



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

ENT 46834 2024 PG 1 of 86  
**ANDREA ALLEN**  
**UTAH COUNTY RECORDER**  
2024 Jul 15 01:37 PM FEE 40.00 BY LM  
RECORDED FOR AMERICAN FORK CITY

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

This Notice is recorded to bind the attached Geotechnical Study dated 11/22/21 along with the site grading plan to the property generally located at 75 W 1100 S (address), American Fork, UT 84003 and therefore mandating that all construction be in compliance with said Geotechnical Study and site grading plan per the requirements of American Fork City ordinances and standards and specification including specifically Ordinance 07-10-47, Section 6-5, Restrictive Covenant Required and 6-2-4, Liquefiable Soils. Said Sections require establishment of a restrictive covenant and notice to property owners of liquefiable soils or other unique soil conditions and construction methods associated with the property.

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

Dated this 22nd day of May, 2024.

**OWNER(S):**

(Signature)

Tyler Horan

(Printed Name)

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(Signature)

(Printed Name)

Manager

(Title) Keystone Construction

(Title)

STATE OF UTAH

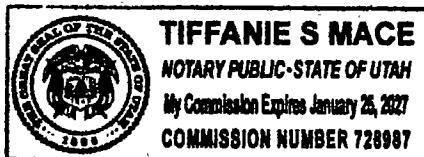
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COUNTY OF Utah

Ω = 1

On the 23<sup>rd</sup> day of May  
Tyler Moran  
of said Property, as (individuals and/or authorized  
that such individuals or company executed the  
to the articles of organization where applicable.

Instrument freely of their own volition and pursuant  
  
\_\_\_\_\_  
Lee S. Mace  
Notary Public  
My Commission Expires: Jan 25, 2027



# Exhibit A

ENT 46834 2024 PG 2 of 86

## Title Report Legal Description

Commencing 4.20 chains East and 5.40 chains South of the Northwest corner of the Southeast quarter of Section 26, Township 5 South, Range 1 East, Salt Lake Base and Meridian; thence South 21.60 chains; thence East 3.10 chains; thence North 21.60 chains; thence West 3.10 chains to the beginning.

ALSO:

Commencing 4.2 chains East of the Northwest corner of the Southeast quarter of Section 26, Township 5 South, Range 1 East, Salt Lake Meridian; thence South 5.40 chains; thence East 3.10 chains; thence South 21.60 chains; thence East 1.03 chains; thence North 27.00 chains; thence West 4.13 chains to the beginning.

THIS IS THE SAME LEGAL DESCRIPTION PROVIDED BY: FIDELITY NATIONAL TITLE INSURANCE COMPANY

ISSUING AGENT: COTTONWOOD TITLE INSURANCE AGENCY, INC.

COMMITMENT DATE: JULY 2, 2021

FILE NO. 147516-DMP

**LETTER**  
**ADDENDUM #1 AND REVIEW RESPONSE #1**  
**PROPOSED 6800 NORTH INDUSTRIAL/**  
**PROPOSED DEER PARK INDUSTRIAL**  
**1100 SOUTH 50 WEST**  
**AMERICAN FORK, UTAH**

Submitted To:

White Horse Developers  
520 South 850 East, Suite A4  
Lehi, Utah 84043

Submitted By:

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

November 22, 2021

Job No. 3388-001-21

November 22, 2021  
Job No. 3388-001-21

Mr. Jake Horan  
White Horse Developers  
520 South 850 East, Suite A4  
Lehi, Utah 84043

Mr. Horan:

Re: Letter  
Addendum #1 and Review Response #1  
Proposed 6800 North Industrial/Proposed Deer Park Industrial  
1100 South 50 West  
American Fork, Utah

## 1. INTRODUCTION

### 1.1 GENERAL

This letter is to serve as an addendum to the previously completed geotechnical study for the above-mentioned site as well as in response to the review and questions posed by Mr. Alan Taylor, P.E. of Taylor Geotechnical on behalf of the City of American Fork. GSH previously completed a geotechnical study for the site dated May 14, 2021<sup>1</sup>. GSH returned to the site on September 9, 2021, to conduct 4 additional borings and subsequent analysis for this addendum.

Since the issuance of the original report, one warehouse was added to the overall scope of the project on an additional parcel to the west of the original site. This addendum outlines the soil conditions and properties in the additional borings and any applicable recommendation changes. With the exception of the recommendations herein, all recommendations from the original report remain valid.

### 1.2 SUBSURFACE SOIL

Non-engineered fill soils were encountered in each additional boring, to depths of up to 6.5 feet beneath the existing ground surface. The non-engineered fill soils primarily consisted of clay with

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<sup>1</sup> "Geotechnical Study, Proposed 6800 North Industrial, American Fork, Utah" prepared by GSH Geotechnical, Inc., GSH Job No. 2354-003-21.

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

The following sections provide updated recommendations for the treatment of non-engineered fills.

## **2. DISCUSSIONS AND RECOMMENDATIONS**

### **2.1 SITE PREPARATION**

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

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

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

### **2.2 STRUCTURAL FILL**

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

### **2.3 PAVEMENTS**

The natural clay soils and non-engineered fills will exhibit poor pavement support characteristics when saturated. All pavement areas must be prepared as previously discussed. Under no circumstances shall pavements be established over unprepared non-engineered fills, loose or disturbed soils, topsoil, surface vegetation, root systems, rubbish, construction debris, other deleterious materials, frozen soils, or within ponded water. With the subgrade soils and the

projected traffic as discussed in Section 2, Proposed Construction in the original report, the following pavement sections are recommended:

Parking Areas

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

Flexible Pavements:  
(Asphalt Concrete)

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

Rigid Pavements:  
(Non-reinforced Concrete)

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

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Primary Drive Lanes/Loading and Unloading Areas

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

Flexible Pavements:

(Asphalt Concrete)

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

\* Subbase may consist of granular site grading fills with a minimum California Bearing Ratio (CBR) of 30 percent.

Rigid Pavements:

(Non-reinforced Concrete)

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

In areas with tight maneuvering heavy vehicles, rigid pavements are recommended.

For dumpster pads, we recommend a pavement section consisting of 8.0 inches of Portland cement concrete, 12.0 inches of aggregate base, over properly prepared natural subgrade or site grading structural fills. Dumpster pads should not be constructed overlying non-engineered fills under any circumstances.

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

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

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

## **2.4 SITE VISITS**

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

## **3. TAYLOR GEOTECHNICAL (TG) REVIEW RESPONSE**

### **TG Comment 1**

*Section 3.3.1 General (page 4) of the May 14, 2021, GSH document states, “Lab testing was ongoing at the time this report was written. Upon completion, an updated version of this report containing lab results will be sent, along with any revised recommends.”*

*TG recommends American Fork City request GSH provide the updated version of the report with the accompany lab work results (i.e. consolidations, gradations, Atterberg Limits, etc.).*

### **GSH Review Response 1**

Lab testing associated with the May 14, 2021, report as well as the additional borings conducted on September 9, 2021 and associated addendum are included as Attachment 1, Laboratory Testing.

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### **TG Comment 2**

*Section 5.1 Summary of Findings (page 7) of the May 14, 2021, GSH document states, “GSH is currently conducting a site-specific seismic response analysis and the results will be transmitted upon completion.”*

*TG recommends American Fork City request GSH provide the site-specific seismic response analysis.*

### **GSH Review Response 2**

The site-specific seismic response analysis completed in association with the May 14, 2021, study is included as Attachment 2, Site-Specific Seismic Study.

### **TG Comment 3**

*Section 5.3 Groundwater (page 11) of the May 14, 2021, GSH document states, “Floor slabs must be placed a minimum of 4 feet from the stabilized groundwater elevation.”*

*TG recommends American Fork City request GSH provide the stabilized groundwater elevation as measured from existing grade.*

### **GSH Review Response 3**

Stabilized groundwater elevations are presented in the following tables.

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Boring No.	Groundwater Depth (feet)
<b>May 13, 2021</b>	
B-1	4.8
B-2	Pipe Damaged
B-3	7.8
B-4	2.8
B-5	5.0
B-6	6.1
B-8	7.8
B-9	Pipe Damaged
B-10	7.1
B-12	4.6
B-15	3.6

Boring No.	Groundwater Depth (feet)
<b>September 17, 2021</b>	
B-1A	7.6
B-3A	9.3
B-4A	9.8

#### TG Comment 4

*Section 5.9 Cement Types (page 17) of the May 14, 2021, GSH document states, “A representative soil sample was collected and sent for laboratory analysis for pH and sulfate content. As of the date of this report, results are still pending and will be transmitted when available and with corresponding cement recommendations, if applicable.”*

*TG recommends American Fork City request GSH provide the laboratory results and corresponding cement recommendations.*

#### GSH Review Response 4

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

Boring No.	Depth (feet)	Soil Classification	pH	Total Water Soluble Sulfate (mg/kg-dry)
B-1	2.5	CL	7.37	247
B-1A	2.5	CL (Fill)	8.24	158

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

#### TG Comment 5

*Section 4-2-2 of the American Fork City Sensitive Land Ordinance sub-item (10), states the report must be in accordance with the guidelines and recommendations of the "American Fork Sensitive Lands Geologic Hazards Study," Chapter 5 titled "Conclusions and Recommendations" prepared by RB&G Engineering, Inc., dated December 2006. The RB&G report specifies for facilities designed according to the IBC seismic provisions and located within the moderate or high liquefaction hazard zones identified on Figure 6 of the RB&G report, that the recommended Site Class be based on a site- specific subsurface investigation to a depth of at least 30 feet, supplemented by at least one investigation to a depth of at least 70 feet and located within 2,000 feet of the site. TG recommends American Fork City request GSH provide the recommended Site Class in accordance the American Fork City Sensitive Land Ordinance.*

#### GSH Review Response 5

GSH completed a site-specific seismic response analysis in association with the May 14, 2021. Per this study, the site has been determined as a Site Class D – Stiff Soil Profile as defined in Chapter 20 of ASCE 7-16 (per Section 1613.3.2, Site Class Definitions, of IBC 2018).

#### TG Comment 6

*TG recommends American Fork City request GSH update their ground motions and liquefaction analysis based on the IBC 2018 or ASCE 7-16.*

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## GSH Review Response 6

An updated ground motion table is presented in the site-specific seismic response analysis completed in association with the May 14, 2021, study. This study is included as Attachment 2, Site-Specific Seismic Study.

An updated liquefaction analysis will be provided to address the following comment “TG Comment 7”.

### TG Comment 7

*Section 5.10.5 Liquefaction (page 19) of the May 14, 2021, GSH document states, “Calculations were performed using the procedures described in the 2008 Soil Liquefaction During Earthquakes Monograph by Idriss and Boulanger<sup>3</sup>. Our calculations indicate the very, saturated sand layers encountered in Borings B-1, B-2, B-4 and B-12 could liquefy during the design seismic event. Calculated settlement associated with the liquefaction of each layer within the borings was on the order of 1 to 1.5 inches. This magnitude of settlement should be tolerable to design for life safety. Additionally, lateral spread and ground rupture are unlikely to occur.”*

*The subject document did not contain the calculations to substantiate there liquefaction induced settlement analysis. The document also did not substantiate the liquefaction induced lateral spread analysis.*

*TG recommends the American Fork City request the calculations that substantiate the liquefaction induced settlement and lateral spread analyses.*

## GSH Review Response 7

Calculations were performed using the procedures described in the 2008 Soil Liquefaction During Earthquakes Monograph by Idriss and Boulanger<sup>2</sup>. Our calculations indicate the very loose to medium dense, saturated sand layers encountered in Borings B-1, B-2, B-6, and B-12 could liquefy during the design seismic event. Calculated settlement associated with the liquefaction of each layer within the borings was on the order of 1.16 to 2.1 inches.

The liquefaction calculations utilized to substantiate the liquefaction induced settlement are included as Attachment 3, Liquefaction Analysis.

Additionally, due to the lack of horizontal relief and change of topography throughout the site, lateral spread is unlikely to occur.

<sup>2</sup> Idriss, I. M., and Boulanger, R. W. (2008), Soil liquefaction during earthquakes: Monograph MNO-12, Earthquake Engineering Research Institute, Oakland, CA, 261 pp.

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### **TG Comment 8**

*Based on section 2-7-2 of the American Fork City Sensitive Land Ordinance, GSH should provide the historical high groundwater table for the subject site. TG recommends American Fork City request GSH provide the historical high groundwater table for the subject site and state the reference used.*

### **GSH Review Response 8**

GSH utilized waterdata.usgs.gov to review the historical high groundwater table for the subject. Historical high groundwater tables in wells directly adjacent to the northwest and northeast indicated were recorded as shallow as approximately 33 feet below the ground surface.

The historical high groundwater tables are included in Attachment 5, Historical High Groundwater Tables. However, these levels are unrealistically low. GSH recommends designing to an anticipated groundwater elevation of 3.6 feet, 1 foot higher than what was measured in the original study.

### **TG Comment 9**

*Since the site is below elevation 4593 feet, TG recommends American Fork City request GSH to address artesian conditions at the site.*

### **GSH Review Response 9**

GSH did not encounter artesian conditions within the borings performed in accordance with the May 14, 2021, report, nor within the additional borings performed to the maximum depths explored.

### **TG Comment 10**

*TG recommends American Fork City request GSH to provide calculations that substantiate their recommended allowable bearing capacity, estimated settlement, lateral resistance and lateral loading recommendations.*

### **GSH Review Response 10**

Calculations to substantiate the recommended allowable bearing capacity, estimated settlement, lateral resistance, and lateral loading recommendations are provided within Attachment 4, Engineering Calculations.

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### **TG Comment 11**

*In accordance with section 4-2-4 of the American Fork City Sensitive Land Ordinance, sub-item (7B), the report should be accompanied with the following Certificate statement sealed by the licensed professional that prepared the report:*

*I hereby certify that I am a licensed professional engineer or an engineering geologist, as those terms are defined in the "Sensitive Lands Ordinance" Section of the American Fork City Ordinances. I have examined the letter report/geologic report to which this certificate is attached and the information and conclusions contained therein are, without any reasonable reservation not stated therein, accurate and complete. All procedures and tests used in said letter report/geologic report meet minimum applicable professional standards.*

*The subject document did not contain the required certificate. TG recommends the City of American Fork request the required certificate for the subject document.*

### **GSH Review Response 11**

GSH did not encounter artesian conditions within the borings performed in accordance with the May 14, 2021, report, nor within the additional borings performed to the maximum depths explored.

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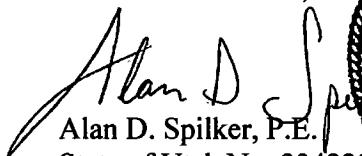


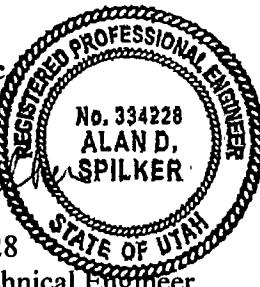
#### 4. CLOSURE

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

Respectfully submitted,

**GSH Geotechnical, Inc**

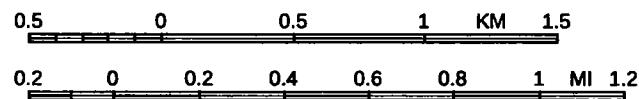
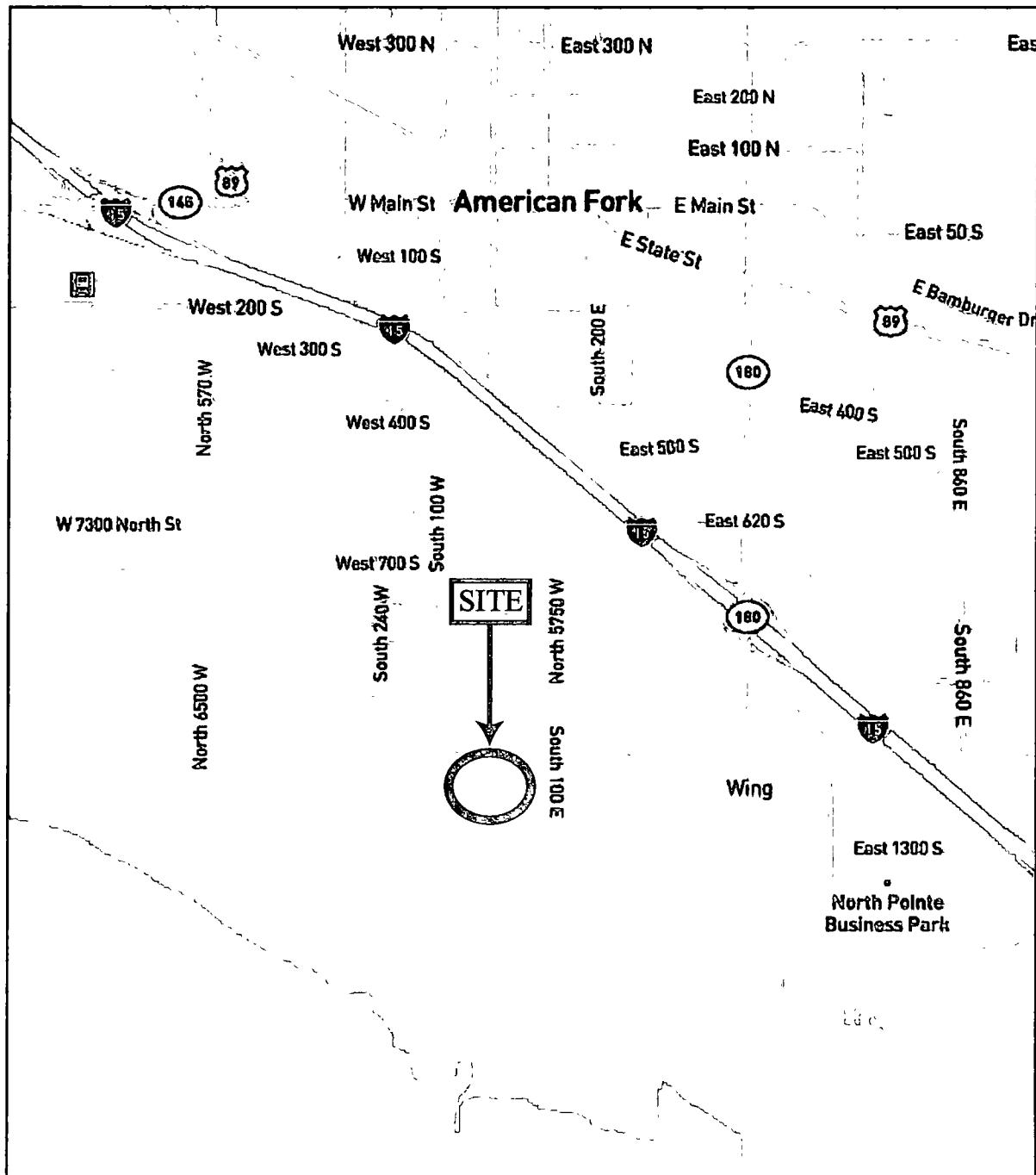
  
