown, iron oxide stains									
6				■								
			...loose (estimated)									
7		CL	Lean CLAY, medium stiff (estimated), moist, grey, shells, organics, concretions									
8				╳								
9			▽									
10				■	27		32	9	1	6	93	
			Test Pit Terminated at 10 Feet									
11												
12												

Notes:

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 228636

EARTHTEC ENGINEERING

FIGURE NO.: 4

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 7/8/22

TEST PIT LOG
NO.: TP-2

PROJECT: Meadow Brook
CLIENT: Woodside Homes of Utah, LLC
LOCATION: See Figure No. 2
OPERATOR: D. Judd
EQUIPMENT: Track Mounted Mini-Excavator
DEPTH TO WATER; INITIAL ▽ : 4.5 ft.

PROJECT NO.: 228636
DATE: 06/17/22
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, lean clay with sand, dry, dark grey, organics									
1												
2		CL-ML	Sandy Silty CLAY, stiff (estimated), slightly moist, brown and grey, pinholes									
3				■								
4												
5		GP	Poorly Graded GRAVEL with sand, medium dense (estimated), wet, brown, cobbles ▽									
6				X								
7			Test Pit Terminated at 7 Feet due to Cave-ins									
8												
9												
10												
11												
12												

Notes:

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 228636

EARTHTEC ENGINEERING

FIGURE NO.: 5

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 7/8/22

TEST PIT LOG
NO.: TP-3

PROJECT: Meadow Brook
CLIENT: Woodside Homes of Utah, LLC
LOCATION: See Figure No. 2
OPERATOR: D. Judd
EQUIPMENT: Track Mounted Mini-Excavator
DEPTH TO WATER; INITIAL ▽ : 7.5 ft.

PROJECT NO.: 228636
DATE: 06/17/22
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, sandy lean clay, dry, dark brown, organics									
1												
2		SC-SM	Silty Clayey SAND, medium dense (estimated), slightly moist, grey and brown, iron oxide stains, pinholes									
3				■	32	92	24	4	1	51	48	C
4												
5		SM	Silty SAND, medium dense to loose (estimated), moist, brown and grey, iron oxide stains									
6				X								
7			...with gravel ▽									
8		GP	Poorly Graded GRAVEL with sand, loose (estimated), wet, grey									
9				X								
10												
11			Test Pit Terminated at 10 Feet									
12												

Notes:

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 228636

EARTHTEC ENGINEERING

FIGURE NO.: 6

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 7/8/22

TEST PIT LOG
NO.: TP-4

PROJECT: Meadow Brook
CLIENT: Woodside Homes of Utah, LLC
LOCATION: See Figure No. 2
OPERATOR: D. Judd
EQUIPMENT: Track Mounted Mini-Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 228636
DATE: 06/17/22
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, sandy silt, dry, dark grey, organics									
1												
2			Lean CLAY, stiff (estimated), dry, grey, pinholes, roots, iron oxide stains, concretions									
3												
4												
5		CL										
6			...slightly moist		33	76	33	13	2	10	88	C
7												
8												
9			Sandy SILT, medium stiff (estimated), slightly moist, grey and brown, iron oxide stains, organics									
10		ML										
11			Test Pit Terminated at 10 Feet									
12												

Notes: No groundwater encountered

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 228636

EARTHTEC ENGINEERING

FIGURE NO.: 7

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 7/8/22

TEST PIT LOG
NO.: TP-5

PROJECT: Meadow Brook
CLIENT: Woodside Homes of Utah, LLC
LOCATION: See Figure 2
OPERATOR: D. Judd
EQUIPMENT: Track Mounted Mini-Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 228636
DATE: 06/17/22
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, sandy lean clay, dry, dark grey, organics									
1		ML	Sandy SILT, very stiff to stiff (estimated), slightly moist, grey, roots, iron oxide stains									
2												
3				■								
4												
5												
6		SM	Silty SAND, medium dense (estimated), slightly moist, brown and grey, iron oxide stains, organics	X								
7												
8												
9			...with clay lenses, very moist	X								
10			Test Pit Terminated at 10 Feet									
11												
12												

Notes: No groundwater encountered

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 228636

EARTHTEC ENGINEERING

FIGURE NO.: 8

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 7/8/22

TEST PIT LOG
NO.: TP-6

PROJECT: Meadow Brook
CLIENT: Woodside Homes of Utah, LLC
LOCATION: See Figure 2
OPERATOR: D. Judd
EQUIPMENT: Track Mounted Mini-Excavator
DEPTH TO WATER; INITIAL ▽ :

PROJECT NO.: 228636
DATE: 06/17/22
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, sandy lean clay, dry, dark grey, organics									
1		CL-ML	Sandy Silty CLAY, stiff (estimated), dry, grey, pinholes, roots									
2												
3												
4												
5												
6		SP-SM	Poorly Graded SAND with silt and gravel, medium dense (estimated), dry, brown, organics									
7												
8		CL	Lean CLAY with sand, medium stiff (estimated), slightly moist, dark grey, organics									
9					29				1	16	83	
10												
11			Test Pit Terminated at 10 Feet									
12												

Notes: No groundwater encountered

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 228636

EARTHTEC ENGINEERING

FIGURE NO.: 9

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 7/8/22

TEST PIT LOG
NO.: TP-7

PROJECT: Meadow Brook
CLIENT: Woodside Homes of Utah, LLC
LOCATION: See Figure 2
OPERATOR: D. Judd
EQUIPMENT: Track Mounted Mini-Excavator
DEPTH TO WATER; INITIAL ▽ : 10 ft.

PROJECT NO.: 228636
DATE: 06/17/22
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, lean clay with sand, dry, dark brown, organics									
1												
2		SC	Clayey SAND, medium dense (estimated), moist, dark brown, pinholes, roots									
3					28	85	27	9	4	48	48	C
4			...medium stiff									
5												
6		SM	Silty SAND, medium dense to loose (estimated), moist, brown, organics									
7												
8			...gravel seam for 6-8 inches, wet									
9		CL	Lean CLAY, medium stiff (estimated), very moist with wet pockets, grey		26	100	43	20	1	4	95	C
10			▽									
			Test Pit Terminated at 10 Feet									
11												
12												

Notes:

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 228636

EARTHTEC ENGINEERING

FIGURE NO.: 10

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 7/8/22

TEST PIT LOG
NO.: TP-8

PROJECT: Meadow Brook
CLIENT: Woodside Homes of Utah, LLC
LOCATION: See Figure 2
OPERATOR: D. Judd
EQUIPMENT: Track Mounted Mini-Excavator
DEPTH TO WATER; INITIAL ▽ : 5 ft.

PROJECT NO.: 228636
DATE: 06/17/22
ELEVATION: Not Measured
LOGGED BY: M. Schedel
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	TEST RESULTS: Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL, sandy silt, dry, dark grey, organics									
1		ML	Sandy SILT, stiff (estimated), slightly moist, grey, pinholes, roots									
2												
3												
4												
5			▽									
6		CL-ML	Sandy Silty CLAY, soft (estimated), wet, grey									
7												
8		SM	Silty SAND, loose (estimated), wet, brown and grey									
9			Test Pit Terminated at 8½ Feet due to Cave-ins									
10												
11												
12												

Notes:

Tests Key
CBR = California Bearing Ratio
C = Consolidation
R = Resistivity
DS = Direct Shear
SS = Soluble Sulfates
B = Burnoff

PROJECT NO.: 228636

EARTHTEC ENGINEERING

FIGURE NO.: 11

LOG OF TESTPIT LOGS.GPJ EARTHTEC.GDT 7/8/22

LEGEND

PROJECT: Meadow Brook **DATE:** 06/27/22
CLIENT: Woodside Homes of Utah, LLC **LOGGED BY:** M. Schedel

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR SOIL DIVISIONS			USCS SYMBOL	TYPICAL SOIL DESCRIPTIONS
COARSE GRAINED SOILS (More than 50% retaining on No. 200 Sieve)	GRAVELS (More than 50% of coarse fraction retained on No. 4 Sieve)	CLEAN GRAVELS (Less than 5% fines)	GW	Well Graded Gravel, May Contain Sand, Very Little Fines
			GP	Poorly Graded Gravel, May Contain Sand, Very Little Fines
		GRAVELS WITH FINES (More than 12% fines)	GM	Silty Gravel, May Contain Sand
			GC	Clayey Gravel, May Contain Sand
	SANDS (50% or more of coarse fraction passes No. 4 Sieve)	CLEAN SANDS (Less than 5% fines)	SW	Well Graded Sand, May Contain Gravel, Very Little Fines
			SP	Poorly Graded Sand, May Contain Gravel, Very Little Fines
		SANDS WITH FINES (More than 12% fines)	SM	Silty Sand, May Contain Gravel
			SC	Clayey Sand, May Contain Gravel
FINE GRAINED SOILS (More than 50% passing No. 200 Sieve)	SILTS AND CLAYS (Liquid Limit less than 50)		CL	Lean Clay, Inorganic, May Contain Gravel and/or Sand
			ML	Silt, Inorganic, May Contain Gravel and/or Sand
			OL	Organic Silt or Clay, May Contain Gravel and/or Sand
	SILTS AND CLAYS (Liquid Limit Greater than 50)		CH	Fat Clay, Inorganic, May Contain Gravel and/or Sand
			MH	Elastic Silt, Inorganic, May Contain Gravel and/or Sand
			OH	Organic Clay or Silt, May Contain Gravel and/or Sand
HIGHLY ORGANIC SOILS			PT	Peat, Primarily Organic Matter

SAMPLER DESCRIPTIONS

- SPLIT SPOON SAMPLER (1 3/8 inch inside diameter)
- MODIFIED CALIFORNIA SAMPLER (2 inch outside diameter)
- SHELBY TUBE (3 inch outside diameter)
- BLOCK SAMPLE
- BAG/BULK SAMPLE

WATER SYMBOLS

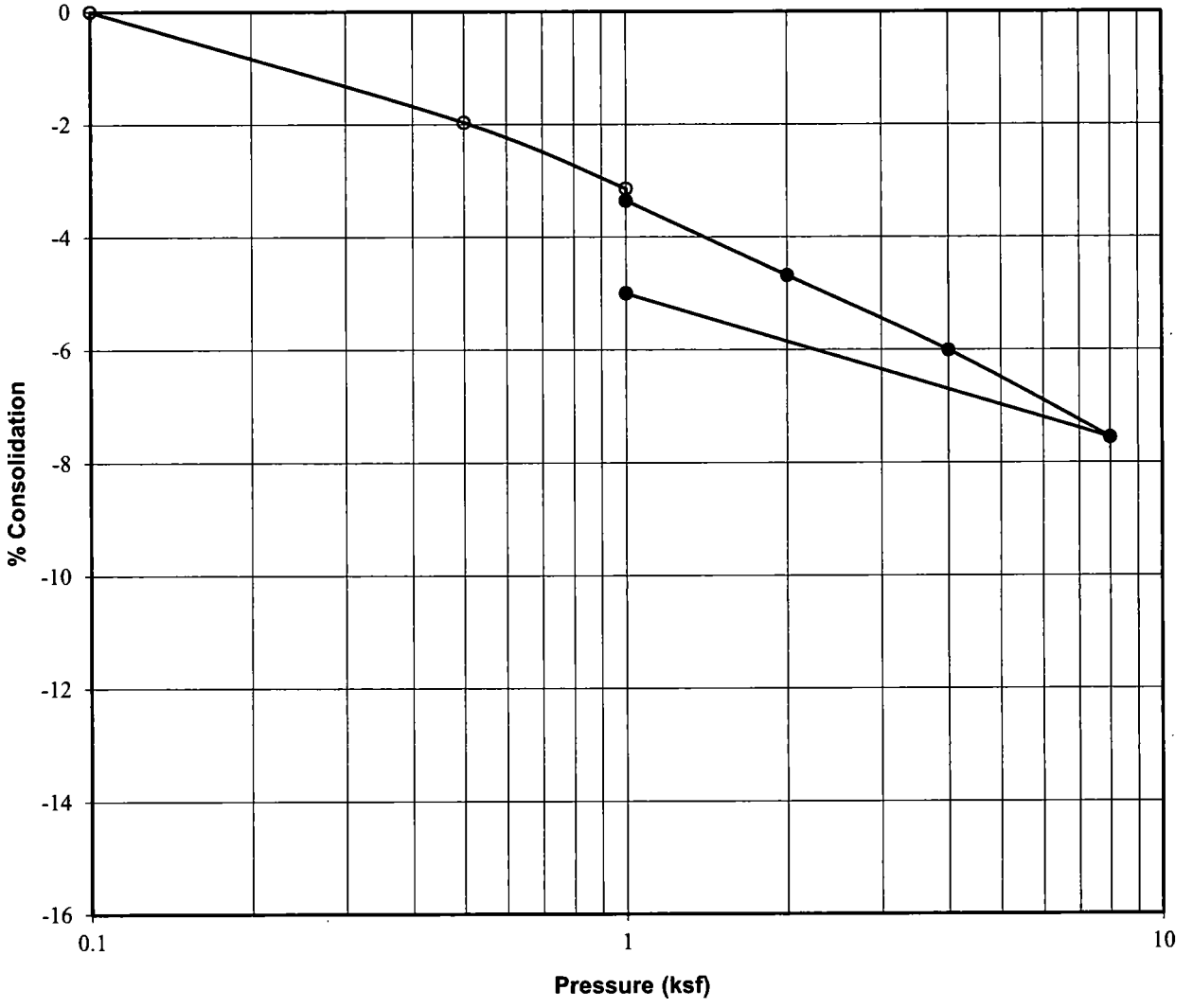
- Water level encountered during field exploration
- Water level encountered at completion of field exploration

NOTES:
1. The logs are subject to the limitations, conclusions, and recommendations in this report.
2. Results of tests conducted on samples recovered are reported on the logs and any applicable graphs.
3. Strata lines on the logs represent approximate boundaries only. Actual transitions may be gradual.
4. In general, USCS symbols shown on the logs are based on visual methods only: actual designations (based on laboratory tests) may vary.

