ENT 143676:2020 PG 1 of 42
JEFFERY SMITH
UTAH COUNTY RECORDER
2020 Sep 21 9:41 am FEE 40.00 BY MA
RECORDED FOR AMERICAN FORK CITY

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

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

This Notice is recorded to bind the attached Geotechnical Study dated July 25th, 2020 along with the site grading plan to the property generally located at 1620 South 700 East (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 9th day of September, 2020.

OWNER(S):

(Signature) (Signature)

Greg Rindlisbacher (Printed Name) (Printed Name)

Managing Member (Title) (Title)

STATE OF UTAH)
§
COUNTY OF SALT LAKE)

On the 9 day of SEPTEMBER, 2020, personally appeared before me GREG RINDLISBACHER and _____, 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.

NOTARY PUBLIC
NIC ABBOTT
COMM. # 707078
COMMISSION EXPIRES
JULY 5, 2023
STATE OF UTAH

Nic Abbott
Notary Public
My Commission Expires: July 5, 2023

Approved as to form: American Fork City Attorney

Rev. 12/4/18

Exhibit A

COM N 89 DEG 35' 45" W 1326.32 FT & N 60.73 FT FR SE COR. SEC. 24, T5S, R1E, SLB&M.; S 82 DEG 14' 24" W 89.2 FT; N 89 DEG 26' 51" W 588.5 FT; N 89 DEG 47' 54" W 150.04 FT; N 0 DEG 26' 49" E 44.96 FT; N 0 DEG 47' 6" E 143.49 FT; N 0 DEG 29' 8" E 343.65 FT; S 88 DEG 56' 0" E 604.99 FT; ALONG A CURVE TO R (CHORD BEARS: S 84 DEG 40' 52" E 177.96 FT, RADIUS = 1200 FT); S 80 DEG 25' 43" E 122.13 FT; S 9 DEG 35' 42" W 484.96 FT TO BEG.

AREA 10.386 AC.

GSH

REPORT
GEOTECHNICAL STUDY
PROPOSED VEST PROPERTY – AMERICAN FORK APARTMENTS NEAR THE INTERSECTION OF 620 SOUTH AND 600 EAST AMERICAN FORK, UTAH

Submitted To:

Bach Homes
116500 South State Street, Suite 300
Draper, Utah 84020

Submitted By:

GSH Geotechnical, Inc.
473 West 4800 South
Salt Lake City, Utah 84123

July 25, 2020

Job No. 1726-020-20

GSH

July 25, 2020
Job No. 1726-020-20

Mr. Brian Carlisle
Bach Homes
116500 South State Street, Suite 300
Draper, Utah 84020

Mr. Carlisle:

Re: Report
Geotechnical Study
Proposed Vest Property – American Fork Apartments
Near the Intersection of 620 South and 600 East
American Fork, Utah

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical study performed at the site of the proposed Vest Property – American Fork Apartments to be located near the intersection of 620 South and 600 East in American Fork, Utah. The general location of the site with respect to existing roadways, as of 2020, is presented on Figure 1, Vicinity Map. A more detailed layout of the site showing proposed facilities and borings drilled in conjunction with this study is presented on Figure 2, Site Plan.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of the study were planned in discussions between Mr. Brian Carlisle of Bach Homes and Mr. Alan Spilker of GSH Geotechnical, Inc. (GSH).

In general, the objectives of this study were to:

1. Define and evaluate the subsurface soil and groundwater conditions across the site.

2. Provide appropriate foundation, earthwork, pavement, and geoseismic recommendations to be utilized in the design and construction of the proposed facilities.

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Salt Lake City, Utah 84123
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www.gshgeo.com

In accomplishing these objectives, our scope has included the following:

1. A field program consisting of the drilling, logging, and sampling of 10 exploration borings, as well as a site-specific shear wave velocity test.

2. A laboratory testing program.

3. An office program consisting of the correlation of available data, engineering analysis, and the preparation of this summary report.

1.3 AUTHORIZATION

Authorization was provided by returning a signed copy of the Professional Services Agreement No. 20-0651 dated June 22, 2020.

1.4 PROFESSIONAL STATEMENTS

Supporting data upon which our recommendations are based are presented in subsequent sections of this report. Recommendations presented herein are governed by the physical properties of the soils encountered in the exploration borings, projected groundwater conditions, and the layout and design data discussed in Section 2, Proposed Construction. If subsurface conditions other than those described in this report are encountered and/or if design and layout changes are implemented, GSH must be informed so that our recommendations can be reviewed and amended, if necessary.

Our professional services have been performed, our findings developed, and our recommendations prepared in accordance with generally accepted engineering principles and practices in this area at this time.

2. PROPOSED CONSTRUCTION

The project is to consist of the construction of a residential apartment structure with an associated pool area and surrounding pavements. The structure is anticipated to be 3 to 4 stories, placed slab on grade, and supported upon conventional spread and continuous wall footings.

Maximum real column and wall loads are anticipated to be on the order of up to 200 kips and up to 7 kips per lineal foot, respectively. Real loads are defined as the total of all dead plus frequently applied (reduced) live loads.

Paved parking areas and drive lanes are planned around the structure. Projected traffic in the parking areas is anticipated to consist of a light volume of automobiles and light trucks, occasional medium-weight trucks, and no heavyweight trucks. Projected traffic in the drive lanes is anticipated to consist of a moderate volume of automobiles and light trucks, a light volume of medium-weight trucks, and occasional heavyweight trucks (garbage trucks).

Site development will require some earthwork in the form of minor cutting and filling. At this time, we anticipate that maximum site grading cuts and fills, excluding utilities, will be on the order of 1 to 3 feet.

3. SITE INVESTIGATIONS

3.1 GENERAL

Subsurface conditions in unexplored locations or at other times may vary from those encountered at specific boring locations. If such variations are noted during construction or if project development plans are changed, GSH must review the changes and amend our recommendations, if necessary.

Boring locations were established by estimating distances and angles from site landmarks. If increased accuracy is desired by the client, we recommend that the boring locations and elevations be surveyed.

3.2 FIELD PROGRAM

To define and evaluate the subsurface soil and groundwater conditions across the site, 10 borings were drilled within the accessible areas. These borings were completed to depths ranging from 11 to 46 feet with a truck-mounted drill rig equipped with hollow-stem augers. The approximate locations of the borings are presented on Figure 2.

The field portion of our study was under the direct control and continual supervision of an experienced member of our geotechnical staff. During the course of the drilling operations, a continuous log of the subsurface conditions encountered was maintained. In addition, samples of the typical soils encountered were obtained for subsequent laboratory testing and examination. The soils were classified in the field based upon visual and textural examination. These classifications were supplemented by subsequent inspection and testing in our laboratory. Graphical representation of the subsurface conditions encountered is presented on Figures 3A through 3J, Boring Logs. Soils were classified in accordance with the nomenclature described on Figure 4, Key to Boring Log (USCS).

A 3.0-inch outside diameter, 2.42-inch inside diameter drive sampler (Dames & Moore) and a 2.0-inch outside diameter, 1.38-inch inside diameter drive sampler (SPT) were utilized at select locations and depths. The blow counts recorded on the boring logs were those required to drive the sampler 12 inches with a 140-pound hammer dropping 30 inches.

Following completion of excavation operations, 1.25-inch diameter slotted PVC pipe was installed in each boring to provide a means of monitoring the groundwater fluctuations. The borings were backfilled with auger cuttings.

3.3 LABORATORY TESTING

3.3.1 General

To provide data necessary for our engineering analysis, a laboratory testing program was performed. This program included moisture, density, partial gradation, Atterberg limits, consolidation, and chemical tests. The following paragraphs describe the tests and summarize the test data.

3.3.2 Moisture and Density Tests

To provide index parameters and to correlate other test data, moisture and density tests were performed on selected samples. The results of these tests are presented on the boring logs, Figures 3A through 3J.

3.3.3 Partial Gradation Tests

To aid in classifying the granular soils, partial gradation tests were performed. Results of the tests are tabulated below and presented on the boring logs, Figures 3A through 3J.

Boring No.	Depth (feet)	Percent Passing No. 200 Sieve	Moisture Content Percent	Soil Classification
B-7	5.0	45.1	27.6	*SM/SC
B-7	10.0	32.2	24.0	*SM/SC
B-7	15.0	81.9	28.7	ML
B-7	20.0	58.1	24.4	ML
B-10	10.0	36.3	14.3	SM/SC

* Sample contained multiple clay layers

3.3.4 Atterberg Limits Test

To aid in classifying the soils, an Atterberg limits test was performed on a sample of the fine-grained cohesive soils. Results of the test are tabulated below and presented on the boring logs, Figures 3A through 3J:

Boring No.	Depth (feet)	Liquid Limit (percent)	Plastic Limit (percent)	Plasticity Index (percent)	Soil Classification
B-7	30.0	40	26	14	ML

3.3.5 Consolidation Tests

To provide data necessary for our settlement analysis, consolidation testing was performed on 3 representative samples of the natural fine-grained clay soils encountered at the site. The results of these tests indicate that the samples tested were moderately over-consolidated and will exhibit moderate strength and compressibility characteristics under the anticipated loading. Detailed results of the tests are maintained within our files and can be transmitted to you, upon your request.

3.3.6 Chemical Tests

To determine if the site soils will react detrimentally with concrete, chemical tests were performed on a representative sample of the near-surface soil encountered at the site. The results of the chemical tests are tabulated below:

Boring No.	Depth (feet)	Soil Classification	pH	Total Water Soluble Sulfate (mg/kg-dry)
B-3	2.5	CL	8.40	48.5

4. SITE CONDITIONS

4.1 SURFACE

The site is located near the intersection of 620 South and 600 East in American Fork, Utah. The site is currently vacant/undeveloped brush/grass land previously used for agricultural purposes. Review of historic aerial imagery indicates that an irrigation ditch previously existed in the northern portion of the site running from east to west. The topography of the site is relatively flat, grading down to the south with a total relief of approximately 9 to 11 feet. Site vegetation consists of various weeds and brush/grass throughout.

