REPORT
GEOTECHNICAL STUDY
PROPOSED CANYON RIDGE MEETINGHOUSE
APPROXIMATELY 1150 SOUTH 2300 EAST
SPANISH FORK, UTAH

Submitted To:

The Church of Jesus Christ of Latter-Day Saints

45 East 300 North
Provo, Utah 84606

Submitted By:

GSH Geotechnical, Inc.
1596 West 2650 South
Ogden, Utah 84401

July 15, 2014

Job No. 0153-235-14

July 18, 2014
Job No. 0153-235-14

The Church of Jesus Christ of Latter-Day Saints

Re: Report
Geotechnical Study
Proposed Canyon Ridge Meetinghouse
Approximately 1850 South 2300 East
Spanish Fork, Utah
(40.0860 North, 111.6158 West)
LDS Property Number: 500-9668

1. INTRODUCTION

1.1 GENERAL

This report presents the results of our geotechnical study performed at the site of the proposed Canyon Ridge meetinghouse to be located at approximately 1850 South 2300 East in Spanish Fork, Utah. The general location of the site with respect to major topographic features and existing facilities, as of 2000, is presented on Figure 1, Vicinity Map. A more detailed layout of the site showing the proposed facilities, and adjacent roadways is presented on Figure 2, Site Plan. The approximate locations of the borings completed with this study are presented on Figure 2.

1.2 OBJECTIVES AND SCOPE

The objectives and scope of our study were planned in discussions between Mr. Roger Knell of Knell Architects and Mr. Mike Huber 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.

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

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

1. A field program consisting of the drilling, logging, and sampling of 12 borings.

2. A laboratory testing program.

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

1.3 AUTHORIZATION

Authorization was provided by the client by the Agreement Between Client and Geotechnical Consultant For Geotechnical Evaluation Report dated July 10, 2014.

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, of this report. 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

A new meetinghouse is proposed for the approximate 3.83-acre site. The location and layout of the proposed meetinghouse is shown on Figure 2. The building will be one to one-extended level in height and of wood-frame construction established slab on grade.

Maximum real column and wall loads are anticipated to be on the order of 70 kips and 5 kips per lineal foot, respectively. Real loads are defined as the total of all dead plus frequently applied (reduced) live loads.

At-grade paved parking and drive areas will be part of the overall site development improvement. Projected traffic in the parking areas is anticipated to consist of a light volume of

automobiles and light trucks and occasional medium-weight trucks. In primary drive areas within the church parking lot, traffic is projected to consist of a moderate volume of automobiles and light trucks, a light volume of medium-weight trucks, and occasional heavy-weight trucks.

It is anticipated that site grading will include raising the building pad 1.0 to 1.5 feet above existing surrounding grades for drainage. Maximum anticipated site grading cuts and fills are anticipated to be minor, on the order of 2 to 3 feet.

3. SITE INVESTIGATIONS

3.1 FIELD PROGRAM

In order to define and evaluate the subsurface soil and groundwater conditions at the site, 12 borings were drilled to depths ranging from 4.5 to 15.5 feet below existing grade using a truck-mounted drill rig equipped with hollow-stem augers. Maximum drill depths were dictated by auger refusal on the gravel soils with cobbles. The locations of the borings are presented on Figure 2.

The field portion of our study was performed 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 have been supplemented by subsequent observation and laboratory testing. Detailed graphical representation of the subsurface conditions encountered is presented on Figures 3A through 3L, Boring Logs. Soils were classified in accordance with the nomenclature described on Figure 4, Key to Boring Log (USCS).

A 3.25-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. The blow counts recorded on the boring logs were those required to drive the samplers 12 inches with a 140-pound hammer dropping 30 inches.

3.2 LABORATORY TESTING

3.2.1 General

In order to provide data necessary for our engineering analyses, a laboratory testing program was initiated. The program included moisture and density, partial gradation, consolidation, chemical, and topsoil tests. The following paragraphs describe the tests and summarize the test data.

3.2.2 Moisture and Density Tests

To aid in classifying the soils and to help 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 3L.

3.2.3 Partial Gradation Tests

To aid in classifying the granular soils, partial gradation tests were performed. Results of the tests are tabulated below:

Boring No.	Depth (feet)	Percent Passing No. 200 Sieve	Soil Classification
B-1	3.0	31.1	GM
B-2	4.5	8.1	GP-GM
B-11	8.5	6.6	GP-GM
B-12	5.5	7.6	GP-GM

3.2.4 Consolidation Tests

To provide data necessary for our settlement analyses, a consolidation test was performed on a representative sample of the shallow clay soils encountered. The results indicate that the tested soil is moderately over-consolidated and will exhibit moderate compressibility characteristics when loaded below the pre-consolidation pressure. Detailed results of the tests are maintained within our files and can be transmitted to you, upon your request.

3.2.5 Chemical Tests

To determine if the site soils will react detrimentally with concrete, chemical tests were performed on a representative sample of the clayey soils encountered at the site. The results of the chemical tests are tabulated on the following page.