PROJECT NO.: 228636 | EARTHTEC ENGINEERING | **FIGURE NO.:** 12

LEGEND LOGS.GPJ EARTHTEC.GDT 7/8/22

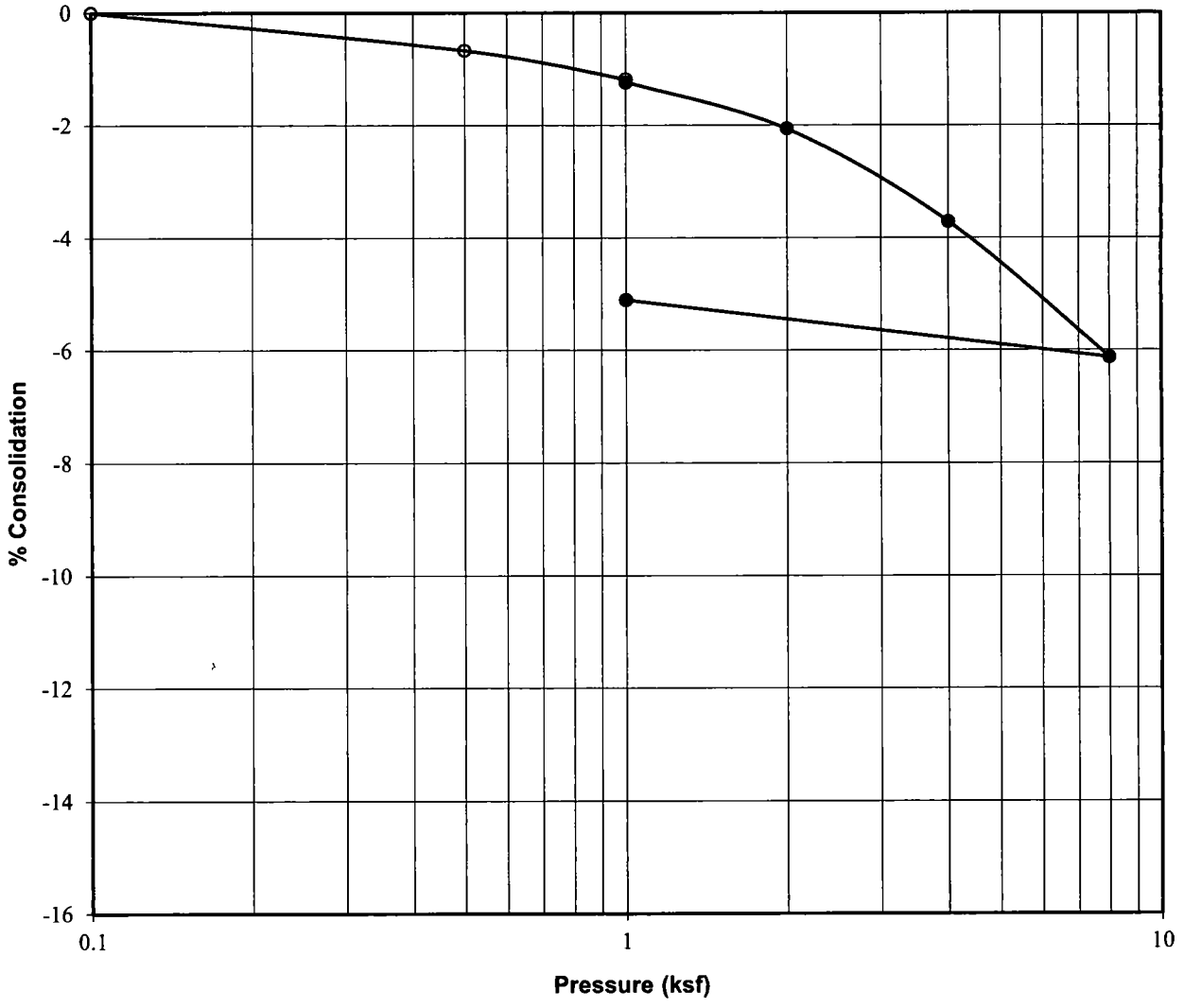
CONSOLIDATION - SWELL TEST



Project:	Meadow Brook
Location:	B-1
Sample Depth, ft:	5
Description:	Shelby
Soil Type:	Sandy SILT (ML)
Natural Moisture, %:	10
Dry Density, pcf:	104
Liquid Limit:	26
Plasticity Index:	4
Water Added at:	1 ksf
Percent Collapse:	0.2

PROJECT NO.: 228636	EARTHTEC ENGINEERING	**FIGURE NO.:** 13

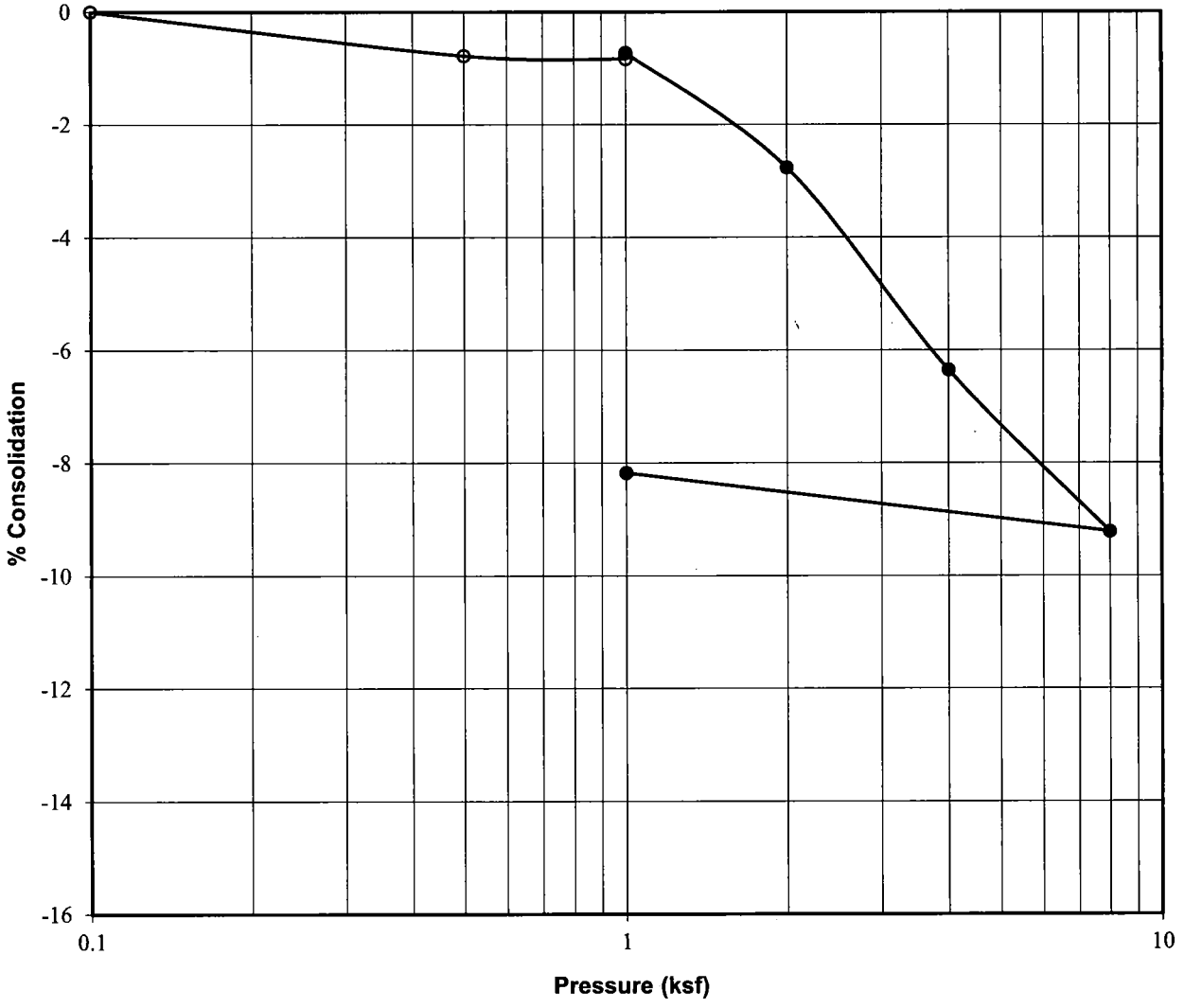
CONSOLIDATION - SWELL TEST



Project:	Meadow Brook
Location:	TP-3
Sample Depth, ft:	3
Description:	Block
Soil Type:	Silty Clayey SAND (SC-SM)
Natural Moisture, %:	32
Dry Density, pcf:	92
Liquid Limit:	24
Plasticity Index:	4
Water Added at:	1 ksf
Percent Collapse:	0.1

PROJECT NO.: 228636	EARTHTEC ENGINEERING	**FIGURE NO.:** 14

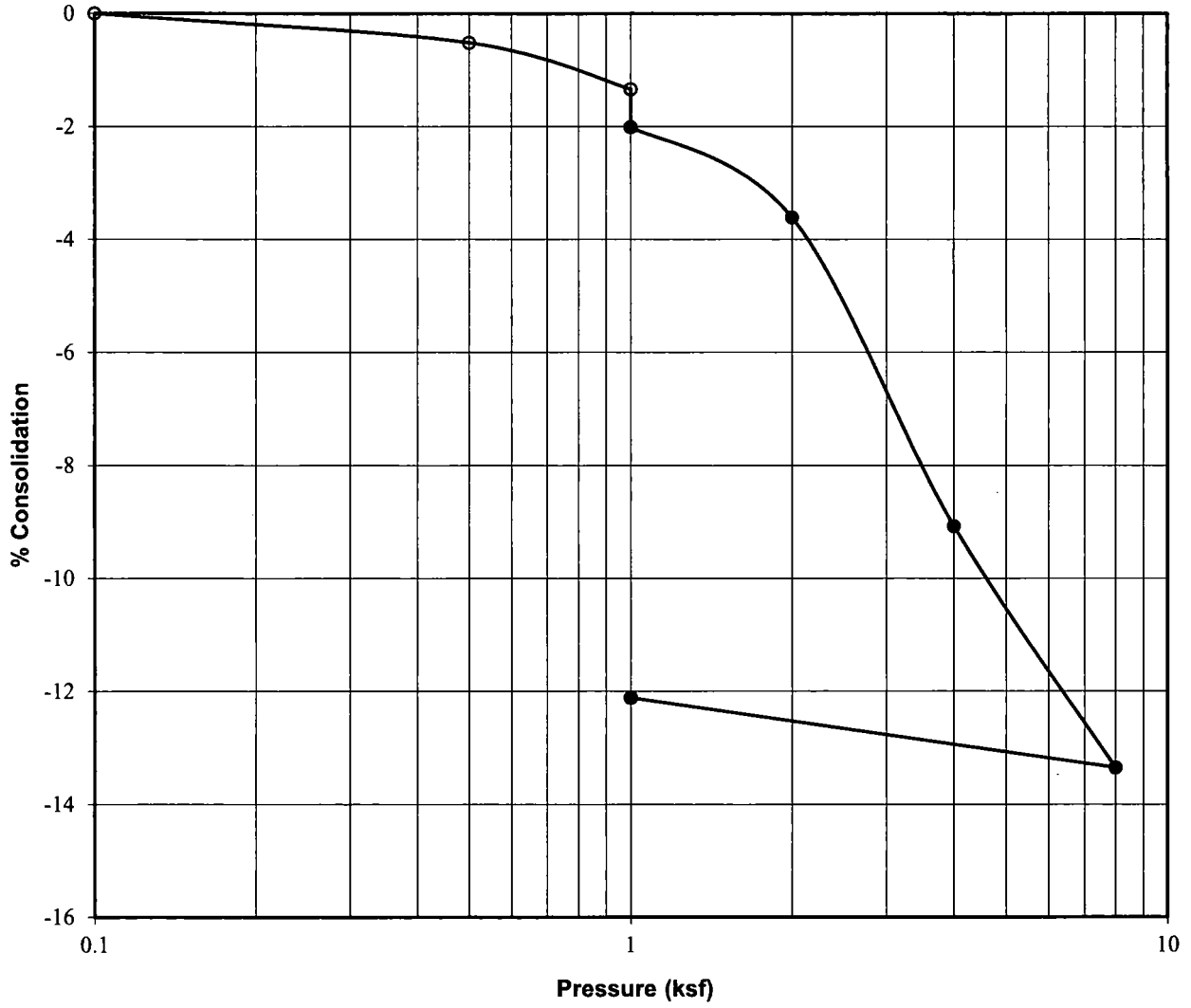
CONSOLIDATION - SWELL TEST



Project:	Meadow Brook
Location:	TP-4
Sample Depth, ft:	6
Description:	Block
Soil Type:	Lean CLAY (CL)
Natural Moisture, %:	33
Dry Density, pcf:	76
Liquid Limit:	33
Plasticity Index:	13
Water Added at:	1 ksf
Percent Swell:	0.1