The site is bounded to the north by similar vacant/undeveloped brush/grass land followed by single-family residential structures; to the east by similar vacant/undeveloped brush/grass land along with a single-family residential structure followed by 4850 South Street; to the south by residential and commercial structures along with 700 South Street; and to the west by single-family residential structures followed by 620 East Street.

4.2 SUBSURFACE SOIL

The following paragraphs provide generalized descriptions of the subsurface profiles and soil conditions encountered within the borings conducted during this study. As previously noted, soil conditions may vary in unexplored locations.

The borings were drilled to depths ranging from 11 to 46 feet. The soil conditions encountered in each of the borings, to the depths penetrated, were generally similar across the boring locations.

- Approximately 4 to 6 inches of topsoil was encountered in each boring. Topsoil thickness is frequently erratic and thicker zones of topsoil should be anticipated.

- Non-engineered fill soils were encountered in each boring except Borings B-3, B-5, and B-6, to depths ranging from 1.5 to 6.5 feet beneath the existing ground surface. The non-engineered fill soils primarily consisted of sand with varying clay, silt, and gravel content, and gravel with varying silt, sand, and cobble content.

- Natural soils were encountered below the non-engineered fill or the ground surface in each boring. The natural soils consisted primarily of clay with varying silt, sand, and gravel content, silt with varying clay and sand content, and sand with varying clay, silt, and gravel content.

The natural clay/silt soils were very soft to very stiff, slightly moist to saturated, gray, brownish-gray, brownish-yellow, and brown in color, and moderately over-consolidated. The natural clay soils are anticipated to exhibit moderate strength and compressibility characteristics under the anticipated loading.

The natural sand soils were very loose to dense, slightly moist to saturated, and gray and brown in color. The natural sand soils are anticipated to exhibit moderately high strength and moderately low compressibility characteristics under the anticipated load range.

For a more descriptive interpretation of subsurface conditions, please refer to Figures 3A through 3J, Boring Logs. The lines designating the interface between soil types on the boring logs generally represent approximate boundaries. In situ, the transition between soil types may be gradual.

4.3 GROUNDWATER

On July 10, 2020 (8 days following drilling), groundwater was measured within the PVC pipes installed as tabulated below:

Boring No.	Groundwater Depth (feet)
	July 10, 2020
B-1	5.2
B-2	6.8
B-3	10.3
B-4	7.2
B-5	8.4
B-6	9.5

Boring No.	Groundwater Depth (feet)
	July 10, 2020
B-7	7.1
B-8	7.0
B-9	6.1
B-10	7.0

Groundwater levels vary with changes in season and rainfall, construction activity, irrigation, snow melt, surface water run-off, and other site-specific factors.

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

The proposed structures may be supported upon conventional spread and continuous wall foundations supported upon suitable natural soils and/or structural fill extending to suitable natural soils.

The most significant geotechnical aspects at the site are:

1. The existing non-engineered fills across much of the site.
2. The relatively shallow depth to groundwater.
3. The potentially liquefiable sand layers encountered in Boring B-7.

Prior to proceeding with construction, removal of the existing debris, surface vegetation, root systems, topsoil, non-engineered fill, and any deleterious materials from beneath an area extending out at least 5 feet from the perimeter of the proposed structure footprint and 3 feet beyond rigid pavements and exterior flatwork areas will be required. All existing utility locations should be reviewed to assess their impact on the proposed construction and abandoned and/or relocated as appropriate.

Due to the developed nature of this site and the surrounding area, additional non-engineered fills may exist in unexplored areas of the site. Based on our experience, non-engineered fills are frequently erratic in composition and consistency. All surficial loose/disturbed soils and non-engineered fills must be removed below all footings, floor slabs, and rigid pavements. The in situ, non-engineered fills may remain below flexible pavements if free of any deleterious materials, of limited thickness, and if properly prepared, as discussed later in this report.

On-site non-engineered fill soils encountered were primarily granular. On-site granular soils, including existing non-engineered fills, may be re-utilized as structural site grading fill if they meet the criteria for such, as stated later in this report.

Groundwater was measured as shallow as 5.1 feet below the ground surface. GSH recommends placing floor slabs no closer than 4 feet from the highest groundwater elevation. Site grading fill may be utilized to raise the overall grade to achieve the required separation between the floor slab and the highest groundwater elevation.

Proof rolling of the natural clay subgrade must not be completed if cuts extend to within 1 foot of the groundwater surface. In areas where cuts are to extend to within 1 foot of the groundwater surface, stabilization must be anticipated.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

A very loose, saturated sand layer was encountered in Boring B-7. Due to liquefiable soils being present, the site has been determined to be Site Class F (in accordance with Section 20.3.1, Site Class F of ASCE 7-16). According to ASCE 7-16, a site-specific response analysis is required. Section 20.3.1 of ASCE 7-16 provides exception to this requirement under certain conditions. These options will need to be reviewed and evaluated by the project structural engineer. If needed, GSH can provide additional information and analysis, including a complete site-specific response analysis.

Detailed discussions pertaining to earthwork, foundations, pavements, and the geoseismic setting of the site are presented in the following sections.

5.2 EARTHWORK

5.2.1 Site Preparation

Initial site preparation will consist of the removal of the existing debris, non-engineered fills, surface vegetation, root systems, topsoil, and any deleterious materials from beneath an area extending out at least 5 feet from the perimeter of the proposed structure footprint and 3 feet beyond rigid pavements and exterior flatwork areas. All existing utility locations should be reviewed to assess their impact on the proposed construction and abandoned and/or relocated as appropriate.

In situ, non-engineered fills may remain below flexible pavements if free of debris and deleterious materials, less than 3 feet in thickness, and if properly prepared. Proper preparation below pavements will consist of the scarification of the upper 12 inches below asphalt concrete (flexible pavement), followed by moisture preparation and re-compaction to the requirements of structural fill. Even with proper preparation, pavements established overlying non-engineered fills may encounter some long-term movements unless the non-engineered fills are completely removed.

It must be noted that from a handling and compaction standpoint, soils containing high amounts of fines (silts and clays) are inherently more difficult to rework and are very sensitive to changes in moisture content, requiring very close moisture control during placement and compaction. This will be very difficult, if not impossible, during wet and cold periods of the year. Additionally, the on-site soils are likely above optimum moisture content for compacting at present and would require some drying prior to re-compacting.

Subsequent to stripping and prior to the placement of floor slabs, foundations, structural site grading fills, exterior flatwork, and pavements, the exposed subgrade must be proof rolled by passing moderate-weight rubber tire-mounted construction equipment over the surface at least twice. If excessively soft or otherwise unsuitable soils are encountered beneath footings, they must be completely removed. If removal depth required is greater than 2 feet below footings, GSH must be notified to provide further recommendations. In pavement, floor slab, and outside flatwork areas, unsuitable natural soils should be removed to a maximum depth of 2 feet and replaced with compacted granular structural fill.

Subgrade preparation as described must be completed prior to placing overlying structural site grading fills.

Due to the relatively high groundwater, site grading cuts should be kept to a minimum. Cuts extending to within 1 foot of the groundwater elevation will likely disturb the natural clay soils and proof rolling must not be completed. Stabilization must be anticipated in areas where cuts are to extend to within 1 foot of the groundwater surface.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

GSH must be notified prior to the placement of structural site grading fills, floor slabs, footings, and pavements to verify that all loose/disturbed soils and non-engineered fills have been completely removed and/or properly prepared.

5.2.2 Temporary Excavations

Temporary excavations up to 8 feet deep in fine-grained cohesive soils, above or below the water table, may be constructed with sideslopes no steeper than one-half horizontal to one vertical (0.5H:1.0V). Excavations deeper than 8 feet are not anticipated at the site.

For granular (cohesionless) soils, construction excavations above the water table, not exceeding 4 feet, should be no steeper than one-half horizontal to one vertical (0.5H:1.0V). For excavations up to 8 feet, in granular soils and above the water table, the slopes should be no steeper than one horizontal to one vertical (1H:1V). Excavations encountering saturated cohesionless soils will be very difficult and will require very flat sideslopes and/or shoring, bracing, and dewatering.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

The static groundwater table was encountered as shallow as 5.1 feet below the existing surface and may be shallower with seasonal fluctuations. Consideration for dewatering of utility trenches, excavations for the removal of non-engineered fill, and other excavations below this level should be incorporated into the design and bidding process.

All excavations must be inspected periodically by qualified personnel. If any signs of instability or excessive sloughing are noted, immediate remedial action must be initiated.

5.2.3 Structural Fill

Structural fill is defined as all fill which will ultimately be subjected to structural loadings, such as imposed by footings, floor slabs, pavements, etc. Structural fill will be required as backfill over foundations and utilities, as site grading fill, and as replacement fill below footings. All structural fill must be free of surface vegetation, root systems, rubbish, topsoil, frozen soil, and other deleterious materials.

Structural site grading fill is defined as structural fill placed over relatively large open areas to raise the overall grade. For structural site grading fill, the maximum particle size shall not exceed 4 inches; although, occasional larger particles, not exceeding 8 inches in diameter, may be incorporated if placed randomly in a manner such that "honeycombing" does not occur and the desired degree of compaction can be achieved. The maximum particle size within structural fill placed within confined areas shall be restricted to 2 inches.

On-site soils, including existing non-engineered fills, may be re-utilized as structural site grading fill if they do not contain construction debris or deleterious material and meet the requirements of structural fill. Fine-grained soils will require very close moisture control and may be very difficult, if not impossible, to properly place and compact during wet and cold periods of the year.