Sample Location	Depth (feet)	Soil Classification	pH	Total Water Soluble Sulfate (mg/kg-dry)
Surface	0.5	SC-SM	7.4	Not Measured
B-1	2.0	CL	Not Measured	*

***** Sulfate chemical testing is in progress at this time. Once results become available they will be transmitted in a supplementary document.

3.2.6 Topsoil Tests

A series of topsoil tests were performed on a combined surface sample from 3 locations on the site. The results of these tests are attached to this study as Appendix A, Topsoil Testing Report.

4. SITE CONDITIONS

4.1 SURFACE

The site is located at approximately 1850 South 2300 East in Spanish Fork, Utah. The property consists of an open rectangular field currently planted with alfalfa extending up to roughly knee height. The site slopes gently downslope to the west with estimated total relief on the order of 3 to 4 feet. The property is slightly lower than 2300 East which borders the site along the west. Single family residential homes border the site along the north. Similar vacant property borders the site to the east and south.

4.2 SUBSURFACE SOIL AND GROUNDWATER

In general the site is blanketed with a layer of surficial clay soils extending to depths of 2.5 to 4 feet below the surface at the boring locations. This surficial clay is stiff, moderately over-consolidated, moist, brown, and contains varying sand content. The upper 6 to 8 inches are loose with the top approximate 4 inches containing major roots/topsoil.

Underlying the surficial clay soils and extending to the full depths penetrated, 4.5 to 16.5 feet, natural granular soils comprised of fine and coarse gravels and silty sands which were medium dense to very dense, slightly moist to moist and brown and grayish brown in color. The gravel soils contained varying silt content as well as trace to some cobbles. With depth, the cobble content appears to increase with possible boulders as well.

Augur refusal was encountered at depth of 10 to 16.5 feet in Borings B-1, B-2 and B-12 in dense gravel with cobble soils. Groundwater was not encountered within the depths penetrated and is not anticipated to affect propose construction.

For a more detailed description of subsurface conditions encountered, please refer to the attached boring logs, Figures 3A through 3L.

5. DISCUSSIONS AND RECOMMENDATIONS

5.1 SUMMARY OF FINDINGS

Our analysis indicates that the proposed structure may be supported upon conventional spread and continuous wall foundations supported upon suitable natural soils and/or structural fill extending to suitable natural soils.

GSH must observe excavations to verify that topsoil/loose disturbed surficial soils have been completely removed prior to the placement of structural site grading fills, floor slabs, or pavements.

In the following sections, detailed discussions pertaining to earthwork, foundations, lateral resistance, floor slabs, pavements, and the geoseismic setting of the site are provided.

5.2 EARTHWORK

5.2.1 Site Preparation

Initial site preparation will consist of the removal of surface vegetation, topsoil, any other deleterious materials, loose/disturbed surface soils, and non-engineered fills (if encountered) from beneath an area extending out at least 5 feet from the perimeter of the proposed buildings and 2 feet beyond pavements and exterior flatwork areas. Vegetation and other deleterious materials should be removed from the site. Stripped topsoil will be unsuitable for structural fill but may be stockpiled for subsequent landscaping purposes.

Subsequent to the above operations and prior to the placement of footings, structural site grading fill, floor slabs, and pavements, the exposed natural subgrade must be proofrolled by passing moderate-weight rubber tire-mounted construction equipment over the surface at least twice. If any loose, soft, or disturbed zones are encountered, they must be completely removed in footing and floor slab areas and replaced with granular structural fill. If required removal depth is greater than 2 feet, GSH must be notified to provide further recommendations. In pavement areas, unsuitable soils encountered during recompaction and proofrolling must be removed to a maximum depth of 2 feet and replaced with compacted granular structural fill.

5.2.2 Temporary Excavations

Temporary construction excavations in the site soils, not exceeding 4 feet in depth, may be constructed with near-vertical sideslopes. Temporary excavations up to 8 feet deep in the site soils shall be constructed with sideslopes no steeper than one horizontal to one vertical (1H:1V). Excavations deeper than 8 feet are not anticipated at the site. If excessive sloughing occurs, if

groundwater is encountered, or where extensive layers of clean granular soils are encountered, the sideslopes should be appropriately flattened and/or shoring/bracing/dewatering utilized.

All excavations must be inspected periodically by qualified personnel. If any signs of instability 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 possibly as replacement fill below footings. All structural fill must be free of sod, 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.

To stabilize soft subgrade conditions, a mixture of coarse gravels and cobbles and/or 1.5- to 2.0-inch gravel (stabilizing fill) should be utilized.

The natural soils may be re-utilized as structural site grading fills if they meet with the requirements stated herein. However, please note that the fine-grained clay soils will require tight moisture control near optimum to properly compact. Utilization of the natural on-site silty clay soils as structural site grading fill will be very difficult, if not impossible, especially during wet and cold periods of the year. Only granular soils are recommended as structural fill in confined areas, such as around foundations, and within utility trenches.