PROJECT NO.: 228636	EARTHTEC ENGINEERING	**FIGURE NO.:** 15

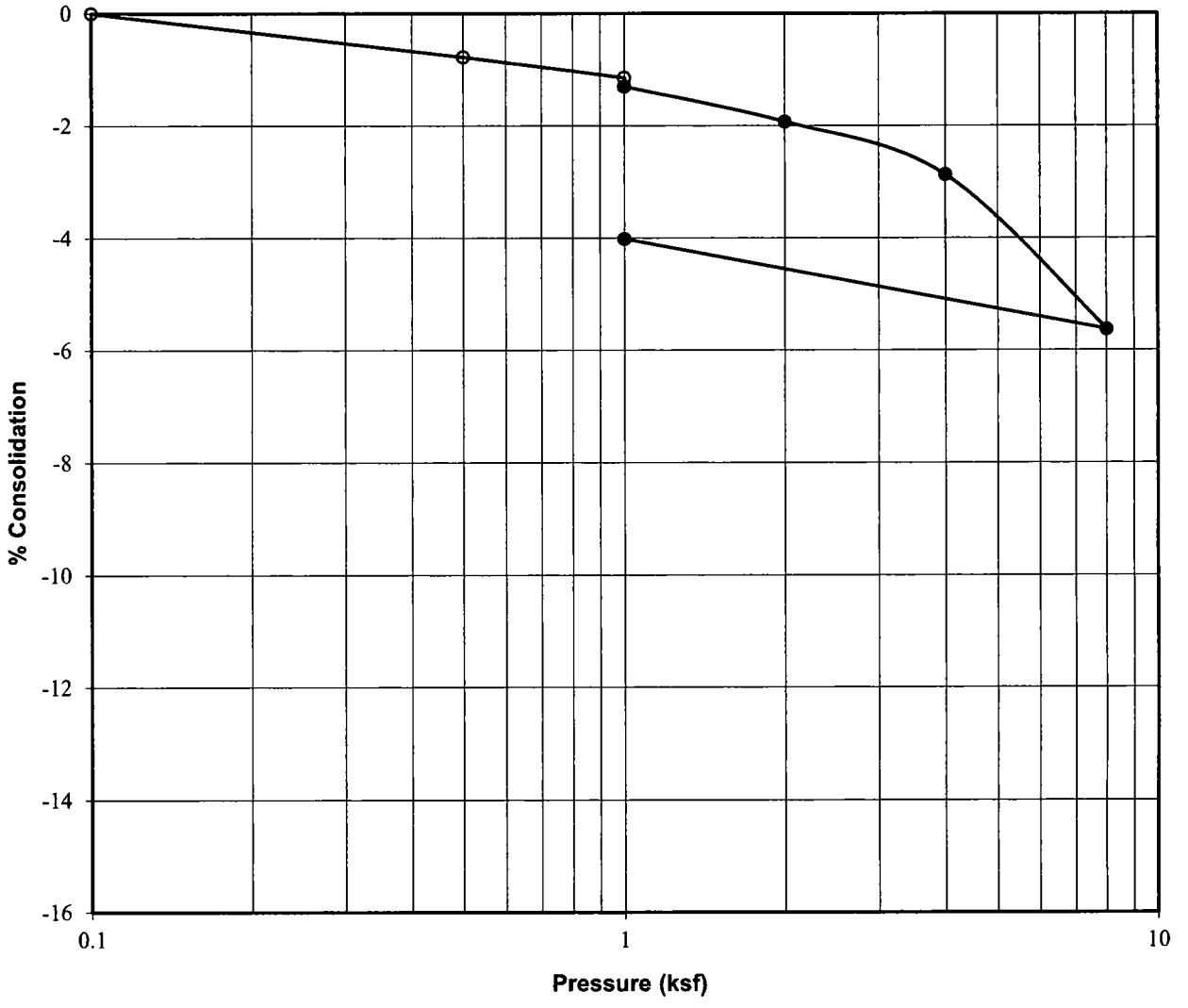
CONSOLIDATION - SWELL TEST



Project:	Meadow Brook
Location:	TP-7
Sample Depth, ft:	3
Description:	Block
Soil Type:	Clayey SAND (SC)
Natural Moisture, %:	28
Dry Density, pcf:	85
Liquid Limit:	27
Plasticity Index:	9
Water Added at:	1 ksf
Percent Collapse:	0.7

PROJECT NO.: 228636	EARTHTEC ENGINEERING	**FIGURE NO.:** 16

CONSOLIDATION - SWELL TEST



Project:	Meadow Brook
Location:	TP-7
Sample Depth, ft:	9
Description:	Block
Soil Type:	Lean CLAY (CL)
Natural Moisture, %:	26
Dry Density, pcf:	100
Liquid Limit:	43
Plasticity Index:	20
Water Added at:	1 ksf
Percent Collapse:	0.2

PROJECT NO.: 228636	EARTHTEC ENGINEERING	**FIGURE NO.:** 17

APPENDIX A

CHEMTECH-FORD LABORATORIES

Chemtech-Ford Laboratories
Serving the Intermountain West Since 1953

9632 South 500 West
Sandy, UT 84070
O:(801) 262-7299 F: (866) 792-0093
www.ChemtechFord.com

Certificate of Analysis

BGT Partners (dba Earthtech Engineering)
Jeremy Balleck
1497 West 40 South
Lindon, UT 84042

PO#: **228636**
Receipt: **6/17/22 10:24 @ 23.0 °C**
Date Reported: 6/22/2022
Project Name: **Meadow Brook**

Sample ID: **228636 TP1 - 2.5'**

Matrix: **Solid**
Lab ID: **22F1572-01**
Date Sampled: **6/17/22 9:30**
Sampled By: **M. Schedel**

	Result	Units	Minimum Reporting Limit	Method	Preparation Date/Time	Analysis Date/Time	Flag(s)
Inorganic							
Sulfate, Soluble (IC)	253	mg/kg dry	12	EPA 300.0	6/20/22	6/21/22	
Total Solids	86.5	%	0.1	SM 2540G	6/20/22	6/21/22	

ENT 122955:2022 PG 42 of 79

CHEMTECH-FORD LABORATORIES

Chemtech-Ford Laboratories
Serving the Intermountain West Since 1953

9632 South 500 West
Sandy, UT 84070
O:(801) 262-7299 F: (866) 792-0093
www.ChemtechFord.com

Certificate of Analysis

BGT Partners (dba Earthtech Engineering)
Jeremy Balleck
1497 West 40 South
Lindon, UT 84042

PO#: **228636**
Receipt: **6/17/22 10:24 @ 23.0** °C
Date Reported: 6/22/2022
Project Name: **Meadow Brook**

Report Footnotes

Abbreviations

ND = Not detected at the corresponding Minimum Reporting Limit (MRL).
1 mg/L = one milligram per liter or 1 mg/kg = one milligram per kilogram = 1 part per million.
1 ug/L = one microgram per liter or 1 ug/kg = one microgram per kilogram = 1 part per billion.
1 ng/L = one nanogram per liter or 1 ng/kg = one nanogram per kilogram = 1 part per trillion.

ENT 122955:2022 PG 43 of 79

Chemtech-Ford Laboratories

Joyce Applegate

Joyce Applegate, Project Manager

Analyses presented in this report were performed in accordance with the National Environmental Laboratory Accreditation Conference, unless otherwise noted.

Timpview Analytical Labs
1384 W 130 S Orem, Ut 84058 801-229-2282

Chain of Custody/Sample Submittal Form

*TAL is a Chemtech-Ford Affiliate

Company or Name: Earthtec Engineering
Address: 1497 W. 40S., Lindon, UT 84042
Phone: (801) 225-5711
Contact Name/Email: Michael Schedel, mschedel@earthteceng.com
PO# 228636 Project: Meadow Brook
DW System # _____ Report DW to State Y or N

Lab Notes:

[ ] Custody Seals [✓] Correct Containers [ ] Temp Blank
[✓] Containers Intact [✓] COC Included [✓] Received within hold time
[✓] COC/Labels Agree [✓] COC Complete
[ ] Preservation Confirmed [✓] Sufficient Sample Volume Temp 23.0 C
[ ] Received on Ice [ ] Headspace Present (VOC)

Lab Work Order #: 22F1572
Rush Due Date: 5 Day

(Lab Use) Sample #	Sample ID or Location	Sample Date	Sample Time	Sample Matrix	(For Drinking Water) Source	Sample Pt.	Analysis Requested	(For Lab Use) Bottle-Lot	Quantity
-01	228636, TP1-2.5'	6/17	0930	S			Sulfate	Q	

ENT 122955:2022 PG 44 of 79

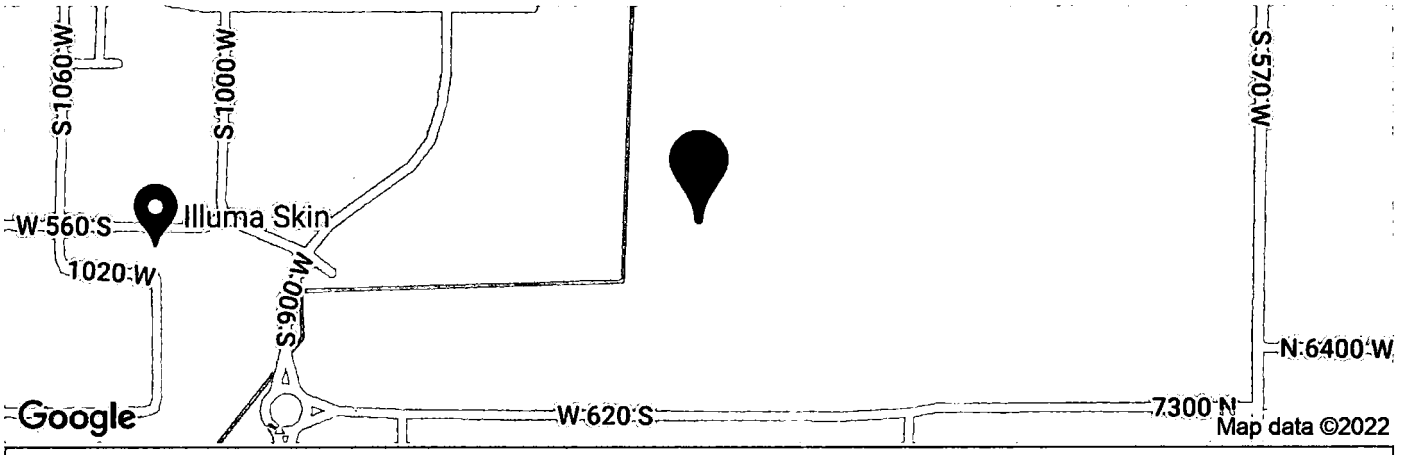
Sampled by: M. Schedel
Delivery Method: (Walk-In) Client Courier CTF Courier UPS FedEx Other Tracking #

Relinquished by	6/17 10:04 Date/Time	Received by Joyce Applegate	6-17-22 @1024 Date/Time
Relinquished by	6-17-22 @1400 Date/Time	Received by	6-17-22 1435 Date/Time
Relinquished by	Date/Time	Received by	Date/Time

OSHPD

MEADOW BROOK

Latitude, Longitude: 40.365594, -111.819164



Date	6/24/2022, 10:58:03 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	D - Default (See Section 11.4.3)

Type	Value	Description
S_S	1.236	MCE_R ground motion. (for 0.2 second period)
S_1	0.447	MCE_R ground motion. (for 1.0s period)
S_{MS}	1.483	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	0.989	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	1.2	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.553	MCE_G peak ground acceleration
F_{PGA}	1.2	Site amplification factor at PGA
PGA_M	0.663	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.236	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.412	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	3.03	Factored deterministic acceleration value. (0.2 second)
S1RT	0.447	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.503	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.181	Factored deterministic acceleration value. (1.0 second)
PGAd	1.176	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.875	Mapped value of the risk coefficient at short periods
C_{R1}	0.888	Mapped value of the risk coefficient at a period of 1 s

ENT 122955:2022 PG 45 of 79

DISCLAIMER

While the information presented on this website is believed to be correct, SEAOC /OSHPD and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in this web application should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. SEAOC / OSHPD do not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the seismic data provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the search results of this website.

ENT 122955:2022 PG 46 of 79

TAYLOR GEOTECHNICAL

2650 North 180 East
Lehi, Utah 84043
P. 801-400-9784

July 29, 2022

ENT 122955:2022 PG 47 of 79

Mr. Ben Hunter
Project Engineer
City of American Fork
51 East Main Street
American Fork, Utah 84003

Subject: **Geotechnical Engineering Review No. 3**
Meadowbrook Development
Approximately 800 West 600 South
American Fork Utah
American Fork Application No. 2021-005
American Fork File No. 854-814-457
TG Project No. 22024

Subject Document: Earthtec Engineering, Geotechnical Study, Meadow Brook, approximately 600 South 6600 West, American Fork, Utah, Earthtec Project No. 228636, prepared for Ms. Ginger Romriell, Woodside Homes of Utah, LLC, 460 West 50 North, Suite 300, Salt Lake City, Utah 84101, dated July 8, 2022.

Submittal Status: **GEOTECHNICAL ENGINEERING SUBMITTAL INCOMPLETE**

Dear Mr. Hunter:

At your request, Taylor Geotechnical (TG) reviewed the subject document. The purpose of TG's review is to evaluate whether or not the Earthtec Engineering (Earthtec) report adequately addresses geotechnical engineering parameters at the site, consistent with concerns for public health, safety, welfare, and reasonable professional standards-of-care, and the American Fork City (the City) Sensitive Lands Ordinance 07-10-47. Section 4-2-2 of the City Sensitive Land Ordinance sub-item (10), states the report must be in accordance with the guidelines and recommendations of the "American Fork Sensitive Lands Geologic Hazards Study," Chapter 5, Conclusions and Recommendations, prepared by RB&G Engineering, Inc., dated December 2006.

TG previously reviewed a geotechnical report (GSH, 2020) and a letter addendum (GSH, 2022) for the subject site. Based on the technical documentation and assurances provided by GSH, TG recommended the City consider the submittals acceptable from a geotechnical engineering perspective (TG, 2022).

TG Conclusion

Based substantially in and on reliance of the technical documentation and assurances provided by Earthtec, including their opinions and conclusions, it is TG's opinion the July 8, 2022, Earthtec report does not fulfill the requirements of the City Sensitive Lands Ordinance 07-10-47.

TG Recommendations

Based on the requirements of the City Sensitive Land Ordinance and the technical documentation provided by Earthtec, TG recommends the City not consider the Earthtec report complete from a geotechnical perspective until the following items are adequately addressed.

1. Section 9.3 Liquefaction Potential (page 9) of the July 8, 2022, Earthtec document states, "Our analysis indicates that approximately up to 2 inches of liquefaction-induced settlement and possibly up to 1 foot of lateral spreading could occur during a moderate to large earthquake event. Given the small amount of movement, it is our opinion that liquefaction mitigation is not needed at the site."

   TG recommends the City request Earthtec to substantiate that public health, safety, and welfare are not impacted. by 2 inches of liquefaction-induced settlement and 1 foot of lateral spreading.