 Alan D. Spilker, P.E.  
 State of Utah No. 334228  
 President/Senior Geotechnical Engineer



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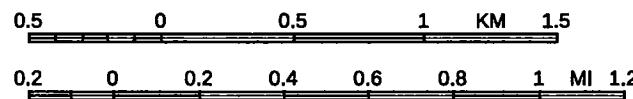
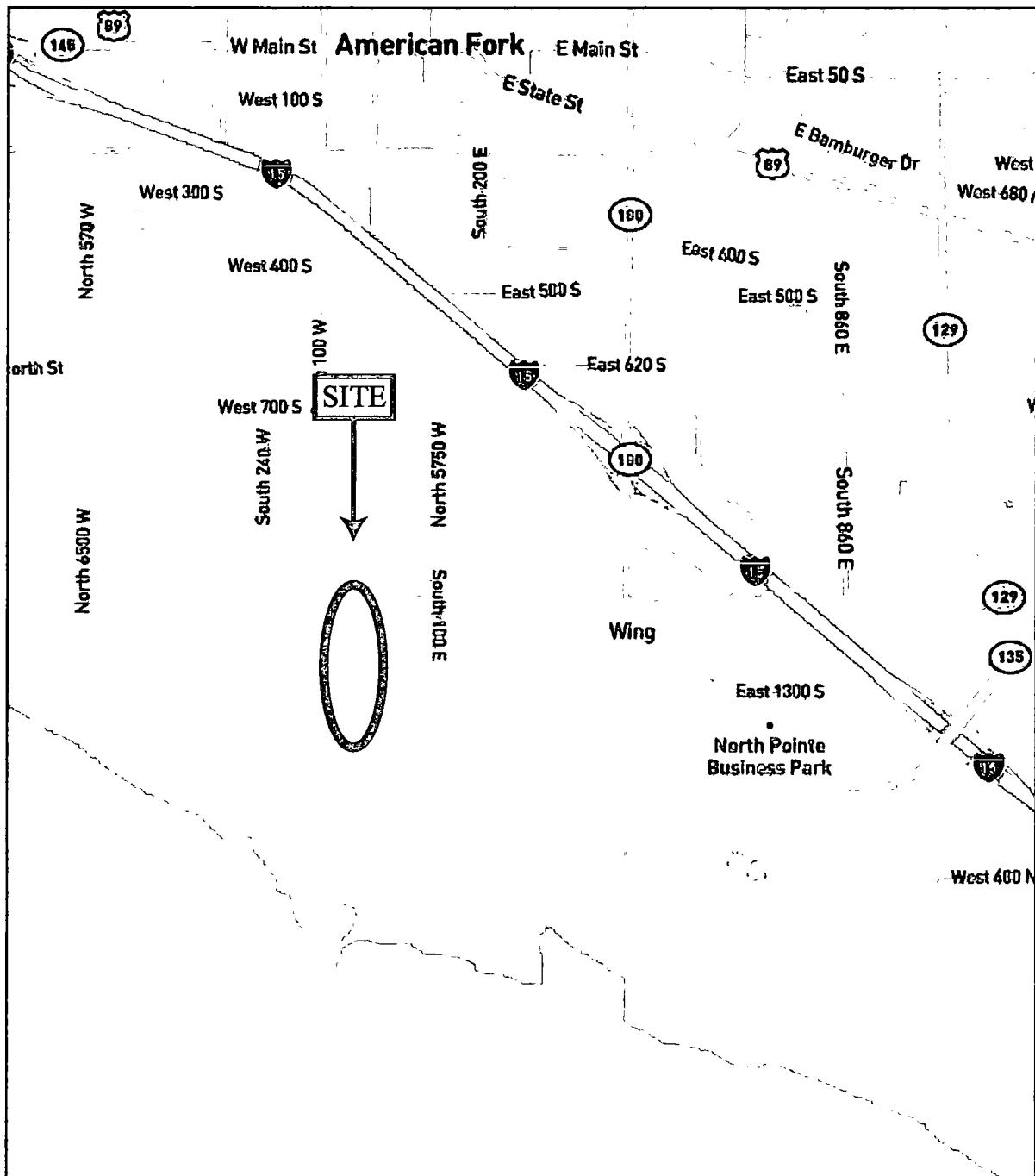
Encl. Figures 1 and 1A, Vicinity Maps  
 Figures 2, and 2A, Site Plans  
 Figures 3A through 3O, Boring Logs  
 Figures 4A through 4D, Additional Boring Logs  
 Figure 5, Key to Boring Log (USCS)  
 Attachment 1, Laboratory Testing  
 Attachment 2, Site-Specific Seismic Study  
 Attachment 3, Liquefaction Analysis  
 Attachment 4, Engineering Calculations  
 Attachment 5, Historical High Groundwater Tables

Addressee (email)



REFERENCE:  
ALL TRAILS - NATIONAL GEOGRAPHIC TERRAIN  
DATED 2021

FIGURE 1  
VICINITY MAP  
 GSH



REFERENCE:  
ALL TRAILS - NATIONAL GEOGRAPHIC TERRAIN  
DATED 2021

FIGURE 1A  
VICINITY MAP  
 GSH

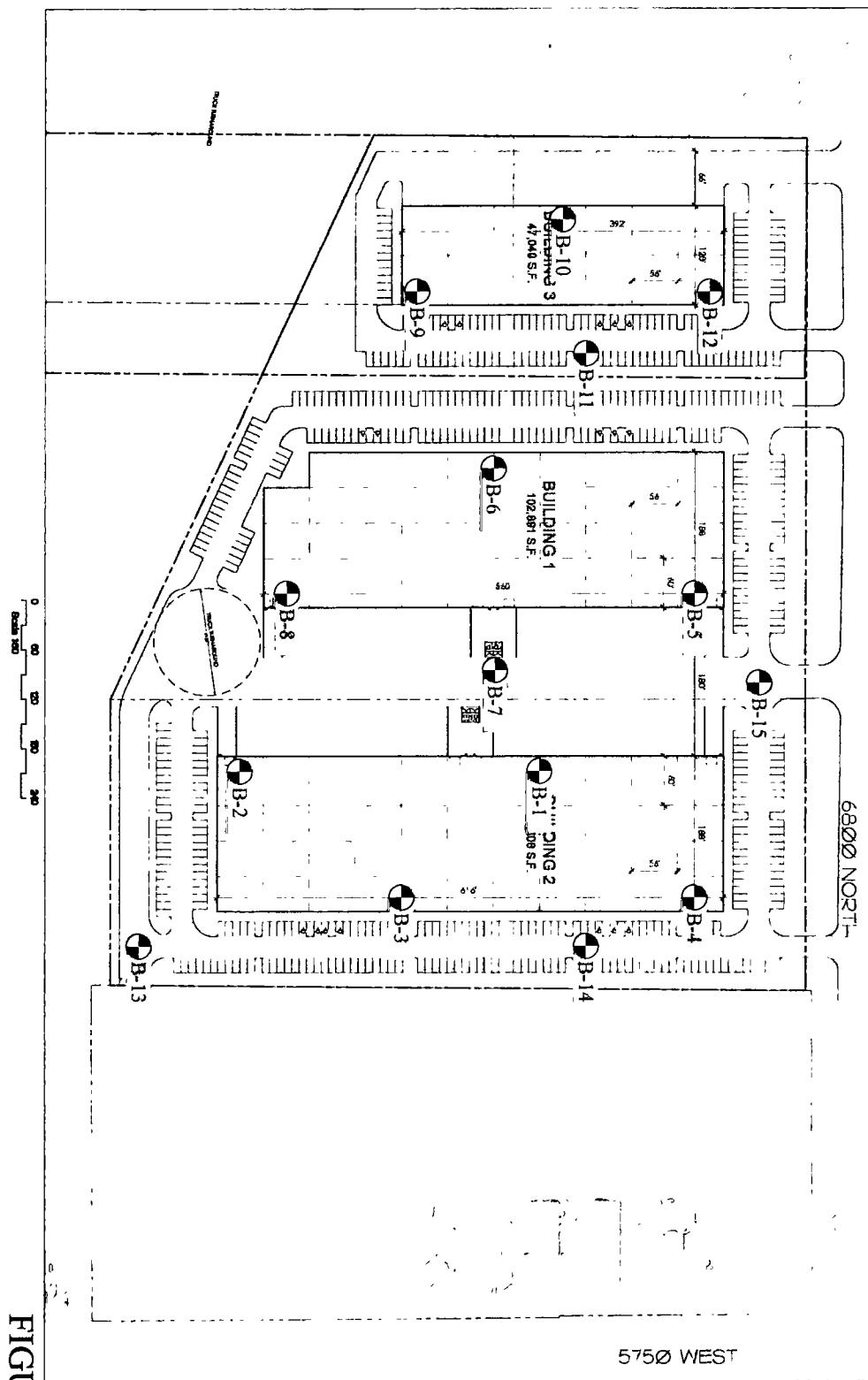
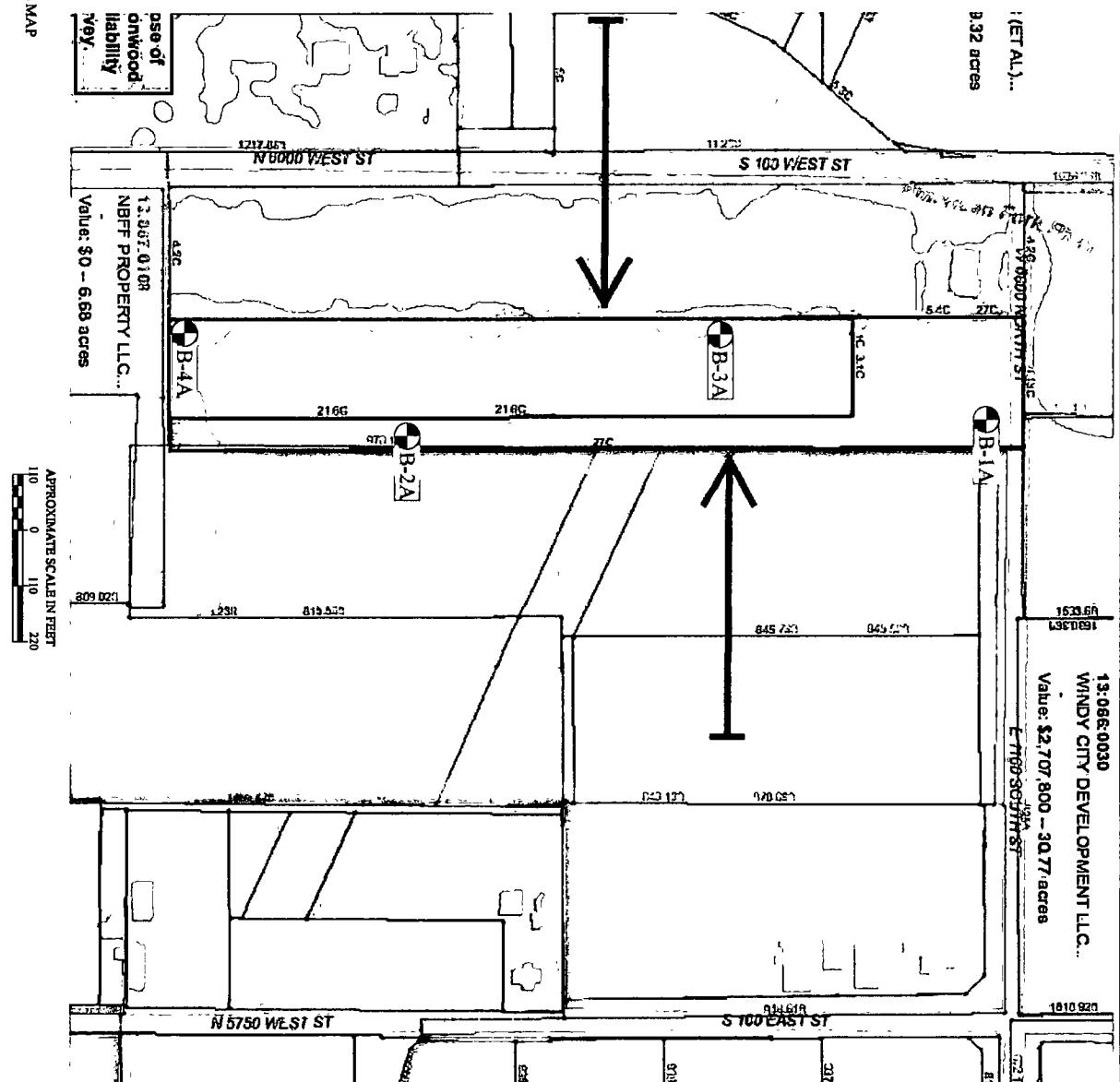


FIGURE 2  
SITE PLAN

REFERENCE  
ADAPTED FROM DRAWING ENTITLED  
"MIKE HORAN - 6800 NORTH INDUSTRIAL AREA"  
BY ABURBIA, DATED 8 APR 2021

REFERENCE  
ADAPTED FROM UTAH COUNTY PARCEL MAP  
DATED 8/12/21



## FIGURE 2A SITE PLAN



## BORING LOG

Page: 1 of 2

BORING: B-1

CLIENT: Red Pine Construction

PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial

DATE STARTED: 4/22/21

DATE FINISHED: 4/22/21

LOCATION: 5900 West 6800 North, American Fork, Utah

GSH FIELD REP.: JH

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic WEIGHT: 140 lbs DROP: 30"

GROUNDWATER DEPTH: 4.8' (5/13/21)

ELEVATION: ---

WATER LEVEL U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
1	2	3	4	5	6	7	8			
	Ground Surface	0								
CL	SILTY CLAY with some fine sand and occasional layers of silty fine sand up to 3" major roots (topsoil) to 6"; brown	2	2	2						slightly moist soft
	grades with trace fine sand	5	3	3						saturated
	grades with occasional layers of fine to coarse sandy fine gravel up to 6" thick	10	26	2	2					
	grades with some fine sand with layers of silty fine sand up to 3" thick	15	2	2	2					very soft
	grades fine sandy clay; tan	20	2	2	2					
	grades silty clay with some fine sand; gray	25		2	2					

See Subsurface Conditions section in the report for additional information.

FIGURE 3A



## BORING LOG

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BORING: B-1

CLIENT: Red Pine Construction

PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial

DATE STARTED: 4/22/21

DATE FINISHED: 4/22/21

WATER LEVEL U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
	grades silty clay with some fine sand; gray	25	0							
SP	FINE TO MEDIUM SAND with occasional layers of silty clay up to 3" thick; brown	30	3							saturated very loose
CL	SILTY CLAY with some fine sand, brown	35	7							saturated medium stiff
	grades with trace fine sand, gray	40	4							soft
		45	4							
	grades brown	50	3							
	End of Exploration at 51.5' Installed 1.25" diameter slotted PVC pipe to 51.5'.									

See Subsurface Conditions section in the report for additional information.