Imported structural fill below foundations and floor slabs shall consist of a well graded sand and gravel mixture with less than 30 percent retained on the three-quarter-inch sieve and less than 20 percent passing the No. 200 Sieve (clays and silts).

To stabilize soft subgrade conditions (if encountered) or where structural fill is required to be placed closer than 2.0 feet above the water table at the time of construction, a mixture of coarse angular gravels and cobbles and/or 1.5- to 2.0-inch gravel (stabilizing fill) should be utilized. It may also help to utilize a stabilization fabric, such as Mirafi 600X or equivalent, placed on the natural ground if 1.5- to 2.0-inch gravel is used as stabilizing fill.

5.2.4 Fill Placement and Compaction

All structural fill shall be placed in lifts not exceeding 8 inches in loose thickness. Structural fills shall be compacted in accordance with the percent of the maximum dry density as determined by the AASHTO[1] T180 (ASTM[2] D1557) compaction criteria in accordance with the following table:

Location	Total Fill Thickness (feet)	Minimum Percentage of Maximum Dry Density
Beneath an area extending at least 5 feet beyond the perimeter of the structure	0 to 10	95
Site grading fills outside area defined above	0 to 5	90
Site grading fills outside area defined above	5 to 10	95
Utility trenches within structural areas	--	96
Road base	--	96

Structural fills greater than 10 feet thick are not anticipated at the site.

Subsequent to stripping and prior to the placement of structural site grading fill, the subgrade shall be prepared as discussed in Section 5.2.1, Site Preparation, of this report. In confined areas, subgrade preparation should consist of the removal of all loose or disturbed soils.

Coarse angular gravel and cobble mixtures (stabilizing fill), if utilized, shall be end dumped, spread to a maximum loose lift thickness of 15 inches, and compacted by dropping a backhoe bucket onto the surface continuously at least twice. As an alternative, the stabilizing fill may be compacted by passing moderately heavy construction equipment or large self-propelled compaction equipment at least twice. Subsequent fill material placed over the coarse gravels and cobbles shall be adequately compacted so that the "fines" are "worked into" the voids in the underlying coarser gravels and cobbles. Where soil fill materials are to be placed directly over more than about 18 inches of clean gravel, a separation geofabric, such as Mirafi 140N or equivalent, is recommended to be placed between the gravel and subsequent soil fills.

Non-structural fill may be placed in lifts not exceeding 12 inches in loose thickness and compacted by passing construction, spreading, or hauling equipment over the surface at least twice.

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1 American Association of State Highway and Transportation Officials
2 American Society for Testing and Materials

5.2.5 Utility Trenches

All utility trench backfill material below structurally loaded facilities (footings, floor slabs, flatwork, pavements, etc.) shall be placed at the same density requirements established for structural fill. If the surface of the backfill becomes disturbed during the course of construction, the backfill shall be proof rolled and/or properly compacted prior to the construction of any exterior flatwork over a backfilled trench. Proof rolling shall be performed by passing moderately loaded rubber tire-mounted construction equipment uniformly over the surface at least twice. If excessively loose or soft areas are encountered during proof rolling, they shall be removed to a maximum depth of 2 feet below design finish grade and replaced with structural fill.

Many utility companies and City-County governments are now requiring that Type A-1a or A-1b (AASHTO Designation – granular soils with limited fines) soils be used as backfill over utilities. These organizations are also requiring that in public roadways, the backfill over major utilities be compacted over the full depth of fill to at least 96 percent of the maximum dry density as determined by the AASHTO T180 (ASTM D1557) method of compaction. GSH recommends that as the major utilities continue onto the site that these compaction specifications are followed.

Fine-grained soils, such as silts and clays, are not recommended for utility trench backfill in structural areas.

The static groundwater table was encountered as shallow as 5.1 feet below the existing surface and may be shallower with seasonal fluctuations. Dewatering of utility trenches and other excavations below this level should be anticipated.

To reduce disturbance of the natural soils during excavation, it is recommended that low-impact, track-mounted equipment with smooth edge buckets/blades be utilized.

5.3 GROUNDWATER

On July 10, 2020 (8 days following drilling), groundwater was measured within the PVC pipes installed as tabulated below:

Boring No.	Groundwater Depth (feet)
	July 10, 2020
B-1	5.2
B-2	6.8
B-3	10.3
B-4	7.2

Boring No.	Groundwater Depth (feet)
	July 10, 2020
B-5	8.4
B-6	9.5
B-7	7.1
B-8	7.0
B-9	6.1
B-10	7.0

Based on the anticipated cuts necessary to reach design subgrades, we anticipate temporary and permanent dewatering may be necessary. Floor slabs must be placed a minimum of 4 feet from the stabilized groundwater elevation. Site grading fill may be utilized to raise the overall grade to achieve the required separation between the floor slab and the highest groundwater elevation.

The groundwater measurements presented are conditions at the time of the field exploration and may not be representative of other times or locations. Groundwater levels may vary seasonally and with precipitation, as well as other factors including irrigation. Evaluation of these factors is beyond the scope of this study. Groundwater levels may, therefore, be at shallower or deeper depths than those measured during this study, including during construction and over the life of the structure.

The extent and nature of any dewatering required during construction will be dependent on the actual groundwater conditions prevalent at the time of construction and the effectiveness of construction drainage to prevent run-off into open excavations.

5.4 SPREAD AND CONTINUOUS WALL FOUNDATIONS

5.4.1 Design Data

The results of our analysis indicate that the proposed structures may be supported upon conventional spread and continuous wall foundations established upon suitable natural soils and/or structural fill extending to suitable natural soils. Under no circumstances shall foundations be established over non-engineered fills, loose or disturbed soils, topsoil, surface vegetation, root systems, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. More heavily loaded footings will require a certain amount of granular structural replacement fill as specified in Section 5.4.3, Settlements, of this report. For design, the parameters on the following page are provided.

Minimum Recommended Depth of Embedment for Frost Protection	- 30 inches
Minimum Recommended Depth of Embedment for Non-frost Conditions	- 15 inches
Recommended Minimum Width for Continuous Wall Footings	- 18 inches
Minimum Recommended Width for Isolated Spread Footings	- 24 inches
Recommended Net Bearing Capacity for Real Load Conditions	- 2,500 pounds per square foot
Bearing Capacity Increase for Seismic Loading	- 50 percent

The term "net bearing capacity" refers to the allowable pressure imposed by the portion of the structure located above lowest adjacent final grade. Therefore, the weight of the footing and backfill to lowest adjacent final grade need not be considered. Real loads are defined as the total of all dead plus frequently applied live loads. Total load includes all dead and live loads, including seismic and wind.

5.4.2 Installation

Under no circumstances shall the footings be installed upon non-engineered fills, loose or disturbed soils, topsoil, surface vegetation, root systems, rubbish, construction debris, or other deleterious materials. If unsuitable soils are encountered, they must be removed and replaced with compacted granular fill. If granular soils become loose or disturbed, they must be recompacted prior to pouring the concrete.

The width of structural replacement fill below footings should be equal to the width of the footing plus one foot for each foot of fill thickness.

5.4.3 Settlements

Granular structural replacement fill will be required under more heavily loaded footings. For the required amount, refer to the table on the following page.

Foundations	Loading	Minimum Thickness of Replacement Structural Granular Fill (feet)
Wall	Up to 7 kips per lineal foot	0
Spread	Up to 125 kips	0
	125 kips to 200 kips	1.0

Based on column loadings, soil bearing capacities, and the foundation recommendations as discussed above, we expect primary total settlement beneath individual foundations to be less than one inch.

The amount of differential settlement is difficult to predict because the subsurface and foundation loading conditions can vary considerably across the site. However, we anticipate differential settlement between adjacent foundations could vary from 0.5 to 0.75 inch. The final deflected shape of the structure will be dependent on actual foundation locations and loading.

5.5 LATERAL RESISTANCE

Lateral loads imposed upon foundations due to wind or seismic forces may be resisted by the development of passive earth pressures and friction between the base of the footings and the supporting soils. In determining frictional resistance, a coefficient of friction of 0.35 may be utilized for the footing interface with the in situ natural clay soils and 0.40 for footing interface with natural granular soils or granular structural fill. Passive resistance provided by properly placed and compacted granular structural fill above the water table may be considered equivalent to a fluid with a density of 300 pounds per cubic foot. Below the water table, this granular soil should be considered equivalent to a fluid with a density of 150 pounds per cubic foot.

A combination of passive earth resistance and friction may be utilized provided that the friction component of the total is divided by 1.5.

5.6 FLOOR SLABS

Floor slabs may be established upon suitable natural subgrade soils or structural fill extending to suitable natural soils. Under no circumstances shall floor slabs be established directly over non-engineered fills, loose or disturbed soils, sod, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water.

Additionally, GSH recommends that floor slabs be constructed a minimum of 4.0 feet from the stabilized groundwater elevation. Site grading fill may be utilized to raise the overall grade to achieve the required separation between the floor slab and the highest groundwater elevation.

To facilitate curing of the concrete and to provide a capillary moisture break, it is recommended that floor slabs be directly underlain by at least 4 inches of "free-draining" fill, such as "pea" gravel or three-quarters to one-inch minus clean gap-graded gravel.

Settlement of lightly loaded floor slabs designed according to previous recommendations (average uniform pressure of 200 pounds per square foot or less) is anticipated to be less than one-quarter of an inch.

