ENT 33743:2012 PG 1 of 33
JEFFERY SMITH
UTAH COUNTY RECORDER
2012 Apr 25 8:57 am FEE 74.00 BY DRG
RECORDED FOR MENLOVE, KEN

When Recorded Mail To:

American Fork City
51 E. Main
~~75 East 80 North~~

American Fork, UT 84003

Notice of Building Requirements

This Notice is recorded in order to bind the attached Geotechnical Study dated April 5th, 2007 (Job No. 070519) and any addendum thereto to the property located at 30 East 1500 South, American Fork, UT 84003 and mandates that all construction be in compliance with said Geotechnical Study and any addendum per the requirements of American Fork City. The property is further described as follows:

A PARCEL OF LAND BEING IN THE NE 1/4 OF SECTION 35, TOWNSHIP 5 SOUTH, RANGE 1 EAST, S.L.B.&M., UTAH COUNTY, UTAH, MORE PARTICULARLY DESCRIBED AS FOLLOWS:

COMMENCING AT THE NE CORNER OF SECTION 35 TOWNSHIP 5 SOUTH RANGE 1 EAST SALT LAKE BASE AND MERIDIAN THENCE N 89°49'51" W 1808.28 FEET AND SOUTH 116.87 FEET TO THE POINT OF BEGINNING;

THENCE S.89°01'24"E. ALONG 1500 SOUTH RIGHT-OF-WAY A DISTANCE OF 405.19 FEET; THENCE S.89°01'24"E. CONTINUING ALONG 1500 SOUTH RIGHT-OF-WAY A DISTANCE OF 12.17 FEET; THENCE S.01°26'00"W. A DISTANCE OF 236.56 FEET; THENCE N.90°00'00"E. A DISTANCE OF 11.48 FEET; THENCE S.00°00'00"E. A DISTANCE OF 478.50 FEET; THENCE N.90°00'00"W. A DISTANCE OF 29.95 FEET; THENCE S.00°53'24"W. A DISTANCE OF 38.29 FEET TO A FOUND REBAR AND CAP AT A FENCE CORNER; THENCE N.88°30'52"W. ALONG A FENCE LINE A DISTANCE OF 367.02 FEET; THENCE N.00°53'30"E. A DISTANCE OF 412.48 FEET; THENCE N.89°06'30"W. A DISTANCE OF 34.20 FEET; THENCE N.00°23'48"E. A DISTANCE OF 49.96 FEET TO A FOUND REBAR AND CAP AT A FENCE CORNER; THENCE N.00°23'47"E. ALONG A FENCE LINE A DISTANCE OF 287.96 FEET TO THE POINT OF BEGINNING.

SAID PROPERTY CONTAINS 4.42 ACRES.

Dated this 24 day of Apr, 2012.

Ruben Glen Adams — Ruben Glen Adams

Christine R. Adams — Christine R Adams

State of Utah)
Ss:
County of Utah)

LAUREL PEREZ
Notary Public
State of Utah
Comm. No. 583519
My Comm. Expires Jul 29, 2014

On the 24th Day of April, A.D. 2012, personally appeared before me the signer of the foregoing instrument who duly acknowledged to me that they did execute the same.

My commission expires 7/29/14

Laurel Perez
Notary Public

Earthtec Testing & Engineering, P.C.

133 North 1330 West
Orem, Utah - 84057
Phone (801) 225-5711
Fax (801) 225-3363

1596 W. 2650 S. #108
Ogden, Utah - 84401
Phone (801) 399-9516
Fax (801) 399-9842

ADAMS BOAT STORAGE

GEOTECHNICAL STUDY
STORAGE CENTER
6400 NORTH 6000 WEST
AMERICAN FORK, UTAH

Prepared By:

Earthtec
Testing and Engineering, P.C.

133 North 1330 West
Orem, Utah 84057

(801) 225-5711

Job No. 070519

Prepared for:

Mr. Rueben Adams
P.O. Box 1089
American Fork, Utah 84003

April 5, 2007

TABLE OF CONTENTS

FIGURES

TABLES

1.0 INTRODUCTION

This report presents the results of a geotechnical study for a proposed storage center development to be located at approximately 6400 North 6000 West in American Fork, Utah. The approximate location of the proposed development is shown on Figure No. 1, *Vicinity Map*, at the end of this report.

The purposes of this investigation were to 1) evaluate the subsurface soil conditions at the site, 2) assess the engineering characteristics of the subsurface soils, and 3) provide geotechnical recommendations for general site grading, and the design and construction of foundations, concrete floor slabs, miscellaneous concrete flatwork, and asphalt pavement sections. The scope of work completed for this study included field reconnaissance, subsurface investigation, field and laboratory soil testing, engineering analysis, and the preparation of this report.

2.0 CONCLUSIONS

The following is a brief summary of our findings and conclusions:

1. Soil conditions encountered at the test hole locations consisted of approximately 3 to 10 inches of topsoil followed by Elastic Silt (MH), Fat Clay (CH), Lean Clay (CL), and Poorly Graded Sand with silt (SP-SM) layers extending to the maximum depths explored of approximately 16½ to 31½ feet below the existing surface.

2. Very shallow groundwater (at depths of 1 to 2 feet) was encountered in the test holes. Subgrade floor slabs are not recommended. Soil near the surface will likely be soft and wet, and require stabilization for grading and structures. Recommendations are given in Section 8.5.

3. Subsurface soils are estimated to have low liquefaction potential.

4. The near surface soils encountered in the drill holes are wet near the surface and will likely require stabilization. Topsoil and any organic soils, if encountered, should be completely removed from beneath all footings and floor slabs. All footings should bear on a minimum of 18 inches of properly placed and compacted structural fill. We also recommend that a geotextile (Mirafi 500X or

equivalent) be placed over the native soils prior to placing and compacting fill. Structural fill should meet the specifications for stabilization material as recommended in Section 8.5, or free draining granular material as recommended in Section 8.3. A maximum bearing capacity of 1,500 psf may be used for design of the footings. More details regarding foundation design and drainage can be found in Sections 10.0 of this report.

These findings and conclusions should not be relied upon without reading and consulting this report for a more detailed description of the geotechnical evaluation and recommendations contained herein.

3.0 PROPOSED CONSTRUCTION

It is our understanding that the site will be developed as a self storage facility. We estimate that foundation loads for the proposed storage units will not exceed 4 kips per linear foot for bearing walls, 40 kips for columns, and 150 to 250 pounds per square foot for floor slabs. If structural loads will be greater our office should be notified so that we may review our recommendations and, if necessary, make modifications.

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

4.0 SURFACE OBSERVATIONS

At the time our subsurface soil investigation was conducted, the site was a pasture vegetated with trees, grass, and weeds. Hydric plants (indicative of wetland areas) were not observed on the site. The site grade was relatively flat. There were irrigation ditches around the perimeter of the site and some standing water on the west side. The site is bounded on the northeast by 6400 North street, on the northeast by a field and a residence, on the southwest by an RV Park, on the southeast by a field, on the east by a farm, and on the west by 6000 West street.

5.0 SUBSURFACE INVESTIGATION

The subsurface soil conditions at the site were assessed by a member of our geotechnical staff who supervised the drilling of 4 exploratory test holes across the site on March 20, 2007 which extended about 16½ and 31½ feet below the existing surface. The test holes were drilled using an all-terrain drill rig and hollow stem augers to allow sampling below the augers.