Import structural fill is recommended to consist of a well-graded sand and gravel mixture with less than 30 percent retained on the 0.75-inch sieve and less than 20 percent passing the No. 200 Sieve (clays and silts).

Non-structural site grading fill is defined as all fill material not designated as structural fill and may consist of any cohesive or granular soils not containing excessive amounts of degradable material.

5.2.4 Fill Placement and Compaction

Structural fill (other than stabilizing 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] T-180 (ASTM[2] D-1557) compaction criteria in accordance with the table below:

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 8	95
Outside area defined above	0 to 5	90
Outside area defined above	5 to 8	95
Aggregate road base	--	96

Structural fills greater than 8 feet thick are not anticipated at the site.

Coarse gravel and cobble mixtures (stabilizing fill), if utilized, should 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 should be adequately compacted so that the "fines" are "worked into" the voids in the underlying coarser gravels and cobbles.

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.

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.

5.2.5 Utility Trenches

All utility trench backfill material below structurally loaded facilities (flatwork, floor slabs, roads, 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 proofrolled and/or properly compacted prior to the construction of any exterior flatwork over a backfilled trench. Proofrolling shall be performed by passing moderately loaded rubber tire-

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

mounted construction equipment uniformly over the surface at least twice. If excessively loose or soft areas are encountered during proofrolling, they shall be removed to a maximum depth of 2 feet below design finish grade and replaced with structural fill.

Most utility companies and City-County governments are now requiring that Type A-1a or A-1b (AASHTO Designation – basically 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 T-180 (ASTM D-1557) method of compaction. We recommend that as the major utilities continue onto the site that these compaction specifications are followed.

Fine-grained (clays and silts) soils are not recommended as utility trench backfill.

5.3 SPREAD AND CONTINUOUS WALL FOUNDATIONS

5.3.1 Design Data

The proposed structure may be supported upon conventional spread and continuous wall foundations established upon suitable natural soils and/or structural fill extending to suitable natural soils. Loose/disturbed soils are not suitable for the support of footings and must be completely removed underneath footings. For design, the following parameters 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 Pressure for Real Load Conditions	- 3,000 pounds per square foot
Bearing Pressure Increase for Seismic Loading	- 50 percent

The term “net bearing pressure” refers to the 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.

5.3.2 Installation

Under no circumstances shall the footings be established upon loose/disturbed soils non-engineered fills, loose or disturbed soils, topsoil, sod, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. If unsuitable soils are encountered, they must be completely removed and replaced with compacted structural fill.

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.

5.3.3 Settlements

Settlements of foundations designed and installed in accordance with above recommendations and supporting maximum projected structural loads are anticipated to be less than approximately one inch. Settlements are expected to occur rapidly with approximately 50 to 60 percent of the settlements occurring during construction.

5.4 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 0.40 should be utilized. 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.

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

5.5 FLOOR SLABS

Floor slabs may be established upon suitable natural soils and/or upon structural fill extending to suitable natural soils. Under no circumstances shall floor slabs be established over non-engineered fills, loose or disturbed soils, sod, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. In order to facilitate construction and curing of the concrete and provide a capillary break, it is recommended that floor slabs be directly underlain by 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 (average uniform pressure of 200 pounds per square foot or less) is anticipated to be less than one-quarter of an inch.

5.6 PAVEMENTS

The existing natural soils will exhibit poor to fair pavement support characteristics when saturated. All pavement areas must be prepared as previously discussed (see Section 5.2.1, Site Preparation). 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,
No Heavy-Weight Trucks)
[6 equivalent 18-kip axle loads per week]

Flexible:

2.5 inches	Asphalt concrete
8.0 inches	Aggregate base course
Over	Properly prepared natural subgrade soils, and/or structural site grading fill extending to suitable natural subgrade soils

Rigid:

5.0 inches	Portland cement concrete (non-reinforced)
4.0 inches	Aggregate base course
Over	Properly prepared natural subgrade soils and/or structural site grading fill extending to suitable natural subgrade soils

Parking Lot Primary Drive Lanes

(Moderate Volume of Automobiles and Light Trucks,
Light Volume of Medium-Weight Trucks,
and Occasional Heavy-Weight Trucks)
[15 equivalent 18-kip axle loads per week]

Flexible:

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

Rigid:

5.5 inches	Portland cement concrete (non-reinforced)
5.0 inches	Aggregate base course
Over	Properly prepared natural subgrade soils and/or structural site grading fill extending to suitable natural subgrade soils

For dumpster pads, we recommend a pavement section consisting of 6.5-inches of Portland cement concrete, 4.0-inches of aggregate base course, over properly prepared suitable natural subgrade or site grading structural fills extending to suitable natural soils.

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.

5.7 CEMENT TYPES

The laboratory Sulfate tests are currently in progress. Cement recommendations will be provided at the test results become available in a subsequent document.