5.7 PAVEMENTS

The natural clay soils and non-engineered fills will exhibit poor pavement support characteristics when saturated. All pavement areas must be prepared as previously discussed (see Section 5.2.1, Site Preparation). Under no circumstances shall pavements be established over unprepared non-engineered fills, loose or disturbed soils, topsoil, surface vegetation, root systems, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. With the subgrade soils and the projected traffic as discussed in Section 2, Proposed Construction, the following pavement sections are recommended:

Parking Areas

(Light Volume of Automobiles and Light Trucks,
Occasional Medium-Weight Trucks,
and No Heavyweight Trucks)
[1-3 equivalent 18-kip axle loads per day]

Flexible Pavements:
(Asphalt Concrete)

3.0 inches	Asphalt concrete
8.0 inches	Aggregate base
Over	Properly prepared fills, stabilized natural subgrade soils, and/or structural site grading fill extending to properly prepared fills and/or stabilized natural subgrade soils

Rigid Pavements:
(Non-reinforced Concrete)

5.0 inches	Portland cement concrete (non-reinforced)

5.0 inches	Aggregate base
Over	Properly prepared and stabilized natural subgrade soils, and/or structural site grading fill extending to properly prepared and stabilized natural subgrade soils

Roadways

(Moderate Volume of Automobiles and Light Trucks,
Light Volume of Medium-Weight Trucks,
and Occasional Heavyweight Trucks)
[6 equivalent 18-kip axle loads per day]

Flexible Pavements:
(Asphalt Concrete)

3.0 inches	Asphalt concrete
9.0 inches	Aggregate base
Over	Properly prepared fills, stabilized natural subgrade soils, and/or structural site grading fill extending to properly prepared fills and/or stabilized natural subgrade soils

Rigid Pavements:
(Non-reinforced Concrete)

6.0 inches	Portland cement concrete (non-reinforced)
6.0 inches	Aggregate base
Over	Properly prepared and stabilized natural subgrade soils, and/or structural site grading fill extending to properly prepared and stabilized natural subgrade soils

For dumpster pads, we recommend a pavement section consisting of 7.0 inches of Portland cement concrete, 12.0 inches of aggregate base, over properly prepared natural subgrade or site grading

structural fills. Dumpster pads should not be constructed overlying non-engineered fills under any circumstances.

These above rigid pavement sections are for non-reinforced Portland cement concrete. Concrete should be designed in accordance with the American Concrete Institute (ACI) and joint details should conform to the Portland Cement Association (PCA) guidelines. The concrete should have a minimum 28-day unconfined compressive strength of 4,000 pounds per square inch and contain 6 percent ±1 percent air-entrainment.

The crushed stone should conform to applicable sections of the current Utah Department of Transportation (UDOT) Standard Specifications. All asphalt material and paving operations should meet applicable specifications of the Asphalt Institute and UDOT. A GSH technician shall observe placement and perform density testing of the base course material and asphalt.

Please note that the recommended pavement section is based on estimated post-construction traffic loading. If the pavement is to be constructed and utilized by construction traffic, the above pavement section may prove insufficient for heavy truck traffic, such as concrete trucks or tractor-trailers used for construction delivery. Unexpected distress, reduced pavement life, and/or premature failure of the pavement section could result if subjected to heavy construction traffic and the owner should be made aware of this risk. If the estimated traffic loading stated herein is not correct, GSH must review actual pavement loading conditions to determine if revisions to these recommendations are warranted.

5.8 CEMENT TYPES

The laboratory tests indicate that the natural soils tested contain a negligible amount of water soluble sulfates. Based on our test results, concrete in contact with the on-site soil will have a low potential for sulfate reaction (ACI 318, Table 4.3.1). Therefore, all concrete which will be in contact with the site soils may be prepared using Type I or IA cement.

5.9 GEOSEISMIC SETTING

5.9.1 General

Utah municipalities have adopted the International Building Code (IBC) 2018. The IBC 2018 code refers to ASCE 7-16 Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE 7-16) determines the seismic hazard for a site based upon mapping of bedrock accelerations prepared by the United States Geologic Survey (USGS) and the soil site class. The USGS values are presented on maps incorporated into the IBC code and are also available based on latitude and longitude coordinates (grid points).

5.9.2 Faulting

Based on our review of available literature, no active faults pass through or immediately adjacent to the site. The nearest active mapped fault consists of the Utah Lake Faults, located about 2.1 miles to the southeast of the site.

5.9.3 Soil Class

Due to liquefiable soils being present, the site has been determined to be Site Class F (in accordance with Section 20.3.1, Site Class F of ASCE 7-16). According to ASCE 7-16, a site-specific response analysis is required. Section 20.3.1 of ASCE 7-16 provides exception to this requirement under certain conditions. These options will need to be reviewed and evaluated by the project structural engineer. If needed, GSH can provide additional information and analysis including a complete site-specific response analysis.

5.9.4 Ground Motions

The IBC 2018 code is based on USGS mapping, which provides values of short and long period accelerations for average bedrock values for the Western United States and must be corrected for local soil conditions. The following table summarizes the peak ground and short and long period accelerations for the MCE event and incorporates the appropriate soil amplification factor for a Site Class D – Default Profile. Based on the site latitude and longitude (40.3636 degrees north and 111.7789 degrees west, respectively), the values for this site are tabulated below:

Spectral Acceleration Value, T	Bedrock Boundary [mapped values] (% g)	Site Coefficient	Site Class * [adjusted for site class effects] (% g)	Design Values* (% g)
Peak Ground Acceleration	*	F_a = *	*	*
0.2 Seconds (Short Period Acceleration)	S_S = *	F_a = *	S_{MS} = *	S_{DS} = *
1.0 Second (Long Period Acceleration)	S_1 = *	F_v = *	S_{M1} = *	S_{D1} = *

* See Section 5.9.3, Soil Class.

5.9.5 Liquefaction

The site is located in an area that has been identified by the Utah Geological Survey (UGS) as being a "high" liquefaction potential zone. Liquefaction is defined as the condition when saturated, loose, granular soils lose their support capabilities because of excessive pore water pressure, which

develops during a seismic event. Clayey soils, even if saturated, will generally not liquefy during a major seismic event.

Calculations were performed using the procedures described in the 2008 Soil Liquefaction During Earthquakes Monograph by Idriss and Boulanger[3]. Our calculations indicate the very loose, saturated sand layer encountered in Boring B-1 could liquefy during the design seismic event. Calculated settlement associated with the liquefaction of each layer within the borings was less than 2.2 inches. This magnitude of settlement should be tolerable to design for life safety. Additionally, lateral spread and ground rupture are unlikely to occur.

5.10 SITE VISITS

GSH must verify that all topsoil/disturbed soils and any other unsuitable soils have been removed, that non-engineered fills have been removed and/or properly prepared, and that suitable soils have been encountered prior to placing site grading fills, footings, slabs, and pavements. Additionally, GSH must observe fill placement and verify in-place moisture content and density of fill materials placed at the site.

[3] Idriss, I. M., and Boulanger, R. W. (2008), Soil liquefaction during earthquakes: Monograph MNO-12, Earthquake Engineering Research Institute, Oakland, CA, 261 pp.

5.11 CLOSURE

If you have any questions or would like to discuss these items further, please feel free to contact us at (801) 685-9190.

Respectfully submitted,

GSH Geotechnical, Inc.

Robert A. Gifford
Staff Engineer/Geologist

Reviewed by:

Alan D. Spilker, P.E.
State of Utah No. 334228
President/Senior Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
No. 334228
ALAN D. SPILKER
STATE OF UTAH

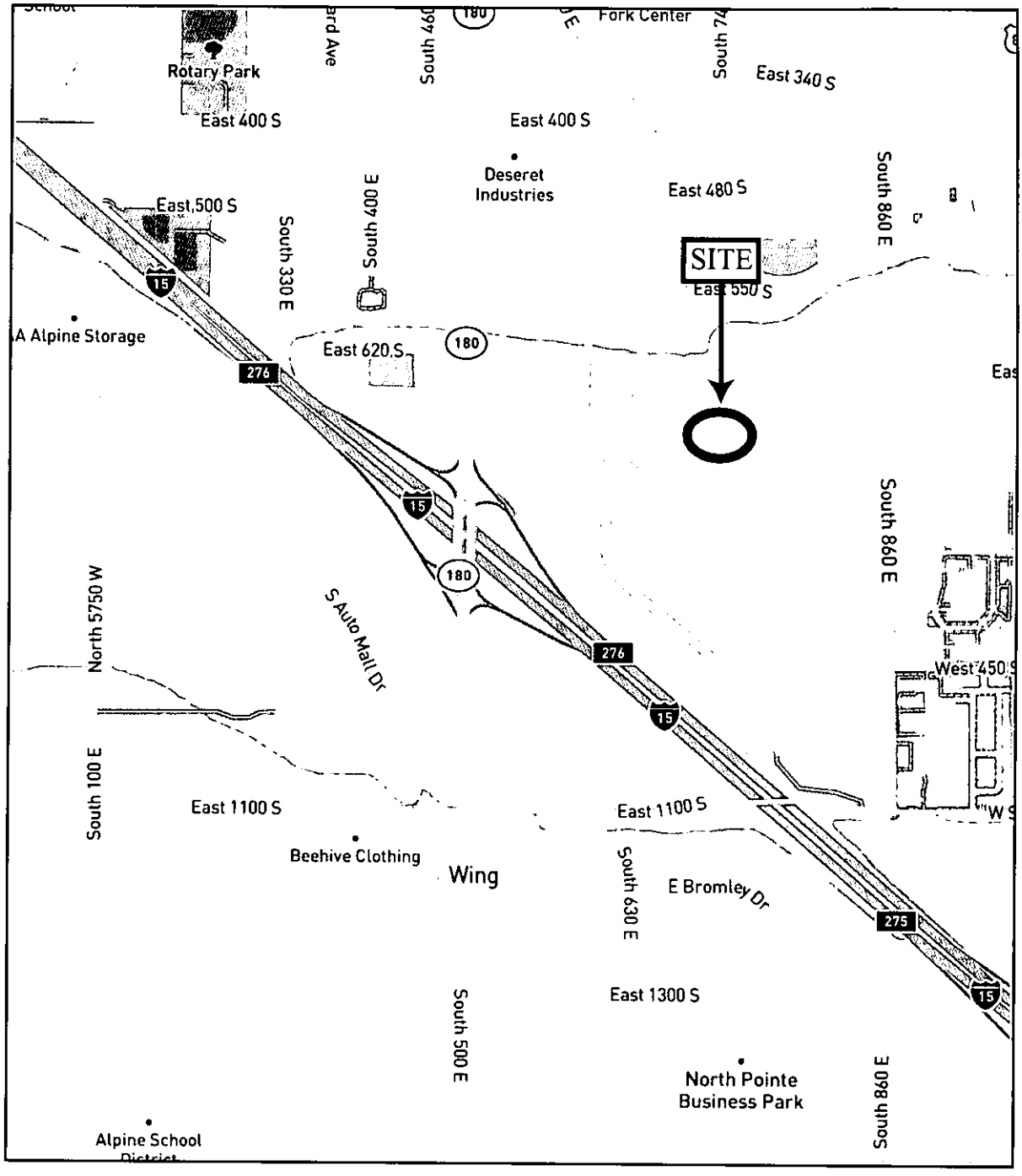
RAG/ADS:jlh

Encl. Figure 1, Vicinity Map
Figure 2, Site Plan
Figures 3A through 3J, Log of Borings
Figure 4, Key to Boring Log (USCS)