Disturbed samples were collected with a 1⅜ inch inside diameter split spoon sampler. The split spoon sampler was driven 18 inches into undisturbed soil with a 140 pound hammer free-falling through a distance of 30 inches. The blows required to drive the sampler through the final 12 inches of penetration is called the blow count, and is recorded on the attached test hole logs at the respective sample depths. The blow count provides a reasonable indication of the in-place relative density of sandy soils, but provides only an indication of the relative stiffness of cohesive (clayey) materials, since the penetration resistance for these soils is a function of the moisture content.

Relatively undisturbed samples were collected by pushing thin walled "Shelby"tubes into the soil below the augers. The soil samples collected were classified by visual examination in the field using the guidelines of the Unified Soil Classification System (USCS). Samples will be retained in our laboratory for 30 days following the date of this report and then discarded unless a written request for additional holding time is received prior to the disposal date.

6.0 LABORATORY TESTING

Selected soil samples were tested in the laboratory to assess pertinent engineering properties and to aid in classification. Laboratory testing consisted of natural moisture content and dry density tests, mechanical gradation analyses, Atterberg limits determinations, and one-dimensional consolidation tests. Table No. 1 on the following page presents the results of the laboratory testing. Test results are also given on the enclosed test hole logs at the respective sample depths, and on Figure Nos. 8 through 12, *Consolidation-Swell Test*.

Table No. 1: Laboratory Test Results

TEST HOLE NO.	DEPTH (ft.)	NATURAL MOISTURE (%)	NATURAL DRY DENSITY (pcf)	ATTERBERG LIMITS		GRAIN SIZE DISTRIBUTION (%)			SOIL TYPE
				LIQUID LIMIT	PLASTICITY INDEX	GRAVEL #4	SAND	SILT/ CLAY #200	
TH-1	5	46	67	54	23	---	---	---	MH
TH-2	10	31	91	42	19	---	---	---	CL
TH-2	25	19	---	---	---	0	90	10	SP-SM
TH-3	7½	35	84	33	13	---	---	---	CL
TH-4	7½	38	83	43	19	---	---	---	CL
TH-4	15	40	80	64	41	---	---	---	CH

7.0 SUBSURFACE CONDITIONS

7.1 Soil Types

The surface of the site at the test hole locations was covered with clay topsoil which we estimated to extend up to about 3 to 10 inches in depth. Below the topsoil we encountered layers of Elastic Silt (MH), Fat Clay (CH), Lean Clay (CL), and Poorly Graded Sand with silt (SP-SM) extending to the maximum depths explored of approximately 16½ to 31½ feet below the existing surface.

Graphical representations and detailed descriptions of the soils encountered are shown on Figure Nos. 3 through 6, *Test Hole Log* at the end of this report. A key to the symbols and terms on the logs is presented on Figure No. 7, *Legend.* The stratification lines shown on the logs represent the approximate boundary between soil units; the actual transition may be gradual. Due to potential natural variations inherent in soil deposits, care should be taken in interpolating between and extrapolating beyond exploration points.

7.2 Groundwater Conditions

Groundwater was encountered in the test holes at approximate depths of 1 to 1¾ feet below the ground surface. A slotted PVC pipe was placed in Test Hole 3 after drilling so that groundwater could be measured at a later date. Groundwater depths will fluctuate in response to the season, precipitation, irrigation, and other on and off site influences. Precisely quantifying these fluctuations would require long term monitoring which is beyond the scope of this investigation.

8.0 SITE GRADING

8.1 General Site Grading

Unsuitable soils and vegetation should be removed from below areas which will ultimately support structural loads. These areas include those below foundations, floor slabs, exterior concrete flatwork, and pavements. Unsuitable soils consist of topsoil, organic soils, undocumented fill, soft, loose, or disturbed native soils, and any other inapt materials. We estimated the topsoil to extend about 3 to 10 inches in depth. The topsoil should be completely removed beneath structural areas, even if found to extend deeper than observed, along with any other unsuitable soils if encountered.

Native soils do not meet the requirements for structural fill presented in Section 8.3 below, and should not be used as structural fill, but may be stockpiled for use as fill in landscape areas. Stabilization, as discussed in Section 8.5 below, will likely be required to facilitate grading and construction operations.

Placing more than 2 feet of grading fill at the site (to raise general site grade) could induce consolidation of the native soils and settlement of the fill and structures. If more than 2 feet of grading fill is planned, Earthtec should be notified so that appropriate recommendations can be provided.

8.2 Excavations

For excavations into the native soils or structural fill, less than five feet in depth, slopes should not be made steeper than 0.5:1.0 (horizontal:vertical). Excavations extending up to 10 feet in depth should not be made steeper than 1:1.. If unstable conditions or groundwater seepage are encountered flatter slopes or shoring or bracing may be required. We do not anticipate excavations deeper than about 8 feet. Water will likely be encountered in excavations.

Because of shallow groundwater and soft soils, we recommend that excavations be made with a smooth blade bucket to minimize disturbance and that excavations be as shallow as possible.

8.3 Fill Material

Regular structural fill, unless otherwise specified, should consist of imported material meeting the following requirements:

Maximum particle size:	4 inches
Percent retained on the 3/4 inch sieve (coarse gravel):	30 maximum
Percent passing the No. 200 sieve (fines):	15 maximum
Liquid Limit of fines:	35 maximum
Plasticity Index of fines:	15 maximum

In some situations, particles larger than 4 inches and/or more than 30 percent coarse gravel may be acceptable, however, compaction and compaction testing may be more difficult. As a result more strict quality control measures than normally used may be required. Such measures may include using thinner lifts, and increased or full time observation of fill placement.

Utility trenches can be backfilled with the native soil or structural fill. However, the native fine grained soil may be time consuming to compact, due to difficulty in adjusting the moisture content. All backfill soil should meet the following requirements:

Maximum particle size:	4 inches

Liquid Limit of fines:	35 maximum
Plasticity Index of fines:	15 maximum

Fill in submerged areas should consist of free draining granular material (sand and/or gravel) meeting the following requirements:

Maximum particle size:	3 inches
Percent passing the No. 10 sieve:	25 maximum
Percent passing the No. 40 sieve:	15 maximum
Percent passing the No. 200 sieve (fines):	5 maximum

Three inch minus washed rock (sometimes called river rock or drain rock) meets this requirement and may be used as free draining fill. If free draining fill will be placed adjacent to soil containing a significant amount of sand or silt, precautions should be taken to prevent the migration of fine soil into the free draining fill. Such precautions should include either placing a filter fabric (such as Mirafi 140N or equivalent) between the free draining fill and the adjacent material, or using a well graded, free draining fill material approved by the geotechnical engineer.

8.4 Fill Placement and Compaction

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

In landscape areas not supporting structural loads:	90%
Less than 5 feet of fill below foundations, flatwork and pavements:	95%
Five or more feet of fill below foundations, flatwork and pavements:	98%

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

We recommend that fill be tested frequently during placement. Early testing is recommended to demonstrate that placement and compaction methods are achieving the required compaction. It is the contractors responsibility to ensure that fill materials and compaction efforts are consistent so that tested areas are representative of the entire fill.

8.5 Stabilization

Fine-grained soils susceptible to rutting and pumping will be encountered in footing excavations. The likelihood of rutting and/or pumping, and the depth of disturbance, is proportional to the moisture content in the soil, the load applied to the ground surface, and the frequency of the load. Consequently, rutting and pumping can be minimized by avoiding concentrated traffic, minimizing the load applied to the ground surface by using lighter equipment and/or partial loads, by working in dry times of the year, or by providing a working surface for equipment.