FIGURE 3A  
(continued)



## BORING LOG

Page: 1 of 1

BORING: B-2

CLIENT: Red Pine Construction

PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial

DATE STARTED: 4/22/21 DATE FINISHED: 4/22/21

LOCATION: 5900 West 6800 North, American Fork, Utah

GSH FIELD REP.: JH

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic WEIGHT: 140 lbs DROP: 30"

GROUNDWATER DEPTH: 6.0' (4/22/21)

ELEVATION: ---

WATER LEVEL U S C S	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 5", brown	8	8	▲▼						slightly moist medium stiff
		5	3	▲▼						moist soft
		10	3	▲▼						saturated
SM	SILTY FINE SAND with numerous layers of clay up to 2" thick, gray									saturated very loose
CL	SILTY CLAY with some fine sand; brown	15	4	▲▼						saturated soft
	End of Exploration at 16.0' Installed 1.25" diameter slotted PVC pipe to 16.0'.	20								
		25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3B



## BORING LOG

Page: 1 of 1

BORING: B-3

CLIENT: Red Pine Construction

PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial

DATE STARTED: 4/22/21

DATE FINISHED: 4/22/21

LOCATION: 5900 West 6800 North, American Fork, Utah

GSH FIELD REP.: JH

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic WEIGHT: 140 lbs DROP: 30"

GROUNDWATER DEPTH: 7.8' (5/13/21)

ELEVATION: ---

WATER LEVEL U S C S	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 6", brown	8	8	XX						slightly moist medium stiff
	grades fine sandy clay with some fine and coarse gravel	6	6	XX						saturated
	grades with occasional layers of silty fine sand up to 2" thick	2	2	XX						soft
	grades silty clay with some fine sand	15	3	XX						
	End of Exploration at 16 0'. Installed 1.25" diameter slotted PVC pipe to 16.0'.	20								
		25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3C



## BORING LOG

Page: 1 of 1

BORING: B-4

CLIENT: Red Pine Construction

PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial

DATE STARTED: 4/23/21 DATE FINISHED: 4/23/21

LOCATION: 5900 West 6800 North, American Fork, Utah

GSH FIELD REP.: GL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic WEIGHT: 140 lbs DROP: 30"

GROUNDWATER DEPTH: 2.8' (5/13/21)

ELEVATION: ---

WATER LEVEL U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
	Ground Surface	0								
CL	SILTY CLAY major roots (topsoil) to 5"; brown	5	15	XX						slightly moist medium stiff
SP	FINE TO COARSE SAND with fine gravel and silt; brown	5	15	XX						saturated
SM		10	14	XX						saturated dense
CL	SILTY CLAY brown	10	14	XX						saturated medium stiff
SM	FINE TO COARSE SAND with silt; brown	15	2	XX						saturated very loose
CL	SILTY CLAY brown	15	2	XX						saturated very soft
	End of Exploration at 16.0' Installed 1.25" diameter slotted PVC pipe to 16.0'.	20								
		25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3D

OGSH		BORING LOG				BORING: B-5					
		Page: 1 of 1									
CLIENT: Red Pine Construction		PROJECT NUMBER: 2354-003-21									
PROJECT: Proposed 6800 North Industrial		DATE STARTED: 4/23/21				DATE FINISHED: 4/23/21					
LOCATION: 5900 West 6800 North, American Fork, Utah		GSH FIELD REP.: GL									
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger		HAMMER: Automatic				WEIGHT: 140 lbs					
GROUNDWATER DEPTH: 5.0' (5/13/21)		DROP: 30"				ELEVATION: ---					
WATER LEVEL	U S C S	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 gravel, major roots (topsoil) to 6"; brown	4	4	X						moist soft
		fine gravel grades out	5								
		grades fine to coarse sandy clay with some fine gravel	10	2	X						soft
		grades fine to medium sandy clay with silt	15	4	X						medium stiff
		End of Exploration at 16.5' Installed 1 25" diameter slotted PVC pipe to 16 5'	20	7	X						
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3E



## BORING LOG

Page: 1 of 1

BORING: B-6

CLIENT: Red Pine Construction

PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial

DATE STARTED: 4/26/21

DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah

GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 6.1' (5/13/21)

ELEVATION: ---

WATER LEVEL U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
17	4	5	10	15	20	25				
	Ground Surface	0								
CL	FINE TO MEDIUM SANDY CLAY major roots (topsoil) to 6"; dark brown	0	17	XX						slightly moist stiff
	grades brown	5	4	XX						medium stiff saturated
SM	SILTY FINE SAND with occasional layers of silty clay up to 6" thick, gray	10	5	XX						saturated medium dense
CL	FINE TO MEDIUM SANDY CLAY brown	15	4	XX						saturated medium stiff
	End of Exploration 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 3F



## BORING LOG

Page: 1 of 1

BORING: B-7

CLIENT: Red Pine Construction

PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial

DATE STARTED: 4/26/21 DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah

GSH FIELD REP.: AL

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

GROUNDWATER DEPTH: Not Encountered (4/26/21)

ELEVATION: ---

WATER LEVEL U S C S	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 fine to medium sand; major roots (topsoil) to 6"; brown									slightly moist medium stiff
	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 3G

OGSH		BORING LOG				BORING: B-8								
		Page: 1 of 1												
CLIENT: Red Pine Construction		PROJECT NUMBER: 2354-003-21												
PROJECT: Proposed 6800 North Industrial		DATE STARTED: 4/26/21				DATE FINISHED: 4/26/21								
LOCATION: 5900 West 6800 North, American Fork, Utah		GSH FIELD REP.: AL												
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger		HAMMER: Automatic				WEIGHT: 140 lbs								
GROUNDWATER DEPTH: 7.8' (5/13/21)						DROP: 30"								
						ELEVATION: ---								
WATER LEVEL	U S C S	DESCRIPTION				DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
▼		Ground Surface				0								
	SM/ML	SILTY FINE SAND/FINE SANDY SILT major roots (topsoil) to 6"; brown					13	X						slightly moist dense
							5							
	CL	FINE TO MEDIUM SANDY CLAY brown					4	X						slightly moist medium stiff
							10	II						saturated
							4							
			grades silty clay with some fine sand				15							
							6	X						
			End of Exploration 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 3H



## BORING LOG

Page: 1 of 1

BORING: B-9

CLIENT: Red Pine Construction

PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial

DATE STARTED: 4/26/21

DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah

GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 14.5' (4/26/21)

ELEVATION: ---

WATER LEVEL U S C S	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 to medium sand and trace fine gravel; major roots to 5"; brown	17	X							slightly moist stiff
	grades with occasional layers of silty fine sand up to 6" thick	41	X							
GP	FINE TO COARSE SANDY FINE GRAVEL with some clay; brown	10								moist medium dense
		38	X							
CL	FINE TO MEDIUM SANDY CLAY brown	15								saturated medium stiff
	End of Exploration at 16.5'. Installed 1 25" diameter slotted PVC pipe to 16 5'	5	X							
		20								
		25								

See Subsurface Conditions section in the report for additional information.

FIGURE 31

CGSH		BORING LOG				BORING: B-10					
		Page: 1 of 1									
CLIENT: Red Pine Construction		PROJECT NUMBER: 2354-003-21									
PROJECT: Proposed 6800 North Industrial		DATE STARTED: 4/26/21				DATE FINISHED: 4/26/21					
LOCATION: 5900 West 6800 North, American Fork, Utah		GSH FIELD REP.: AL									
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger		HAMMER: Automatic				WEIGHT: 140 lbs					
GROUNDWATER DEPTH: 7.1' (5/13/21)		DROP: 30"				ELEVATION: ---					
WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM/ SC	SILTY/CLAYEY FINE TO MEDIUM SAND with some fine gravel, major roots (topsoil) to 6"; brown	16	X							dry loose
	CL	SILTY CLAY with fine to medium sand and trace fine gravel, gray  grades fine to medium sandy clay with some fine gravel	2	X							saturated soft
		grades silty clay with some fine to medium sand and trace fine gravel, gray to brown	5	X							medium stiff
		End of Exploration at 16.5'. No groundwater encountered at time of drilling. Installed 1.25" diameter slotted PVC pipe to 16 5'	9	X							
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3J

GSH		BORING LOG				BORING: B-11					
Page: 1 of 1											
CLIENT: Red Pine Construction			PROJECT NUMBER: 2354-003-21								
PROJECT: Proposed 6800 North Industrial			DATE STARTED: 4/26/21			DATE FINISHED: 4/26/21					
LOCATION: 5900 West 6800 North, American Fork, Utah				GSH FIELD REP.: AL							
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger				HAMMER: Automatic		WEIGHT: 140 lbs		DROP: 30"			
GROUNDWATER DEPTH: Not Encountered (4/26/21)								ELEVATION: ---			
WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL	FINE TO MEDIUM SANDY CLAY with some fine gravel; major roots (topsoil) to 5"; brown									dry medium stiff
		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 3K



## BORING LOG

Page: 1 of 1

BORING: B-12

CLIENT: Red Pine Construction

PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial

DATE STARTED: 4/26/21

DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah

GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic

WEIGHT: 140 lbs

DROP: 30"

GROUNDWATER DEPTH: 4.6' (5/13/21)

ELEVATION: ---

WATER LEVEL U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
	Ground Surface	0								
SM/SC	SILTY/CLAYEY FINE TO MEDIUM SAND major roots (topsoil) to 6", brown	8	X							dry loose
		5								saturated
SP	FINE GRAVELLY FINE TO COARSE SAND with some clay, gray  grades fine to coarse sand; brown	47	X							saturated medium dense
		10								loose
		16								
		15								very loose
	grades fine gravelly fine to coarse sand with trace clay and occasional layers of silty clay up to 6" thick	2								
	End of Exploration at 16.5'. Installed 1.25" diameter slotted PVC pipe to 16 5'	20								
		25								

See Subsurface Conditions section in the report for additional information.

FIGURE 3L

OGSH		BORING LOG				BORING: B-13					
		Page: 1 of 1									
CLIENT: Red Pine Construction		PROJECT NUMBER: 2354-003-21									
PROJECT: Proposed 6800 North Industrial		DATE STARTED: 4/26/21				DATE FINISHED: 4/26/21					
LOCATION: 5900 West 6800 North, American Fork, Utah						GSH FIELD REP.: AL					
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger		HAMMER: Automatic				WEIGHT: 140 lbs					
GROUNDWATER DEPTH: Not Encountered (4/26/21)						ELEVATION: ---					
WATER LEVEL	U S C S	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 and trace fine gravel; major roots (topsoil) to 6"; brown									slightly moist medium stiff
		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 3M



## BORING LOG

Page: 1 of 1

BORING: B-14

CLIENT: Red Pine Construction

PROJECT NUMBER: 2354-003-21

PROJECT: Proposed 6800 North Industrial

DATE STARTED: 4/26/21 DATE FINISHED: 4/26/21

LOCATION: 5900 West 6800 North, American Fork, Utah

GSH FIELD REP.: AL

DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger

HAMMER: Automatic WEIGHT: 140 lbs DROP: 30"

GROUNDWATER DEPTH: Not Encountered (4/26/21)

ELEVATION: ---

WATER LEVEL U S C S	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 5", brown	5								slightly moist medium stiff
	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 3N

OGSH		BORING LOG				BORING: B-15					
		Page: 1 of 1									
CLIENT: Red Pine Construction				PROJECT NUMBER: 2354-003-21							
PROJECT: Proposed 6800 North Industrial				DATE STARTED: 4/26/21				DATE FINISHED: 4/26/21			
LOCATION: 5900 West 6800 North, American Fork, Utah				GSH FIELD REP.: AL							
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger				HAMMER: Automatic				WEIGHT: 140 lbs			
GROUNDWATER DEPTH: 3.6' (5/13/21)				DROP: 30"				ELEVATION: ---			
WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
▼	GC	Ground Surface	0								slightly moist medium dense
		FINE SANDY FINE AND COARSE GRAVEL with clay, major roots (topsoil) to 6", brown	5								
		End of Exploration at 5.0'. Installed 1.25" diameter slotted PVC pipe to 5 0'	10								
			15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 30

OGSH		BORING LOG				BORING: B-1					
		Page: 1 of 1									
CLIENT: White Horse Developers		PROJECT NUMBER: 3388-001-21									
PROJECT: Proposed 6800 North Industrial/ Proposed Deer Park Industrial		DATE STARTED: 9/9/21				DATE FINISHED: 9/9/21					
LOCATION: 1100 South 50 West, American Fork, Utah						GSH FIELD REP.: BH					
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger		HAMMER: Automatic				WEIGHT: 140 lbs DROP: 30"					
GROUNDWATER DEPTH: 7.6' (9/17/21)						ELEVATION: ---					
WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	CL FILL	FINE TO MEDIUM SANDY CLAY, FILL with silt and some fine gravel; major roots (topsoil) to 5", brown	35	X							slightly moist very stiff
	GP/ GM	FINE AND COARSE GRAVEL with fine to coarse sand and some silt; brown	51								slightly moist very dense
		grades with fine to medium sand and some silt	10	24		3.2	8				saturated medium dense
	CL	SILTY CLAY with some fine to medium sand; gray	15	6							saturated medium stiff
		End of Exploration at 16.0'. Installed 1.25" diameter slotted PVC pipe to 16.0'.	20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 4A

GSH		BORING LOG				BORING: B-2					
		Page: 1 of 1									
CLIENT: White Horse Developers		PROJECT NUMBER: 3388-001-21									
PROJECT: Proposed 6800 North Industrial/ Proposed Deer Park Industrial		DATE STARTED: 9/9/21				DATE FINISHED: 9/9/21					
LOCATION: 1100 South 50 West, American Fork, Utah						GSH FIELD REP.: BH					
DRILLING METHOD/EQUIPMENT: 3-3/4" ID Hollow-Stem Auger		HAMMER: Automatic				WEIGHT: 140 lbs DROP: 30"					
GROUNDWATER DEPTH: Not Encountered (9/9/21)						ELEVATION: ---					
WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
		Ground Surface	0								
	SM	SILTY FINE SAND, FILL									dry
	FILL	with trace clay and some fine and coarse gravel, major roots (topsoil) to 6", brown									medium dense
			20								
	CL	FINE TO MEDIUM SANDY CLAY with silt and trace fine gravel; brown	5								slightly moist
			4								medium stiff
			10								
			7						43	21	
		End of Exploration at 11.0' No groundwater encountered at time of drilling	15								
			20								
			25								

See Subsurface Conditions section in the report for additional information.

FIGURE 4B



## BORING LOG

Page: 1 of 2

BORING: B-3

CLIENT: White Horse Developers

PROJECT NUMBER: 3388-001-21

PROJECT: Proposed 6800 North Industrial/ Proposed Deer Park Industrial DATE STARTED: 9/10/21 DATE FINISHED: 9/10/21

LOCATION: 1100 South 50 West, American Fork, Utah

GSH FIELD REP.: BH

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

GROUNDWATER DEPTH: 9.3' (9/17/21)

ELEVATION: ---

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
			18	19	10	0	0				
		Ground Surface	0								
	SM	SILTY FINE TO MEDIUM SAND, FILL									dry
	FILL	with some fine and coarse gravel; major roots (topsoil) to 6"; brown									medium dense
	GP	FINE AND COARSE GRAVEL	18	11	11						moist
		with some fine to coarse sand and trace silt; brown	19	11	11						loose
	CL	SILTY CLAY	10	11	11						saturated
		with fine to medium sand; brown	0	11	11						stiff
			0	11	11						very soft
			20	11	11			36	18		
			25	11	11						

See Subsurface Conditions section in the report for additional information.

FIGURE 4C



## BORING LOG

Page: 2 of 2

BORING: B-3

CLIENT: White Horse Developers

PROJECT NUMBER: 3388-001-21

PROJECT: Proposed 6800 North Industrial/ Proposed Deer Park Industrial DATE STARTED: 9/10/21 DATE FINISHED: 9/10/21

WATER LEVEL U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	Liquid Limit (%)	Plasticity Index	REMARKS
	grades with some fine to medium silty sand	25	1							
	grades with trace fine sand	30	6					33	13	medium stiff
		35	6							
	grades gray	40	0					42	18	very soft
		45	1							
		50	1					46	21	
	End of Exploration at 50.0'. Installed 1.25" diameter slotted PVC pipe to 50 0'									

See Subsurface Conditions section in the report for additional information.

FIGURE 4C  
(continued)



## BORING LOG

Page: 1 of 1

BORING: B-4

CLIENT: White Horse Developers

PROJECT NUMBER: 3388-001-21

PROJECT: Proposed 6800 North Industrial/ Proposed Deer Park Industrial DATE STARTED: 9/10/21 DATE FINISHED: 9/10/21

LOCATION: 1100 South 50 West, American Fork, Utah

GSH FIELD REP.: BH

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

GROUNDWATER DEPTH: 9.8' (9/17/21)

ELEVATION: ---

WATER LEVEL U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS
	<b>Ground Surface</b>	0								
SM FILL	FINE TO MEDIUM SAND, FILL with trace fine and coarse gravel; major roots (topsoil) to 6", brown	13	13	X	8.8	110				slightly moist loose
CL	SILTY CLAY with trace fine sand, brown	13	13							slightly moist stiff
		10	0							saturated
		15	6	X						very soft
		20	9	X						medium stiff
	End of Exploration at 21 0' No groundwater encountered at time of drilling Installed 1 25" diameter slotted PVC pipe to 21.0'.	25								

See Subsurface Conditions section in the report for additional information.