5.8 GEOSEISMIC SETTING

5.8.1 General

Utah municipalities adopted the International Building Code (IBC) 2012 on July 1, 2013. The IBC 2012 code determines the seismic hazard for a site based upon 2008 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).

The structures must be designed in accordance with the procedure presented in Section 1613, Earthquake Loads, of the IBC 2012 edition.

5.8.2 Site Class

For dynamic structural analysis, the Site Class D - Stiff Soil Profile as defined in Chapter 20 of ASCE 7 (per Section 1613.3.2, Site Class Definitions, of IBC 2012) can be utilized.

5.8.3 Faulting

Based upon our review of available literature, no active faults are known to pass through or immediately adjacent to the site. The nearest active fault is approximately 0.65 miles to the southeast.

5.8.4 Ground Motions

The IBC 2012 code is based on 2008 USGS mapping, which provides values of short and long period accelerations for the Site Class B boundary for the Maximum Considered Earthquake (MCE). This Site Class B boundary represents 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 soil profile. Based on the site latitude and longitude (40.086 degrees north and 111.6158 degrees west, respectively), the values for this site is tabulated on the following page.

Spectral Acceleration Value, T	Site Class B Boundary [mapped values] (% g)	Site Coefficient	Site Class D [adjusted for site class effects] (% g)	Design Values (% g)
Peak Ground Acceleration	46.0	F_a = 1.040	47.8	31.9
0.2 Seconds (Short Period Acceleration)	S_S = 115.0	F_a = 1.040	S_{MS} = 131.0	S_{DS} = 87.3
1.0 Second (Long Period Acceleration)	S_1 = 41.6	F_v = 1.584	S_{M1} = 65.9	S_{D1} = 43.9

5.8.5 Liquefaction

The site is located in a mapped area that has been identified as having "low" liquefaction potential. Liquefaction is defined as the condition when saturated, loose, finer-grained sand-type soils lose their support capabilities because of excessive pore water pressure which develops during a seismic event.

Liquefaction of the site soils is not anticipated during the design seismic event within the depths penetrated due to the dense nature of the granular soils and the lack of groundwater.

Calculations were performed using the procedures described in the 2008 Soil Liquefaction During Earthquakes Monograph by Idriss and Boulanger[3].

5.9 SITE VISITS

As stated previously, GSH must verify that topsoil/loose disturbed soils have been completely removed prior to the placement of structural site grading fills, floor slabs, or pavements

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

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.

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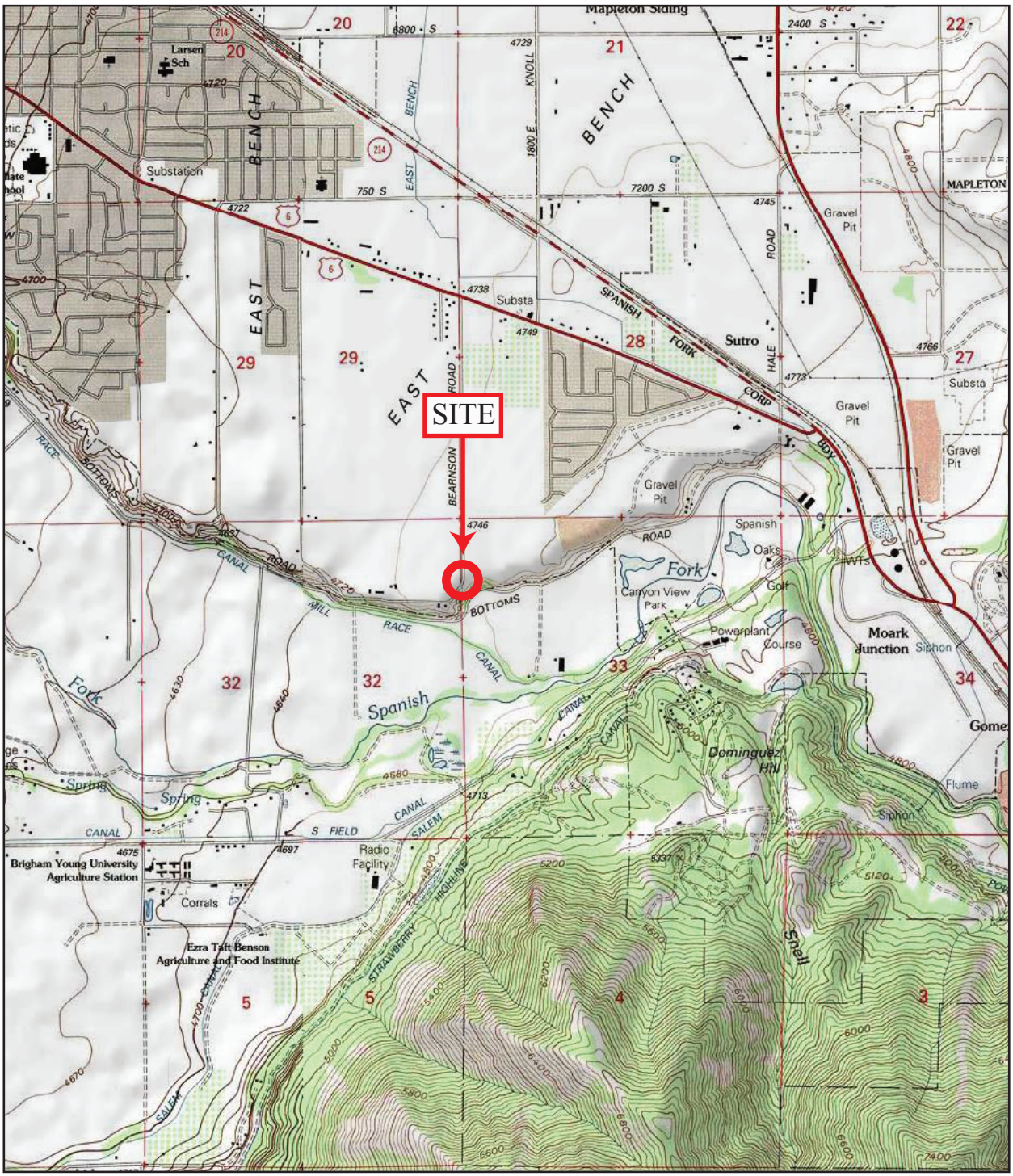
BNR/MSH:mmh