The soil in any obvious soft spots should be removed and replaced with granular material. If rutting or pumping occurs traffic should be stopped in the area of concern. The soil in rutted areas should be removed and replaced with granular material. In areas where pumping occurs the soil should either be allowed to sit until pore pressures dissipate (several hours to several days) and the soil firms up, or be removed and replaced with granular material. Typically, we recommend removal to a minimum depth of 18 inches. Removal and replacement to a greater depth may be required.

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

Using a geosynthetic fabric, such as Mirafi 500X or equivalent, may also reduce the amount of material required and avoid mixing of the granular material and the subgrade. If a fabric is used, following removal of disturbed soils and water, the fabric should be placed over the bottom and up the sides of the excavation a minimum of 18 inches. The fabric should be placed in accordance with the manufacturer's recommendations, including proper overlaps. The granular material should then be placed over the fabric in compacted lifts. Again, we suggest that the initial lift be approximately 12 inches thick and be compacted with a static roller-type compactor.

9.0 SEISMIC CONSIDERATIONS

9.1 Faulting

Based on published data no active faults are known to traverse the site and no surficial evidence of faulting was observed during our field investigation. The nearest mapped fault trace is approximately ¾ miles southwest of the site and is a segment of the Utah Lake Faults[1] beneath Utah Lake.

[1]Hecker, S., 1993, Quaternary Faults and Folds, Utah, Utah Geologic Survey, Bulletin 127.

9.2 Liquefaction Potential

The site is located within an area which has been mapped by the Utah Geological Survey[2] as having high liquefaction potential. As a part of this investigation, the potential for liquefaction to occur in the soils we observed was assessed. Liquefaction is a phenomenon where a soil loses intergranular strength due to an increase in soil pore water pressures during a dynamic event such as an earthquake. The potential for liquefaction is based on several factors, including 1) the grain size distribution of the soil, 2) the plasticity of the fine fraction of the soil (material passing the No. 200 sieve), 3) relative density of the soil, 4) earthquake strength (magnitude) and duration, and 5) overburden pressures. In addition, the soils must be saturated for liquefaction to occur.

Loose, saturated sands are most susceptible to liquefaction. However, soft, sensitive silt soils also have the potential to experience failure and movement during a seismic event. The subsurface soils were saturated. The silt (MH) encountered in Test Pit 1 had high plasticity and we estimate this layer to have low liquefaction potential. The sand (SP-SM) encountered near the bottom of Test Hole 2 was in a medium dense state (based upon the blow count) and is estimated to have low liquefaction potential.

9.3 IRC Seismic Design Category

The Seismic Design Categories in the International Residential Code (IRC) are based upon the short period design accelerations determined using the seismic provisions of the International Building Code (IBC) and the soil properties in the upper 100 feet of the soil profile. These properties are determined from SPT blow counts and undrained shear strength measurements. The IBC code also states that "Where site specific data are not available to a depth of 100 feet, appropriate soil properties may be estimated by the registered design professional preparing the soils report...." Due to the soft soils we recommend using Site Class E.

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[2]Liquefaction Potential Map, Utah Geological Survey, Public Information Series 28. 1994.

The site is located at approximately 40.35 degrees latitude and -111.80 degrees longitude. Using Site Class E, the design spectral response acceleration parameters are 0.74*g* for S_{DS} and 0.85*g* for S_{D1}, for short and one second periods, respectively. The intermediate values from the IBC used to obtain the design parameters are contained in Table Nos. 2 and 3 below.

Table No. 2: Design Acceleration for Short Period

S_S	F_a	S_{MS}	S_{DS}
		$S_{MS} = F_a S_s$	$S_{DS} = 2/3\ S_{MS}$
1.23 g	0.90	1.11 g	0.74 g

S_S = The mapped spectral accelerations for short periods from Figure 1615(5)
F_a = Site coefficient from Table 1615.1.2(1)
S_{MS} = The maximum considered earthquake spectral response accelerations for short periods
S_{DS} = Five-percent damped design spectral response acceleration at short periods

Table No. 3: Design Acceleration for 1 Second Period

S_1	F_v	S_{M1}	S_{D1}
		$S_{M1} = F_v S_1$	$S_{D1} = 2/3\ S_{M1}$
0.53 g	2.40	1.27 g	0.85 g

S_1 = The mapped spectral accelerations for 1-second period from Figure 1615(6)
F_v = Site coefficient from Table 1615.1.2(2)
S_{M1} = The maximum considered earthquake spectral response accelerations for 1 second period
S_{D1} = Five-percent damped design spectral response acceleration at 1 second period

10.0 FOUNDATIONS

10.1 General

The foundation recommendations presented in this report are based on the soil conditions encountered at the site, the results of field testing of the native soils, the site grading recommendations presented in this report, and the foundation loading conditions presented in Section 3.0, *Proposed Construction,* of this report. If loading conditions are significantly different, we should be notified in order to re-evaluate our design parameters and estimates, and to provide additional recommendations if necessary.

Based upon our field exploration we anticipate that soft, wet soils will be encountered in footing excavations and that these soils will need stabilization to provide a firm surface for footing construction. Therefore, we recommend that footing areas be over-excavated 18 inches (dewatering may be required). A stabilization fabric should be placed over the bottom and up the sides of the excavation as recommended in Section 8.5. Granular stabilization material (see Section 8.5) or free draining fill (see Section 8.3) should then be placed over the fabric. The initial lift should be 12 inches thick and compacted with a roller type compactor without vibration. The remaining 6 inches should also be compacted statically. For design of conventional strip and spread footings, the following parameters are recommended:

Minimum embedment for frost protection:	30 inches
Minimum strip footing width:	20 inches
Minimum spot footing width:	30 inches
Maximum allowable net bearing pressure:	1,500 psf
Bearing pressure increase for transient loading:	33 percent

Foundations should not be installed on disturbed soils, undocumented fill, debris, frozen soil, or in ponded water. If foundation soils become disturbed during construction they should be recompacted to the requirements for structural fill presented in this report.

Structural fill used below foundations should extend laterally a minimum of 6 inches for every 12 vertical inches of structural fill placed. For example, if 18 inches of structural fill are required to bring the excavation to footing grade, the structural fill should extend laterally a minimum of 9 inches beyond the edge of the footings.

10.2 Estimated Settlement

If the proposed foundations are properly designed and constructed using the parameters provided above, total estimated settlement is less than one inch for non-seismic conditions. Differential settlement is anticipated to be one-half of the total settlement over a 25-foot length of foundation. Additional settlement could occur if more than 2 feet of grading fill (to raise general site grades) is placed, or during a seismic event due to ground shaking.

11.0 FLOOR SLABS

Because of the groundwater conditions encountered in the test holes, the near proximity of the site to Utah Lake, and uncertainties in both current and future groundwater levels, we recommend that floor slabs not extend below the existing ground surface.

To facilitate construction, act as a capillary break, and aid in distributing floor loads we recommend that all at-grade slabs and exterior flatwork be underlain by four inches of free-draining granular material such as "pea" gravel or three-quarters to one-inch minus clean gravel supported on competent native soils or structural fill.

To help control normal shrinkage and stress cracking the floor slabs should have the following features:

1. Adequate reinforcement for the anticipated floor loads with the reinforcement continuous through interior floor joints;
2. Frequent crack control joints; and
3. Non-rigid attachment of the slabs to foundation and bearing walls.