FIGURE 4D

CLIENT: White Horse Developers  
 PROJECT: Proposed 6800 North Industrial/ Proposed Deer Park Industrial  
 PROJECT NUMBER: 3388-001-21

## KEY TO BORING LOG

WATER LEVEL	U S C S	DESCRIPTION	DEPTH (FT.)	BLOW COUNT	SAMPLE SYMBOL	MOISTURE (%)	DRY DENSITY (PCF)	% PASSING 200	LIQUID LIMIT (%)	PLASTICITY INDEX	REMARKS												
①	②	③	④	⑤	⑥	⑦	⑧	⑨	⑩	⑪	⑫												
<b>COLUMN DESCRIPTIONS</b>																							
① <b>Water Level:</b> Depth to measured groundwater table. See symbol below.	⑩ <b>Liquid Limit (%):</b> Water content at which a soil changes from plastic to liquid behavior																						
② <b>USCS:</b> (Unified Soil Classification System) Description of soils encountered; typical symbols are explained below	⑪ <b>Plasticity Index (%):</b> Range of water content at which a soil exhibits plastic properties.																						
③ <b>Description:</b> Description of material encountered, may include color, moisture, grain size, density/consistency,	⑫ <b>Remarks:</b> 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:																						
④ <b>Depth (ft.):</b> Depth in feet below the ground surface	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">CEMENTATION</th> <th style="text-align: center;">MODIFIERS</th> <th style="text-align: center;">MOISTURE CONTENT (FIELD TEST)</th> </tr> </thead> <tbody> <tr> <td>Weakly: Crumbles or breaks with handling or slight finger pressure.</td> <td>Trace &lt;5% Some 5-12% With &gt; 12%</td> <td>Dry: Absence of moisture, dusty, dry to the touch.</td> </tr> <tr> <td>Moderately: Crumbles or breaks with considerable finger pressure.</td> <td></td> <td>Moist: Damp but no visible water.</td> </tr> <tr> <td>Strongly: Will not crumble or break with finger pressure.</td> <td></td> <td>Saturated: Visible water, usually soil below water table</td> </tr> </tbody> </table>											CEMENTATION	MODIFIERS	MOISTURE CONTENT (FIELD TEST)	Weakly: Crumbles or breaks with handling or slight finger pressure.	Trace <5% Some 5-12% With > 12%	Dry: Absence of moisture, dusty, dry to the touch.	Moderately: Crumbles or breaks with considerable finger pressure.		Moist: Damp but no visible water.	Strongly: Will not crumble or break with finger pressure.		Saturated: Visible water, usually soil below water table
CEMENTATION	MODIFIERS	MOISTURE CONTENT (FIELD TEST)																					
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⑤ <b>Blow Count:</b> Number of blows to advance sampler 12" beyond first 6", using a 140-lb hammer with 30" drop.	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.																						
⑥ <b>Sample Symbol:</b> Type of soil sample collected at depth interval shown; sampler symbols are explained below.																							
⑦ <b>Moisture (%):</b> Water content of soil sample measured in laboratory; expressed as percentage of dryweight of																							
⑧ <b>Dry Density (pcf):</b> The density of a soil measured in laboratory; expressed in pounds per cubic foot.																							
⑨ <b>% Passing 200:</b> Fines content of soils sample passing a No. 200 sieve; expressed as a percentage.																							
MAJOR DIVISIONS																							
UNIFIED SOIL CLASSIFICATION SYSTEM (USCS)			USCS SYMBOLS	TYPICAL DESCRIPTIONS																			
COARSE-GRAINED SOILS			CLEAN GRAVELS (little or no fines)	GW	Well-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines																		
More than 50% of material is larger than No. 200 sieve size			GRAVELS WITH FINES (appreciable amount of fines)	GP	Poorly-Graded Gravels, Gravel-Sand Mixtures, Little or No Fines																		
FINE-GRAINED SOILS			CLEAN SANDS (little or no fines)	GM	Silty Gravels, Gravel-Sand-Silt Mixtures																		
More than 50% of material is smaller than No. 200 sieve size			SANDS (little or no fines)	GC	Clayey Gravels, Gravel-Sand-Clay Mixtures																		
HIGHLY ORGANIC SOILS			SANDS WITH FINES (appreciable amount of fines)	SW	Well-Graded Sands, Gravelly Sands, Little or No Fines																		
SILTS AND CLAYS			SP	Poorly-Graded Sands, Gravelly Sands, Little or No Fines								STRATIFICATION:											
Liquid Limit less than 50%			SM	Silty Sands, Sand-Silt Mixtures								DESCRIPTION THICKNESS											
Liquid Limit greater than 50%			SC	Clayey Sands, Sand-Clay Mixtures								Seam up to 1/8" Layer 1/8" to 12"											
SILTS AND CLAYS			ML	Inorganic Silts and Very Fine Sands, Rock Flour, Silty or Clayey Fine Sands or Clayey Silts with Slight Plasticity								Occasional: One or less per 6" of thickness											
Organic Silts and Organic Silty Clays of Low Plasticity			CL	Inorganic Clays of Low to Medium Plasticity, Gravelly Clays, Sandy Clays, Silty Clays, Lean Clays								Numerous: More than one per 6" of thickness											
Inorganic Silts, Micaceous or Diatomaceous Fine Sand or Silty Soils			OL									TYPICAL SAMPLER GRAPHIC SYMBOLS											
Inorganic Clays of High Plasticity, Fat Clays			MH									Bulk/Bag Sample											
Organic Silts and Organic Clays of Medium to High Plasticity			CH									Standard Penetration Split Spoon Sampler											
Peat, Humus, Swamp Soils with High Organic Contents			OH									Rock Core											
No Recovery			PT									No Recovery											
3 25" OD, 2 42" ID D&M Sampler												3 25" OD, 2 42" ID D&M Sampler											
3 0" OD, 2 42" ID D&M Sampler												3 0" OD, 2 42" ID D&M Sampler											
California Sampler												California Sampler											
Tun Wall												Tun Wall											
WATER SYMBOL												Water Level											
Note: Dual Symbols are used to indicate borderline soil classifications												FIGURE 5											
GSH												GSH											



**ATTACHMENT 1**

Laboratory Testing

**200 Wash Results**

ENT 46834:2024 PG 43 of 86

Date:	9/14/21
Job #:	3388-001-21
Project:	Deer Park Industrial
Analyst:	NLW
Project Engineer:	ADS

Boring #:	B1A							
Sample #:	3							
Depth (ft):	10							
Pan Wt. (gr):	153.6							
<b>Wet Weight Before Washing (Wet Soil + Pan)</b>	369							
<b>Dry Weight Before Washing (Dry Soil + Pan)</b>	362.4							
<b>Weight Retained After Washing (Dry Soil + Pan)</b>	345.6							
<b>Soil Description &amp; Comments:</b>								

<b>% Moisture Content</b>	3.2	#DIV/0!						
<b>% Retained #200 Sieve</b>	92.0	#DIV/0!						
<b>% Passing #200 Sieve</b>	8.0	#DIV/0!						
<b>Soil Classification</b>								

## 200 Wash Results

Date:	5/11/21
Job #:	2354-003-21
Project:	6800 N Industrial
Analyst:	HB
Project Engineer:	ADS

Boring #:	B1	B2	B4	B6	B12	B12	B1	
Sample #:	7	3	2	3	3	4	3	
Depth (ft):	30	10	5	10	10	15	10	
Pan Wt. (gr):	142.2	124.1	126.3	130.1	128.6	142.2	152.5	
<b>Wet Weight Before Washing (Wet Soil + Pan)</b>	352.7	348.1	354.8	352.2	257.2	353.8	359.5	
<b>Dry Weight Before Washing (Dry Soil + Pan)</b>	308.2	302.9	333.5	312.9	228.6	308.3	318.1	
<b>Weight Retained After Washing (Dry Soil + Pan)</b>	233.7	221.1	299.6	252	217.5	234.8	237.2	
<b>Soil Description &amp; Comments:</b>								

<b>% Moisture Content</b>	26.8	25.3	10.3	21.5	28.6	27.4	25.0	#DIV/0!
<b>% Retained #200 Sieve</b>	55.1	54.3	83.6	66.7	88.9	55.7	51.1	#DIV/0!
<b>% Passing #200 Sieve</b>	44.9	45.7	16.4	33.3	11.1	44.3	48.9	#DIV/0!
<b>Soil Classification</b>								

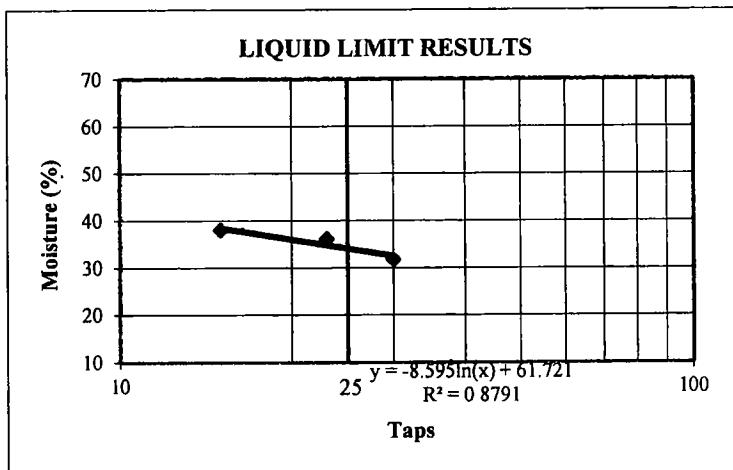
## ATTERBERG LIMITS TEST



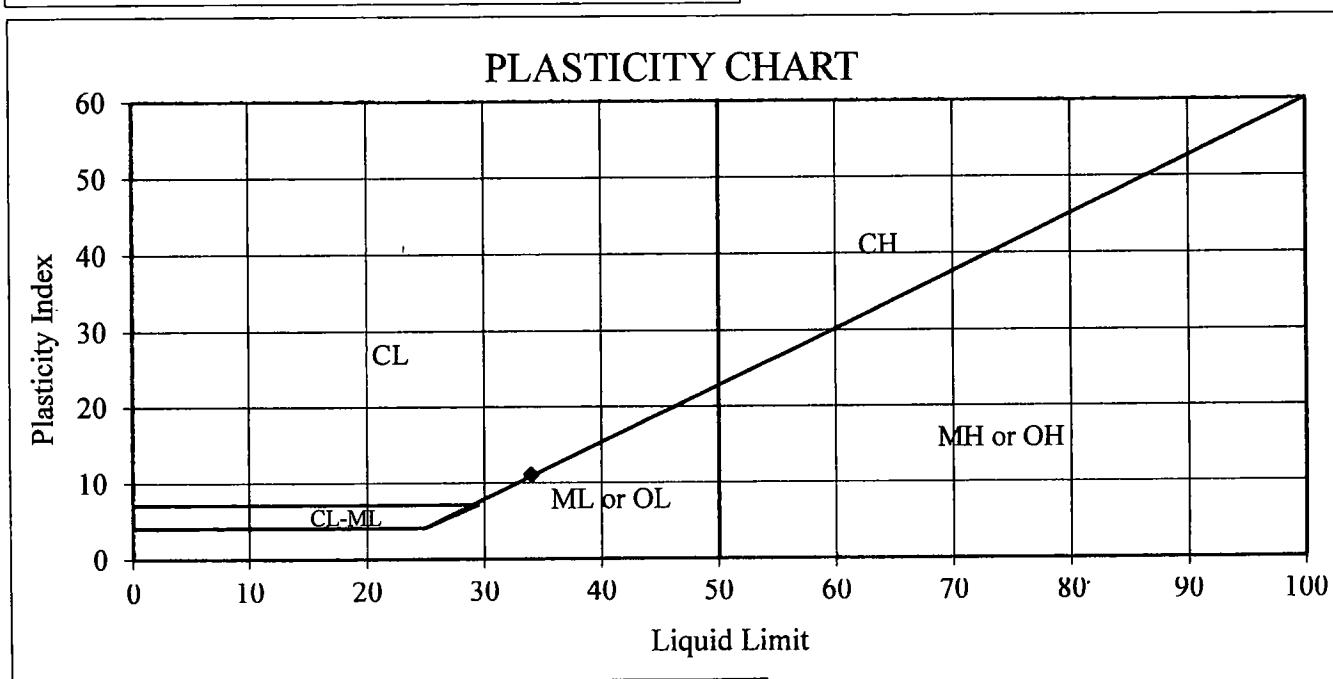
Project:	6800 N. Industrial			Job No.:	2354-003-21	Date:	5/11/21
Boring/TP:	B1	Sample No.:	9	Depth:	40'	Engineer:	ADS
Soil Descr.:							

Weight (g)	LIQUID LIMIT		
	Au	W2	8
Taps	30	23	15
Can+wet soil	12.18	12.67	12.65
Can+dry soil	10.95	11.12	11.09
Can	7.07	6.82	6.98
Moisture (%)	31.70	36.05	37.96

PLASTIC LIMIT	
Can No.	Hi
Weight (g)	12.62
Can+wet soil	11.56
Can+dry soil	6.96
Can	23.04
Moisture (%)	



Moisture (%)	
LL	34
PL	23
PI	11
USCS	CL

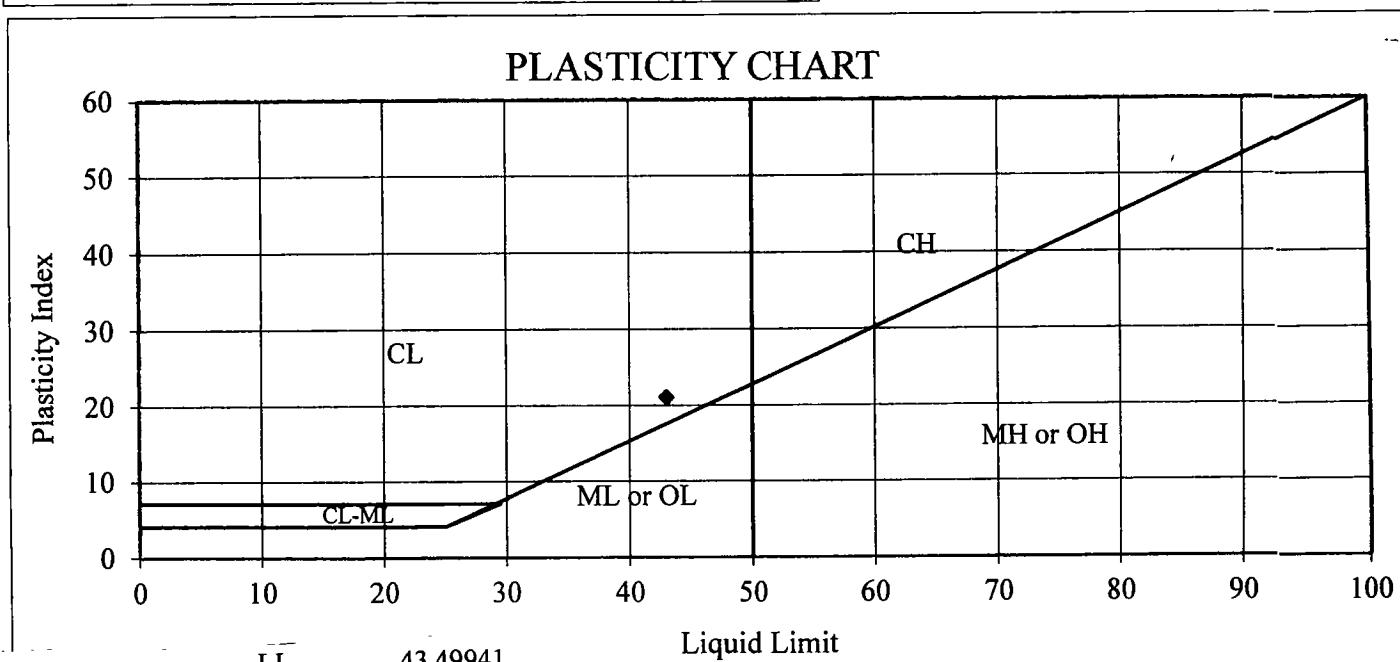
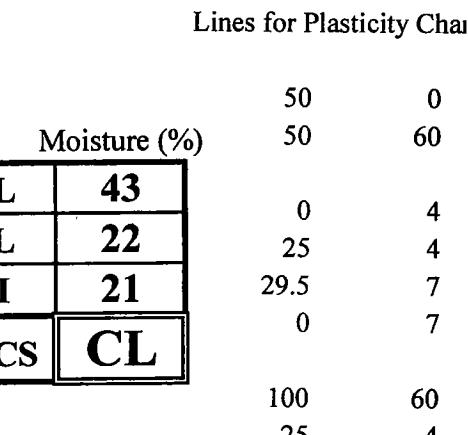
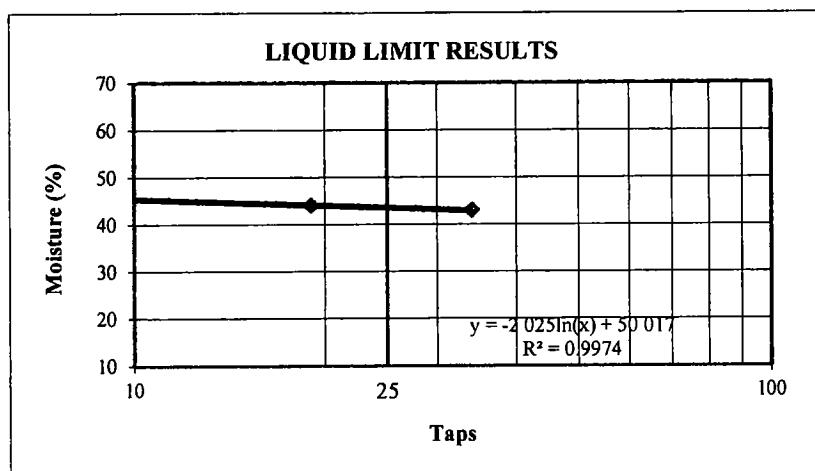


# ATTERBERG LIMITS TEST

Project:	Deer Park Industrial	Job No.:	3388-007	Date:	9/14/21
Boring/TH	B2A	Sample N	13	Depth:	10
Soil Desc:		Engineer:	ADS	Tester:	NLW

LIQUID LIMIT		
Can No.	6a	10
Taps	34	19
Can+wet s	13.28	11.77
Can+dry so	11.37	10.31
Can	6.92	6.99
Moisture (%)	42.92	43.98
		45.60

PLASTIC LIMIT		
Can No.	A3	
Can+wet s	16.52	
Can+dry so	14.79	
Can	6.91	
Moisture (%)	21.95	



LL 43.49941

L or H L

PI (A-line) 17.15457

PI (rounded) 21.00000

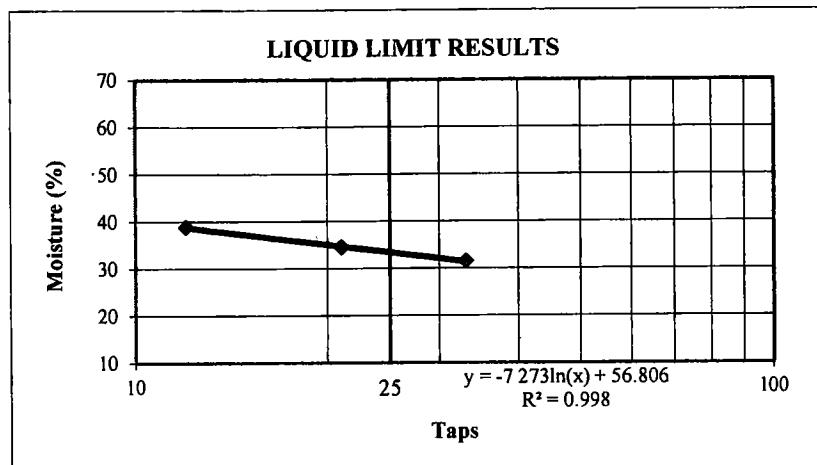
Above? C

# ATTERBERG LIMITS TEST

Project:	Deer Park Industrial	Job No.:	3388-007	Date:	9/14/21
Boring/TB	B3A	Sample N	7	Depth:	30
Soil Desc		Engineer:	ADS	Tester:	NLW