Encl. Figure 1, Vicinity Map
Figure 2, Site Plan
Figures 3A through 3L, Log of Borings
Figure 4, Key to Borings (USCS)
Appendix A Topsoil Testing Report

Addressee (3 + email)

THE CHURCH OF JESUS CHRIST OF LATTER-DAY SAINTS
JOB NO. 0153-235-14



SCALE IN FEET
1000 0 1000 2000

FIGURE 1
VICINITY MAP

REFERENCE:
USGS 7.5 MINUTE TOPOGRAPHIC QUADRANGLE MAP(S)
ENTITLED "SPANISH FORK PEAK, UTAH" AND
"SPANISH FORK, UTAH" BOTH DATED 2000

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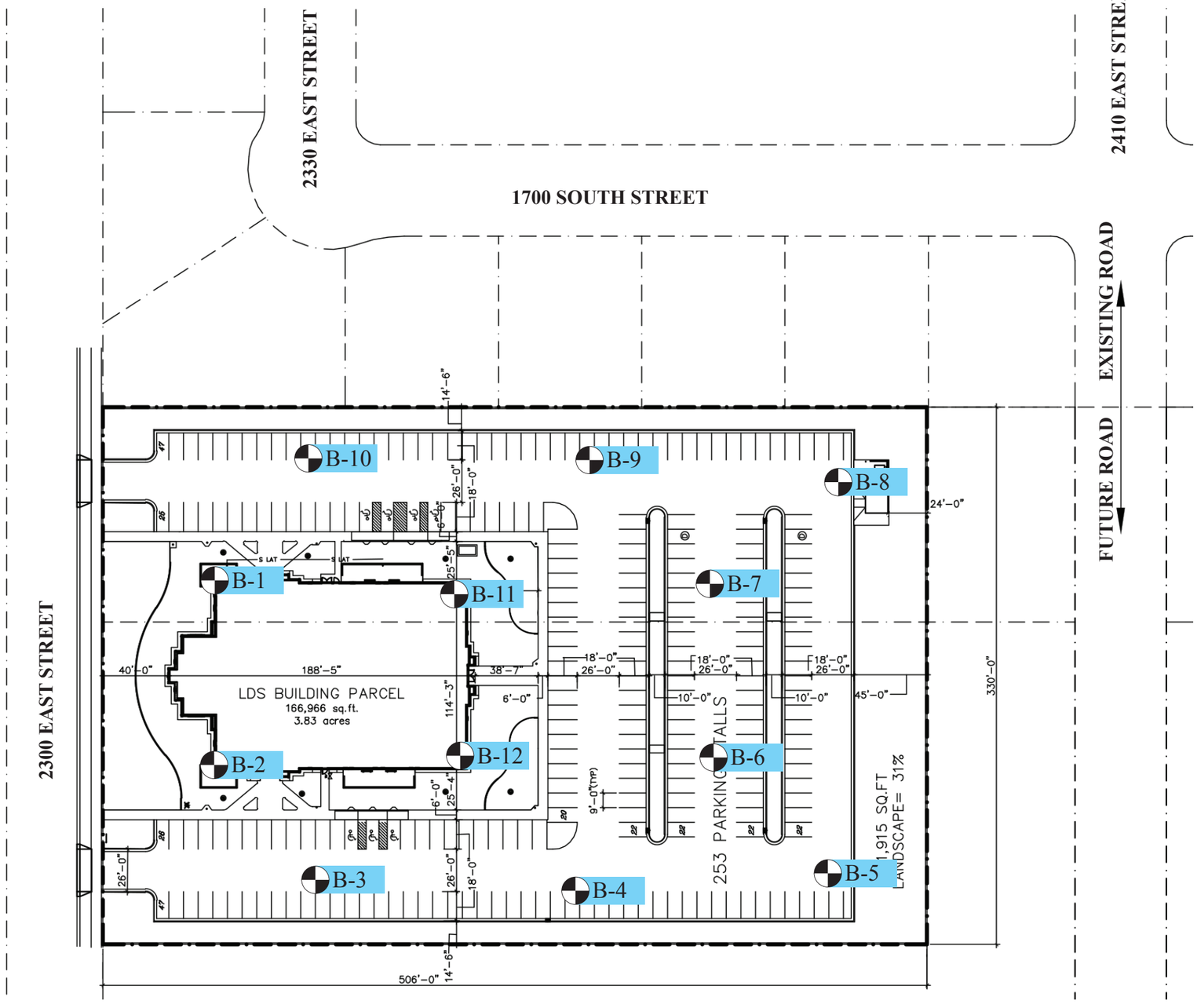
JOB NO. 0153-235-14