Addressee (email)

cc: Mr. James McLaughlin (email)
Back Homes

BACH HOMES
JOB NO. 1726-020-20



200 0 200 400 600 800 M

0.2 0 0.2 MI 0.4

FIGURE 1
VICINITY MAP

REFERENCE:
ALL TRAILS - NATIONAL GEOGRAPHIC TERRAIN
DATED 2020

GSH

BACH HOMES
JOB NO. 1726-020-20

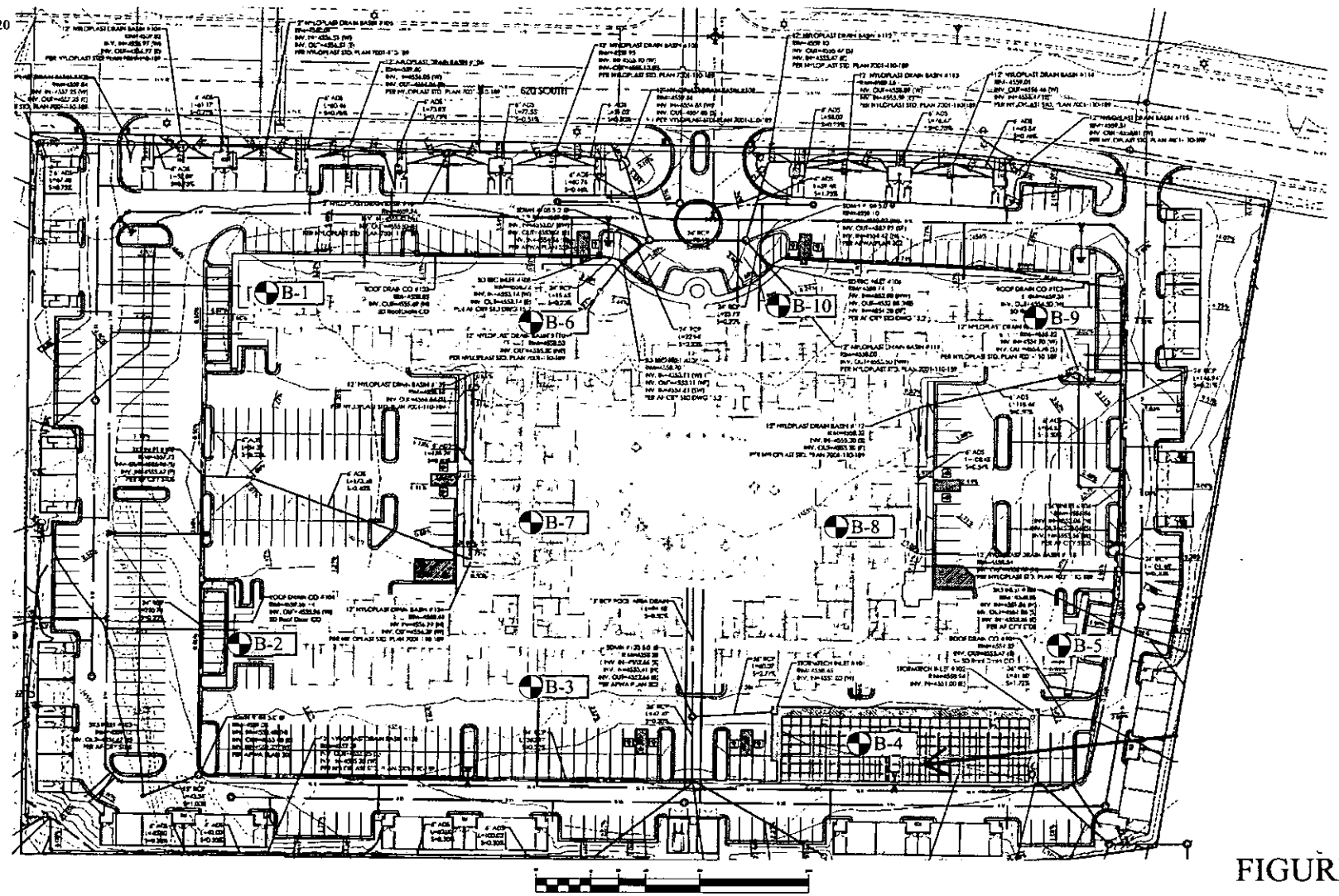


FIGURE 2
SITE PLAN

GSH

REFERENCE:
ADAPTED FROM DRAWING ENTITLED
"BACH APARTMENTS, SHEET C5.0" BY FOCUS
DATED 05/05/2020

GSH

BORING LOG

Page: 1 of 1

BORING: B-1

CLIENT: Bach Homes — PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments — DATE STARTED: 7/1/20 — DATE FINISHED: 7/1/20

LOCATION: Near Intersection of 620 South 600 East, American Fork, Utah — GSH FIELD REP.: HB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 5.2' (7/10/20) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM/SC FILL	SILTY/CLAYEY FINE TO MEDIUM SAND, FILL with some fine gravel; major roots (topsoil) to 6"; brown		34							slightly moist medium dense
	CL	SILTY CLAY with fine sand and occasional layers of silty fine sand up to 1/2" thick; organics; gray									slightly moist stiff
▼			5	10							saturated
		grades brown	10	17							very stiff
	SM/SC	SILTY FINE TO MEDIUM SAND with some clay and layers of clay up to 2" thick; brown									saturated loose
			15	16		27.0	98				
		End of Exploration at 16.0'. No groundwater encountered at time of drilling. Installed 1.25" diameter slotted PVC pipe to 16.0'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3A

GSH	BORING LOG Page: 1 of 1	BORING: B-2

CLIENT: Bach Homes — PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments — DATE STARTED: 7/1/20 — DATE FINISHED: 7/1/20

LOCATION: Near Intersection of 620 South 600 East, American Fork, Utah — GSH FIELD REP.: HB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 6.8' (7/10/20) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM/SC FILL	SILTY FINE TO COARSE SAND, FILL with some clay and trace fine and coarse gravel; major roots (topsoil) to 4"; brown									slightly moist very loose
	SM/SC	SILTY FINE TO COARSE SAND with some clay and trace fine and coarse gravel; brown		6		25.4	95				slightly moist very loose
			5								
				18		20.7	104				medium dense
▼											saturated
	CL	SILTY CLAY with silty fine sand; roots; brownish gray	10	0		30.7	92				saturated very soft
		End of Exploration at 11.0'. Installed 1.25" diameter slotted PVC pipe to 11.0'.									
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3B

GSH BORING LOG

Page: 1 of 1

BORING: B-3

CLIENT: Bach Homes — PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments — DATE STARTED: 7/1/20 — DATE FINISHED: 7/1/20

LOCATION: Near Intersection of 620 South 600 East, American Fork, Utah — GSH FIELD REP.: HB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 10.3' (7/10/20) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with fine sand; major roots (topsoil) to 6"; brown									slightly moist stiff
				17							
			5								
				10							moist stiff
▼		grades fine sandy clay with silt and occasional layers of silty fine sand up to 2" thick; brown	10								medium stiff saturated
				7		30.8	94				
		End of Exploration at 13.0'. Installed 1.25" diameter slotted PVC pipe to 13.0'.	15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3C

GSH

BORING LOG

Page: 1 of 1

BORING: B-4

CLIENT: Bach Homes | PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments | DATE STARTED: 7/1/20 | DATE FINISHED: 7/1/20

LOCATION: Near Intersection of 620 South 600 East, American Fork, Utah | GSH FIELD REP.: HB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger | HAMMER: Automatic | WEIGHT: 140 lbs | DROP: 30"

GROUNDWATER DEPTH: 7.2' (7/10/20) | ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	GP/ GM FILL	FINE AND COARSE GRAVEL, FILL with fine to medium sand and silt; major roots (topsoil) to 6"; brown		34		5.4	110				dry-slightly moist medium dense
	GP FILL	FINE AND COARSE GRAVEL, FILL with fine to coarse sand; brown and gray	5	20							slightly moist medium dense
▼	CL	SILTY CLAY with trace fine sand; organics; gray									moist medium stiff saturated
			10	4							
	SM/ SC	SILTY FINE TO MEDIUM SAND with clay; gray									saturated loose
			15	12							
		End of Exploration at 16.0'. Installed 1.25" diameter slotted PVC pipe to 16.0'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3D

GSH	BORING LOG Page: 1 of 1	BORING: B-5

CLIENT: Bach Homes — PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments — DATE STARTED: 7/1/20 — DATE FINISHED: 7/1/20