Special precautions should be taken during placement and curing of all concrete slabs and flatwork. Excessive slump (high water-cement ratios) of the concrete and/or improper finishing and curing procedures used during hot or cold weather conditions may lead to excessive shrinkage, cracking, spalling, or curling of slabs. We recommend all concrete placement and curing operations be performed in accordance with American Concrete Institute (ACI) codes and practices.

12.0 MOISTURE CONTROL AND SURFACE DRAINAGE

We recommend that precautions be taken during and after construction to reduce the potential for saturation of foundation soils. These precautions include the following:

1. Adequate compaction of foundation backfill should be provided i.e. a minimum of 90% of ASTM D-1557. **Water consolidation methods should not be used.**

2. The ground surface should be graded to drain away from the residences in all directions. We recommend a minimum fall of 6 inches in the first 10 feet.

3. Roof runoff should be collected in rain gutters with down spouts designed to discharge well outside of the backfill limits and at least 10 feet from structures.

4. Sprinklers should be aimed away from foundation walls. Sprinkler systems should be designed with proper drainage and well maintained. Over-watering should be avoided.

5. Other precautions which may become evident during design and construction should be taken.

13.0 PAVEMENT DESIGN

We anticipate that asphalt concrete pavement will be used around the storage units. We have assumed that traffic volumes will be light, about 100 vehicles per day, and will consist mostly of cars and pickup trucks, with an occasional light delivery truck and large moving truck, and a weekly garbage truck. Our design is also based on visual and laboratory classification of the on-site soils. We estimate that a California Bearing Ratio (CBR) of 2 for the subgrade soils is appropriate. Using these and other typical parameters with the procedures outlined in the AASHTO Guide for Design of Pavement Structures (1993), we recommend the proposed residential streets consist of the minimum asphalt pavement section presented in Table No. 4, *Pavement Section Design*, below.

Table No. 4: Pavement Section Design

ASPHALT THICKNESS (in)	COMPACTED ROADBASE THICKNESS (in)	COMPACTED SUBBASE THICKNESS (in)
3.0	6.0	12.0

Because of the soft soils at the site, following removal of the topsoil, it may be necessary to use the previously described stabilization procedures below pavement areas.

All subbase, base material, and asphalt should conform to UDOT or American Fork City requirements regarding gradation, oil content, and any other requirements pertaining to the project. We recommend that all roadbase and subbase be properly processed, moisture conditioned, and compacted to a minimum of 95% of the maximum dry density as determined by ASTM-D 1557. All asphalt should be compacted to a minimum of 95% of the laboratory Marshal mix design density.

14.0 GENERAL CONDITIONS

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

The geotechnical study as presented in this report was conducted within the limits prescribed by our client, with the usual thoroughness and competence of the engineering profession in the area. No other warranty or representation, either expressed or implied, is intended in our proposals, contracts or reports.

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

Respectfully;

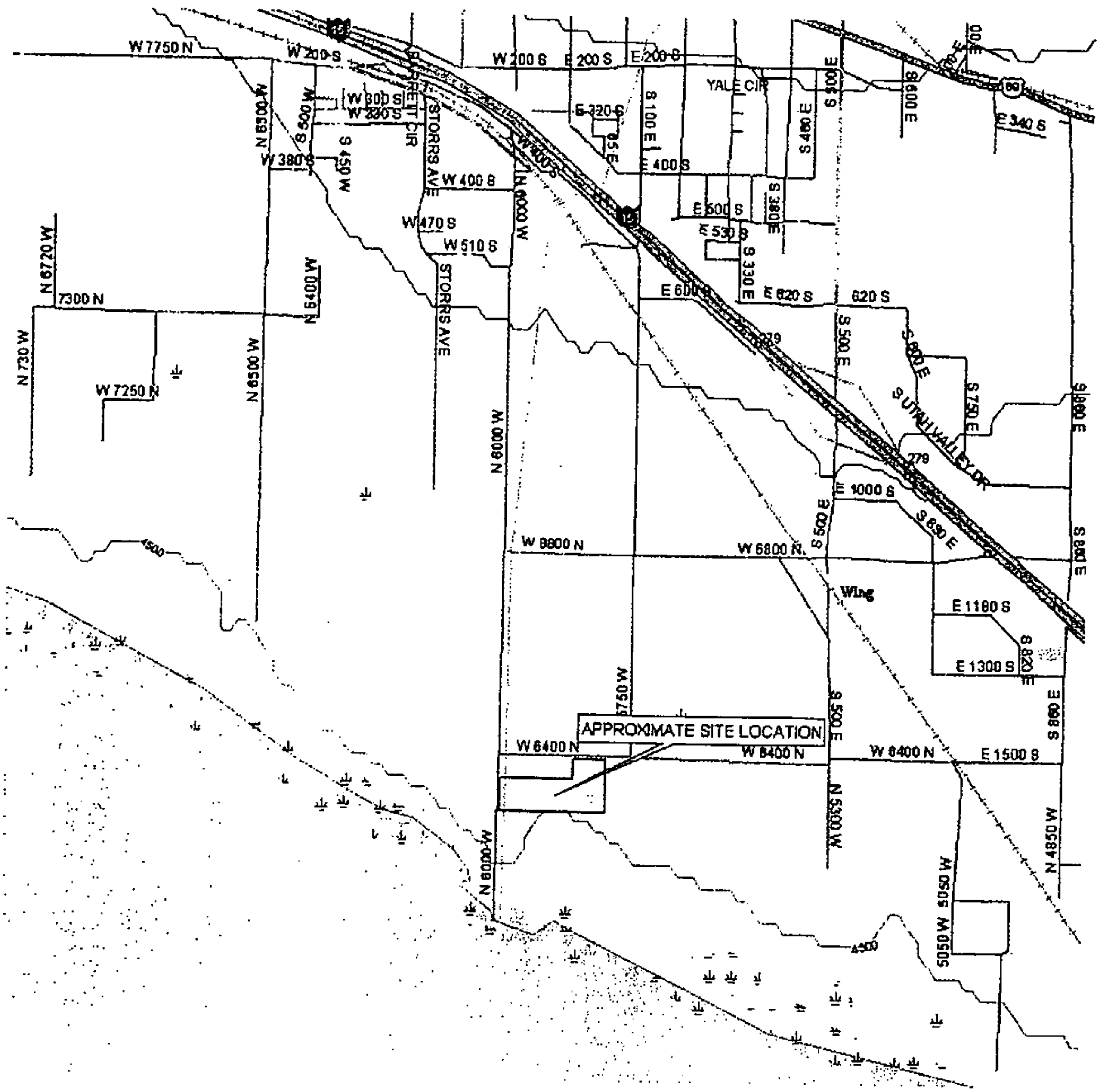
EARTHTEC TESTING AND ENGINEERING, P.C.