2. The RB&G, 2006, report specifies for facilities designed according to the IBC seismic provisions and located within the moderate or high liquefaction hazard zones identified on Figure 6 of the RB&G report, that the recommended Site Class be based on a site-specific subsurface investigation to a depth of at least 30 feet, supplemented by at least one investigation to a depth of at least 70 feet and located within 2,000 feet of the site (see page 17, RGB 2006).

   The Earthtec report did not supplement their report with at least one investigation to a depth of at least 70 feet within 2,000 feet of the site. *TG recommends the City request Earthtec provide the recommended Site Class in accordance the City Sensitive Land Ordinance with:*

   a) *The referenced 70 foot boring shown on a site map;*

   b) *The log of the 70 foot boring provided for review; and,*

   c) *Substantiation of their respective site class recommendation.*

3. Section 11.0 Floor Slabs and Flatwork (page 12) of the July 8, 2022, Earthtec document states, "Due to shallow groundwater encountered at the site, lowest floor slab depths should be limited to 1½ feet below existing site grades."

   Section 12.2 Subsurface Drainage (pages 13 & 14) of the July 8, 2022, Earthtec document states, "The depth of the basements will depend greatly on-site [sic] grading and drainage. Based on current site conditions, basements may be constructed no deeper than 2 feet below existing site grades."

   TG recommends the City request Earthtec to clarify the discrepancy between the recommended 1½ feet and 2 feet of subsurface construction.

4. The subject site is below elevation 4593 feet. For sites below elevation 4593 feet, the Sensitive Land Ordinance requires the geotechnical report to address artesian conditions at

ENT 122955:2022 PG 48 of 79

the site. The July 8, 2022, Earthtec report did not address artesian conditions at the property. *TG recommends the City request Earthtec address artesian conditions for the proposed development.*

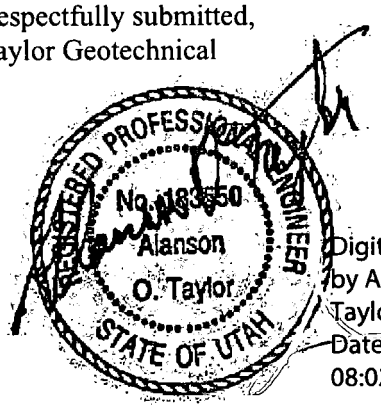
5. *TG recommends the City request Earthtec provide calculations that substantiate their recommended allowable bearing capacity, estimated settlement, lateral resistance, lateral loading recommendations, and the calculations that substantiate the liquefaction induced settlement and lateral spread analysis. Variables used in the calculations should be substantiated.*

Closure

All services performed by Taylor Geotechnical for this review were provided for the exclusive use and benefit of the City. No other person or entity is entitled to use or rely upon any of the information or reports generated by Taylor Geotechnical as a result of this review.

If you have any questions, please feel free to contact the undersigned. The opportunity to be of continued service to the City of American Fork is appreciated.

Respectfully submitted,
Taylor Geotechnical



Alanson O. Taylor, P.E.
Principal

ENT 122955:2022 PG 49 of 79

References Cited

GSH, 2020, GSH Geotechnical, Inc., Report, Geotechnical Study, Proposed American Fork Subdivision, (Approximately 25 Acres), Near 600 South 6600 West, American Fork, Utah, GSH Project No. 1586-007-20, prepared for Mr. Derek Terry, Woodside Homes, 460 West 50 North, Suite 300, Salt Lake City, Utah 84101, dated December 9, 2020.

GSH, 2022, GSH Geotechnical, Inc., Letter-Addendum, Response to Review Comments, Proposed American Fork Subdivision, (Approximately 25 Acres), Near 600 South 6600 West, American Fork, Utah, GSH Project No. 1586-007-20, prepared for Mr. Derek Terry, Woodside Homes, 460 West 50 North, Suite 300, Salt Lake City, Utah 84101, dated March 11, 2022.

TG, 2022, Taylor Geotechnical Engineering Review No. 2, Meadowbrook Development, Approximately 800 West 600 South, American Fork, Utah, American Fork Application No. 2021-005, TG Project No: 22024, prepared for Mr. Ben Hunter, Project Engineer, American Fork City, 51 East Main Street, American Fork, Utah 84003, dated April 5, 2022.

ENT 122955:2022 PG 50 of 79

1497 West 40 South
Lindon, Utah - 84042
Phone (801) 225-5711

840 West 1700 South #10
Salt Lake City, Utah - 84104
Phone (801) 787-9138

1596 W. 2650 S. #108
Ogden, Utah - 84401
Phone (801) 399-9516

August 12, 2022

Woodside Homes of Utah, LLC
Attention: Ms. Ginger Romriell
460 West 50 North, Suite 300
Salt Lake City, UT 84101

Re: Response to Review
Meadow Brook
600 South 6600 West
American Fork, Utah
Project No: 228636

Ms. Romriell:

This letter is a response to the review by Taylor Geotechnical of our Geotechnical Report[1] completed in July of 2022. A letter[2] to update structural loads has also been completed by Earthtec Engineering.

Taylor Geotechnical's Review Comment No. 1
Section 9.3 Liquefaction Potential (page 9) of the July 8, 2022, Earthtec document states, "Our analysis indicates that approximately up to 2 inches of liquefaction-induced settlement and possibly up to 1 foot of lateral spreading could occur during a moderate to large earthquake event. Given the small amount of movement, it is our opinion that liquefaction mitigation is not needed at the site."

TG recommends the City request Earthtec to substantiate that public health, safety, and welfare are not impacted. by 2 inches of liquefaction-induced settlement and 1 foot of lateral spreading.

Earthtec Engineering's Response to Comment No. 1
As long as the structural engineer is aware and takes into account these values in their calculations and designs, public health, safety and welfare should not be impacted.

Taylor Geotechnical's Review Comment No. 2
The RB&G, 2006, report specifies for facilities designed according to the IBC seismic provisions and located within the moderate or high liquefaction hazard zones identified on Figure 6 of the RB&G report, that the recommended Site Class be based on a site-specific subsurface investigation to a depth of at least 30 feet, supplemented by at least one investigation to a depth of at least 70 feet and located within 2,000 feet of the site (see page 17, RGB 2006).

The Earthtec report did not supplement their report with at least one investigation to a depth of at least 70 feet within 2,000 feet of the site. TG recommends the City request Earthtec provide the recommended Site Class in accordance the City Sensitive Land Ordinance with:

[1] Geotechnical Study, Meadow Brook, Approximately 600 South 6600 West, American Fork, Utah, Earthtec Engineering, Project No.228636, July 8, 2022.
[2] Addendum 1 – Updated Structural Loads, Meadow Brook, 600 South 6600 West, American Fork, Utah, Earthtec Engineering, Project No.228636, August 9, 2022.

a) The referenced 70 foot boring shown on a site map;
b) The log of the 70 foot boring provided for review; and,
c) Substantiation of their respective site class recommendation.

Earthtec Engineering's Response to Comment No. 2
Boring AF-06-3 is within 2,000 feet of the subject site. A site plan showing the location of the boring in relation to the site is provided at the end of this response. A log of the boring is also provided at the end of this response. Based on this boring the site class is borderline D/E.

Taylor Geotechnical's Review Comment No. 3
Section 11.0 Floor Slabs and Flatwork (page 12) of the July 8, 2022, Earthtec document states, "Due to shallow groundwater encountered at the site, lowest floor slab depths should be limited to 1½ feet below existing site grades."

Section 12.2 Subsurface Drainage (pages 13 & 14) of the July 8, 2022, Earthtec document states, "The depth of the basements will depend greatly on-site [sic] grading and drainage. Based on current site conditions, basements may be constructed no deeper than 2 feet below existing site grades."

TG recommends the City request Earthtec to clarify the discrepancy between the recommended 1½ feet and 2 feet of subsurface construction.

Earthtec Engineering's Response to Comment No. 3
To provide a minimum of 3 feet of separation between the shallowest observed groundwater and the bottom of the floor slab, the lowest floor slab depth should be limited to 1½ feet below the ground surface at the time of our investigation.

Taylor Geotechnical's Review Comment No. 4
The subject site is below elevation 4593 feet. For sites below elevation 4593 feet, the Sensitive Land Ordinance requires the geotechnical report to address artesian conditions at the site. The July 8, 2022, Earthtec report did not address artesian conditions at the property. TG recommends the City request Earthtec address artesian conditions for the proposed development.

Earthtec Engineering's Response to Comment No. 4
Earthtec Engineering did not encounter artesian conditions to the depths explored of approximately 36½ feet.

Taylor Geotechnical's Review Comment No. 5
TG recommends the City request Earthtec provide calculations that substantiate their recommended allowable bearing capacity, estimated settlement, lateral resistance, lateral loading recommendations, and the calculations that substantiate the liquefaction induced settlement and lateral spread analysis. Variables used in the calculations should be substantiated.

Earthtec Engineering's Response to Comment No. 5
Calculations for bearing capacity, settlement, and liquefaction are provided at the end of this response. We understand that all buildings at the subject site will be slab-on-grade, therefore lateral loading will not be required. Consolidation graphs and seismic maps are included in the

original report to substantiate the variables in the calculations.

General Conditions

The information presented in this letter applies only to the soils encountered during the field investigation on the subject site. It should be noted that Earthtec Engineering was not involved with the selection of the foundation system being used, surface drainage control, floor slab design and construction, backfill compaction requirements against foundation walls, mass grading of the site, or any other aspect of the building construction. Site grading activities completed in other areas such as driveways, sidewalks, or detached structures, were not observed during this site visit, are outside of the scope of our work and are not addressed in this letter. The observations and recommendations presented in this letter were conducted within the limits prescribed by our client, with the usual thoroughness and competence of the engineering profession in this area at this time. No warranty or representation is intended in our proposals, contracts, reports, or letters.

Closure

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please call.

Respectfully;
EARTHTEC ENGINEERING

Jeremy A. Balleck, E.I.T.
Staff Engineer

PROFESSIONAL ENGINEER
No. 5567049-2202
TIMOTHY ALLAN MITCHELL
Electronically generated on 08/12/2022
STATE OF UTAH

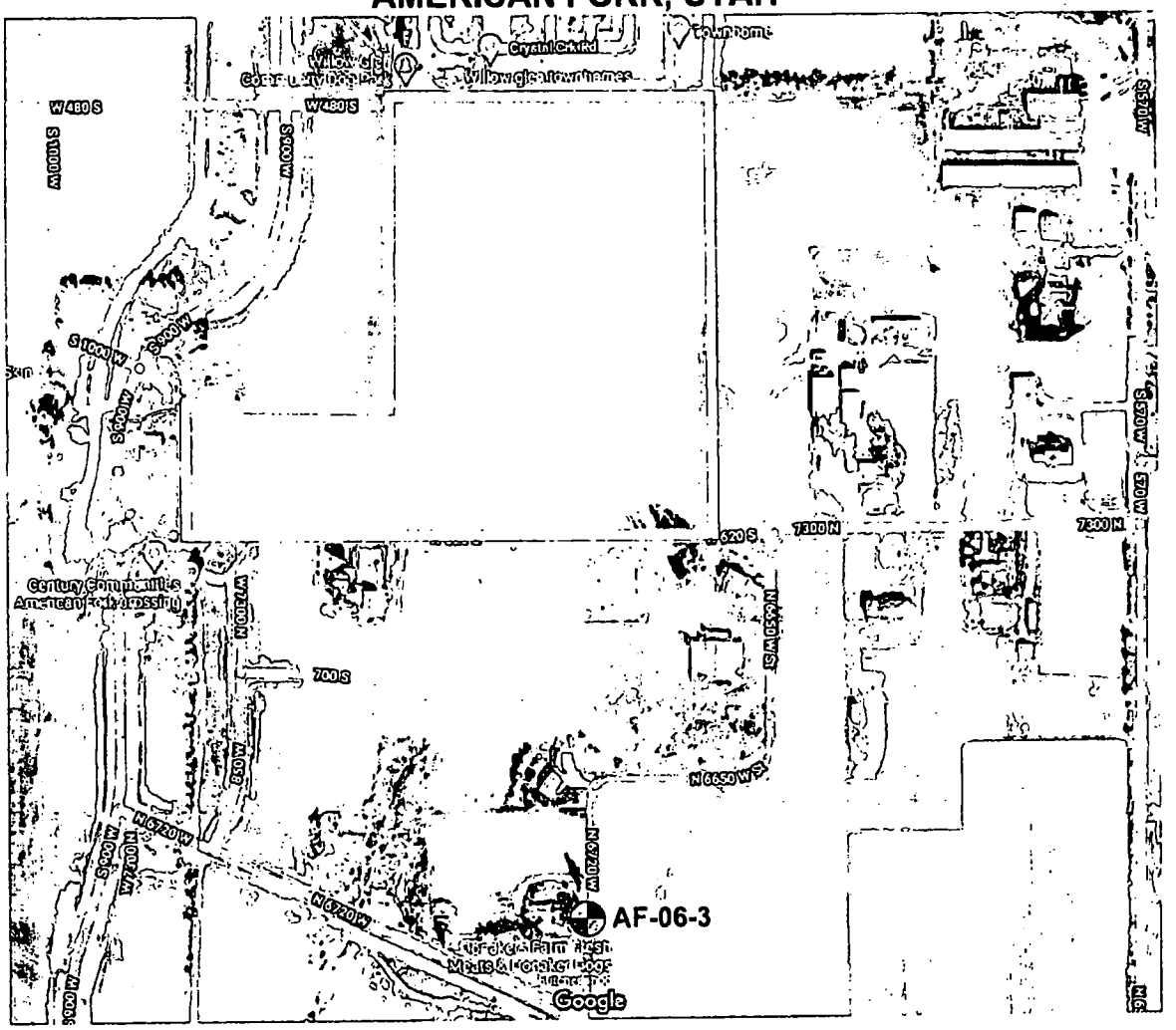
Timothy A. Mitchell, P.E.
Vice President

JB/tm

Attachments:
Aerial Photograph Showing Location of Boring in Relation to Subject Site
Boring AF-06-3 Log
Bearing Capacity Calculations
Settlement Calculations
Liquefaction Calculations

AERIAL PHOTOGRAPH SHOWING LOCATION OF BORING IN RELATION TO SUBJECT SITE

MEADOW BROOK
APPROXIMATELY 600 SOUTH 6600 WEST
AMERICAN FORK, UTAH



*Aerial photograph from Google Maps

Approximate Boring Location

ENT 122955:2022 PG 54 of 79

N

Not to Scale

PROJECT NO.: 228636	EARTHTEC ENGINEERING	FIGURE NO.: 2

DRILL HOLE LOG

BORING NO. 06-03

SHEET 1 OF 2

PROJECT: AMERICAN FORK SENSITIVE LAND STUDY
CLIENT: HORROCKS ENGINEERS
LOCATION: SOUTH END OF 6650 WEST
DRILLING METHOD: CME-55 NO. 1 / N.W. CASING
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. **AFTER 24 HOURS:** ▼ N.M.