LOCATION: Near Intersection of 620 South 600 East, American Fork, Utah — GSH FIELD REP.: HB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 8.4' (7/10/20) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	FINE SANDY CLAY with silt and some fine gravel; major roots (topsoil) to 6"; brown									slightly moist medium stiff
				8							
			5								
		grades with occasional layers of silty fine sand up to 2" thick; gray		7		19.3	113				
▼											saturated
			10								
		grades with layers of fine to medium sand up to 3" thick									moist stiff
				12							
		End of Exploration at 13.0'. No groundwater encountered at time of drilling. Installed 1.25" diameter slotted PVC pipe to 13.0'.	15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3E

GSH	BORING LOG Page: 1 of 1	BORING: B-6

CLIENT: Bach Homes — PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments — DATE STARTED: 7/1/20 — DATE FINISHED: 7/1/20

LOCATION: Near Intersection of 620 South 600 East, American Fork, Utah — GSH FIELD REP.: HB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 9.5' (7/10/20) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with fine sand; major roots (topsoil) to 4"; brown									dry stiff
				15							slightly moist
		grades fine sandy clay with silt and organics; layers of silty fine sand up to 2" thick	5	16		20.4	108				moist
▼		grades silty clay with trace fine sand; brownish-yellow	10	17							saturated
		End of Exploration at 11.0'. Installed 1.25" diameter slotted PVC pipe to 11.0'.	15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3F

GSH BORING LOG

Page: 1 of 2

BORING: B-7

CLIENT: Bach Homes | PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments | DATE STARTED: 7/2/20 | DATE FINISHED: 7/2/20

LOCATION: Near Intersection of 620 South 600 East, American Fork, Utah | GSH FIELD REP.: HB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger | HAMMER: Automatic | WEIGHT: 140 lbs | DROP: 30"

GROUNDWATER DEPTH: 7.1' (7/10/20) | ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	GM FILL	FINE AND COARSE GRAVEL, FILL with fine to coarse sand and cobbles; major roots (topsoil) to 4"; gray		50/5"							dry very dense
	SM/SC	SILTY/CLAYEY FINE TO MEDIUM SAND with some fine gravel and occasional layers of silty clay up to 2" thick; brown	5	10		27.6	99	45.1			slightly moist loose
▼											saturated
		grades silty/clayey fine to coarse sand with layers of clay up to 2"	10	2		24.0		32.2			very loose
	ML	FINE SANDY SILT brown	15	7		28.7		81.9			saturated medium stiff
			20	14		24.4		58.1			stiff
			25	11							

See Subsurface Conditions section in the report for additional information.

FIGURE 3G

GSH BORING LOG

Page: 2 of 2

BORING: B-7

CLIENT: Bach Homes — PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments — DATE STARTED: 7/2/20 — DATE FINISHED: 7/2/20

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
			25	11							
		grades gray									
		grades with layers of fine to coarse sand up to 1" thick	30	12					40	14	
	SP/SM	FINE TO COARSE SAND with some silt and trace fine gravel; gray									saturated dense
			35	38							
		grades with occasional layers of fine silty clay up to 3" thick									
			40	32							
			45	29							medium dense
		End of Exploration at 46.0'. Installed 1.25" diameter slotted PVC pipe to 46.0'.									
			50								

See Subsurface Conditions section in the report for additional information.

FIGURE 3G
(continued)

GSH

BORING LOG

Page: 1 of 1

BORING: B-8

CLIENT: Bach Homes | PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments | DATE STARTED: 7/2/20 | DATE FINISHED: 7/2/20

LOCATION: Near Intersection of 620 South 600 East, American Fork, Utah | GSH FIELD REP.: HB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger | HAMMER: Automatic | WEIGHT: 140 lbs | DROP: 30"

GROUNDWATER DEPTH: 7.0' (7/10/20) | ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	GP/GM FILL	FINE AND COARSE GRAVEL, FILL with fine sand and silt; major roots (topsoil) to 6"; brown									slightly moist medium dense
			5	12							
	CL	SILTY CLAY with fine sand; organics; gray									moist medium stiff
▼											saturated
			10	4		19.2	102				
		grades fine sandy clay with layers of silty fine sand up to 1" thick	15	13							stiff
		End of Exploration at 16.0'. No groundwater encountered at time of drilling. Installed 1.25" diameter slotted PVC pipe to 16.0'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3H

GSH BORING LOG

Page: 1 of 1

BORING: B-9

CLIENT: Bach Homes | PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments | DATE STARTED: 7/2/20 | DATE FINISHED: 7/2/20

LOCATION: Near Intersection of 620 South 600 East, American Fork, Utah | GSH FIELD REP.: HB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger | HAMMER: Automatic | WEIGHT: 140 lbs | DROP: 30"

GROUNDWATER DEPTH: 6.1' (7/10/20) | ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	GP/ GM FILL	FINE AND COARSE GRAVEL, FILL with fine to coarse sand; major roots (topsoil) to 4"; brown									slightly moist loose
				13							
	CL	FINE SANDY CLAY with silt; organics; gray	5								moist medium stiff
▼											saturated
				7		35.9	84				
			10								
		grades with layers of silty fine sand up to 3" thick; gray and brown		10							stiff
		End of Exploration at 13.0'. Installed 1.25" diameter slotted PVC pipe to 13.0'.	15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 31

GSH	BORING LOG Page: 1 of 1	BORING: B-10

CLIENT: Bach Homes — PROJECT NUMBER: 1726-020-20

PROJECT: Proposed Vest Property - American Fork Apartments — DATE STARTED: 7/2/20 — DATE FINISHED: 7/2/20

LOCATION: Near Intersection of 620 South 600 East, American Fork, Utah — GSH FIELD REP.: HB

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger — HAMMER: Automatic — WEIGHT: 140 lbs — DROP: 30"

GROUNDWATER DEPTH: 7.0' (7/10/20) — ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	GM FILL	FINE AND COARSE GRAVEL, FILL with fine to coarse sand; major roots (topsoil) to 4"; brown									dry medium dense
				40							
	SM/ SC	SILTY/CLAYEY FINE TO MEDIUM SAND gray and brown									slightly moist loose
			5	17							
▼											saturated
		grades with fine and coarse gravel; medium sand grades out; brown	10	7		14.3		36.3			
		End of Exploration at 11.0'. No groundwater encountered at time of drilling. Installed 1.25" diameter slotted PVC pipe to 11.0'.	15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3J

CLIENT: Bach Homes
PROJECT: Proposed Vest Property - American Fork Apartments
PROJECT NUMBER: 1726-020-20

KEY TO BORING LOG

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫

COLUMN DESCRIPTIONS

① **Water Level:** Depth to measured groundwater table. See symbol below.

② **USCS:** (Unified Soil Classification System) Description of soils encountered; typical symbols are explained below.

③ **Description:** Description of material encountered; may include color, moisture, grain size, density/consistency,

④ **Depth (ft.):** Depth in feet below the ground surface.

⑤ **Blow Count:** Number of blows to advance sampler 12" beyond first 6", using a 140-lb hammer with 30" drop.

⑥ **Sample Symbol:** Type of soil sample collected at depth interval shown; sampler symbols are explained below.

⑦ **Moisture (%):** Water content of soil sample measured in laboratory; expressed as percentage of dryweight of

⑧ **Dry Density (pcf):** The density of a soil measured in laboratory; expressed in pounds per cubic foot.

⑨ **% Passing 200:** Fines content of soils sample passing a No. 200 sieve; expressed as a percentage.

⑩ **Liquid Limit (%):** Water content at which a soil changes from plastic to liquid behavior.

⑪ **Plasticity Index (%):** Range of water content at which a soil exhibits plastic properties.

⑫ **Remarks:** Comments and observations regarding drilling or sampling made by driller or field personnel. May include other field and laboratory test results using the following abbreviations:

CEMENTATION:	MODIFIERS:	MOISTURE CONTENT (FIELD TEST):
Weakly: Crumbles or breaks with handling or slight finger pressure.	**Trace** <5%	**Dry:** Absence of moisture, dusty, dry to the touch.
Moderately: Crumbles or breaks with considerable finger pressure.	**Some** 5-12%	**Moist:** Damp but no visible water.
Strongly: Will not crumble or break with finger pressure.	**With** > 12%	**Saturated:** Visible water, usually soil below water table.

Descriptions and stratum lines are interpretive; field descriptions may have been modified to reflect lab test results. Descriptions on the logs apply only at the specific boring locations and at the time the borings were advanced; they are not warranted to be representative of subsurface conditions at other locations or times.

UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)

MAJOR DIVISIONS			USCS SYMBOLS	TYPICAL DESCRIPTIONS
COARSE-GRAINED SOILS More than 50% of material is larger than No. 200 sieve size.	GRAVELS More than 50% of coarse fraction retained on No. 4 sieve.	CLEAN GRAVELS (little or no fines)	GW	Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
			GP	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines
		GRAVELS WITH FINES (appreciable amount of fines)	GM	Silty Gravels, Gravel-Sand-Silt Mixtures
			GC	Clayey Gravels, Gravel-Sand-Clay Mixtures
	SANDS More than 50% of coarse fraction passing through No. 4 sieve.	CLEAN SANDS (little or no fines)	SW	Well-Graded Sands, Gravelly Sands, Little or No Fines
			SP	Poorly-Graded Sands, Gravelly Sands, Little or No Fines
		SANDS WITH FINES (appreciable amount of fines)	SM	Silty Sands, Sand-Silt Mixtures
			SC	Clayey Sands, Sand-Clay Mixtures
FINE-GRAINED SOILS More than 50% of material is smaller than No. 200 sieve size.	SILTS AND CLAYS Liquid Limit less than 50%		ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity
			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays
			OL	Organic Silts and Organic Silty Clays o f Low Plasticity
	SILTS AND CLAYS Liquid Limit greater than 50%		MH	Inorganic Silts, Micacious or Diatomacious Fine Sand or Silty Soils
			CH	Inorganic Clays of High Plasticity, Fat Clays
			OH	Organic Silts and Organic Clays of Medium to High Plasticity
HIGHLY ORGANIC SOILS			PT	Peat, Humus, Swamp Soils with High Organic Contents

Note: Dual Symbols are used to indicate borderline soil classifications.