Jeffrey J. Egbert, P.E.
Project Geotechnical Engineer

William G. Turner, P.E.
Senior Geotechnical Engineer

VICINITY MAP

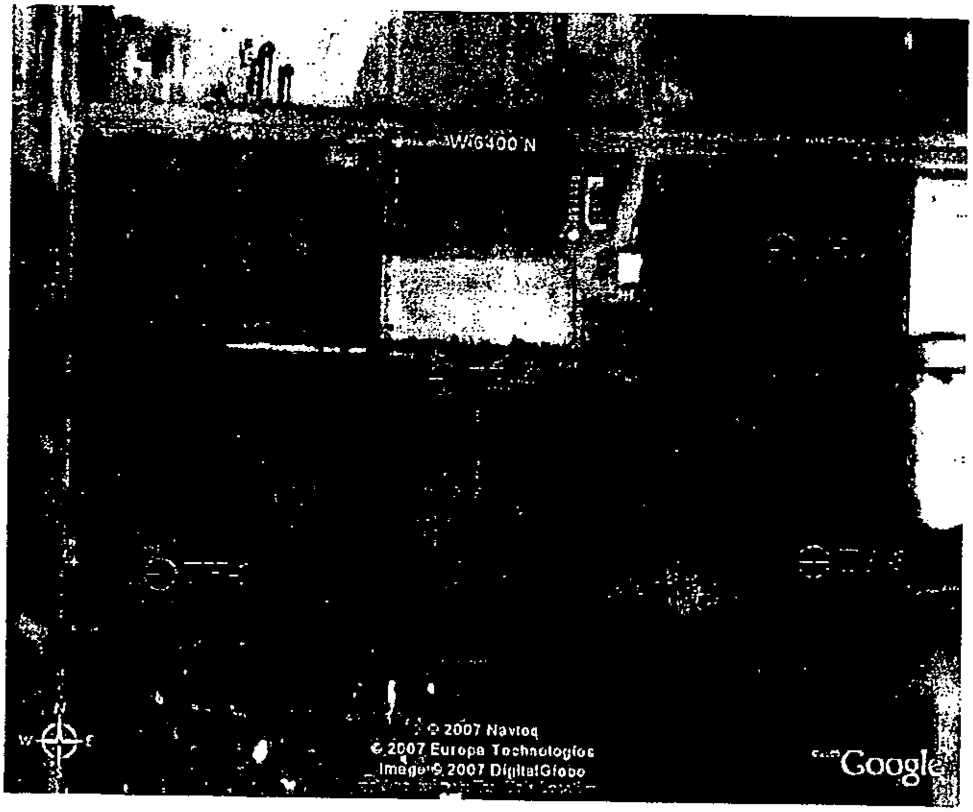
STORAGE CENTER



PROJECT NO.: 070519	Earthtec Testing and Engineering, P.C.	**FIGURE NO.:** 1

AERIAL PHOTO & LOCATION OF TEST HOLES

STORAGE CENTER



PROJECT NO.: 070519	Earthtec Testing and Engineering, P.C.	**FIGURE NO.:** 2

TEST HOLE LOG

NO.: TH-1

PROJECT: Storage Center
CLIENT: Rueben Adams
LOCATION: Refer to Figure 2.
OPERATOR: Ray Con
EQUIPMENT: Deidrich D-120 A.T.
DEPTH TO WATER; INITIAL ∇ : 1.75 ft.

PROJECT NO.: 070519
DATE: 03/20/07
ELEVATION: NM
LOGGED BY: D.D.
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL: Clay with sand (approximately 7 inches).										
		CL	LEAN CLAY, medium stiff, moist to wet, gray.										
3					4								
6		MH	ELASTIC SILT, organics, medium stiff to very stiff, wet, gray.			46	67	54	23				C
9					7								
12													
15					20								
18			Bottom at approximately 16.5 feet.										

Notes:

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

PROJECT NO.: 070519

Earthtec Testing and Engineering, P.C.

FIGURE NO.: 3

TEST HOLE LOG

NO.: TH-2

PROJECT: Storage Center
CLIENT: Rueben Adams
LOCATION: Refer to Figure 2.
OPERATOR: Ray Con
EQUIPMENT: Deidrich D-120 A.T.
DEPTH TO WATER; INITIAL ∇: 1.17 ft.

PROJECT NO.: 070519
DATE: 03/20/07
ELEVATION: NM
LOGGED BY: D.D.
AT COMPLETION ▼:

Depth (Ft.)	Graphic Log	USCS	Description	Samples	Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL: Clay with sand, black (approximately 3 inches).										
			∇ LEAN CLAY with sand, medium stiff to stiff, moist to wet, gray.										
3					7								
6					12								
9					5								
		CL				31	91	42	19				C
12													
15													
18													

Notes:

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

PROJECT NO.: 070519 | Earthtec Testing and Engineering, P.C. | **FIGURE NO.:** 4a

TEST HOLE LOG

NO.: TH-2

PROJECT:	Storage Center	**PROJECT NO.:**	070519
CLIENT:	Rueben Adams	**DATE:**	03/20/07
LOCATION:	Refer to Figure 2.	**ELEVATION:**	NM
OPERATOR:	Ray Con	**LOGGED BY:**	D.D.
EQUIPMENT:	Deidrich D-120 A.T.		
DEPTH TO WATER; INITIAL ▽:	1.17 ft.	**AT COMPLETION ▼:**	

Depth (Ft.)	Graphic Log	USCS	Description	Samples	Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
21–24	▨	CL	LEAN CLAY with sand, medium stiff to stiff, moist to wet, gray.	◤	7								
27–30	▒	SP-SM	POORLY GRADED SAND with silt, medium dense, wet, gray.	◤	19	19				0	90	10	
				◤	12								
33–39			Bottom at approximately 31.5 feet.										

Notes:

Tests Key

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

PROJECT NO.: 070519

Earthtec Testing and Engineering, P.C.

FIGURE NO.: 4b

TEST HOLE LOG

NO.: TH-3

PROJECT: Storage Center
CLIENT: Rueben Adams
LOCATION: Refer to Figure 2.
OPERATOR: Ray Con
EQUIPMENT: Deidrich D-120 A.T.

PROJECT NO.: 070519
DATE: 03/20/07
ELEVATION: NM
LOGGED BY: D.D.

DEPTH TO WATER; INITIAL ∇ : 1.66 ft.
AT COMPLETION ▼ :

Depth (Ft.)	Graphic Log	USCS	Description	Samples	Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL: Clay with sand, black (approximately 8 inches).										
			LEAN CLAY with sand, stiff, wet, gray.										
3					10								
6					8								
9		CL				35	84	33	13				C
12					8								
15					8								
			Bottom at approximately 16.5 feet.										
18													

Notes: Slotted PVC pipe placed in test hole after drilling. Groundwater in pipe measured at 17 inches on Mar 21, 2007.

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

PROJECT NO.: 070519 | Earthtec Testing and Engineering, P.C. | **FIGURE NO.:** 5

TEST HOLE LOG

NO.: TH-4

PROJECT: Storage Center
CLIENT: Rueben Adams
LOCATION: Refer to Figure 2.
OPERATOR: Ray Con
EQUIPMENT: Deidrich D-120 A.T.
DEPTH TO WATER; INITIAL ∇: 1.5 ft.

PROJECT NO.: 070519
DATE: 03/20/07
ELEVATION: NM
LOGGED BY: D.D.
AT COMPLETION ▼:

Depth (Ft.)	Graphic Log	USCS	Description	Samples	Blows per foot	Water Cont. (%)	Dry Dens. (pcf)	LL	PI	Gravel (%)	Sand (%)	Fines (%)	Other Tests
0			TOPSOIL: Clay with sand (approximately 10 inches).										
		CL	∇ LEAN CLAY with gravel, soft to very soft, wet, gray.										
3					4								
6													
9						38	83	43	19				C
12					0								
15		CH	FAT CLAY with gravel, soft, wet, gray.			40	80	64	41				C
18			Bottom at approximately 17 feet.										