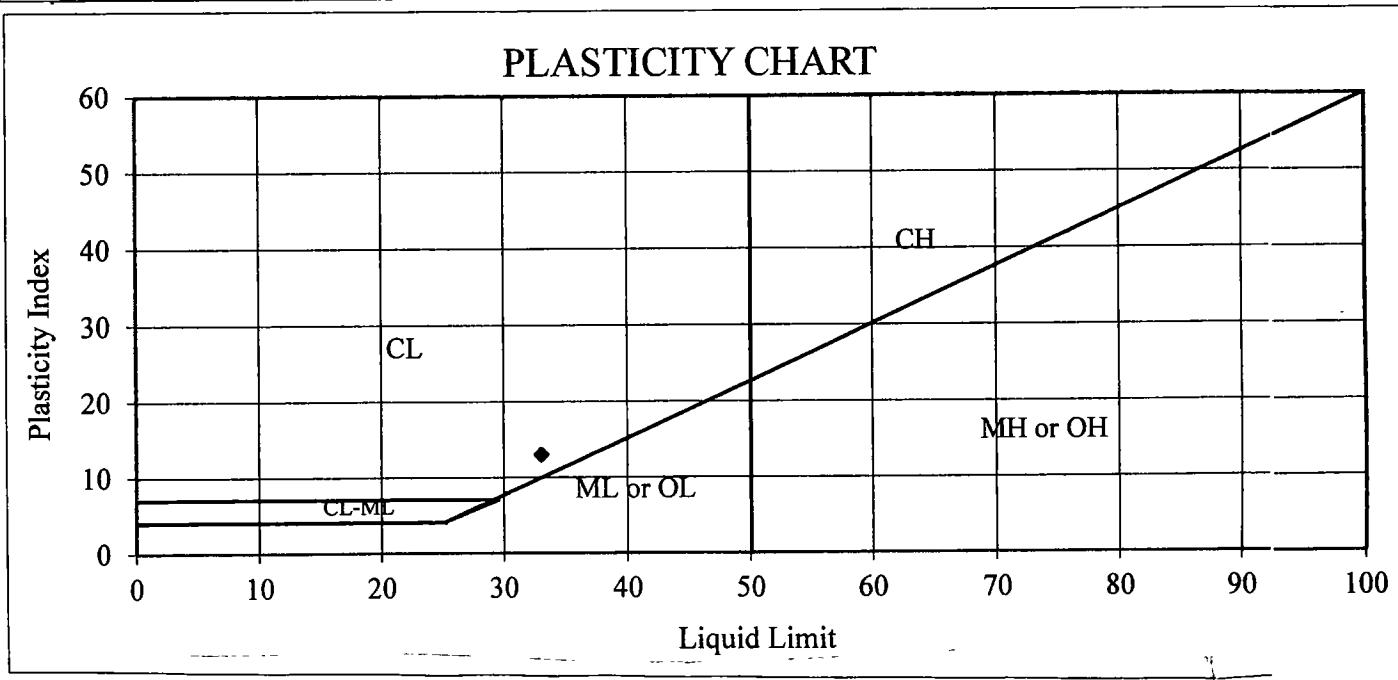
LIQUID LIMIT		
Can No.	W2	YLW
Taps	33	21
Can+wet soil	13.23	12.90
Can+dry soil	11.70	11.39
Can	6.84	7.01
Moisture (%)	31.48	34.47
		38.82

PLASTIC LIMIT		
Can No.	BLK	
Weight (g)	13.84	
Can+wet soil	12.68	
Can+dry soil	6.90	
Can	20.07	
Moisture (%)		



Lines for Plasticity Chart

Moisture (%)	LL	33	0
50	PL	20	4
50	PI	13	4
25	USCS	CL	7
29.5			7
0			0
100			60
25			4



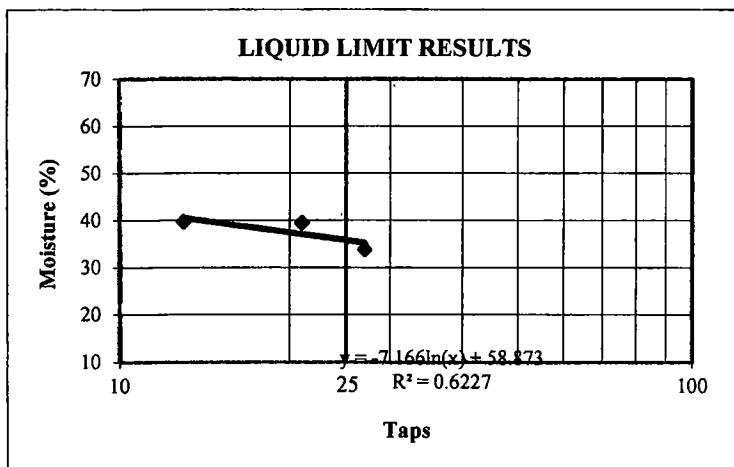
## ATTERBERG LIMITS TEST



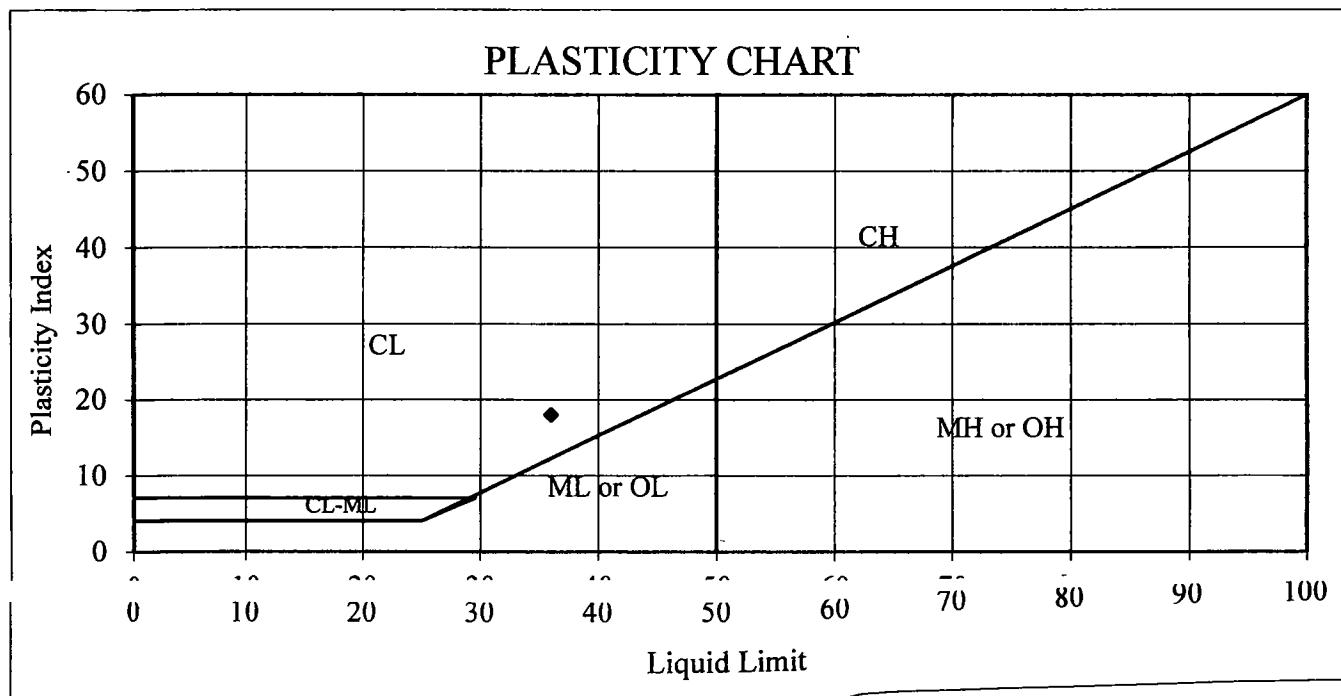
Project:	Deer Park Industrial			Job No.:	3388-007-21	Date:	9/14/21
Boring/TP:	B3A	Sample No.:	5	Depth:	20	Engineer:	ADS
Soil Descr.:							

Weight (g)	LIQUID LIMIT		
	Can No.	A4	Zoo
Taps	8	27	13
Can+wet soil	15.40	12.73	14.02
Can+dry soil	13.31	11.13	12.02
Can	7.11	7.07	6.98
Moisture (%)	33.71	39.41	39.68

PLASTIC LIMIT	
Can No.	14
Can+wet soil	14.00
Can+dry soil	12.97
Can	7.16
Moisture (%)	17.73



Moisture (%)	
LL	36
PL	18
PI	18
USCS	CL

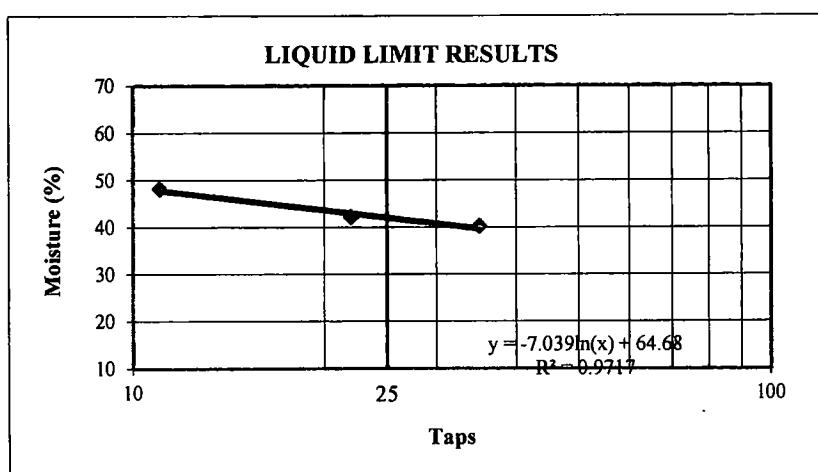


# ATTERBERG LIMITS TEST

Project:	Deer Park Industrial	Job No.:	3388-007	Date:	9/14/21
Boring/TH	B3A	Sample N	9	Depth:	40
Soil Desc:				Engineer:	ADS
				Tester:	NLW

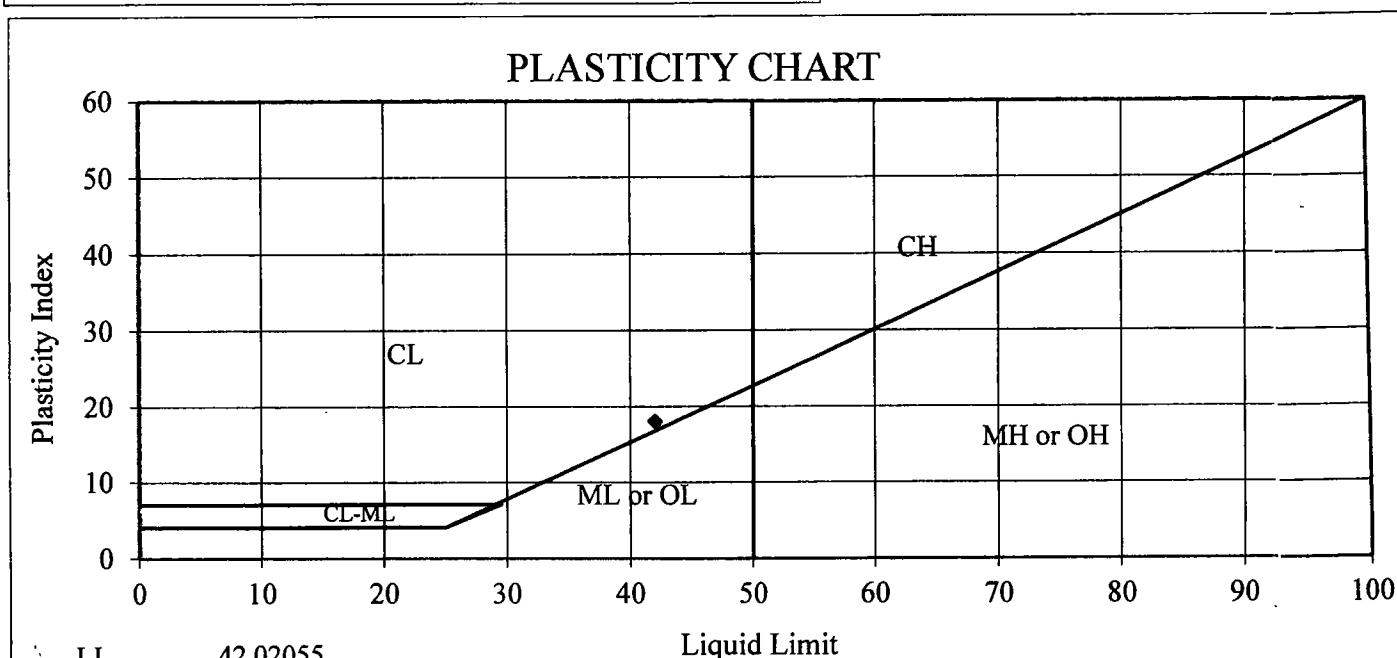
LIQUID LIMIT		
Can No.	QTP	CAT
Taps	35	22
Can+wet s	13.30	13.31
Can+dry s	11.49	11.44
Can	6.98	7.00
Moisture (%)	40.13	42.12
		48.12

PLASTIC LIMIT		
Can No.	Weight (g)	
B4	12.95	
Can+wet s	11.78	
Can+dry s	6.94	
Can	24.17	
Moisture (%)		



Lines for Plasticity Chart

Moisture (%)	50	0
LL	42	
PL	24	
PI	18	
USCS	CL	
	100	60
	25	4



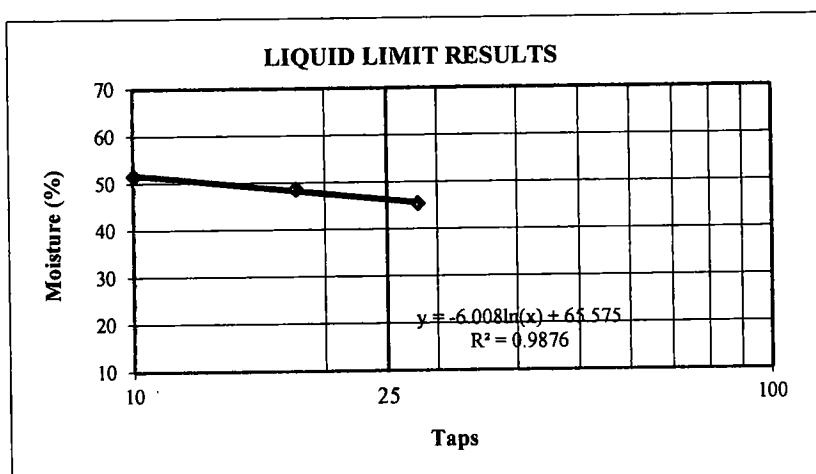
LL 42.02055  
 L or H L  
 PI (A-line) 16.075  
 PI (rounded) 18.00000  
 Above? C

# ATTERBERG LIMITS TEST

Project:	Deer Park Industrial	Job No.:	3388-007	Date:	9/14/21
Boring/TH	B3A	Sample N	11	Depth:	50
Soil Desc		Engineer:	ADS	Tester:	NLW

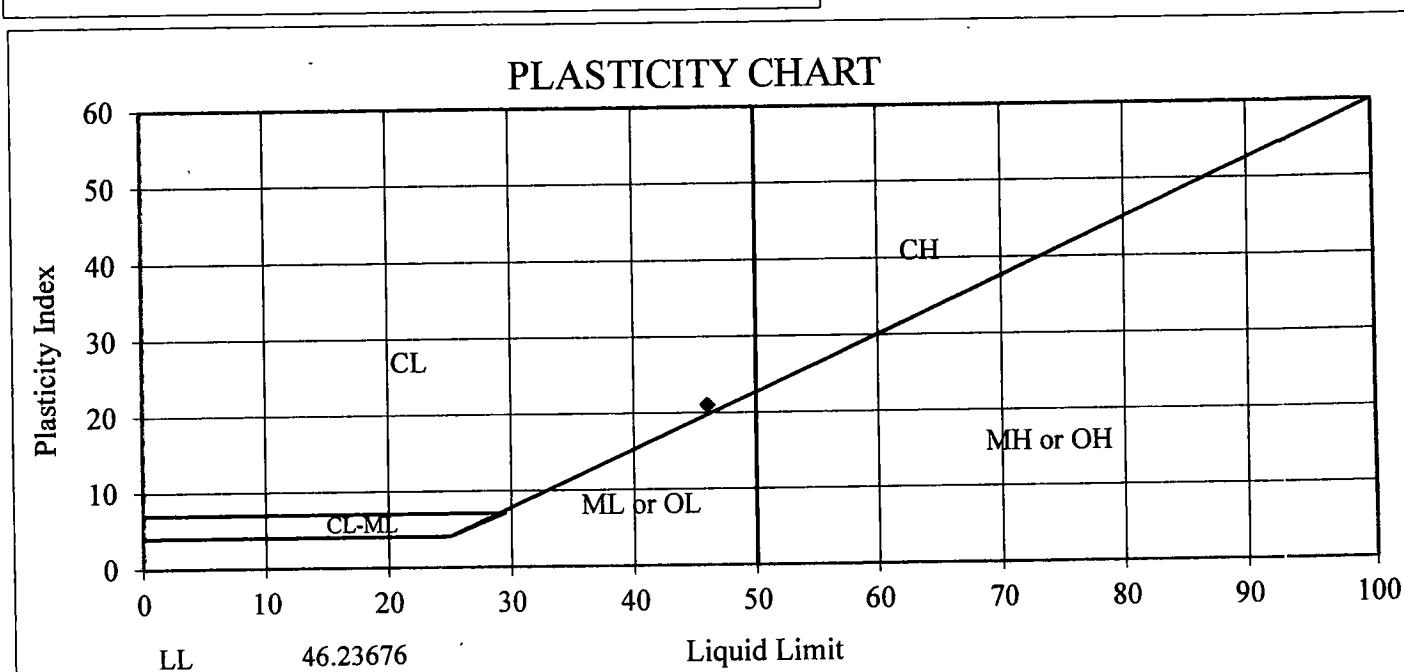
LIQUID LIMIT		
Can No.	116	Hey
Taps	28	18
Can+wet s	13.29	13.43
Can+dry s	11.35	11.33
Can	7.07	7.01
Moisture (%)	45.33	48.61
		51.57

PLASTIC LIMIT	
Can No.	16
Can+wet s	13.30
Can+dry s	12.03
Can	6.97
Moisture (%)	25.10