APPROXIMATE SCALE IN FEET
37.5 0 37.5 75

REFERENCE:
ADAPTED FROM DRAWING
PROVIDED BY CLIENT

FIGURE 2
SITE PLAN

GSH

BORING LOG

Page: 1 of 1

BORING: B-1

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | 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 some fine sand; major roots (topsoil) to 4"; brown									loose moist stiff
				105		15.7	102				
	GP	FINE AND COARSE GRAVEL with fine to coarse sand; trace to some silt; grayish-brown									slightly moist very dense
	GM	SILTY FINE TO COARSE SAND grayish-brown	5	54		4		31.1			moist very dense
		multi colors: yellow, brown, and grayish-brown	10	89							
		grades with cobbles	15	84							
		Auger refusal at 16.5'. No groundwater encountered at time of drilling. Installed 1.25” diameter slotted PVC pipe to 16.5’.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3A

BORING LOG

Page: 1 of 1

BORING: B-2

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | 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 some fine sand; major roots (topsoil) to 4"; brown									loose moist
				35		15.3	108				stiff
	GP/GM	FINE AND COARSE GRAVEL with some fine to coarse sand and silt; brown	5	107		3		8.1			slightly moist very dense
		grades with some cobbles		72							
		Auger refusal at 10.0'. No groundwater encountered at time of drilling.	10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3B

BORING LOG

Page: 1 of 1

BORING: B-3

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

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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 some fine sand and fine sandy clay; rootholes; trace organics; major roots (topsoil) to 4"; brown with mottling									loose moist
				20							stiff
	SM	SILTY FINE TO COARSE SAND with fine and coarse gravel; brown									slightly moist dense
			5	42							
		End of Exploration at 5.5'. No groundwater encountered at time of drilling.									
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3C

BORING LOG

Page: 1 of 1

BORING: B-4

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | 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 some fine sand; major roots (topsoil) to 4"; brown									loose moist stiff
	SM	SILTY FINE TO COARSE SAND with fine and coarse gravel; brown									moist dense
		End of Exploration at 5'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3D

BORING LOG

Page: 1 of 1

BORING: B-5

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | 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 some fine sand; major roots (topsoil) to 4"; brown									loose moist
											stiff
	GM	SILTY FINE AND COARSE GRAVEL with fine to coarse sand; brown									slightly moist very dense
			5	52							
		End of Exploration at 5.5'. No groundwater encountered at time of drilling.									
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3E

BORING LOG

Page: 1 of 1

BORING: B-6

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | 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 some fine sand; major roots (topsoil) to 4"; brown									loose moist
											stiff
	GP	FINE AND COARSE GRAVEL with fine to coarse sand; some silt; brown		37							slightly moist dense
		End of Exploration at 4.5'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3F

BORING LOG

Page: 1 of 1

BORING: B-7

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | 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 some fine sand; major roots (topsoil) to 4"; brown									loose moist
											stiff
	GM	SILTY FINE AND COARSE GRAVEL with fine to coarse sand; brown	5								moist dense
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.									
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3G

BORING LOG

Page: 1 of 1

BORING: B-8

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | 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 some fine sand; major roots (topsoil) to 4"; brown									loose moist stiff
	GM	SILTY FINE AND COARSE GRAVEL with fine to coarse sand; brown									moist very dense
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.	5								
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3H

BORING LOG

Page: 1 of 1

BORING: B-9

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | 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 some fine sand; major roots (topsoil) to 4"; brown									loose moist
				15							stiff
	SM	SILTY FINE TO COARSE SAND with fine and coarse gravel; brown	5	80							slightly moist very dense
		End of Exploration at 5.5'. No groundwater encountered at time of drilling.									
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3I