Notes:

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

LOG OF TESTHOLE 070519.GPJ EARTHTEC.GDT 4/4/07

PROJECT NO.: 070519

Earthtec Testing and Engineering, P.C.

FIGURE NO.: 6

LEGEND

PROJECT: Storage Center
CLIENT: Rueben Adams
DATE: 03/20/07
LOGGED BY: D.D.

UNIFIED SOIL CLASSIFICATION SYSTEM

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

SAMPLER DESCRIPTIONS

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

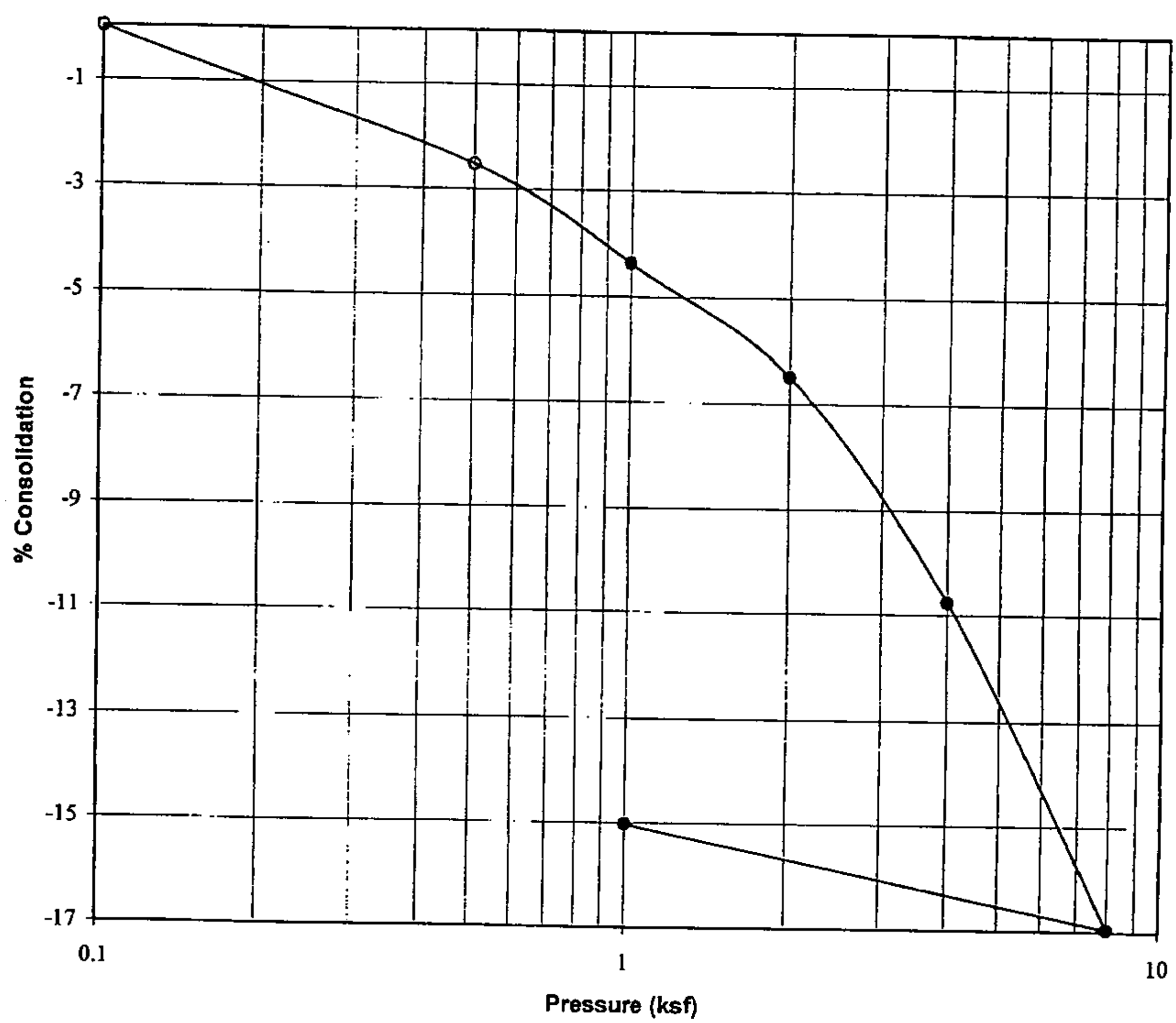
WATER SYMBOLS

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

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

PROJECT NO.: 070519	Earthtec Testing and Engineering, P.C.	FIGURE NO.: 7