Lines for Plasticity Chart

Moisture (%)	50	0
LL	46	4
PL	25	4
PI	21	7
USCS	CL	7
	100	60
	25	4



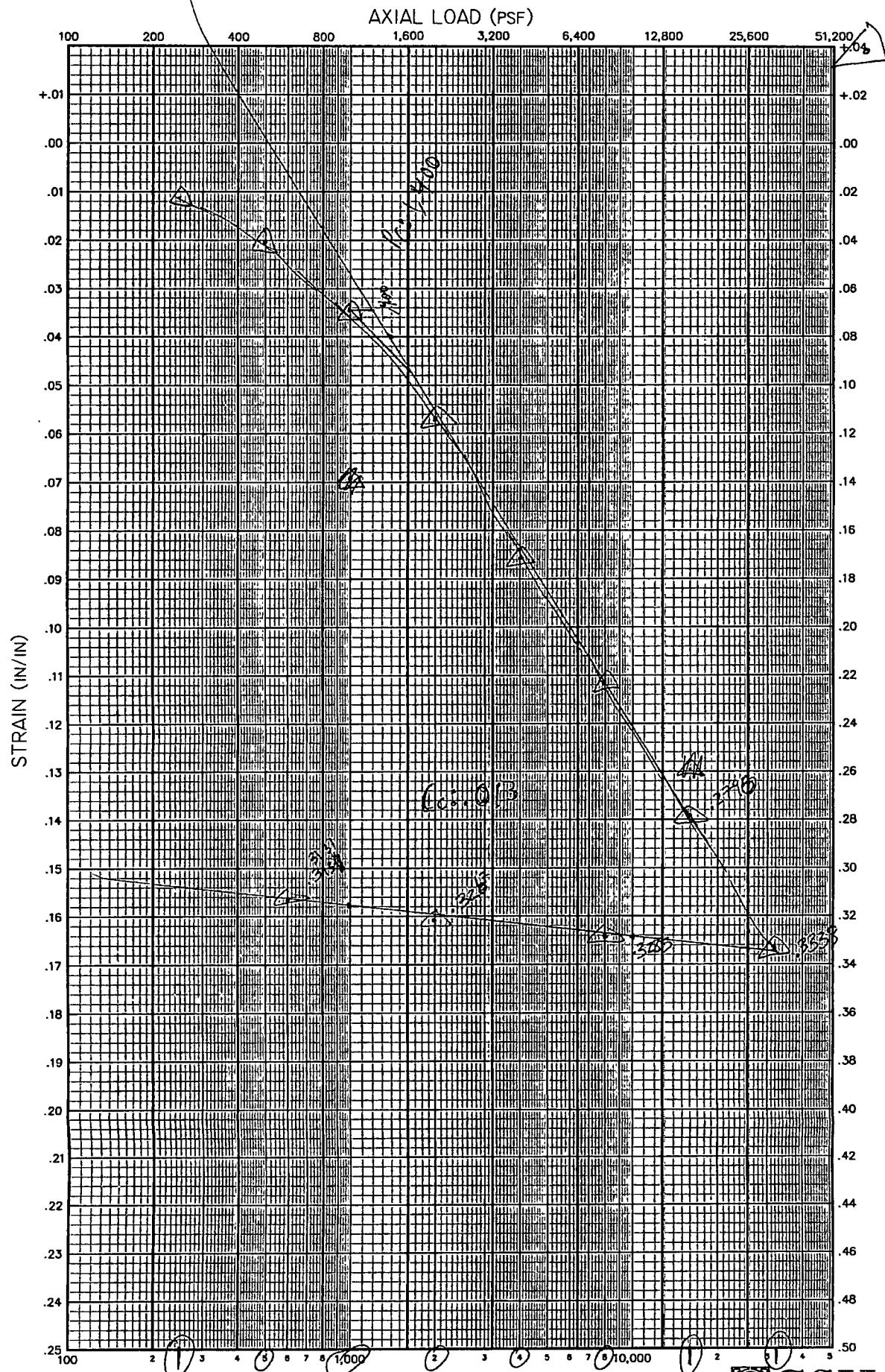
L or H L

PI (A-line) 19.15283

PI (rounded) 21.00000

Above? C

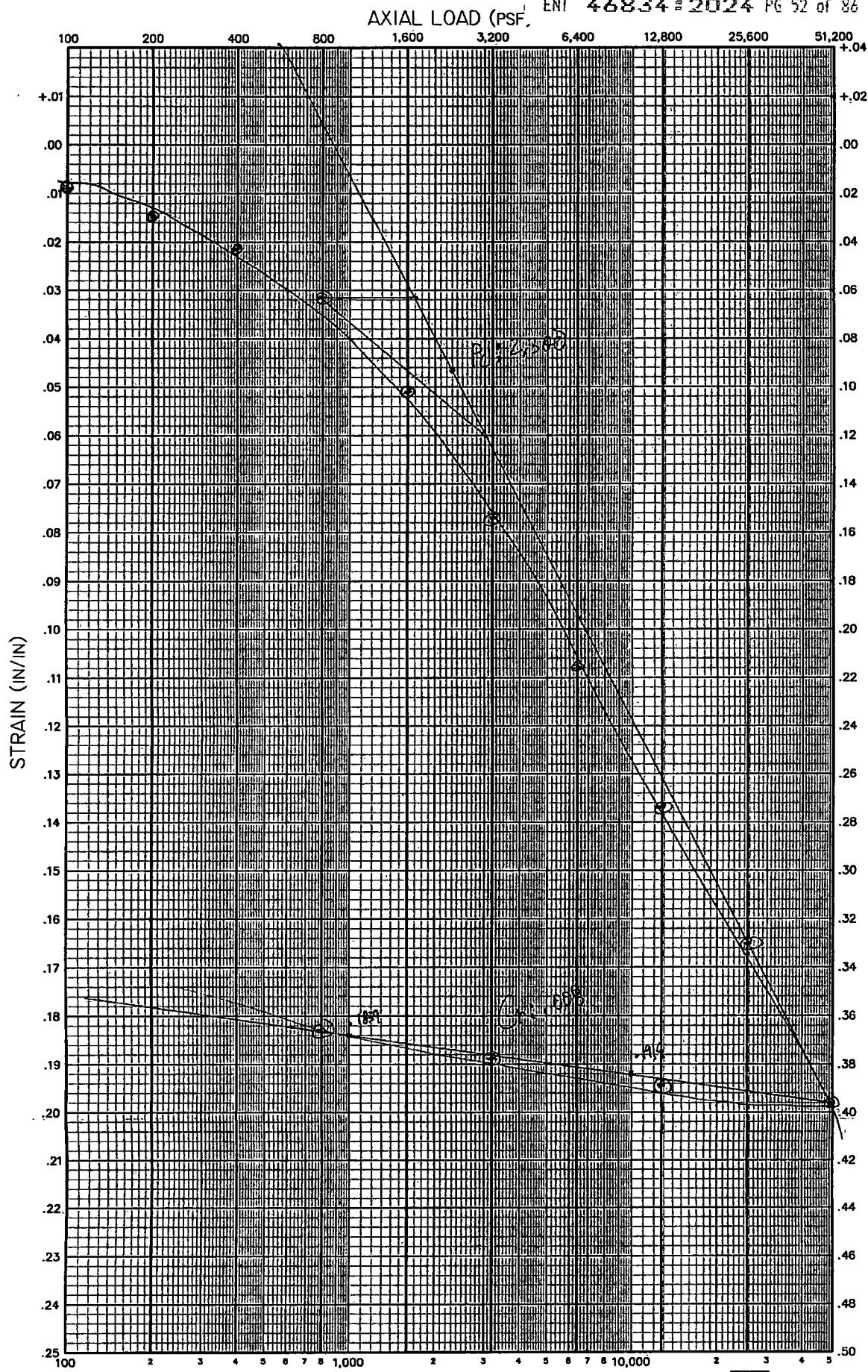
CL



## CONSOLIDATION TEST RESULTS

JOB NO. 2354-003-21 JOB NAME 6800 N. Industrial  
BORING NO. 32 DEPTH 2.5 TESTED BY HB DATE 5/11/21

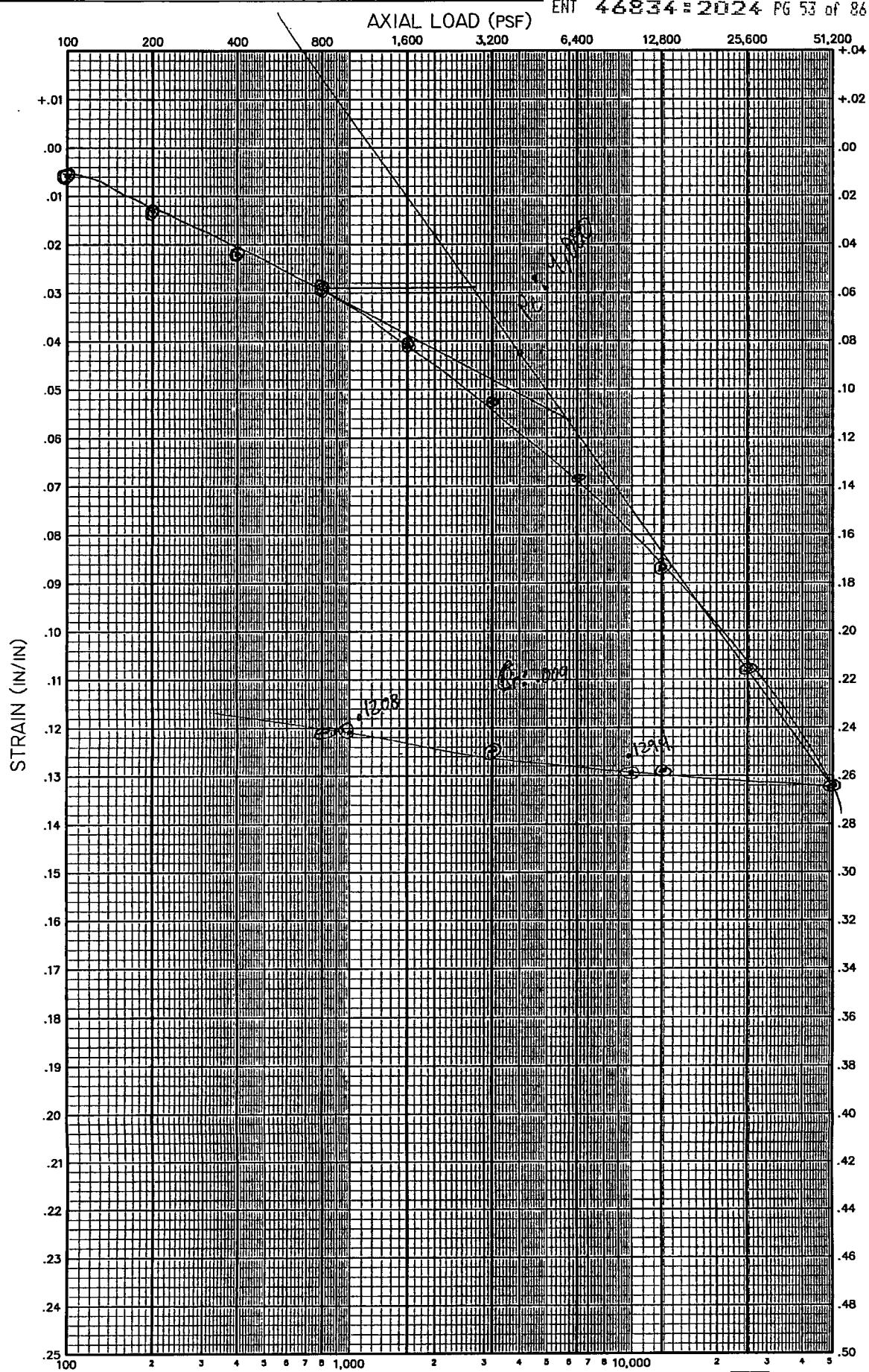




## CONSOLIDATION TEST RESULTS



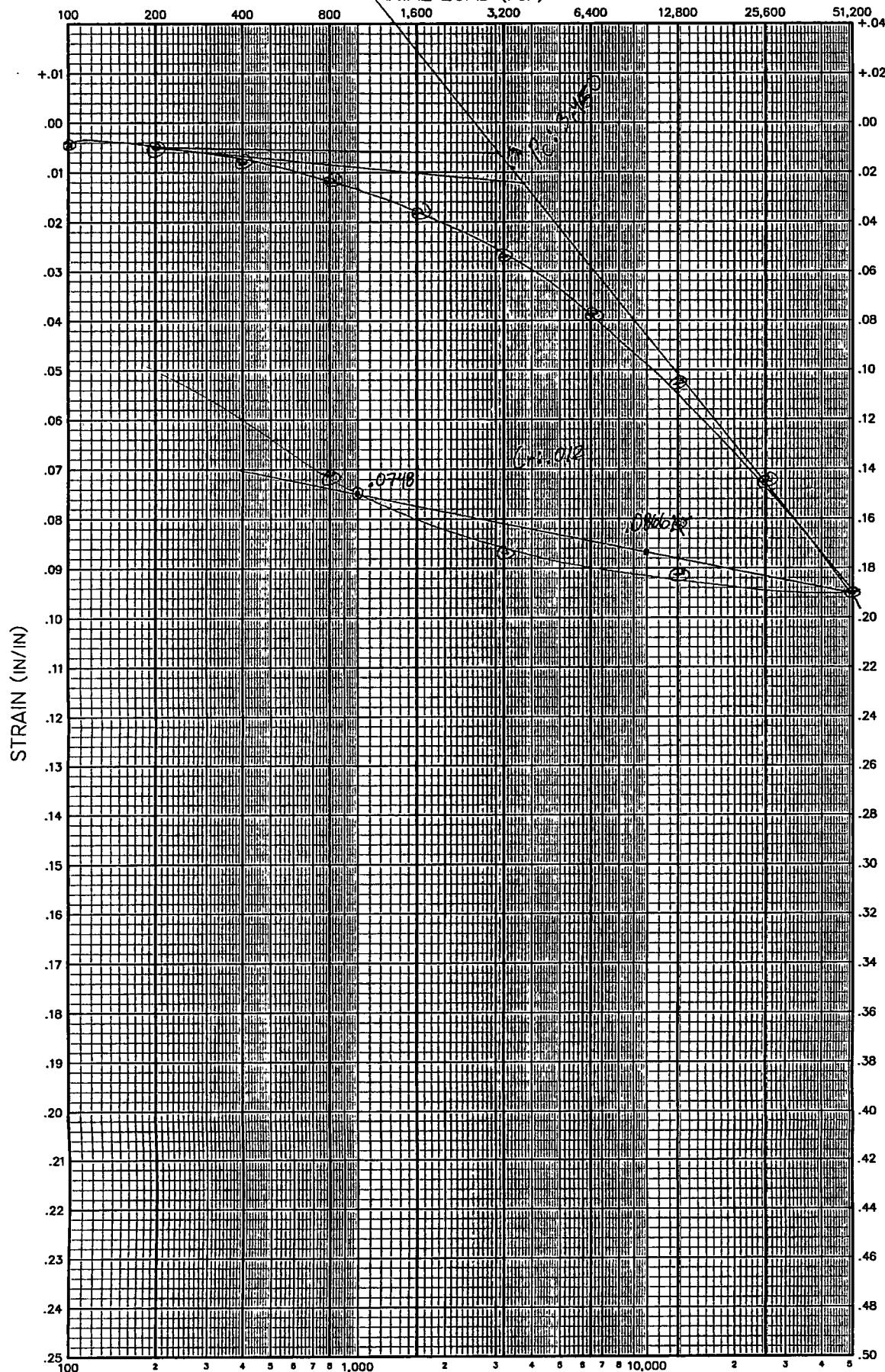
JOB NO. 2354-003-21      JOB NAME 6800 N Industrial  
 BORING NO: 82      DEPTH 5      TESTED BY HB      DATE 5/11/21