BORING LOG

Page: 1 of 1

BORING: B-10

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | 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 some fine sand; major roots (topsoil) to 4"; brown									loose moist
											stiff
	GM	SILTY FINE AND COARSE GRAVEL with fine to coarse sand; brown	5								moist dense
		End of Exploration at 5.0'. No groundwater encountered at time of drilling.									
			10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3J

BORING LOG

Page: 1 of 1

BORING: B-11

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | 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 some fine sand; major roots (topsoil) to 4"; brown									loose moist
				13		14.3	98				medium stiff
			5	17							stiff slightly moist
	GM/GP	SILTY FINE AND COARSE GRAVEL with some fine to coarse sand and silt; brown									very dense
				59		2.8		6.6			
		End of Exploration at 9.5'. No groundwater encountered at time of drilling.	10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3K

BORING LOG

Page: 1 of 1

BORING: B-12

CLIENT: The Church of Jesus Christ of Latter-Day Saints | PROJECT NUMBER: 0153-235-14

PROJECT: Proposed Canyon Ridge Meetinghouse | DATE STARTED: 7/8/14 | DATE FINISHED: 7/8/14

LOCATION: 1850 South 2300 East, Spanish Fork, Utah | GSH FIELD REP.: RG

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

GROUNDWATER DEPTH: Not Encountered (7/8/14) | ELEVATION: ---

WATER LEVEL	USCS	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	SILTY CLAY with some fine sand; major roots (topsoil) to 4"; brown									loose moist stiff
	GM	SILTY FINE AND COARSE GRAVEL with some fine to coarse sand; brown		55							moist medium dense
			5	47		2.7		7.6			
	GP	FINE AND COARSE GRAVEL with fine to coarse sand; some silt; brown									slightly moist dense
			10	53							very dense
		grades with some cobbles		57							
		Auger refusal at 13.5'. No groundwater encountered at time of drilling. Installed 1.25” diameter slotted PVC pipe to 13.5’.	15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3L

CLIENT: The Church of Jesus Christ of Latter-Day Saints
PROJECT: Proposed Canyon Ridge Meetinghouse
PROJECT NUMBER: 0153-235-14

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:

Weakly: Crumbles or breaks with handling or slight finger pressure.

Moderately: Crumbles or breaks with considerable finger pressure.

Strongly: Will not crumble or break with finger pressure.

MODIFIERS:

Trace <5%

Some 5-12%

With > 12%

MOISTURE CONTENT (FIELD TEST):

Dry: Absence of moisture, dusty, dry to the touch.

Moist: Damp but no visible water.

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

APPENDIX A

Topsoil Testing Report

Topsoil Testing Report

Project	Name **Proposed Canyon Ridge Meetinghouse**		Property Number : **500-9668**
	Site Street Address, City, State/Province **1850 S 2300 E, Spanish Fork, UT**		
Person Submitting Test	Name **Mike Huber GSH mike@gshgeotech.com**	Date Requested **10 Jul 2014**	Phone **801 685 9190**
	Address, City, State/Province **473 W 4800 S, SLC, UT 84123**		Fax **2990**
Soil Testing Laboratory	Name **QA Consulting and Testing, LLC**	Date Submitted **12 Jul 2014**	Phone 801 423 1116
	Address, City, State/Province **645 South 240 East Salem, UT 84653 vonisaman@comcast.net**		Fax 1813

General

1. Owner will pay for pre-bid testing and one (1) final top-soil test.

Landscape Architect Instructions

1. Landscape Architect shall determine by investigation quality and quantity of topsoil on site before landscape design. Add physical and fertility recommendations from laboratory recommendations to relevant Church specifications.

Contractor Instructions

1. Test installed topsoil. Installed topsoil shall comply with Project Specifications.
2. If installed topsoil does not comply, Contractor will enhance and test at no cost to Owner until installed topsoil complies with Project Specifications.

Testing Instructions

1. Collect at least two (2) samples of on-site topsoil and each anticipated topsoil source. If site soil profile or borrow pit are not uniform, additional samples shall be taken. Uniform composite samples may also be used if properly acquired and documented.
2. Submit required soil samples to soil testing laboratory along with all required (for this report and laboratory) information.

Soil Testing Laboratory Instructions

1. This report must be completely filled out and provide soil interpretation and amendment, fertilizer, and soil conditioner recommendations for use by Landscape Architect. These recommendations should consider lawn areas, tree and shrub areas, and native plant areas.
2. Provide appropriate times for fertilizing.
3. Return completed Topsoil Testing Report to person submitting the test.