PROJECT NUMBER: 200601.022
DATE STARTED: 8/16/06
DATE COMPLETED: 8/17/06
GROUND ELEVATION: NOT MEASURED
LOGGED BY: M. HANSEN, J.H.B.

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec (in)	Sample See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
				9	3,11,14,(51)	CL	gray-brown, dry, stiff								
	5			12	0,1/12",(2) *0.03*	CL	brown, moist, very soft								
	10			12	Pushed *0.16*	CL	lt. brown, moist, soft — LEAN CLAY W/SAND & SILTY SAND LENSES & LAYERS TO 3" THICK								
	15			18	3,2,3,(8) *0.60*	CL	gray, moist, stiff								
	20			12	Pushed *0.56*	CL-1	gray, moist, stiff		19.1	31	12	0	17	83	UC
	25			18	6,4,6,(13) *0.56*	SM CL-ML	gray, wet, loose — SILTY SAND brown-gray, moist, stiff — SILTY CLAY								
	30			15	Pushed *0.56*	CL-ML	gray, moist, stiff								
	35			18	0/18",(0) *0.55*	CL	gray, moist, stiff								
	40			18	Pushed *0.61*	CL-2	gray, moist, stiff — LEAN CLAY distorted bedding		32.8	42	12	0	1	99	UC
	45			18	0/18",(0) *0.38* *0.21*	CL	gray, moist, soft to firm								
				14	Pushed *0.32*	CL	gray, moist, firm								

LEGEND:

DISTURBED SAMPLE — 2,3,2,(6) ← Blow Count per 6" / $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)

UNDISTURBED SAMPLE — PUSHED; *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
TS = Triaxial Shear

= Potential Liquefaction
= Potential Liquefaction & Lateral Spread

RB&G ENGINEERING INC.
PROVO, UTAH

I:\LOGVT COLOR AFSENSLAND COLOR.GPJ US EVAL.GDT 12/11/06

DRILL HOLE LOG

BORING NO. 06-03

SHEET 2 OF 2

PROJECT: AMERICAN FORK SENSITIVE LAND STUDY
CLIENT: HORROCKS ENGINEERS
LOCATION: SOUTH END OF 6650 WEST
DRILLING METHOD: CME-55 NO. 1 / N.W. CASING
DRILLER: T. KERN
DEPTH TO WATER - INITIAL: ▽ N.M. AFTER 24 HOURS: ▼ N.M.

PROJECT NUMBER: 200601.022
DATE STARTED: 8/16/06
DATE COMPLETED: 8/17/06
GROUND ELEVATION: NOT MEASURED
LOGGED BY: M. HANSEN, J.H.B.

Elev. (ft)	Depth (ft)	Lithology	Sample Type	Sample Rec. (in)	Sample See Legend	USCS (AASHTO)	Material Description	Dry Density (pcf)	Moisture Content (%)	Atter. Liquid Limit	Atter. Plast. Index	Gradation Gravel (%)	Gradation Sand (%)	Gradation Silt/Clay (%)	Other Tests
	55			18	1,3,5,(8) *0.24* *0.49*	CL	gray, moist, soft to firm LEAN CLAY								
	60			10	Pushed *0.48*	CL-1	gray, moist, firm		22.1	32	14	0	2	98	UC
	65			13	3,7,9,(14) *0.30*	CL-ML	gray, moist, firm SANDY SILTY CLAY		23.5	25	6	0	20	80	
	70			16	34,38,33,(61)	GP-GM	dk. gray, wet, dense GRAVEL W/SILT & SAND								
	75			14	7,5,6,(9) *0.56*	CL	gray, moist, stiff LEAN CLAY W/SILTY SAND LENSES & LAYERS TO 5" THICK								
	80			17	Pushed *0.45*	CL-2	gray, moist, stiff		23.4	39	17	0	16	84	UC
	85			8	45,26,48,(58)	GP-GM	gray, wet, dense GRAVEL W/SILT & SAND								
	90			12	Pushed *0.89*	CL	brown-gray, moist, stiff LEAN CLAY								
	95			18	30,11,2,(10) *0.40*	GC CL	gray, wet, med. dense CLAYEY GRAVEL gray, moist, firm SANDY LEAN CLAY								
				12	Pushed	CL-2	gray, moist		22.6	35	17	0	18	82	UC

.LOGV1 COLOR AFSENSLAND COLOR.GPJ US EVAL.GDT 12/11/06

RB&G ENGINEERING INC.
PROVO, UTAH

LEGEND:
DISTURBED SAMPLE: 2,3,2,(6) ← Blow Count per 6" / $(N_1)_{60}$ Value; *0.45* ← Torvane (tsf)
UNDISTURBED SAMPLE: PUSHED; *0.45* ← Torvane (tsf)

OTHER TESTS
UC = Unconfined Compression
CT = Consolidation
DS = Direct Shear
TS = Triaxial Shear

= Potential Liquefaction
= Potential Liquefaction & Lateral Spread

Project: Meadow Brook
Job No. 228636

8/9/2022

Bearing Capacity after Meyerhoff[1]

Allowable Bearing Pressure, $q_{all} = (cN_cs_cd_c + \gamma DN_qs_qd_q + 0.5\gamma BN_\gamma s_\gamma d_\gamma r_\gamma)/(F.S.) \leq q_l$

Friction Angle, ϕ =	32	degrees				N_q =	23.2	$= e^{(\pi \tan\phi)}\tan^2(45+\phi/2)$
Cohesion, c =	0	psf				N_c =	35.5	$= (N_q - 1)\cot\phi$
Effective Unit Weight, γ =	115	pcf	=	18.1	kN/m2	N_g =	22.0	$= (N_q - 1)\tan(1.4\phi)$
Longest Wall Footing Length, L =	25	ft	=	7.6	m	K_p =	3.3	$= \tan^2(45+\phi/2)$
Bearing Pressure Limit, q_l =	1.5	ksf	=	0.1	mPa			
F.S. =	3.0							shaded areas indicate input values

SUMMARY TABLES

Allowable Wall Footing Bearing Capacity, q_{all} - ksf

Footing	Structural Fill	Width - ft									
Depth, D - ft	Depth, D_f - ft	1.50	1.67	1.83	2.00	2.50	3.00	3.50	4.00	4.50	5.00
1.00	0.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
2.50	0.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
1.00	2.00	3.78	3.56	3.39	3.24	2.92	2.70	2.55	2.43	2.34	2.27
2.50	2.00	3.78	3.56	3.39	3.24	2.92	2.70	2.55	2.43	2.34	2.27

Allowable Square Column Footing Bearing Capacity, q_{all} - ksf

Footing	Structural Fill	Width - ft									
Depth, D - ft	Depth, D_f - ft	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00
1.00	0.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
2.50	0.00	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50	1.50
1.00	2.00	4.86	4.17	3.70	3.38	3.13	2.94	2.79	2.67	2.57	2.48
2.50	2.00	4.86	4.17	3.70	3.38	3.13	2.94	2.79	2.67	2.57	2.48

1Bowles, Joseph E.; Foundation Analyses and Design; McGraw-Hill; 1988; pgs: 187-196
using Bowles bearing capacity reduction method (r_γ = 1- 0.25 log (B/6), B ≥ 6 ft.).

Wall (Strip) Footing

Width, B =	1.50	1.67	1.83	2.00	2.50	3.00	3.50	4.00	4.50	5.00
s_c =	1.04	1.04	1.05	1.05	1.07	1.08	1.09	1.10	1.12	1.13
$s_q = s_\gamma$ =	1.02	1.02	1.02	1.03	1.03	1.04	1.05	1.05	1.06	1.07
Depth, D =	1									
d_c =	1.24	1.22	1.20	1.18	1.14	1.12	1.10	1.09	1.08	1.07
$d_q = d_\gamma$ =	1.12	1.11	1.10	1.09	1.07	1.06	1.05	1.05	1.04	1.04
r_γ =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
q_{ult} =	5.2	5.4	5.6	5.8	6.5	7.1	7.8	8.5	9.2	9.9
q_{all} =	1.7	1.8	1.9	1.9	2.2	2.4	2.6	2.8	3.1	3.3
Depth, D =	2.5									
d_c =	1.60	1.54	1.49	1.45	1.36	1.30	1.26	1.23	1.20	1.18
$d_q = d_\gamma$ =	1.30	1.27	1.25	1.23	1.18	1.15	1.13	1.11	1.10	1.09
r_γ =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
q_{ult} =	11.4	11.4	11.5	11.6	12.0	12.5	13.1	13.7	14.4	15.1
q_{all} =	3.8	3.8	3.8	3.9	4.0	4.2	4.4	4.6	4.8	5.0

Square Column Footing

Width, B =	2.50	3.00	3.50	4.00	4.50	5.00	5.50	6.00	6.50	7.00
Depth, D =	1.00									
d_c =	1.14	1.12	1.10	1.09	1.08	1.07	1.07	1.06	1.06	1.05
$d_q = d_\gamma$ =	1.07	1.06	1.05	1.05	1.04	1.04	1.03	1.03	1.03	1.03
r_γ =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98
q_{ult} =	8.3	9.1	9.9	10.7	11.5	12.4	13.2	14.0	14.7	15.5
q_{all} =	2.8	3.0	3.3	3.6	3.8	4.1	4.4	4.7	4.9	5.2
Depth, D =	2.5									
d_c =	1.36	1.30	1.26	1.23	1.20	1.18	1.16	1.15	1.14	1.13
$d_q = d_\gamma$ =	1.18	1.15	1.13	1.11	1.10	1.09	1.08	1.08	1.07	1.06
r_γ =	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.98
q_{ult} =	15.4	16.0	16.6	17.3	18.0	18.8	19.5	20.3	21.0	21.7
q_{all} =	5.1	5.3	5.5	5.8	6.0	6.3	6.5	6.8	7.0	7.2

Settlement--Footings New Loads

SETTLEMENT OF FOOTINGS								
Project:	Meadow Brook		B-1					
B:	2.8	feet (width or diameter)			b =	1.4	ft (1/2 width/dia)	
L:	25	feet (length)			l =	12.5	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	22
unit weight:	114.4	pcf (above footing depth)					Strip Load,k:	4.2
allowable q:	1500	psf						
footing type:	1	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	8	feet						

DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		0.0	1.00
ML	0.051	0.028	2000		114.4	0.2	14.0	2.07

STRIP FOOTINGS...

Soil Type	Below ftg. depth (ft)	Influence	Increased Stress (psf)	avg. ovrbn. press.(psf)	Incremnt. Sett. (in.)	Collapse Sett. (in.)	Total Set. (in.)	
Fill	0	0.000	0.0	457.6	0.000	0.000	0.00	
ML	1	0.906	1359.4	572.0	0.178	0.024	0.20	
ML	2	0.688	1031.8	686.4	0.134	0.024	0.36	
ML	3	0.522	782.9	800.8	0.100	0.024	0.48	
ML	4	0.413	619.3	915.2	0.075	0.024	0.58	
ML	5	0.339	508.6	967.2	0.062	0.024	0.67	
ML	6	0.287	430.2	1019.2	0.051	0.024	0.74	<---2B
ML	7	0.248	372.1	1071.2	0.044	0.024	0.81	
ML	8	0.218	327.6	1123.2	0.037	0.024	0.87	
ML	9	0.195	292.4	1175.2	0.032	0.024	0.93	
ML	10	0.176	263.9	1227.2	0.028	0.024	0.98	
ML	11	0.160	240.5	1279.2	0.025	0.024	1.03	
ML	12	0.147	220.8	1331.2	0.022	0.024	1.08	
ML	13	0.136	204.1	1383.2	0.020	0.024	1.12	
ML	14	0.126	189.7	1435.2	0.018	0.024	1.16	

Settlement--Footings New Loads

SETTLEMENT OF FOOTINGS								
Project:	Meadow Brook	TP-3						
B:	2.8	feet (width or diameter)			b =	1.4	ft (1/2 width/dia)	
L:	25	feet (length)			l =	12.5	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	22
unit weight:	121.44	pcf (above footing depth)					Strip Load,k:	4.2
allowable q:	1500	psf						
footing type:	1	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	7.5	feet						

DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		0.0	1.00
SC-SM	0.08	0.011	2700		121.44	0.1	11.0	2.96

STRIP FOOTINGS...