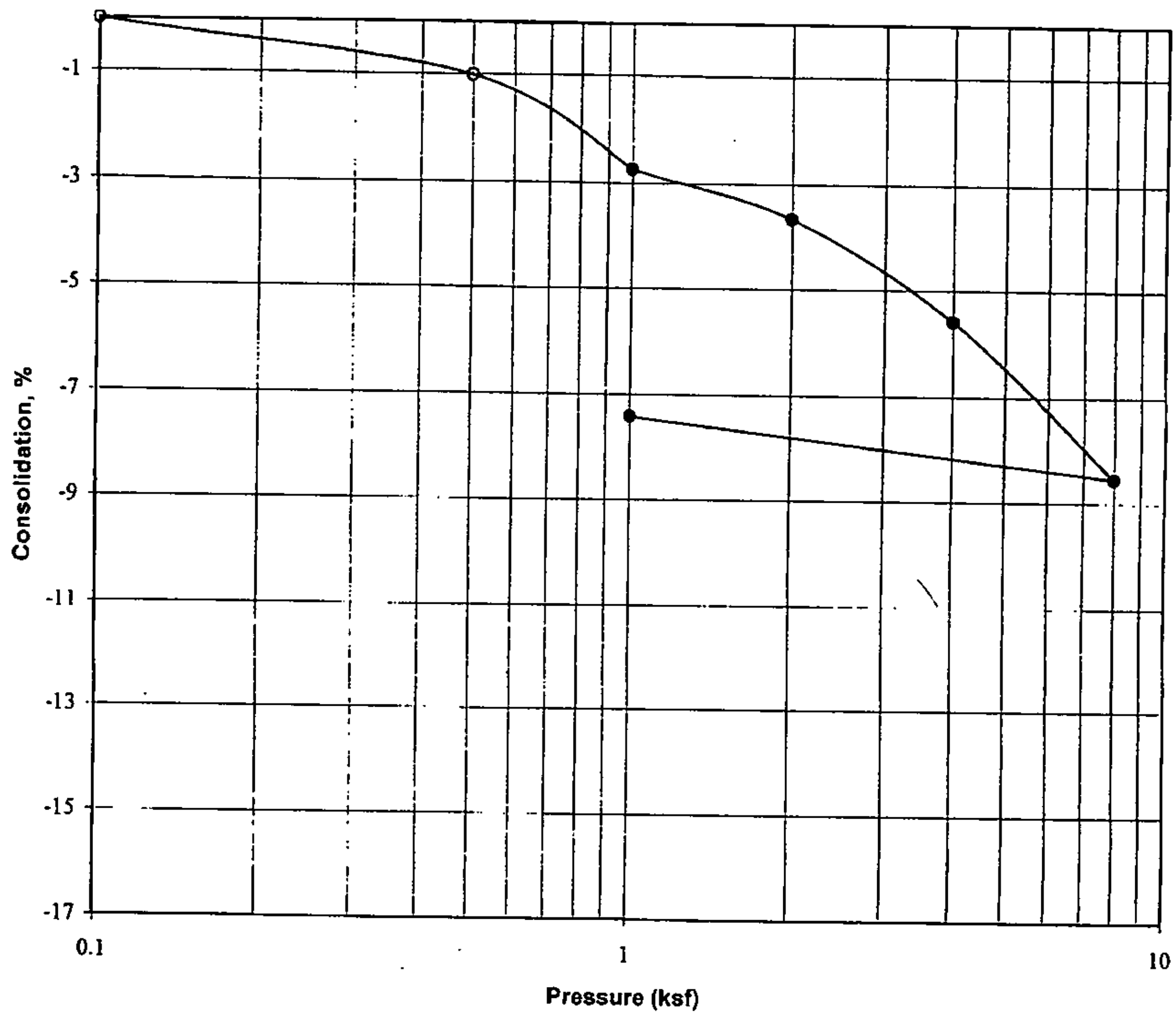
CONSOLIDATION - SWELL TEST



Project:	Storage Center
Location:	TH-1
Sample Depth:	5
Description:	Shelby
Soil Type:	ELASTIC SILT (MH)
Dry Density, pcf:	67
Natural Moisture, %:	46
Liquid Limit:	54
Plasticity Index:	23
Water Added at:	1 ksf

PROJECT NO.: 070519	Earthtec Testing and Engineering, P.C.	**FIGURE NO.:** 8

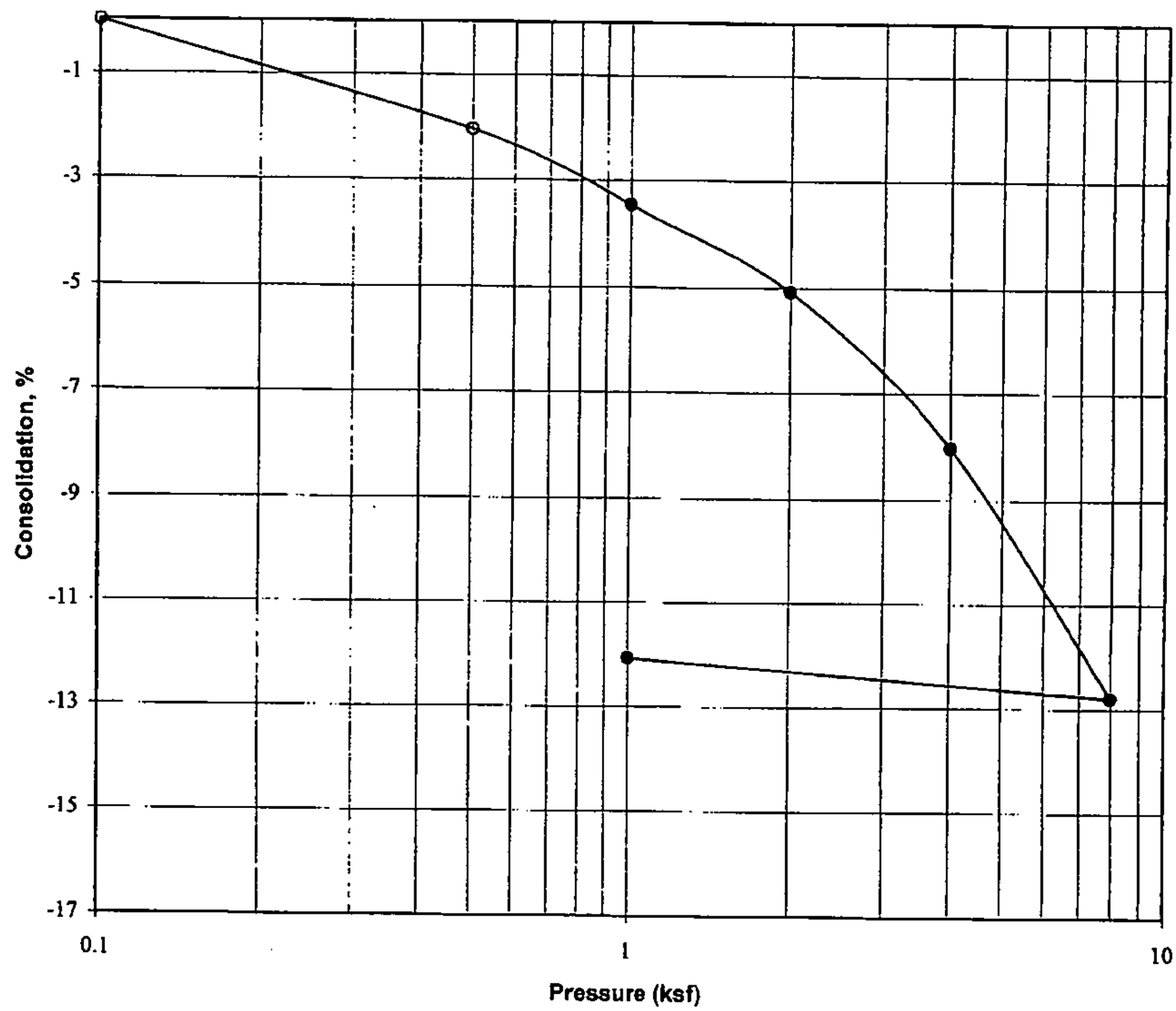
CONSOLIDATION - SWELL TEST



Project:	Storage Center
Location:	TH-2
Sample Depth:	10
Description:	Shelby
Soil Type:	LEAN CLAY with sand (CL)
Dry Density, pcf:	91
Natural Moisture, %:	31
Liquid Limit:	42
Plasticity Index:	19
Water Added at:	1 ksf