SOIL SAMPLE LOG

Soil Sample No.	Description of location where sample was taken	History of use of the soil
1	Composite	Alfalfa Field

Existing Conditions Test Report

("Acceptable Levels" refers to the allowable soil specifications prior to being amended)

SOIL TEST DATA

Sample No.	pH(1)	EC(1) Mmhos/cm	SAR(1)	% Sand	% Silt	% Clay	Text(2) Class	%(3) OM	**NO3-N(4) ppm**	P(5) ppm	**K(5) ppm**	Fe(5) ppm
1	7.4	0.6	0.7	52	24	24	Sandy Clay Loam	2.5	**1**	12	**125**	11
Acceptable Level(s)	5.5 - 8.4	<3.0	<6.0	15-60	10-60	5-**30**	(2)	>1.0	**>20**	>11	**>130**	>10

(1) Saturated soil paste 1:1 soil:water method (please Indicate)

(2) Hydrometer method (Acceptable soil- sand:15-60 percent, silt:10-60 percent, clay-5-30 percent)

(3) Potassium dichromate method (Walkey-Black) or loss of ignition

(4) Chromotropic acid method

(5) AB-DTPA method

If other methods are used for NO3-N, P, K, and Fe, then note.

Continued next page.

ROCKS (Coarse Fragments)		
Sample No.	Percent > 1/4 inch (6.4 mm)	Rocks Present ≥ 1.5 inch (38 mm) Indicate as present or not present
1	0.1%	Not Present
Acceptable Level	≤ 5.0 percent	< 1.5 inch (38 mm)

Landscape Area Description

Lawn Areas: Receive 5 inch (125 mm) topsoil plus recommended amendments and fertilizers.

Shrub/Tree Areas: Unless otherwise indicated, plant pits are to be backfilled with three (3) parts native soil and one part compost or other recommended amendments. Additionally, contractor will add recommended fertilizer.

Native Grass/Shrub/Tree Areas: Planting to receive minimum recommended amendments and fertilizers for establishment.

INFILTRATION RATE	
Documented Infiltration rate of test sample(s) based on texture at 90 percent relative density (to nearest 1/10th of an inch)	
Sample No.	Rate
1	1.6 Inches/Hour
	Inches/Hour

Interpretation Summary of Test Results:

GSH Canyon Ridge

Sample 1 does not meet Acceptable Levels for: NO3N and K.

Soil Amendments, Fertilizer and Soil Conditioner – Recommendations:

Lawn Areas: Amendments: Apply an organic material (compost, etc.) at 5.0 cu yds/1000 sq ft for every 5" of topsoil depth. Incorporate well. See the Compost Quality Guidelines for Landscaping, attached. Or, apply a similar product at label rate following manufacturer's recommendation for soil preparation and turf maintenance. No additional organic material is recommended for organic matter content ≥5%. Fertilizer: Apply a NPK fertilizer at label rate. Incorporate well. Conditioner: None.

Shrub/Tree Areas: Amendments: See **Landscape Area Description** above. Fertilizer: Apply a NPK fertilizer at label rate.

Native Grass/Shrub/Tree Areas: Amendments: None. Conditioners: None. Fertilizer: Apply a NPK fertilizer at 1/2 label rate, or per nurseryman's recommendation. Incorporate fertilizer well

Scarify the subsoil at least 6" before applying topsoil.

Long Term (5 Year) Fertilizer and Soil Conditioner – Recommendations:

Lawn Areas: Amendments: Core aerate annually. Top dress with organic material 1/8"-1/4" depth. Fertilizer: Continue with above recommendation for 3 years, then apply an ammonium sulfate or similar fertilizer at label rate. Conditioner: None.

Shrub/Tree Areas: Amendments: None. Conditioner: None.
Fertilizer: As top dress, continue with above recommendation for 3 years, and then apply an ammonium sulfate or similar fertilizer at label rate.

Native Grass/Shrub/Tree Areas: Amendments: None. Conditioner: None.
Fertilizer: Top dress every other year with 1/2 label rate of NPK fertilizer; or per nurseryman's recommendation.

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COMPOST QUALITY GUIDELINES FOR LANDSCAPING*

Category	pH**	Soluble Salts** dS/m or mmho/cm	Sodium Adsorption Ratio** (SAR)	Carbon:Nitrogen Ratio*** (C:N)	% Moisture****	≥98% Coarse Material Passing (dry wt basis)
Ideal	6 to 8	≤5	<10	≤20:1	25 to 35	3/8" (9.5 mm)
Acceptable	5-6, 8-9	≤10	≤20	21:1 to 30:1	<25, >35	3/4" (19 mm)
Suspect	<5, >9	>10	>20	<10:1, >30:1	<20, >50	<98% 3/4"

*Von Isaman MS, President of QA Consulting and Testing LLC, Dr. Rich Koenig, USU Cooperative Extension Soils Specialist, and Dr. Teresa Cerny, USU Cooperative Extension Horticulturalist, 3 March 2003.

for composts with biosolid feedstocks, biosolids must meet EPA 503 Class A standards

** 1:5 Compost:Water Slurry on Coarse Material passing 3/8" (9.5 mm)
*** on Coarse Material passing 3/8" (9.5 mm)
**** on total sample

Acceptable level Soluble Salts and/or SAR composts then do not exceed 3 cu yds/1000 sq ft for every 3 inches of soil depth.

CompostGuidelinesTable11.O29