STRATIFICATION:

DESCRIPTION	THICKNESS
Seam	up to 1/8"
Layer	1/8" to 12"
Occasional:	One or less per 6" of thickness
Numerous:	More than one per 6" of thickness

TYPICAL SAMPLER GRAPHIC SYMBOLS

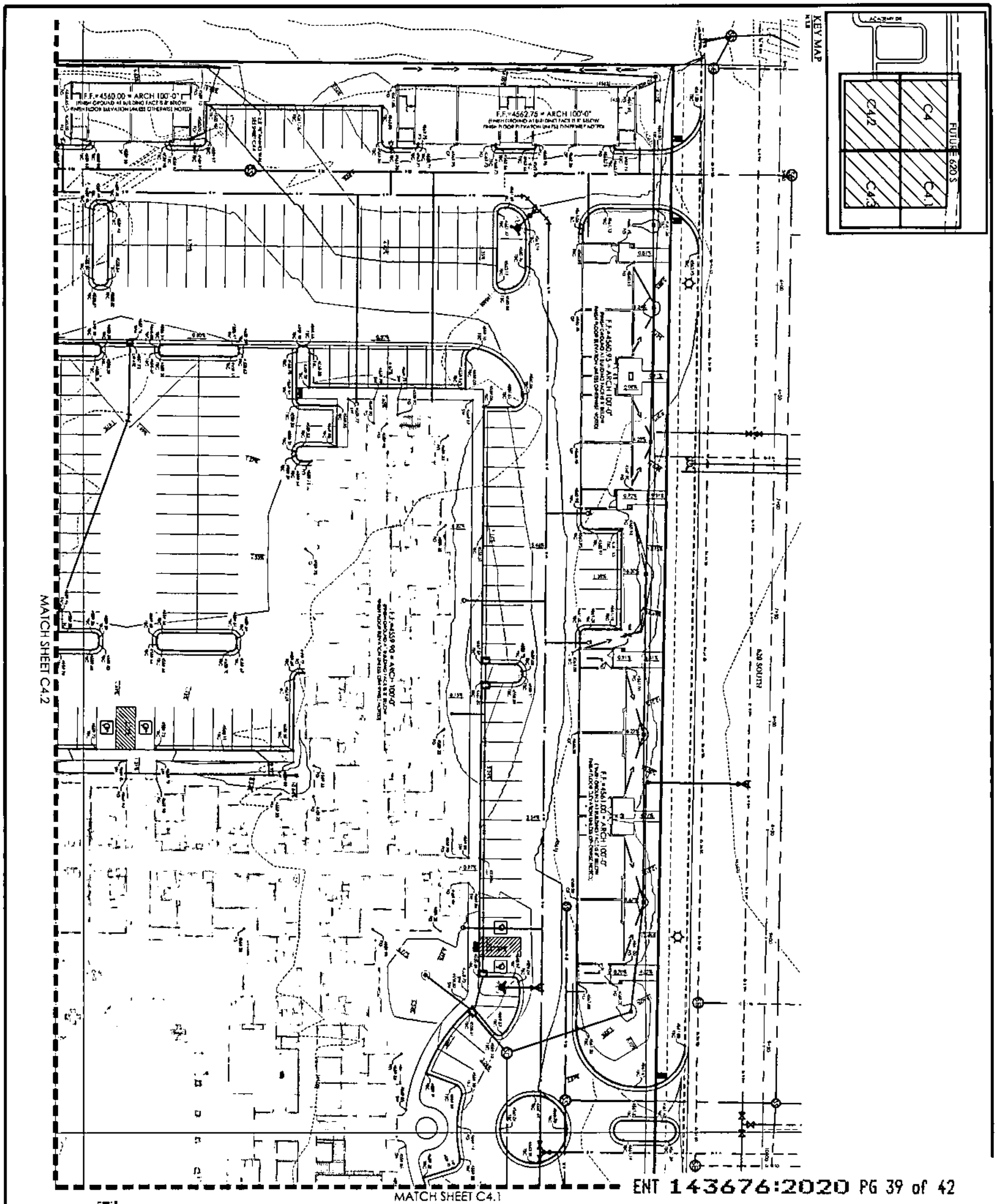
- Bulk/Bag Sample
- Standard Penetration Split Spoon Sampler
- Rock Core
- No Recovery
- 3.25" OD, 2.42" ID D&M Sampler
- 3.0" OD, 2.42" ID D&M Sampler
- California Sampler
- Thin Wall

WATER SYMBOL

- Water Level

FIGURE 4

GSH



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LEGEND

NOTES:
1) NO BASEMENTS WILL BE INSTALLED PER SENSITIVE LAND ORDINANCE 4.5.5.
2) MAIN BUILDING - GARAGE FLOOR ELEVATION [TYP.] = 4559.23

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.

Know what's below. Call 811 before you dig.

GRADING PLAN
C4.0

REVISION BLOCK

#	DATE	DESCRIPTION
1	----	----
2	----	----
3	----	----
4	----	----
5	----	----
6	----	----

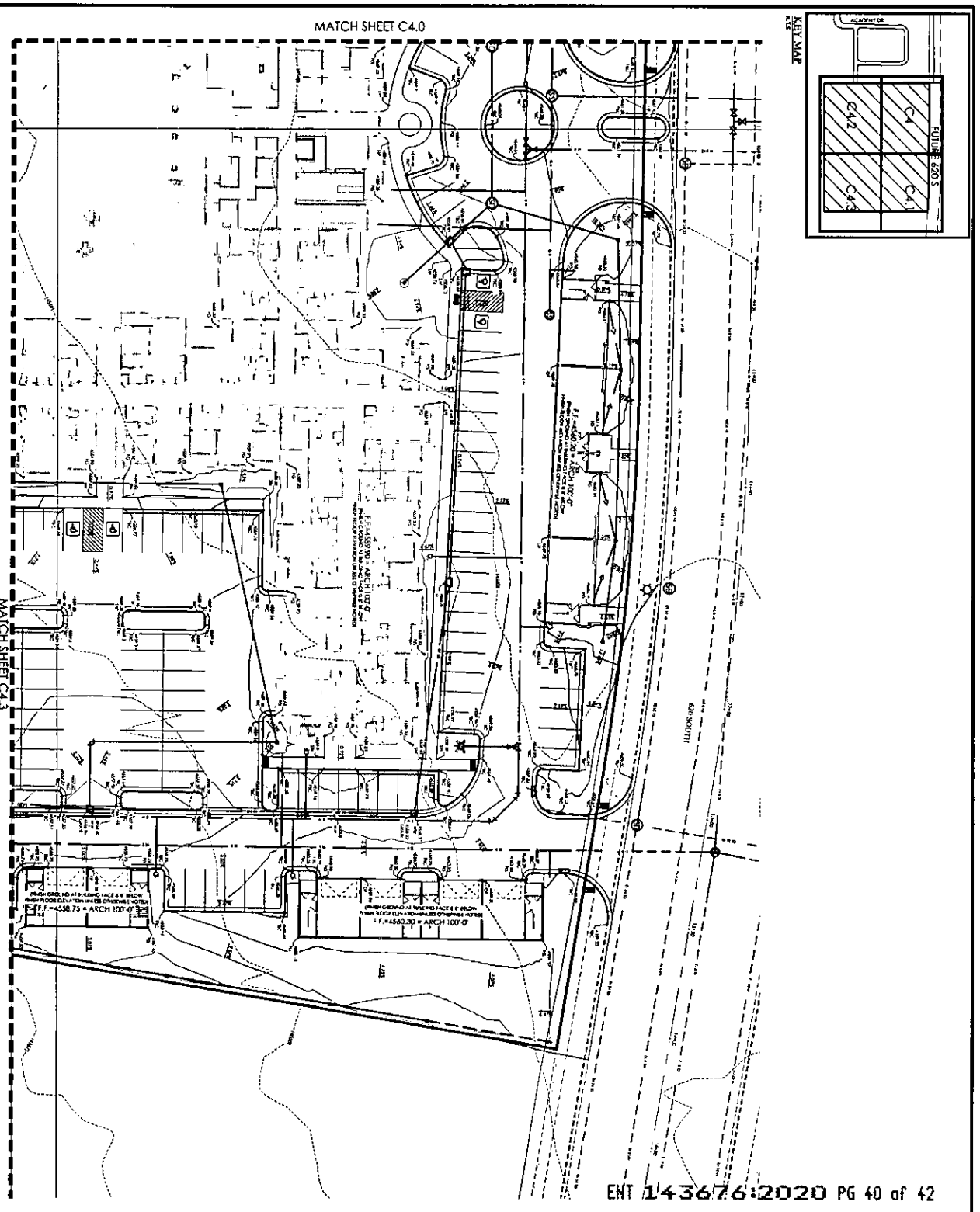
BACH APARTMENTS

AMERICAN FORK, UT

GRADING PLAN

FOR REVIEW ONLY

FOCUS ENGINEERING AND SURVEYING, LLC
6949 S. HIGH TECH DRIVE SUITE 200
MIDVALE, UTAH 84047 PH: (801) 352-0075
www.focusutah.com



LEGEND

NOTES:
(1) NO BASEMENTS WILL BE INSTALLED PER SENSITIVE LAND ORDINANCE 4.5.5.
(2) MAIN BUILDING - GARAGE FLOOR ELEVATION (TYP.) = 4559.25