Soil Type	Below ftg. depth (ft)	Influence	Increased Stress (psf)	avg. ovrbn. press.(psf)	Incremnt. Sett. (in.)	Collapse Sett. (in.)	Total Set. (in.)	
Fill	0	0.000	0.0	485.8	0.000	0.000	0.00	
SC-SM	1	0.906	1359.4	607.2	0.067	0.012	0.08	
SC-SM	2	0.688	1031.8	728.6	0.051	0.012	0.14	
SC-SM	3	0.522	782.9	850.1	0.037	0.012	0.19	
SC-SM	4	0.413	619.3	940.3	0.029	0.012	0.23	
SC-SM	5	0.339	508.6	999.4	0.024	0.012	0.27	
SC-SM	6	0.287	430.2	1058.4	0.020	0.012	0.30	<---2B
SC-SM	7	0.248	372.1	1117.4	0.016	0.012	0.33	
SC-SM	8	0.218	327.6	1176.5	0.014	0.012	0.35	
SC-SM	9	0.195	292.4	1235.5	0.012	0.012	0.38	
SC-SM	10	0.176	263.9	1294.6	0.011	0.012	0.40	
SC-SM	11	0.160	240.5	1353.6	0.009	0.012	0.42	

Settlement--Footings New Loads

SETTLEMENT OF FOOTINGS								
Project:	Meadow Brook	TP-4						
B:	2.8	feet (width or diameter)			b =	1.4	ft (1/2 width/dia)	
L:	25	feet (length)			l =	12.5	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	22
unit weight:	101.08	pcf (above footing depth)					Strip Load,k:	4.2
allowable q:	1500	psf						
footing type:	1	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	12	feet						

DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		0.0	1.00
CL	0.119	0.012	1400		101.08	0	14.0	1.54

STRIP FOOTINGS...

Soil Type	Below ftg. depth (ft)	Influence	Increased Stress (psf)	avg. ovrbn. press.(psf)	Incremnt. Sett. (in.)	Collapse Sett. (in.)	Total Set. (in.)	
Fill	0	0.000	0.0	404.3	0.000	0.000	0.00	
CL	1	0.906	1359.4	505.4	0.241	0.000	0.24	
CL	2	0.688	1031.8	606.5	0.150	0.000	0.39	
CL	3	0.522	782.9	707.6	0.082	0.000	0.47	
CL	4	0.413	619.3	808.6	0.047	0.000	0.52	
CL	5	0.339	508.6	909.7	0.035	0.000	0.55	
CL	6	0.287	430.2	1010.8	0.038	0.000	0.59	<---2B
CL	7	0.248	372.1	1111.9	0.051	0.000	0.64	
CL	8	0.218	327.6	1213.0	0.068	0.000	0.71	
CL	9	0.195	292.4	1251.6	0.068	0.000	0.78	
CL	10	0.176	263.9	1290.3	0.115	0.000	0.89	
CL	11	0.160	240.5	1329.0	0.103	0.000	1.00	
CL	12	0.147	220.8	1367.7	0.093	0.000	1.09	
CL	13	0.136	204.1	1406.4	0.084	0.000	1.17	
CL	14	0.126	189.7	1445.0	0.077	0.000	1.25	

Settlement--Footings New Loads

SETTLEMENT OF FOOTINGS								
Project:	Meadow Brook	TP-7						
B:	2.8	feet (width or diameter)			b =	1.4	ft (1/2 width/dia)	
L:	25	feet (length)			l =	12.5	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	22
unit weight:	108.8	pcf (above footing depth)					Strip Load,k:	4.2
allowable q:	1500	psf						
footing type:	1	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	10	feet						

DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		0.0	1.00
SC	0.182	0.014	2000		108.8	0.7	5.0	4.08
CL	0.092	0.018	2000		126	0.2	14.0	1.51

STRIP FOOTINGS...

Soil Type	Below ftg. depth (ft)	Influence	Increased Stress (psf)	avg. ovrbn. press.(psf)	Incremnt. Sett. (in.)	Collapse Sett. (in.)	Total Set. (in.)	
Fill	0	0.000	0.0	435.2	0.000	0.000	0.00	
SC	1	0.906	1359.4	544.0	0.091	0.084	0.18	
SC	2	0.688	1031.8	652.8	0.069	0.084	0.33	
SC	3	0.522	782.9	761.6	0.052	0.084	0.46	
SC	4	0.413	619.3	870.4	0.039	0.084	0.59	
SC	5	0.339	508.6	979.2	0.031	0.084	0.70	
CL	6	0.287	430.2	1105.2	0.031	0.024	0.76	<---2B
CL	7	0.248	372.1	1168.8	0.026	0.024	0.81	
CL	8	0.218	327.6	1232.4	0.022	0.024	0.85	
CL	9	0.195	292.4	1296.0	0.019	0.024	0.90	
CL	10	0.176	263.9	1359.6	0.017	0.024	0.94	
CL	11	0.160	240.5	1423.2	0.015	0.024	0.98	
CL	12	0.147	220.8	1486.8	0.013	0.024	1.01	
CL	13	0.136	204.1	1550.4	0.012	0.024	1.05	
CL	14	0.126	189.7	1614.0	0.010	0.024	1.08	

Settlement--Footings New Loads

SETTLEMENT OF FOOTINGS								
Project:	Meadow Brook		B-1					
B:	3.82971	feet (width or diameter)			b =	1.914854	ft (1/2 width/dia)	
L:	3.82971	feet (length)			l =	1.914854	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	22
unit weight:	114.4	pcf (above footing depth)					Strip Load,k:	4.2
allowable q:	1500	psf						
footing type:	2	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	8	feet						

DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		0.0	1.00
ML	0.051	0.028	2000		114.4	0.2	14.0	2.07

SQUARE/RECTANGULAR FOOTINGS (Boussinesq Method)...

Soil Type	Below ftg. depth (ft)	Influence	Increased Stress (psf)	avg. ovrbn. press.(psf)	Incremnt. Sett. (in.)	Collapse Sett. (in.)	Total Set. (in.)	
Fill	0	0.000	0.0	457.6	0.000	0.000	0.00	
ML	1	0.922	1382.9	572.0	0.179	0.024	0.20	
ML	2	0.679	1018.8	686.4	0.133	0.024	0.36	
ML	3	0.461	690.8	800.8	0.091	0.024	0.47	
ML	4	0.316	473.9	915.2	0.061	0.024	0.56	
ML	5	0.225	337.3	967.2	0.044	0.024	0.63	
ML	6	0.166	249.3	1019.2	0.032	0.024	0.68	
ML	7	0.127	190.5	1071.2	0.024	0.024	0.73	
ML	8	0.100	149.8	1123.2	0.018	0.024	0.77	<---2B
ML	9	0.080	120.6	1175.2	0.014	0.024	0.81	
ML	10	0.066	99.0	1227.2	0.011	0.024	0.85	
ML	11	0.055	82.6	1279.2	0.009	0.024	0.88	
ML	12	0.047	70.0	1331.2	0.007	0.024	0.91	
ML	13	0.040	60.0	1383.2	0.006	0.024	0.94	
ML	14	0.035	52.0	1435.2	0.005	0.024	0.97	

Settlement--Footings New Loads

SETTLEMENT OF FOOTINGS								
Project:	Meadow Brook		TP-3					
B:	3.82971	feet (width or diameter)			b =	1.914854	ft (1/2 width/dia)	
L:	3.82971	feet (length)			l =	1.914854	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	22
unit weight:	121.44	pcf (above footing depth)					Strip Load,k:	4.2
allowable q:	1500	psf						
footing type:	3	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	7.5	feet						

DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		0.0	1.00
SC-SM	0.08	0.011	2700		121.44	0.1	11.0	2.96

SQUARE/RECTANGULAR FOOTINGS (Westergard Method)...

	Below ftg.		Increased	avg. ovrbn.	Incremnt.	Collapse	Total	
Soil Type	depth (ft)	Influence	Stress (psf)	press.(psf)	Sett. (in.)	Sett. (in.)	Set. (in.)	
Fill	0	0.000	0.0	485.8	0.000	0.000	0.00	
SC-SM	1	0.812	1217.4	607.2	0.063	0.012	0.08	
SC-SM	2	0.642	963.3	728.6	0.048	0.012	0.14	
SC-SM	3	0.502	753.5	850.1	0.036	0.012	0.18	
SC-SM	4	0.393	589.6	940.3	0.028	0.012	0.22	
SC-SM	5	0.310	465.2	999.4	0.022	0.012	0.26	
SC-SM	6	0.248	371.5	1058.4	0.017	0.012	0.29	
SC-SM	7	0.201	300.8	1117.4	0.014	0.012	0.31	
SC-SM	8	0.165	247.0	1176.5	0.011	0.012	0.34	<---2B
SC-SM	9	0.137	205.5	1235.5	0.009	0.012	0.36	
SC-SM	10	0.115	173.1	1294.6	0.007	0.012	0.38	
SC-SM	11	0.098	147.5	1353.6	0.006	0.012	0.39	

Settlement--Footings New Loads

SETTLEMENT OF FOOTINGS								
Project:	Meadow Brook		TP-4					
B:	3.82971	feet (width or diameter)			b =	1.914854	ft (1/2 width/dia)	
L:	3.82971	feet (length)			l =	1.914854	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	22
unit weight:	101.08	pcf (above footing depth)					Strip Load,k:	4.2
allowable q:	1500	psf						
footing type:	3	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	12	feet						

DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		0.0	1.00
CL	0.119	0.012	1400		101.08	0	14.0	1.54

SQUARE/RECTANGULAR FOOTINGS (Westergard Method)...

Soil Type	Below ftg. depth (ft)	Influence	Increased Stress (psf)	avg. ovrbn. press.(psf)	Incremnt. Sett. (in.)	Collapse Sett. (in.)	Total Set. (in.)	
Fill	0	0.000	0.0	404.3	0.000	0.000	0.00	
CL	1	0.812	1217.4	505.4	0.192	0.000	0.19	
CL	2	0.642	963.3	606.5	0.123	0.000	0.32	
CL	3	0.502	753.5	707.6	0.069	0.000	0.38	
CL	4	0.393	589.6	808.6	0.034	0.000	0.42	
CL	5	0.310	465.2	909.7	0.026	0.000	0.44	
CL	6	0.248	371.5	1010.8	0.020	0.000	0.46	
CL	7	0.201	300.8	1111.9	0.020	0.000	0.48	
CL	8	0.165	247.0	1213.0	0.035	0.000	0.52	<---2B
CL	9	0.137	205.5	1251.6	0.032	0.000	0.55	
CL	10	0.115	173.1	1290.3	0.078	0.000	0.63	
CL	11	0.098	147.5	1329.0	0.065	0.000	0.69	
CL	12	0.085	126.9	1367.7	0.055	0.000	0.75	
CL	13	0.073	110.2	1406.4	0.047	0.000	0.80	
CL	14	0.064	96.5	1445.0	0.040	0.000	0.84	

Settlement--Footings New Loads

SETTLEMENT OF FOOTINGS								
Project:	Meadow Brook	TP-7						
B:	3.82971	feet (width or diameter)			b =	1.914854	ft (1/2 width/dia)	
L:	3.82971	feet (length)			l =	1.914854	ft (1/2 length)	
foot. depth:	4	feet					Spread Load,k:	22
unit weight:	108.8	pcf (above footing depth)					Strip Load,k:	4.2
allowable q:	1500	psf						
footing type:	3	(1=strip,2&3=square/rect.,4=circular)						
	4	(4 for center, 1 for corner of square/rect.)						
water depth:	10	feet						

DEFINE SOIL PROFILE:			preconsol		Density	Collapse	Below ftg.	Avg.
Soil type	C_c'	C_r'	press.,σ_c'(psf)	OCR	(pcf)	(%)	depth (ft)	OCR
Fill	0.001	0.000125			135		0.0	1.00
SC	0.182	0.014	2000		108.8	0.7	5.0	4.08
CL	0.092	0.018	2000		126	0.2	14.0	1.51

SQUARE/RECTANGULAR FOOTINGS (Westergard Method)...

Soil Type	Below ftg. depth (ft)	Influence	Increased Stress (psf)	avg. ovrbn. press.(psf)	Incremnt. Sett. (in.)	Collapse Sett. (in.)	Total Set. (in.)	
Fill	0	0.000	0.0	435.2	0.000	0.000	0.00	
SC	1	0.812	1217.4	544.0	0.086	0.084	0.17	
SC	2	0.642	963.3	652.8	0.066	0.084	0.32	
SC	3	0.502	753.5	761.6	0.050	0.084	0.45	
SC	4	0.393	589.6	870.4	0.038	0.084	0.58	
SC	5	0.310	465.2	979.2	0.028	0.084	0.69	
CL	6	0.248	371.5	1105.2	0.027	0.024	0.74	
CL	7	0.201	300.8	1168.8	0.021	0.024	0.78	
CL	8	0.165	247.0	1232.4	0.017	0.024	0.83	<---2B
CL	9	0.137	205.5	1296.0	0.014	0.024	0.86	
CL	10	0.115	173.1	1359.6	0.011	0.024	0.90	
CL	11	0.098	147.5	1423.2	0.009	0.024	0.93	
CL	12	0.085	126.9	1486.8	0.008	0.024	0.96	
CL	13	0.073	110.2	1550.4	0.006	0.024	0.99	
CL	14	0.064	96.5	1614.0	0.005	0.024	1.02	

Project: Meadow Brook
Location: See Figure No. 2, Utah — Calcs By: WGT
Project No: 228636 — Reviewed By:
Date: 8/9/22

Parameter	Value	References / Factors	Value
Drill Rig Code:	L3	1. Youd, et al, 2001. C_E =	1.02
Borehole Diameter, inches:	7	2. Boulanger & Idriss, 2006. C_B =	1.05
Sampler without liners?:	yes	3. Bray & Sancio, 2006. C_S =	1.20
Fill Height, feet:	0	Magnitude Scaling Factor, MSF =	1.00
Magnitude, Mw:	7.5	$R^* = R + 10^{(0.89M_w - 5.64)}$ =	14.5
Peak Horiz. Acceleration, amax:	0.553	ModCal Sampler Conver. Factor (*) =	0.77
Distance from site to fault, km:	3.65	Use representative tests for layers?	yes
Reference atmosphere value,tsf:	1.05811	Enter Ground Slope %:	0.001
		Enter W=Ht/Distance to free face,%:	

LATERAL SPREADING VALUES

Boring	F_{15},T_{15}	$D50_{15}$	D_H, ft	Boring	F_{15},T_{15}	$D50_{15}$	D_H, ft	Boring	F_{15},T_{15}	$D50_{15}$	D_H, ft
B-1	12,1.22	0.427	**1.0**								