PROJECT NO.: 070519	Earthtec Testing and Engineering, P.C.	**FIGURE NO.:** 9

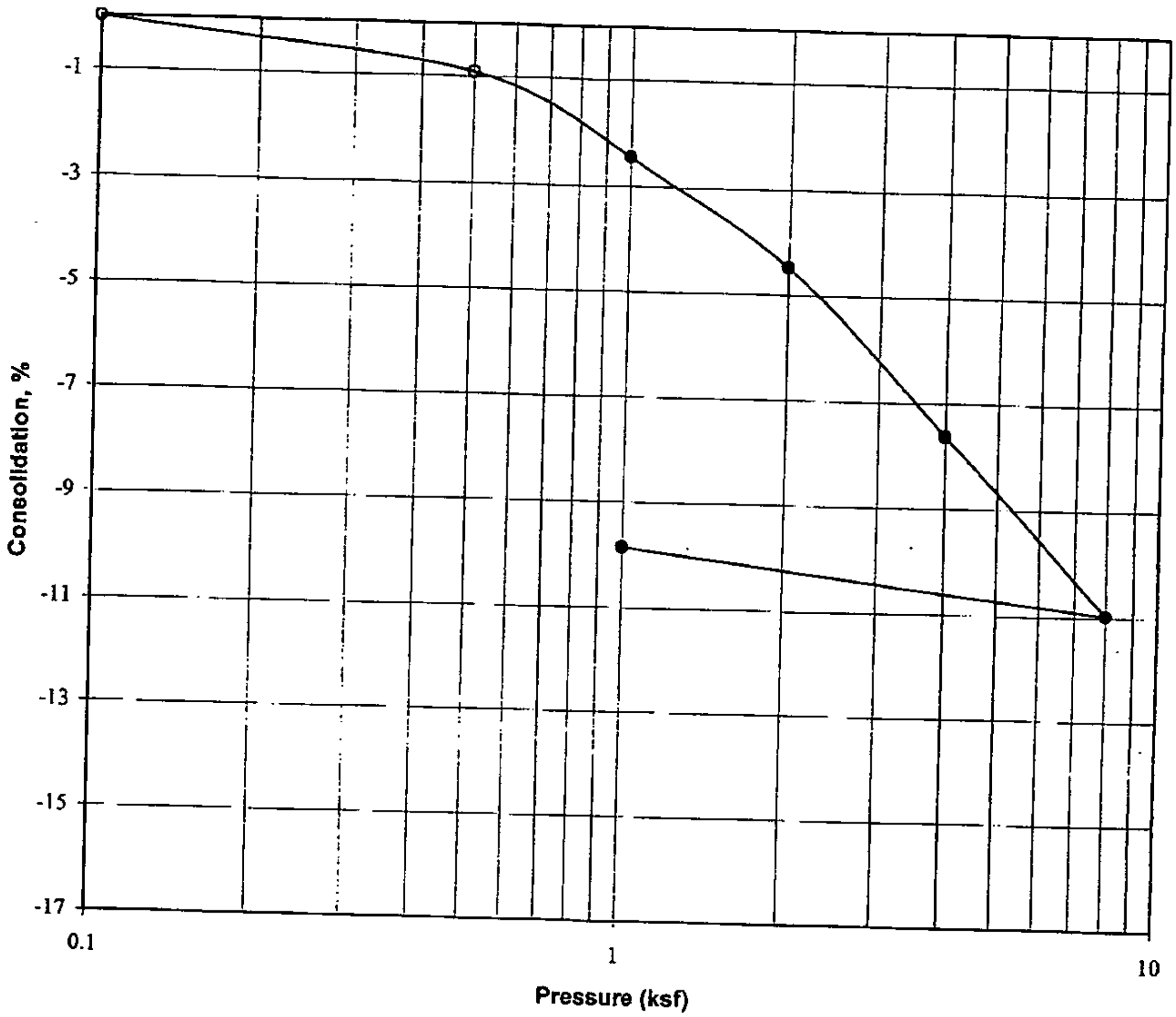
CONSOLIDATION - SWELL TEST



Project:	Storage Center
Location:	TH-3
Sample Depth:	7½
Description:	Shelby
Soil Type:	LEAN CLAY with sand (CL)
Dry Density, pcf:	84
Natural Moisture, %:	35
Liquid Limit:	33
Plasticity Index:	13
Water Added at:	1 ksf

PROJECT NO.: 070519	Earthtec Testing and Engineering, P.C.	**FIGURE NO.:** 10

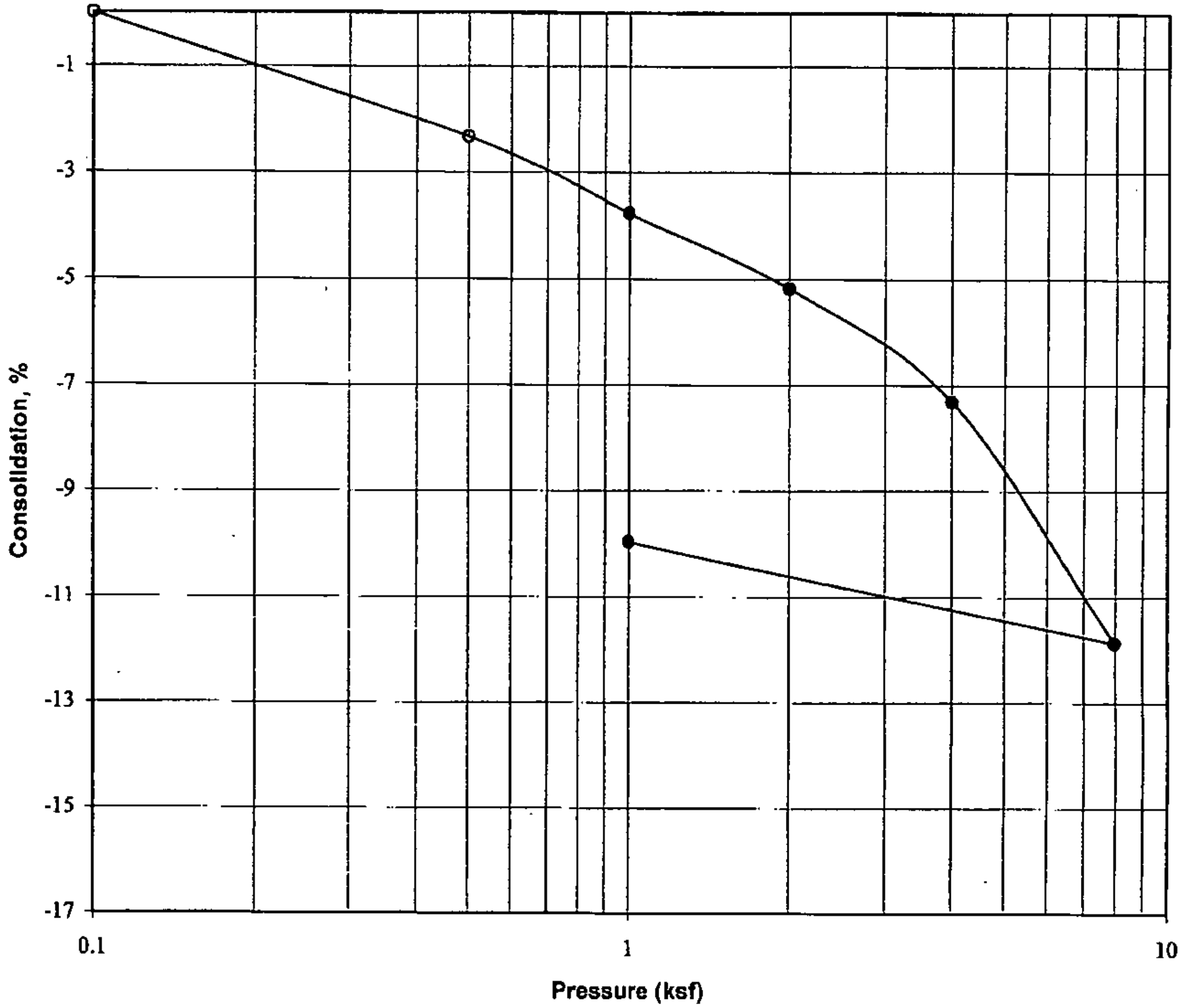
CONSOLIDATION - SWELL TEST



Project:	Storage Center
Location:	TH-4
Sample Depth:	7½
Description:	Shelby
Soil Type:	LEAN CLAY with sand (CL)
Dry Density, pcf:	83
Natural Moisture, %:	38
Liquid Limit:	43
Plasticity Index:	19
Water Added at:	1 ksf

PROJECT NO.: 070519	Earthtec Testing and Engineering, P.C.	**FIGURE NO.:** 11

CONSOLIDATION - SWELL TEST



Project:	Storage Center
Location:	TH-4
Sample Depth:	15
Description:	Shelby
Soil Type:	FAT CLAY (CH)
Dry Density, pcf:	80
Natural Moisture, %:	40
Liquid Limit:	64
Plasticity Index:	41
Water Added at:	1 ksf

PROJECT NO.: 070519	Earthtec Testing and Engineering, P.C.	**FIGURE NO.:** 12