## CONSOLIDATION TEST RESULTS

JOB NO. 2354-003-21 JOB NAME 6800 N. Industrial  
 BORING NO. B2 DEPTH 10' TESTED BY HR DATE 5/11/21

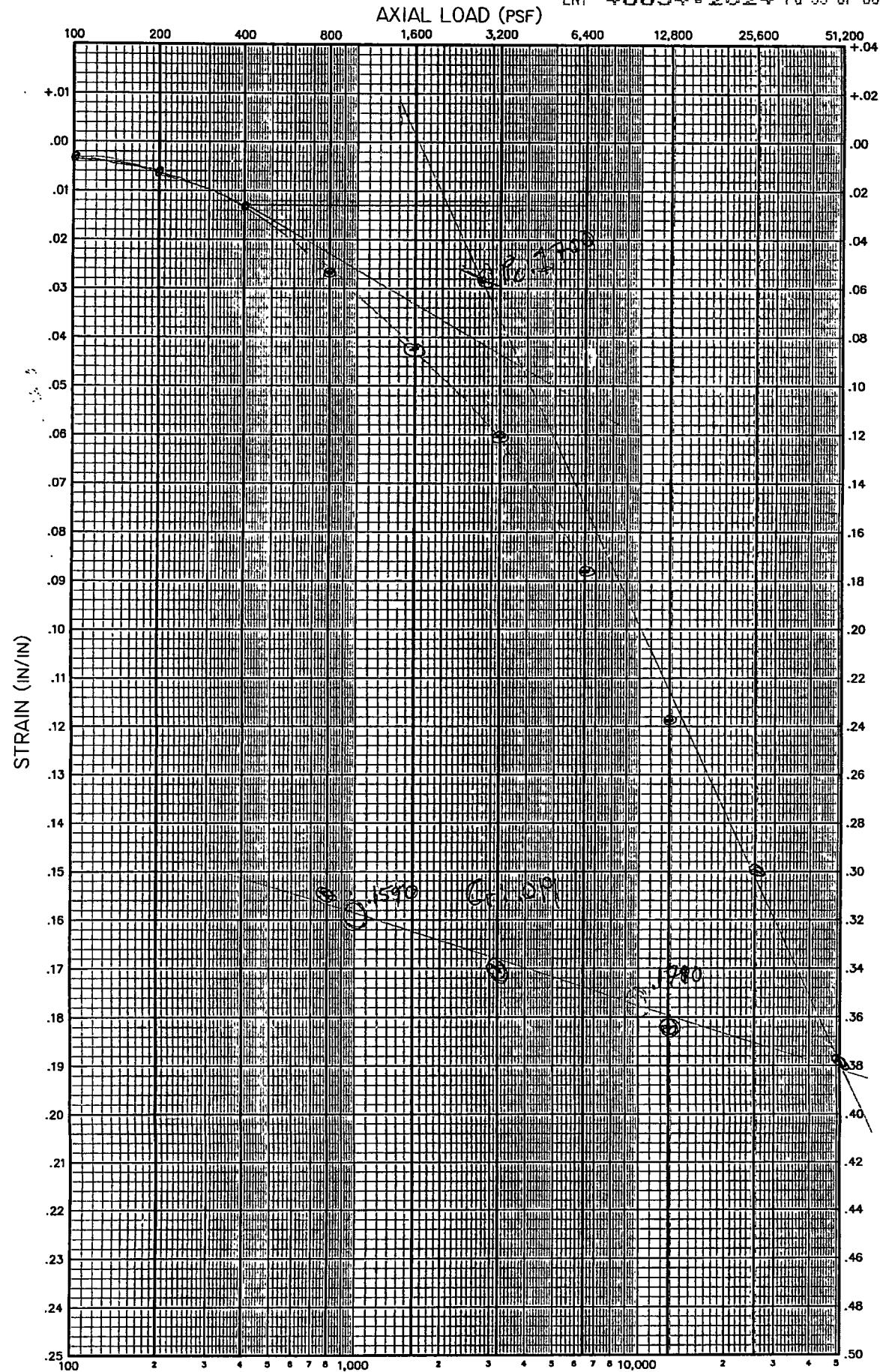




## CONSOLIDATION TEST RESULTS

JOB NO. 2354-003-21 JOB NAME 6800 N. Industrial  
 BORING NO. 134 DEPTH 15' TESTED BY HR DATE 5/11/21

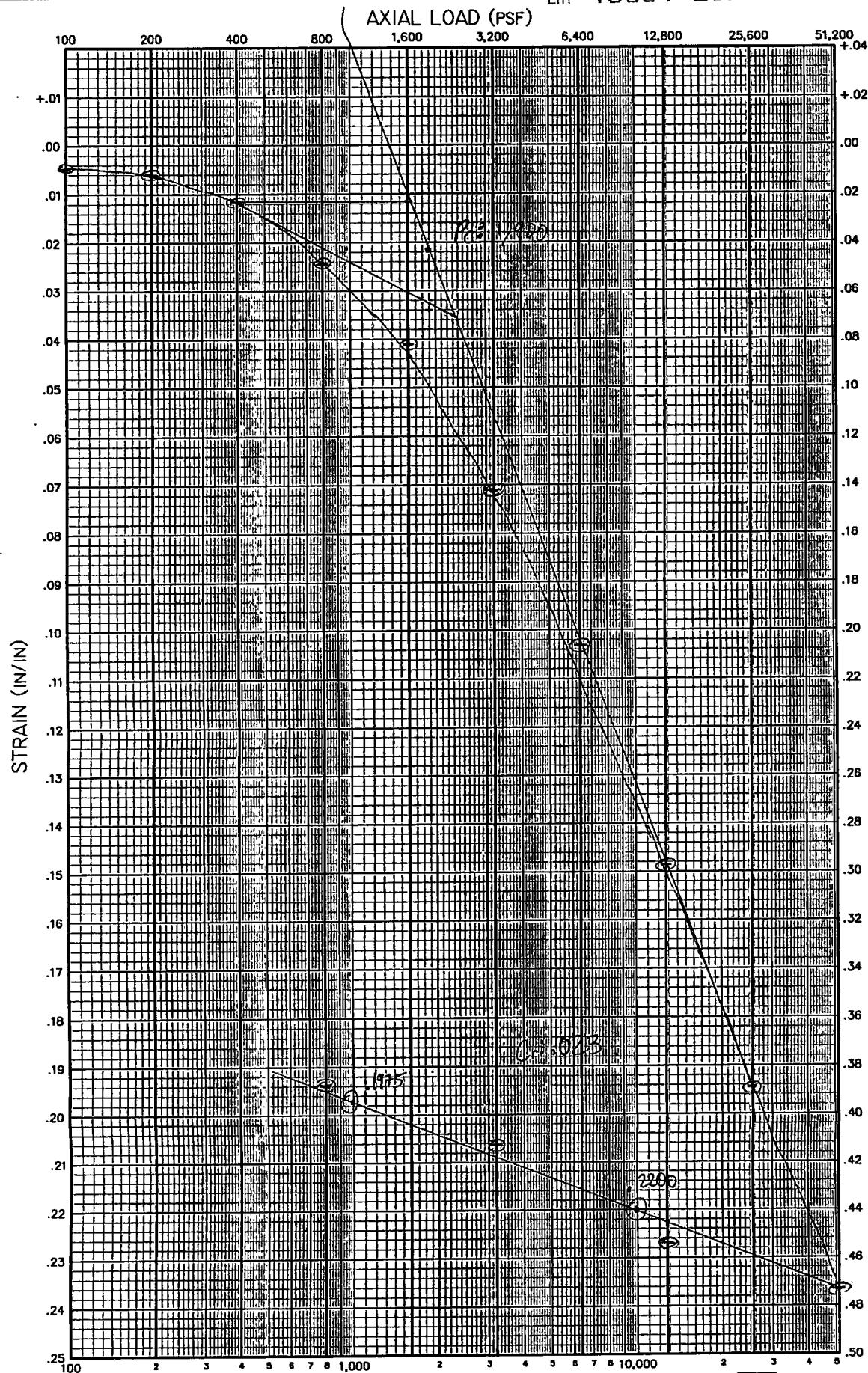




## CONSOLIDATION TEST RESULTS



JOB NO. 3388-007-21 JOB NAME Deer Park Industrial  
 BORING NO. 84 DEPTH 18 TESTED BY ALW DATE 9/14



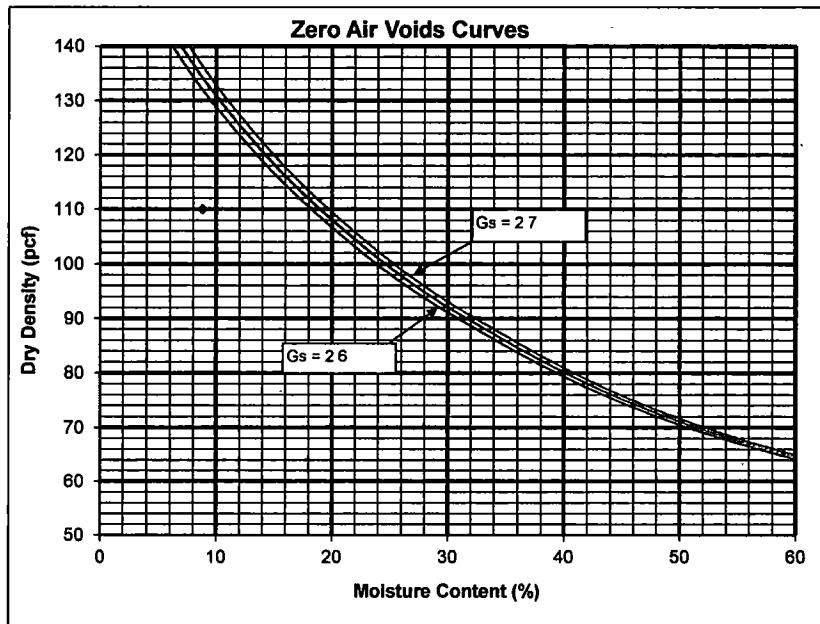
## CONSOLIDATION TEST RESULTS

 GSH

JOB No. 3388-007-21 JOB NAME Deer Park Industrial  
BORING No. 34 DEPTH 20' TESTED BY ALW DATE 9/14

Date:	9/14/21
Job #:	3388-001-21
Project:	Deer Park Industrial
Analyst:	NLW
Project Engineer:	ADS
	Assumed Gs: 2.7

Boring #:	B4A							
Sample #:	1							
Depth (ft):	2.5							
Pan Wt. (gr):	153.7							
Wet Soil + Rings + Pan Wt (gr):	532.9							
# of rings	2							
Dry Soil + Rings + Pan Wt. (gr):	509.4							
Sample type:	rings				rings	rings	rings	rings
Wet Soil Weight (gr):	289.2	0	0	0	0	0	0	0
Wet Density (pcf):	119.7	#DIV/0!						
Dry Density (pcf):	110.0	#DIV/0!						
Assumed Density (pcf):	136.0	#DIV/0!						
Saturation (%):	44.9	#DIV/0!						
Dry Wt. (gr):	265.7	0	0	0	0	0	0	0
Wt. Of Water (gr):	23.5	0	0	0	0	0	0	0
Moisture (%):	8.8	#DIV/0!						
Soil Classification:								
Soil Description & Comments:								
Wet Density (pcf):	119.7	#DIV/0!						
Dry Density (pcf):	110.0	#DIV/0!						
Moisture (%):	8.8	#DIV/0!						

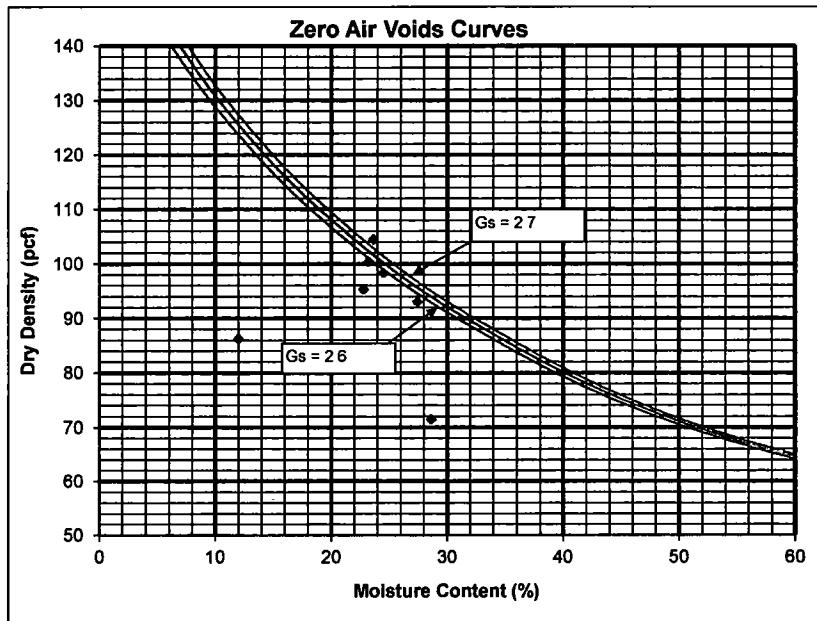


**Date:** \_\_\_\_\_  
**Job #:** \_\_\_\_\_  
**Project:** \_\_\_\_\_  
**Analyst:** \_\_\_\_\_  
**Project Engineer:** \_\_\_\_\_

**Date:**  
**Job #:**  
**Project:**  
**Analyst:**  
**Project Engineer:**

Date:	5/11/21
Job #:	2354-003-21
Project:	6800 N Industrial
Analyst:	HB
Project Engineer:	ADS
	Assumed Gs: 2.7

Boring #:	B6	B2	B4	B8	B9	B10	B12	
Sample #:	3	1	1	3	2	3	1	
Depth (ft):	10	2.5	2.5	7.5	5	10	2.5	
Pan Wt. (gr):	129.2	136.1	130.9	126.4	127.8	129.1	137.1	
Wet Soil + Rings + Pan Wt (gr):	531.2	508.7	442.9	515.1	513.5	505.5	460.3	
# of rings	2	2	2	2	2	2	2	
Dry Soil + Rings + Pan Wt. (gr):	471.5	456.2	393.5	458.8	455.3	443.8	435.3	
Sample type:	rings							
Wet Soil Weight (gr):	312	282.6	222	298.7	295.7	286.4	233.2	0
Wet Density (pcf):	129.2	117.0	91.9	123.7	122.4	118.6	96.6	#DIV/0!
Dry Density (pcf):	104.5	95.3	71.5	100.4	98.3	93.0	86.2	#DIV/0!
Assumed Density (pcf):	102.8	104.3	95.0	103.5	101.4	96.8	127.2	#DIV/0!
Saturation (%):	104.2	80.2	56.9	92.4	92.7	91.4	34.0	#DIV/0!
Dry Wt. (gr):	252.3	230.1	172.6	242.4	237.5	224.7	208.2	0
Wt. Of Water (gr):	59.7	52.5	49.4	56.3	58.2	61.7	25	0
Moisture (%):	23.7	22.8	28.6	23.2	24.5	27.5	12.0	#DIV/0!
Soil Classification:								
Soil Description & Comments:								
Wet Density (pcf):	129.2	117.0	91.9	123.7	122.4	118.6	96.6	#DIV/0!
Dry Density (pcf):	104.5	95.3	71.5	100.4	98.3	93.0	86.2	#DIV/0!
Moisture (%):	23.7	22.8	28.6	23.2	24.5	27.5	12.0	#DIV/0!



**Date:**  
**Job #:**  
**Project:**  
**Analyst:**  
**Project Engineer:**

**Date:**  
**Job #:**  
**Project:**  
**Analyst:**  
**Project Engineer:**



**ATTACHMENT 2**

**Site-Specific Seismic Study**



**REPORT  
SITE-SPECIFIC SEISMIC STUDY  
PROPOSED 6800 NORTH INDUSTRIAL  
5900 WEST 6800 NORTH  
AMERICAN FORK, UTAH**

Submitted To:

Red Pine Construction  
520 South 850 East, Suite A4  
Lehi, Utah 84043

Submitted By:

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

July 28, 2021

Job No. 2354-004-21

July 28, 2021  
Job No. 2354-004-21

Mr. Mike Horan  
Red Pine Construction  
520 South 850 East, Suite A4  
Lehi, Utah 84043

Mr. Horan:

Re: Summary Report  
Site-Specific Seismic Study  
Proposed 6800 North Industrial  
5900 West 6800 North  
American Fork, Utah

## 1. INTRODUCTION

### 1.1 GENERAL

This report presents the results of our site-specific seismic study performed at the site of the proposed 6800 North Industrial to be located near 5900 West 6800 North in American Fork, Utah. GSH Geotechnical, Inc (GSH) completed a geotechnical study<sup>1</sup> for the site. Data from the geotechnical study along with a geophysical survey was used for this site-specific seismic study.

The shear-wave velocity profile for the upper 350 feet at the site (including  $\bar{V}_{s30}$  for the upper 100 feet) was determined utilizing boring data from our geotechnical study and a geophysical survey consisting of Refraction Microtremor (ReMi) testing.

The ground motion hazard and design ground motion response spectra at the site were developed utilizing a site-specific site response analysis (SRA). The analysis was completed in accordance with the procedures presented in ASCE 7-16, Minimum Design Loads and Associated Criteria for Buildings and Other Structures (ASCE 7-16) and Supplement 1 to ASCE 7-16.

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<sup>1</sup> "Report, Geotechnical Study, Proposed 6800 North Industrial, 5900 West 6800 North, American Fork, Utah." GSH Job No. 2093-004-19. Dated May 14, 2021.

## 1.2 OBJECTIVES AND SCOPE

The objectives and scope of the study were planned in discussions between Mr. Mike Horan of Red Pine Construction and Mr. Alan Spilker, PE of GSH.

In general, the objectives of this study were to:

1. Further define the subsurface conditions at the site, including a shear-wave profile to a depth of 350 feet.
2. Develop site-specific and design ground motion response spectra for the site.

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

1. A review of available subsurface information from the geotechnical study completed for the site.
2. A field program consisting of the completion of a Refraction Microtremor (ReMi) geophysical exploration to a depth of 350 feet including the development of  $\bar{v}_{s30}$  for the upper 100 feet.
3. Performance of a site-specific site response analysis (SRA) in accordance with the ASCE 7-16 Section 21.1, Site Response Analysis.
4. Development of site-specific and design ground motion response spectra for the site in accordance with the ASCE 7-16 Section 21.3, Design Response Spectrum.

## 1.3 AUTHORIZATION

Authorization was provided by returning a signed copy of the Professional Services Agreement No. 21-0434 dated April 12, 2021.

## 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 geophysical testing, exploration borings, and projected groundwater conditions. If subsurface conditions other than those described in this report are encountered, GSH must be informed so that our recommendations can be reviewed and amended, if necessary.

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

## **2. PROPOSED CONSTRUCTION**

The site is proposed to be developed with 3 warehouse structures and associated pavements. The structures are anticipated to be one extended level, constructed slab-on-grade, have footprints of 47,040 square feet to 115,808 square feet, and be supported upon conventional spread and continuous wall footings. Paved parking areas and drive lanes are planned around the structure.

Based on information provided by the structural engineer the structure's fundamental period will be approximately 0.4 seconds.

## **3. SITE CONDITIONS**

### **3.1 SURFACE**

The site is located at approximately 5900 West 6800 North in American Fork, Utah. The topography of the site is relatively flat, grading down to the south with a total relief of approximately 6 to 9 feet. Site vegetation consists of agricultural grass fields with undeveloped/vacant grass land in the western portion of the site.

The site is bounded to the north by 6800 North Street followed by agricultural fields; to the east by single-family residential structures along with agricultural fields; to the south by agricultural fields and vacant/undeveloped brush/grass land; and to the west by vacant/undeveloped brush/grass land followed by 100 West Street and a single-family residential structure adjacent to the northwest corner of the site.

### **3.2 SUBSURFACE SOIL AND GROUNDWATER**

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

The borings were completed to depths ranging from 5.0 to 51.5 feet. The soil conditions encountered in each of the borings, to the depths completed, were generally similar across the boring locations.