TOTAL SETTLEMENT VALUES

Boring	Sett., in.	Boring	Sett., in.	Boring	Sett., in.
B-1	**1.9**				

Boring No.	Water Depth, feet	Sample Depth, feet	USC	% Fines	Unit Weight, pcf	Pore Press., tsf	Total Stress tsf	Effective Stress tsf	Rod Length, feet	Meas. N-value N_m	Rod Correct. C_R	Ovrbrdn Correct. C_N	$(N_1)_{60}$	$(N_1)_{60cs}$	r_d	$CRR_{7.5}$	CSR	(>1) F.S.	F.S. = ($CRR_{7.5}$ / CSR) MSF (<=1) F.S.	Moisture Content %	Liquid Limit	Plast. Index	Will It Liquefy By: Boul./Idriss Criteria?	Bray/Sancio Criteria?	Volum. Strain %	Layer Thick. feet	Layer Settlmnt, inches
B-1	8	3.5	ML	66	114	0.000	0.200	0.200	5	7	0.75	1.58	10.7	17.8	0.99	0.19	0.36		**AWT**	10	26	4	**YES**	**NO**			
	8	8.5	CL	70	113	0.016	0.480	0.465	10	4	0.80	1.34	5.5	11.6	0.98	0.13	0.36	(Clay)					**NO**				
	8	11	SM	12	114	0.094	0.627	0.533	15	6	0.85	1.29	8.4	10.2	0.97	0.12	0.41		**0.28**						2.5	4	1.2
	8	16	CL	86	115	0.250	0.920	0.670	20	8	0.85	1.20	10.5	17.6	0.96	0.19	0.47	(Clay)		30	43	21	**NO**				
	8	21	CL	86	116	0.406	1.218	0.812	25	12	0.95	1.12	16.3	24.6	0.95	0.28	0.51	(Clay)		30	43	21	**NO**				
	8	26	CL	86	116	0.562	1.508	0.946	30	12	0.95	1.05	15.3	23.4	0.94	0.26	0.54	(Clay)		30	43	21	**NO**				
	8	31	CL	79	114	0.718	1.767	1.049	35	6	1.00	1.00	7.7	14.2	0.92	0.15	0.56	(Clay)		40	39	18	**NO**	**YES**			
	8	36	SP-SM	8	118	0.874	2.124	1.250	40	18	1.00	0.92	21.3	21.9	0.88	0.24	0.54		**0.45**	22					1.4	4.5	0.7
													#N/A														
													#N/A														
													#N/A														

ENT 122955:2022 PG 66 of 79

TAYLOR GEOTECHNICAL

2650 North 180 East
Lehi, Utah 84043
P. 801-400-9784

September 12, 2022

Mr. Ben Hunter
Project Engineer
City of American Fork
51 East Main Street
American Fork, Utah 84003

ENT 122955:2022 PG 67 of 79

Subject: **Geotechnical Engineering Review No. 4**
Meadowbrook Development
Approximately 800 West 600 South
American Fork Utah
American Fork File No. 854-814-457
TG Project No. 22024

Subject Document: Earthtec Engineering, Response to Review, Meadow Brook, 600 South 6600 West, American Fork, Utah, Earthtec Project No. 228636, prepared for Ms. Ginger Romriell, Woodside Homes of Utah, LLC, 460 West 50 North, Suite 300, Salt Lake City, Utah 84101, dated August 12, 2022.

Submittal Status: **GEOTECHNICAL ENGINEERING SUBMITTAL INCOMPLETE**

Dear Mr. Hunter:

At your request, Taylor Geotechnical (TG) reviewed the subject document prepared by Earthtec Engineering (Earthtec) in response to the following review letter by TG:

> TG Geotechnical Engineering Review No. 3, Meadowbrook Development, Approximately 800 West 600 South, American Fork, Utah, American Fork Application No. 2021-005, American Fork File No. 854-814-457, TG Project No: 22024, prepared for Mr. Ben Hunter, Project Engineer, City of American Fork, 51 East Main Street, American Fork, Utah 84003, dated July 29, 2022.

The July 29, 2022, TG letter was prepared after a review of the following July 8, 2022, Earthtec report:

> Earthtec, Geotechnical Study, Meadow Brook, approximately 600 South 6600 West, American Fork, Utah, Earthtec Project No. 228636, prepared for Ms. Ginger Romriell, Woodside Homes of Utah, LLC, 460 West 50 North, Suite 300, Salt Lake City, Utah 84101, dated July 8, 2022.

Purpose of TG Review

The purpose of TG's review is to evaluate whether:

1. The August 12, 2022, Earthtec response letter adequately responded to the July 29, 2022, TG geotechnical engineering review letter; and,

2. The July 8, 2022, Earthtec report combined with the August 12, 2022, Earthtec letter adequately addressed geotechnical engineering parameters at the site, consistent with concerns for public health, safety, welfare, reasonable professional standards of care, and the American Fork City (the City) Sensitive Lands Ordinance 07-10-47.

TG Conclusion

Based substantially in and on the reliance of the technical documentation and assurances provided by Earthtec, including their opinions and conclusions, it is TG's opinion the August 12, 2022, Earthtec response letter combined with the July 8, 2022, Earthtec report does not fulfill the requirements of the City Sensitive Lands Ordinance 07-10-47.

TG Recommendations

Based on the requirements of the City Sensitive Land Ordinance and the technical documentation provided by Earthtec, TG recommends the City not consider the Earthtec report complete from a geotechnical perspective until the following item is adequately addressed.

Under Item No. 5, of the July 29, 2022, TG review letter, TG recommended the City request Earthtec provide calculations that substantiate the liquefaction-induced settlement and lateral spread analysis. In the review of the liquefaction calculations as provided in the August 12, 2022, Earthtec letter, TG noted that the peak ground acceleration (PGA) was used for the Earthtec liquefaction analysis and not the modified peak ground acceleration (PGA_M). *TG recommends the City request Earthtec to correct their liquefaction analysis using the PGA_M for the subject site and provide their analysis and updated recommendations to the City for review.*

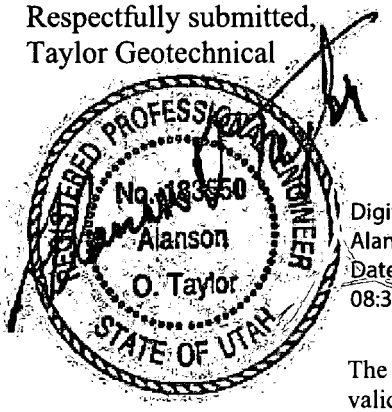
Closure

All services performed by Taylor Geotechnical for this review were provided for the exclusive use and benefit of the City. No other person or entity is entitled to use or rely upon any of the information or reports generated by Taylor Geotechnical as a result of this review.

ENT 122955:2022 PG 68 of 79

If you have any questions, please feel free to contact the undersigned. The opportunity to be of continued service to the City of American Fork is appreciated.

Respectfully submitted,
Taylor Geotechnical



Digitally signed by
Alanson O. Taylor, P.E.
Date: 2022.09.12
08:37:38 -06'00'

The electronic version of this report is not valid without a digital signature noted.

Alanson O. Taylor, P.E.
Principal

ENT 122955:2022 PG 69 of 79

1497 West 40 South
Lindon, Utah - 84042
Phone (801) 225-5711

840 West 1700 South #10
Salt Lake City, Utah - 84104
Phone (801) 787-9138

1596 W. 2650 S. #108
Ogden, Utah - 84401
Phone (801) 399-9516

September 16, 2022

Woodside Homes of Utah, LLC
Attention: Ms. Ginger Romriell
460 West 50 North, Suite 300
Salt Lake City, UT 84101

Re: Response to Review
Meadow Brook
600 South 6600 West
American Fork, Utah
Project No: 228636

ENT 122955:2022 PG 70 of 79

Ms. Romriell:

This letter is a response to the review dated September 12, 2022 by Taylor Geotechnical of our Geotechnical Report[1] completed in July of 2022. A letter[2] to update structural loads has also been completed by Earthtec Engineering.

Taylor Geotechnical's Review Comment
Under Item No. 5, of the July 29, 2022, TG review letter, TG recommended the City request Earthtec provide calculations that substantiate the liquefaction-induced settlement and lateral spread analysis. In the review of the liquefaction calculations as provided in the August 12, 2022, Earthtec letter, TG noted that the peak ground acceleration (PGA) was used for the Earthtec liquefaction analysis and not the modified peak ground acceleration (PGA_M). TG recommends the City request Earthtec to correct their liquefaction analysis using the PGA_M for the subject site and provide their analysis and updated recommendations to the City for review.

Earthtec Engineering's Response to Comment
The liquefaction analysis has been updated using the modified peak ground acceleration and is provided with this letter.

General Conditions
The information presented in this letter applies only to the soils encountered during the field investigation on the subject site. It should be noted that Earthtec Engineering was not involved with the selection of the foundation system being used, surface drainage control, floor slab design and construction, backfill compaction requirements against foundation walls, mass grading of the site, or any other aspect of the building construction. Site grading activities completed in other areas such as driveways, sidewalks, or detached structures, were not observed during this site visit, are outside of the scope of our work and are not addressed in this letter. The observations and recommendations presented in this letter were conducted within the limits prescribed by our client, with the usual thoroughness and competence of the engineering profession in this area at this time. No warranty or representation is intended in our proposals, contracts, reports, or letters.

[1] Geotechnical Study, Meadow Brook, Approximately 600 South 6600 West, American Fork, Utah, Earthtec Engineering, Project No.228636, July 8, 2022.
[2] Addendum 1 – Updated Structural Loads, Meadow Brook, 600 South 6600 West, American Fork, Utah, Earthtec Engineering, Project No.228636, August 9, 2022.

Closure

We appreciate the opportunity of providing our services on this project. If we can answer questions or be of further service, please call.

Respectfully;
EARTHTEC ENGINEERING

Jeremy A. Balleck, E.I.T.
Staff Engineer

PROFESSIONAL ENGINEER
No. 5567049-2202
TIMOTHY ALLAN MITCHELL
Electronically generated on 09/16/2022
STATE OF UTAH

Timothy A. Mitchell, P.E.
Vice President

JB/tm

Attachments:
Liquefaction Calculations
OSHPD-U.S. Seismic Design Maps

Project:	Meadow Brook
Location:	See Figure No. 2, Utah
Project No:	228636
Date:	9/15/22
Drill Rig Code:	L3
Borehole Diameter, inches:	7
Sampler without liners?:	yes
Fill Height, feet:	0
Magnitude, Mw:	7.5
Peak Horiz. Acceleration, amax:	0.634
Distance from site to fault, km:	3.65
Reference atmosphere value,tsf:	1.05811

Calcs By: WGT
Reviewed By:

References:
1. Youd, et al, 2001.
2. Boulanger & Idriss, 2006.
3. Bray & Sancio, 2006.

C_E =	1.02
C_B =	1.05
C_S =	1.20
Magnitude Scaling Factor, MSF =	1.00
$R^* = R + 10^{(0.89M_w - 5.64)}$ =	14.5
ModCal Sampler Conver. Factor (*) =	0.77
Use representative tests for layers?	yes
Enter Ground Slope %:	0.001
Enter W=Ht/Distance to free face,%:	

LATERAL SPREADING VALUES

Boring	F_{15},T_{15}	$D50_{15}$	D_H, ft	Boring	F_{15},T_{15}	$D50_{15}$	D_H, ft	Boring	F_{15},T_{15}	$D50_{15}$	D_H, ft
B-1	12,1.22	0.427	**1.0**								

TOTAL SETTLEMENT VALUES

Boring	Sett., in.	Boring	Sett., in.	Boring	Sett., in.
B-1	**1.9**				

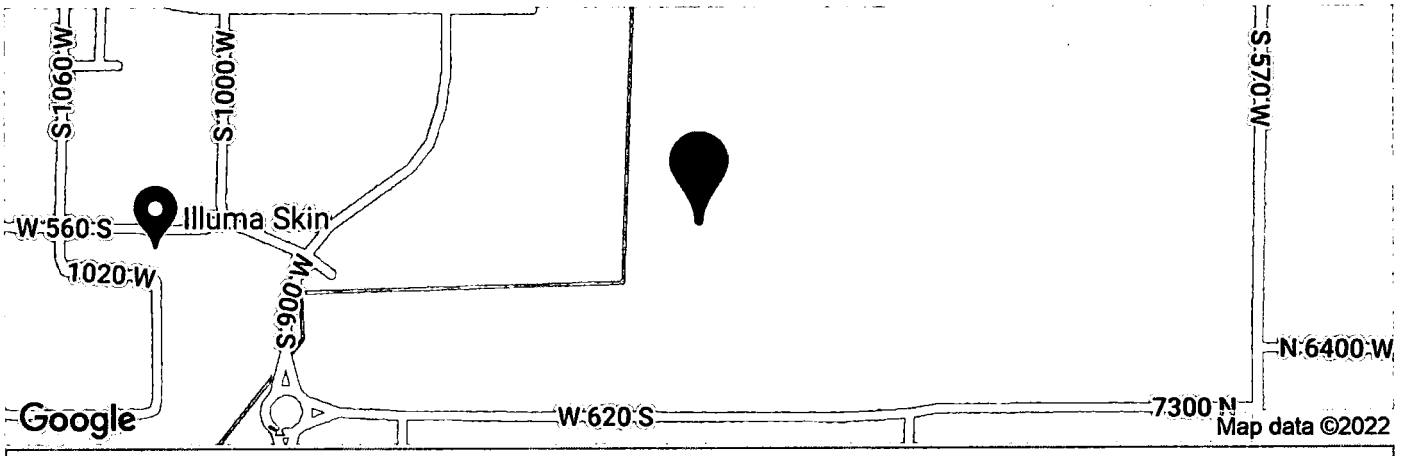
Boring No.	Water Depth, feet	Sample Depth, feet	USC	% Fines	Unit Weight, pcf	Pore Press., tsf	Total Stress tsf	Effective Stress tsf	Rod Length, feet	Meas. N-value N_m	Rod Correct. C_R	Ovrbrdn Correct. C_N	$(N_1)_{60}$	$(N_1)_{60cs}$	r_d	$CRR_{7.5}$	CSR	(>1) F.S.	F.S. = ($CRR_{7.5}$ / CSR) MSF (<=1) F.S.	Moisture Content %	Liquid Limit	Plast. Index	Will It Liquefy By: Boul./Idriss Criteria?	Bray/Sancio Criteria?	Volum. Strain %	Layer Thick. feet	Layer Settlmnt, inches
B-1	8	3.5	ML	66	114	0.000	0.200	0.200	5	7	0.75	1.58	10.7	17.8	0.99	0.19	0.41		**AWT**	10	26	4	**YES**	**NO**			
	8	8.5	CL	70	113	0.016	0.480	0.465	10	4	0.80	1.34	5.5	11.6	0.98	0.13	0.42	(Clay)					**NO**				
	8	11	SM	12	114	0.094	0.627	0.533	15	6	0.85	1.29	8.4	10.2	0.97	0.12	0.47		**0.24**						2.5	4	1.2
	8	16	CL	86	115	0.250	0.920	0.670	20	8	0.85	1.20	10.5	17.6	0.96	0.19	0.54	(Clay)		30	43	21	**NO**				
	8	21	CL	86	116	0.406	1.218	0.812	25	12	0.95	1.12	16.3	24.6	0.95	0.28	0.59	(Clay)		30	43	21	**NO**				
	8	26	CL	86	116	0.562	1.508	0.946	30	12	0.95	1.05	15.3	23.4	0.94	0.26	0.62	(Clay)		30	43	21	**NO**				
	8	31	CL	79	114	0.718	1.767	1.049	35	6	1.00	1.00	7.7	14.2	0.92	0.15	0.64	(Clay)		40	39	18	**NO**	**YES**			
	8	36	SP-SM	8	118	0.874	2.124	1.250	40	18	1.00	0.92	21.3	21.9	0.88	0.24	0.62		**0.39**	22					1.4	4.5	0.7
													#N/A														
													#N/A														
													#N/A														