GRAPHIC SCALE

REVISION BLOCK		
#	DATE	DESCRIPTION

BACH APARTMENTS

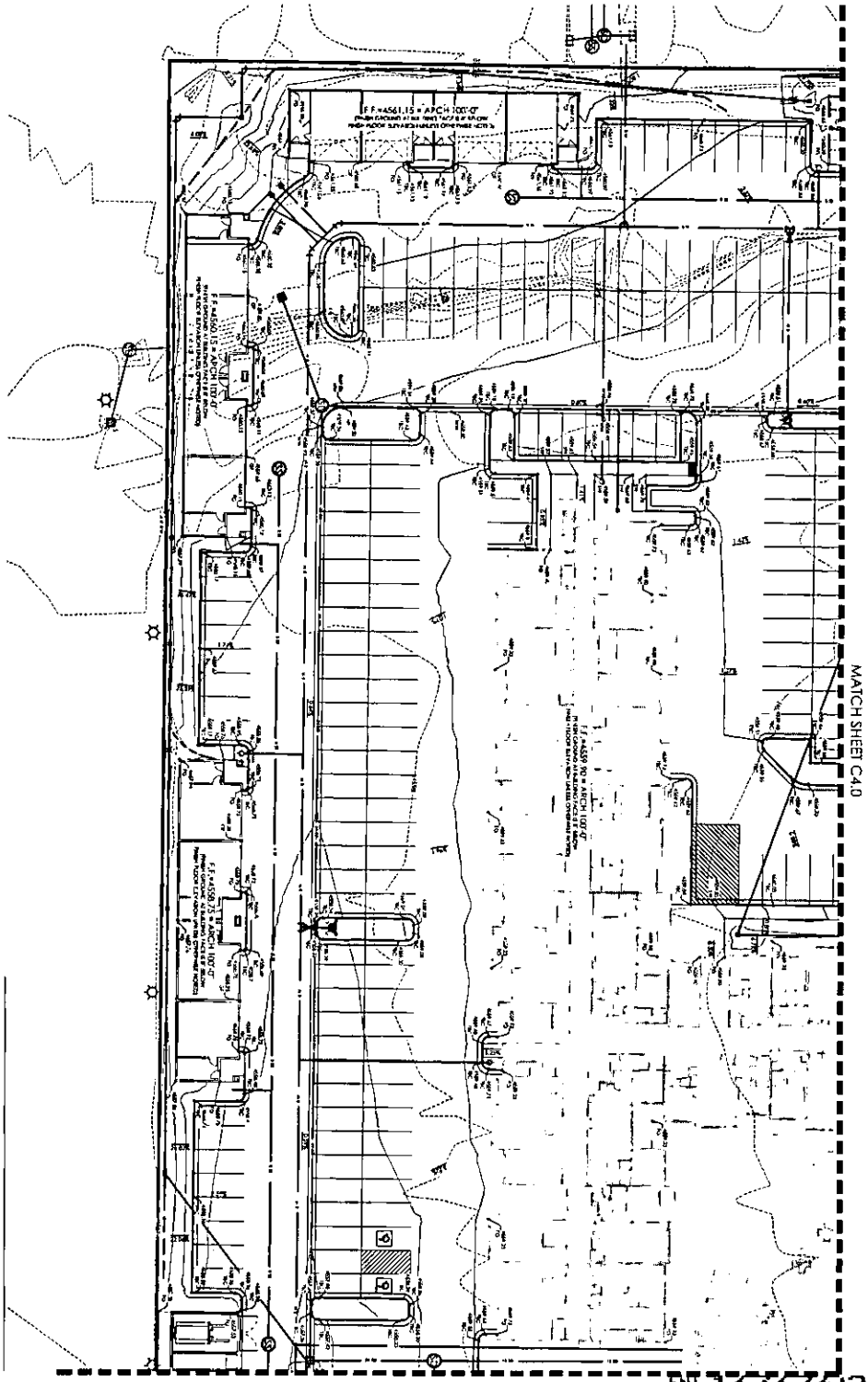
AMERICAN FORK, UT

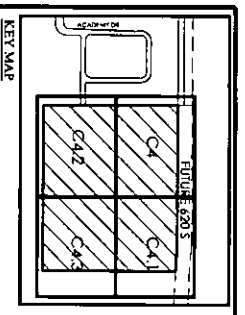
GRADING PLAN

FOR REVIEW ONLY

C4.1 GRADING PLAN

FOCUS
ENGINEERING AND SURVEYING, LLC
6949 S. HIGH TECH DRIVE SUITE 200
MIDVALE, UTAH 84047 PH: (801) 352-0075
www.focusutah.com





GRAPHIC SCALE
1 INCH = 10 FEET

NOTES:
(1) NO BASEMENTS WILL BE INSTALLED PER SENSITIVE LAND ORDINANCE 4.5.5.
(2) MAIN BUILDING - GARAGE FLOOR ELEVATION (TYP.) = 4559.25'

LEGEND

C4.2 GRADING PLAN

REVISION BLOCK		
#	DATE	DESCRIPTION
-	-	-
-	-	-
-	-	-
-	-	-
-	-	-

BACH APARTMENTS

AMERICAN FORK, UT

GRADING PLAN

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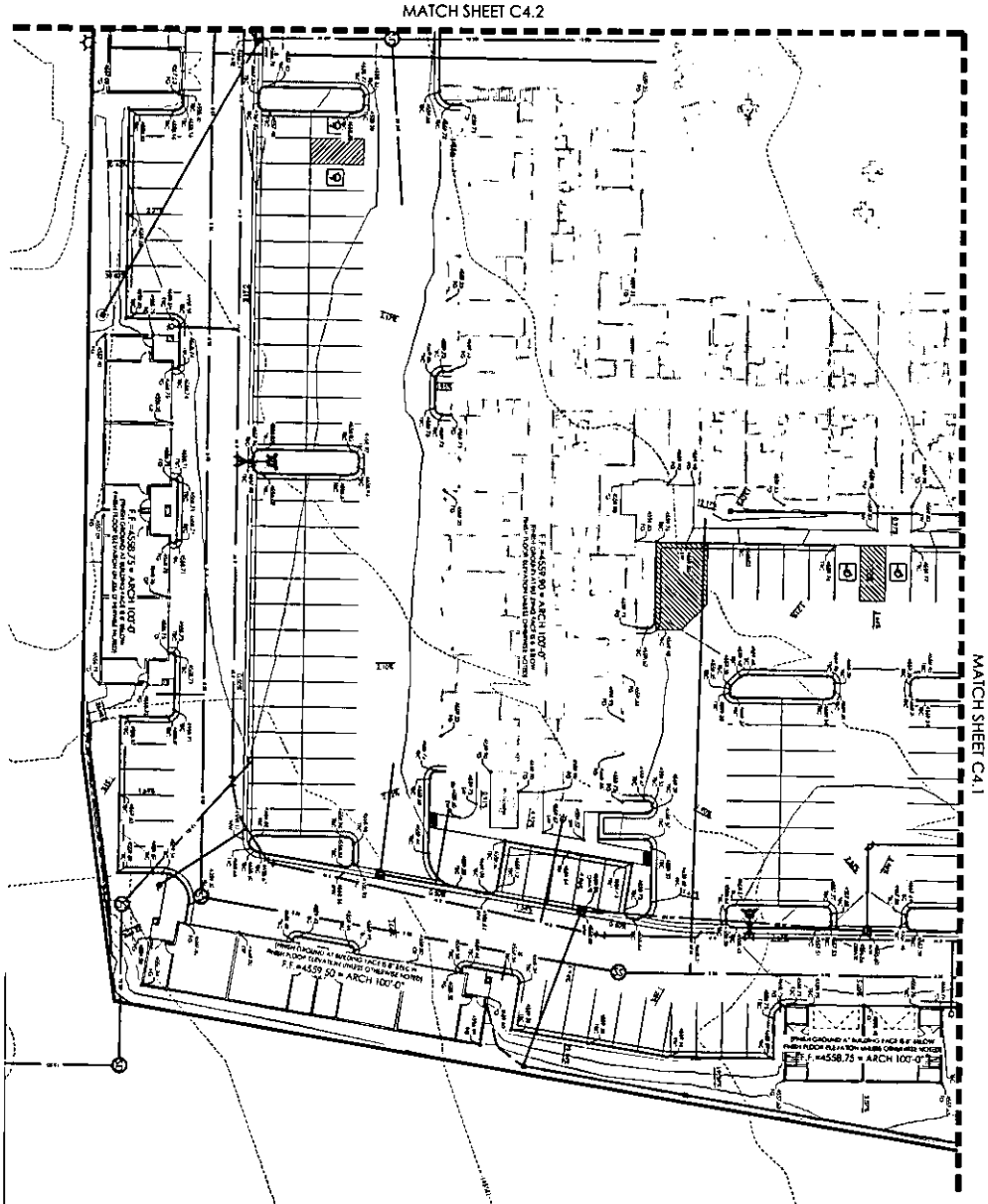

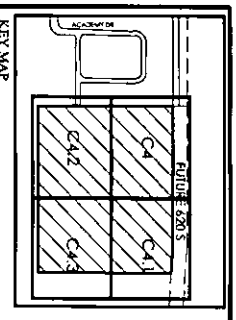

GRAPHIC SCALE
(IN FEET)
1 inch = 30 ft.

LEGEND

NOTES:
(1) NO BASEMENTS WILL BE INSTALLED PER SENSITIVE LAND ORDINANCE 4-5-5.
(2) MAIN BUILDING - GARAGE FLOOR ELEVATION (TYP.) = 4559.25

SHEET	C4.3
TITLE	GRADING PLAN
DATE	04/05/2020
SCALE	1"=30'
DRAWN	MW
JOB #	19-046S

REVISION BLOCK

#	BY	DESCRIPTION

BACH APARTMENTS

AMERICAN FORK, UT

GRADING PLAN

FOR REVIEW ONLY

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