ENT 122955:2022 Pg 72 of 79

OSHPD

MEADOW BROOK

Latitude, Longitude: 40.365594, -111.819164



Date	6/24/2022, 10:58:28 AM
Design Code Reference Document	ASCE7-16
Risk Category	II
Site Class	E - Soft Clay Soil

Type	Value	Description
S_S	1.236	MCE_R ground motion. (for 0.2 second period)
S_1	0.447	MCE_R ground motion. (for 1.0s period)
S_{MS}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{M1}	null -See Section 11.4.8	Site-modified spectral acceleration value
S_{DS}	null -See Section 11.4.8	Numeric seismic design value at 0.2 second SA
S_{D1}	null -See Section 11.4.8	Numeric seismic design value at 1.0 second SA

Type	Value	Description
SDC	null -See Section 11.4.8	Seismic design category
F_a	null -See Section 11.4.8	Site amplification factor at 0.2 second
F_v	null -See Section 11.4.8	Site amplification factor at 1.0 second
PGA	0.553	MCE_G peak ground acceleration
F_{PGA}	1.147	Site amplification factor at PGA
PGA_M	0.634	Site modified peak ground acceleration
T_L	8	Long-period transition period in seconds
SsRT	1.236	Probabilistic risk-targeted ground motion. (0.2 second)
SsUH	1.412	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration
SsD	3.03	Factored deterministic acceleration value. (0.2 second)
S1RT	0.447	Probabilistic risk-targeted ground motion. (1.0 second)
S1UH	0.503	Factored uniform-hazard (2% probability of exceedance in 50 years) spectral acceleration.
S1D	1.181	Factored deterministic acceleration value. (1.0 second)
PGAd	1.176	Factored deterministic acceleration value. (Peak Ground Acceleration)
C_{RS}	0.875	Mapped value of the risk coefficient at short periods
C_{R1}	0.888	Mapped value of the risk coefficient at a period of 1 s

ENT 122955:2022 PG 73 of 79

DISCLAIMER

While the information presented on this website is believed to be correct, SEAOC /OSHPD and its sponsors and contributors assume no responsibility or liability for its accuracy. The material presented in this web application should not be used or relied upon for any specific application without competent examination and verification of its accuracy, suitability and applicability by engineers or other licensed professionals. SEAOC / OSHPD do not intend that the use of this information replace the sound judgment of such competent professionals, having experience and knowledge in the field of practice, nor to substitute for the standard of care required of such professionals in interpreting and applying the results of the seismic data provided by this website. Users of the information from this website assume all liability arising from such use. Use of the output of this website does not imply approval by the governing building code bodies responsible for building code approval and interpretation for the building site described by latitude/longitude location in the search results of this website.

TAYLOR GEOTECHNICAL

2650 North 180 East
Lehi, Utah 84043
P. 801-400-9784

September 28, 2022

Mr. Ben Hunter
Project Engineer
American Fork City
51 East Main Street
American Fork, Utah 84003

Subject: **Geotechnical Engineering Review No. 5**
Meadowbrook Development
Approximately 800 West 600 South
American Fork Utah
TG Project No. 22024

Subject Document: Earthtec Engineering, Response to Review, Meadow Brook, 600 South 6600 West, American Fork, Utah, Earthtec Project No. 228636, prepared for Ms. Ginger Romriell, Woodside Homes of Utah, LLC, 460 West 50 North, Suite 300, Salt Lake City, Utah 84101, dated September 16, 2022.

Submittal Status: **GEOTECHNICAL ENGINEERING SUBMITTAL COMPLETE**

Dear Mr. Hunter:

At your request, Taylor Geotechnical (TG) reviewed the above-referenced September 16, 2022, Earthtec Engineering (Earthtec) document prepared in response to the following review letter by TG to American Fork City (the City):

> TG Geotechnical Engineering Review No. 4, Meadowbrook Development, Approximately 800 West 600 South, American Fork, Utah, American Fork File No. 854-814-457, TG Project No: 22024, prepared for Mr. Ben Hunter, Project Engineer, City of American Fork, 51 East Main Street, American Fork, Utah 84003, dated September 12, 2022.

The September 12, 2022, TG letter was prepared after a review of the following August 12, 2022, Earthtec report:

> Earthtec Engineering, Response to Review, Meadow Brook, 600 South 6600 West, American Fork, Utah, Earthtec Project No. 228636, prepared for Ms. Ginger Romriell, Woodside Homes of Utah, LLC, 460 West 50 North, Suite 300, Salt Lake City, Utah 84101, dated August 12, 2022.

The August 12, 2022, Earthtec document was prepared in response to the following review letter by TG to the City:

TG Geotechnical Engineering Review No. 3, Meadowbrook Development, Approximately 800 West 600 South, American Fork, Utah, American Fork Application No. 2021-005, American Fork File No. 854-814-457, TG Project No: 22024, prepared for Mr. Ben Hunter, Project Engineer, City of American Fork, 51 East Main Street, American Fork, Utah 84003, dated July 29, 2022.

The July 29, 2022, TG letter was prepared after a review of the following July 8, 2022, Earthtec report:

Earthtec, Geotechnical Study, Meadow Brook, approximately 600 South 6600 West, American Fork, Utah, Earthtec Project No. 228636, prepared for Ms. Ginger Romriell, Woodside Homes of Utah, LLC, 460 West 50 North, Suite 300, Salt Lake City, Utah 84101, dated July 8, 2022.

The proposed construction will consist of the development of 25 acres into a new residential subdivision. Proposed structures will consist of conventionally framed, two- to three-story, slab-on-grade townhomes and one- to -two-story houses constructed slab-on-grade. Basement construction is not anticipated due to shallow groundwater. Structural loads for the buildings are anticipated to consist of wall loads up to 4.0 kips per lineal foot and column loads up to 30 kips.

Purpose of TG Review

ENT 122955:2022 PG 76 of 79

The purpose of TG's review is to evaluate whether:

1. The September 16, 2022, Earthtec letter adequately responded to the September 12, 2022, TG geotechnical engineering review letter; and,

2. The July 8, 2022, Earthtec report combined with the August 12, 2022, and the September 16, 2022, Earthtec response letters adequately address geotechnical engineering parameters at the site, consistent with concerns for public health, safety, welfare, reasonable professional standards-of-care, and the American Fork City Sensitive Lands Ordinance 07-10-47.

Liquefaction

A site-specific liquefaction study was completed for the subject property. In the July 8, 2022, Earthtec document, Earthtec concluded that the site is susceptible to 2 inches of liquefaction-induced settlement and 1 foot of liquefaction-induced lateral spread.

TG Conclusion

Based substantially in and on reliance of the technical documentation and assurances provided by Earthtec, including their opinions and conclusions, it is TG's opinion that the September 16, 2022, Earthtec response letter adequately addressed review comments in the September 12, 2022, TG review letter and combined with the July 8, 2022, Earthtec report and the August 12, 2022,

response letter, adequately addressed the geotechnical parameters for the property consistent with concerns for public health, safety, and welfare; reasonable professional standards of practice and the City Sensitive Lands Ordinance 07-10-47.

ENT 122955:2022 PG 77 of 79

TG Recommendations

TG recommends the City:

1. Consider the Earthtec submittals acceptable from a geotechnical engineering perspective.

2. Require disclosure in accordance with section 6-2-4(1) of the Sensitive Lands Ordinance. Disclosure of the liquefaction potential and required mitigation shall be recorded as follows:

   A. The existence of a liquefiable soil condition shall be noted on the final plat recorded at the Office of the County Recorder, together with any limitation to development such as extraordinary foundation treatment as recommended by Earthtec, attached as a condition of approval of the project.

   B. In addition, a "Notice of Interest" setting forth any such condition or limitation shall be recorded at the Office of the County Recorder for each lot to which the condition or limitation is applicable.

3. Require, at the time of building permit, that each building proposed for construction on land having a high liquefaction potential have a footing and foundation design confirming to liquefaction hazard as certified by a geotechnical and structural engineer to meet or exceed the probable forces. See section 6-2-4(2) of the Sensitive Lands Ordinance.

4. Request certification letters from the geotechnical engineer and structural engineer before the placement of concrete for each structure.

Public Right-of-Way

Pavement recommendations provided in the July 8, 2022, Earthtec report are for public streets based on an assumed CBR of 3 and assumed traffic loads. Roads in public right-of-way should be based on project traffic loads provided by the civil engineer for the project or minimum pavement sections as required by the City for roads in the Sensitive Lands Ordinance (see section 13.1 General Description - Asphalt Paving of the City Standards).

Geotechnical Report Summary for Plan Review

1. All organics, topsoil, existing fill, and other deleterious material should be removed from below proposed building and pavement areas.

2. Footings should be supported on a minimum of 24 inches of properly placed and compacted structural fill extending to undisturbed native soils.

3. Footings for the structures may be designed using an allowable bearing capacity of 2,000 pounds per square foot.

4. Footings should have a minimum width of 20 inches for strip footings and 30 inches for spot footings.

5. Footings susceptible to frost should be located at a minimum depth of 30 inches. Footings not susceptible to frost should have a minimum embedment of 18 inches.

6. Footing design for each structure should be certified by the structural engineer stating that they have been designed in accordance with the liquefaction mitigation recommendations by Earthtec

7. Basement construction is not anticipated due to shallow groundwater.

8. Site grading should be limited to floor slabs not extending more than 1.5 feet below the existing grade.

9. Seismic analysis of proposed structures at the site should be based on a spectral response design acceleration of 0.2 sec (short period) S_{DS} = 0.989g. Seismic Design Category D_2 should be used for the design of residential structures.

10. The spectral response design acceleration value was based on factored spectral response accelerations using Site Class D/E.

11. Before the placement of concrete for footings, a letter from the geotechnical engineer should be obtained that indicates the subgrade for footing and floor slab support was prepared in accordance with the geotechnical report and ready for the placement of concrete.

12. Floor slabs should not be placed more than 1.5 feet below the existing grade, supported on a minimum of 6 inches of properly placed, compacted, and tested engineered fill, and should be underlain by at least 4-inches of free draining gravel.

13. Type II cement should be used for concrete placed adjacent to native soils.

14. Gutters should discharge beyond the limits of backfill or at least 10 feet from the buildings, whichever is greater.

15. Surface drainage should slope away from the structure in all directions 8 inches for the first 10 feet.

16. All import materials should be approved by Geotechnical Engineer.

17. All compaction for interior and exterior backfill adjacent to the building should be verified by the geotechnical engineer.

ENT 122955:2022 PG 78 of 79

ENT 122955:2022 PG 78 of 79

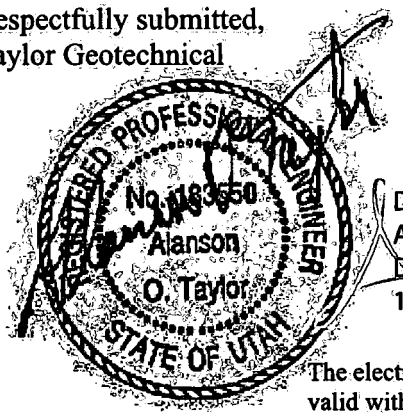
Closure

This letter is issued solely in response to the Consultants' evaluation of the referenced site. Comments and recommendations in this review are based on data presented in the referenced reports. Taylor Geotechnical accordingly provides no warranty that the data in the referenced reports are correct or accurate and has not performed an independent site evaluation. Comments and recommendations presented herein are provided to aid the City in reducing risks from geotechnical hazards and to protect public health and safety.

All services performed by Taylor Geotechnical for this review were provided for the exclusive use and benefit of the City. No other person or entity is entitled to use or rely upon any of the information or reports generated by Taylor Geotechnical as a result of this review.

If you have any questions, please feel free to contact the undersigned. The opportunity to be of continued service to American Fork City is appreciated.

Respectfully submitted,
Taylor Geotechnical



Digitally signed by
Alanson O. Taylor, P.E.
Date: 2022.09.28
15:57:56 -06'00'

The electronic version of this report is not valid without a digital signature noted.

Alanson O. Taylor, P.E.
Principal

ENT 122955:2022 PG 79 of 79