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

The natural clay soils were very soft to stiff, dry to saturated, brown, dark brown, gray, and tan in color. The natural sand soils were very loose to medium dense, dry to saturated, and gray and brown in color.

Groundwater was measured as shallow as 2.8 feet below the existing ground surface during the geotechnical study for the site.

For a more descriptive interpretation of subsurface conditions, please refer our geotechnical report completed for the site (GSH Job No. 2354-003-21).

### **3.3 SHEAR WAVE VELOCITY PROFILE**

The site shear-wave velocity profile was completed utilizing geophysical exploration. The testing consisted of Refraction Microtremor (ReMi) testing. Testing is performed at the surface using a series of geophone sensors and a seismic source. A wavefield transformation is performed on the recorded geophone movements. The transformation is then utilized to create a shear-wave dispersion curve to model the subsurface shear-wave velocity profile.

The location of the ReMi line on the site is presented on Figure 1, Site Plan. The borings completed in conjunction with the geotechnical study are also shown on Figure 1.

The site classification for ASCE 7-16 was Site Class F in the geotechnical report due to potentially liquefiable soils at the site. As a follow up to the geotechnical report the ReMi testing results were analyzed to a depth of 350 feet with a resulting  $\bar{V}_{s30}$  value of 653 ft/s. This characterizes the site as a Site Class D, Stiff Soil Profile as defined in Chapter 20 of ASCE 7-16.

The shear-wave velocity results are provided on attached Figure 2, Shear-Wave Velocity Profile.

### **3.4 GEOLOGIC SETTING**

The site is located in the Utah Valley, which is in the Basin and Range Physiographic Province. The Utah Valley is near (west of) the transition between the Basin and Range Physiographic Province to the west and the Middle Rocky Mountain Physiographic Province to the east. The Basin and Range Province is characterized by generally north-trending valleys and mountain ranges that have formed by displacement along normal faults. The Wasatch Fault forms the boundary between the 2 provinces and has been active for approximately 10 million years. The Middle Rocky Mountains were formed during a period of regional compression that occurred in Cretaceous time, about 75 to 70 million years ago (Hunt, 1967). The surficial geology of the area is characterized by materials deposited within the past 30,000 years by late Pleistocene Lake Bonneville (Currey and Oviatt, 1985), and young lacustrine and deltaic deposits (Holocene to upper Pleistocene) deposited on delta margins as the lake receded to its present Great Salt Lake levels (Hylland et al., 2014). As the ancient lake(s) receded, streams began to regrade through shoreline deltas formed at the mouths of major Wasatch Range canyons and the eroded material was deposited in the basin as a series of recessional deltas, alluvial fans, and shoreline sequences. Toward the east-central portion of the valley where the site is located, shallow-water sediments of clay, silt, and sand predominate.

The primary surficial geology of most of the site as interpreted by Solomon and others (2009) primarily consists of "Lacustrine silt and clay" (QImp). Most of the west and some of the east perimeter of the site consists of "Younger alluvial-fan deposits, undivided" (Qafy).

### 3.5 FAULTING

There are a number of mapped faults near the site. The faults are primarily normal mechanism. Some of the faults included are the Utah Lake Faults (mapped 1.22 miles south of the site), the Provo section of the Wasatch fault zone (mapped 4.13 miles northeast of the site), the Salt Lake City section of the Wasatch fault zone (mapped 9.79 miles north of the site), and the Nephi section of the Wasatch fault zone (mapped 18.91 miles south-southeast of the site).

## 4. SITE RESPONSE ANALYSIS

A soil model was developed from the boring, laboratory, and ReMi data from this study and the geotechnical study for the site.

A series of earthquake time histories were selected and scaled to match the MCE<sub>R</sub> response spectrum at the base of the soil column. Histories were selected from events with similar magnitudes, distances and spectral shape in the period ranges of significance for the proposed structure (approximately 0.4 seconds). These ground motion time histories were input at the base of the soil column model as outcrop motions, propagated through the soil column model, and calculated as surface ground motions. The results of the SRA analysis are presented in the table in the following section.

## 5. DESIGN RESPONSE SPECTRUM

The response spectrum produced from the site-specific seismic analysis was compared with the minimum code spectrum values per ASCE 7-16 Section 21.3, including updates presented in Supplement 1 to ASCE 7-16. This process includes taking the 2014 mapped values from the USGS and utilizing  $F_a$  from Table 11.4-1 and 2.5 as  $F_v$  to obtain the modified accelerations, then reducing them by 20 percent to obtain the code minimum spectral accelerations.

The site-specific response spectrum is lower than the minimum code spectrum at select periods; therefore, the minimum code spectrum governs the design spectrum for the site at these periods. These values are presented in the table on the following page:

Period (sec)	Code 80% Minimum Spectral Acceleration (g)	Site-Specific Spectral Acceleration (g)	Code Modified* Site-Specific Spectral Acceleration (g)	Design Spectral Acceleration (2/3 of Code Modified Site-Specific Acceleration) (g)
0.05	0.572	0.445	0.572	0.381
0.1	0.739	0.476	0.739	0.493
0.2	1.010	0.694	1.010	0.673
0.3	1.010	1.027	1.027	0.685
0.4	1.010	0.937	1.010	0.673
0.5	1.010	1.027	1.027	0.685
0.6	1.010	1.148	1.148	0.766
0.8	1.010	1.046	1.046	0.698
1.0	0.914	0.992	0.992	0.662
1.2	0.762	0.967	0.967	0.645
1.4	0.653	0.755	0.755	0.503
1.6	0.572	0.606	0.606	0.404
1.8	0.508	0.480	0.508	0.339
2.0	0.457	0.390	0.457	0.305
3.0	0.305	0.214	0.305	0.203
4.0	0.229	0.125	0.229	0.153
5.0	0.183	0.080	0.183	0.122

\*The greater of the site-specific and the code minimum spectral acceleration.

## 6. DESIGN ACCELERATION PARAMETERS

The site-specific response spectrum was analyzed in accordance with the procedure outlined in ASCE 7-16 Section 21.4 to produce the design acceleration parameters presented in the table below:

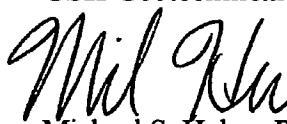
Site-Specific Parameter	Spectral Acceleration Value (g)
$S_{DS}$	0.689
$S_{DI}$	0.774

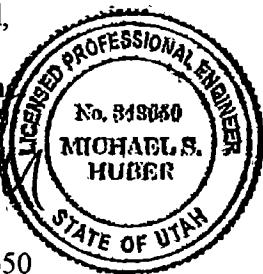
## 7. CLOSURE

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

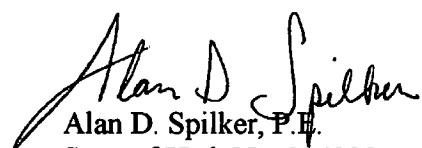
Respectfully submitted,

GSH Geotechnical, Inc.

  
Michael S. Huber, P.E.  
State of Utah No. 343650  
Vice President/Senior Geotechnical Engineer



Reviewed by:

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

MSH/ADS:ea

Encl.

Figure 1, Site Plan  
Figure 2, Shear-Wave Velocity Profile

Addressee (email)

### Geologic References

Currey, D.R., and Oviatt, C.G., 1985, Durations, average rates, and probable causes of Lake Bonneville expansion, still-stands, and contractions during the last deep-lake cycle, 32,000 to 10,000 years ago, in Kay, P.A., and Diaz, H.F., (eds.), Problems of and prospects for predicting Great Salt Lake levels - Processing of a NOAA Conference, March 26-28, 1985: Salt Lake City, Utah.

Hunt, C.B., 1967, Physiography of the United States: San Francisco, W.H. Freeman, 480 p.

Hylland, M. D., DuRoss, C.B., McDonald, G.N., Olig, S.S., Oviatt, C.G., Mahan, S.A., Crone, A.J., and Personius, S.F., 2014, Late Quaternary paleoseismology of the West Valley fault zone, Utah: Insights from the Baileys Lake trench site, *in* DuRoss, C.B. and Hylland, M.D., Evaluating surface faulting chronologies of graben-bounding faults in Salt Lake Valley, Utah—new paleoseismic data from the Salt Lake City segment of the Wasatch fault zone and the West Valley fault zone—Paleoseismology of Utah, Volume 24: Utah Geological Survey Special Study 149, p. 41–76, 8 appendices, 1 plate.

Solomon, Barry J., Biek, Robert F., and Ritter, Scott M., 2009, Geologic Map of the Pelican Point Quadrangle, Utah County, Utah. Utah Geologic Survey, Plate 1.

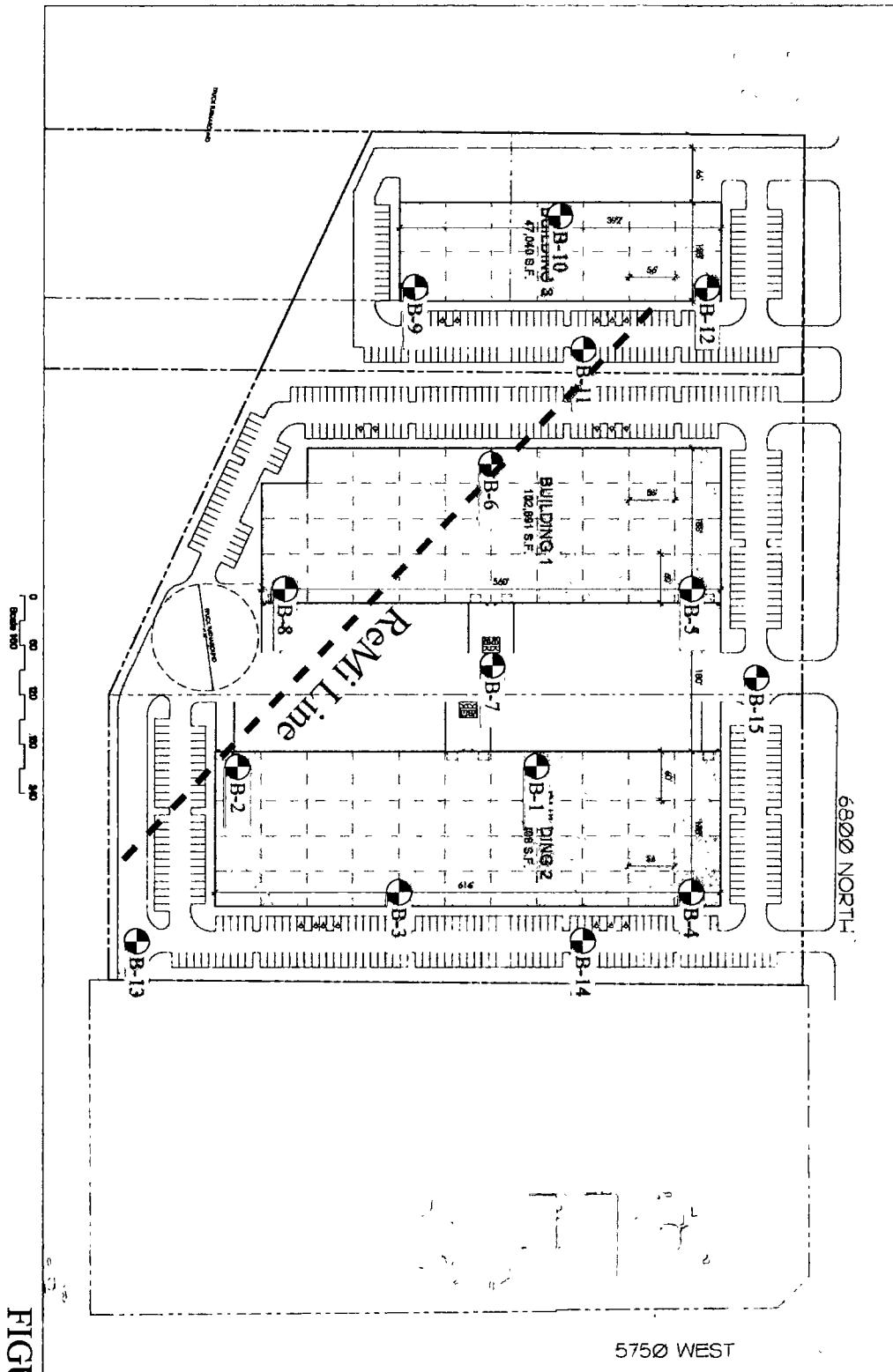
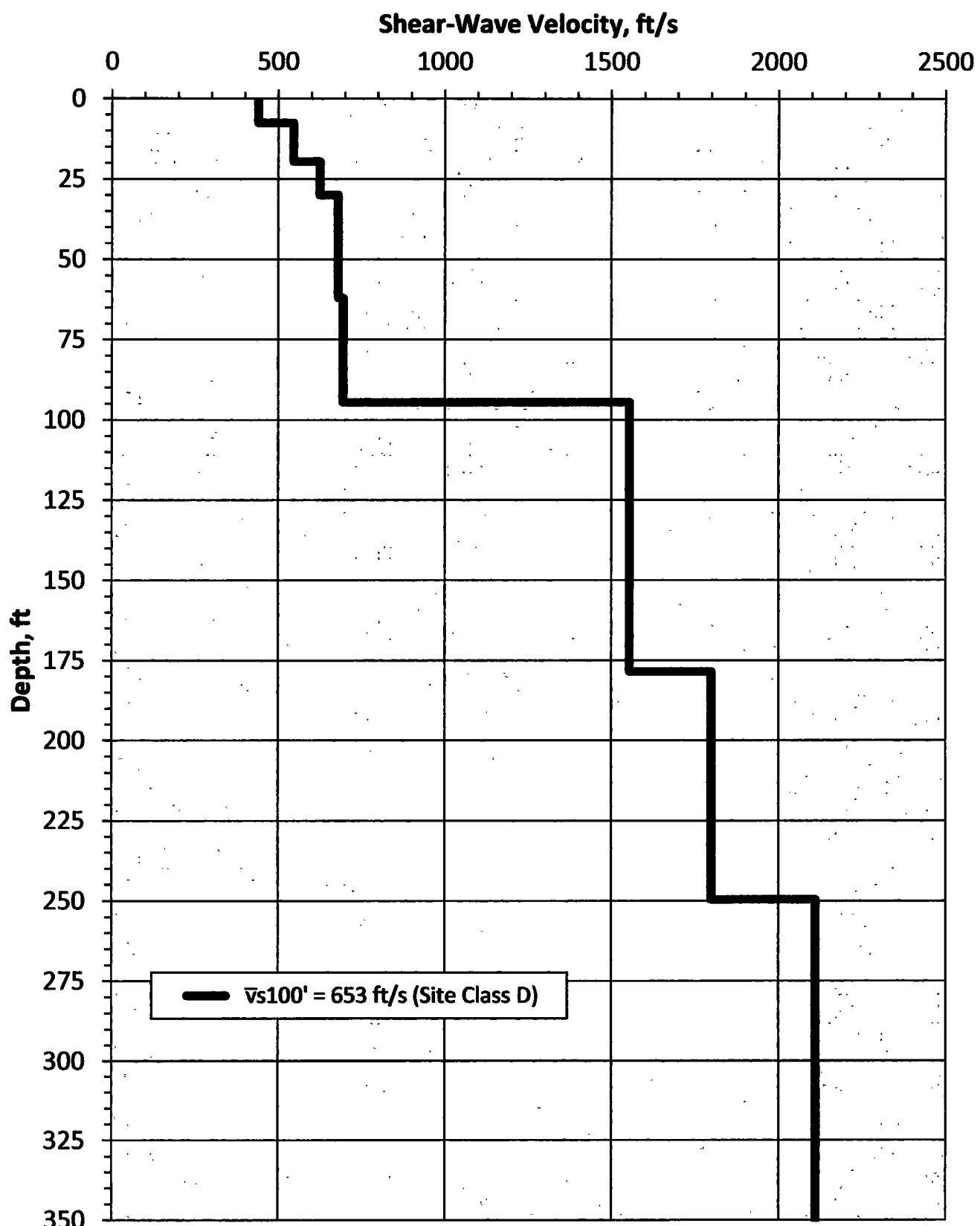


FIGURE 1  
SITE PLAN



**FIGURE 2 6800 North Industrial 2354-004-21**



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### **ATTACHMENT 3**

#### **Liquefaction Analysis**



**ATTACHMENT 4****Engineering Calculations**

Inputs	Spot	Strip
nc	5.14	5.14
nq	1	1
ng	0.5	0.5
b (ft)	2	1.5
phi (deg)	34	34
df (ft)	1.5	2.5
c (psf)	1000	1000
fos	3	3
g (pcf)	120	120
Shape		
nc	1.25	1
ng	0.85	1
Calulations		
C	51	45
G	6425	5140
Q	180	300
qult (psf)	6656	5485
qallow (psf)	2243	1823
qdesign (psf)	1500	1500

## LATERAL EARTH PRESSURES

Project	Propose 6800 N Industrial AF	Date Printed	5.13.2021
Job No.	2354-003-21	Engineer	ADS

### Input parameters:

120.00	Unit Wt of soil, pcf
4	Ht of wall, ft
32	$\phi$ , Peak soil friction angle, deg
0.00	$\theta$ , Wall/slope face inclination from vertical, deg
0.00	$\beta$ , Backslope angle from horizontal, degree
0.5	Reduction in Horizontal Acceleration (typically 0.5 but can vary from 0.33 to 1.0)
0.330	$K_h$ , Horizontal Seismic Coeff, g (2/3 of MCE) (Design Value)

### Results:

Condition	Static	Seismic
	pcf	psf*
Active	37	25
At-Rest	56	79
Mod Yield	47	52

\*uniform pressure

### Seismic Details.

Method	Force	Uniform Pressure	
M-O	99	25	active
Wood*	317	79	at-rest
Average	208	52	mod yielding

\*applicable for for L/H > 4 and u = 0.3 - if not applicable use chart on pg 485 of Kramer

## Square Foundation

Assumed Bearing Capacity BC = **1500** psf  
 Column Load L = **220** kips  
 Width of Footing b = **12.11** feet  
 Unit Weight  $\gamma = 118$  pcf

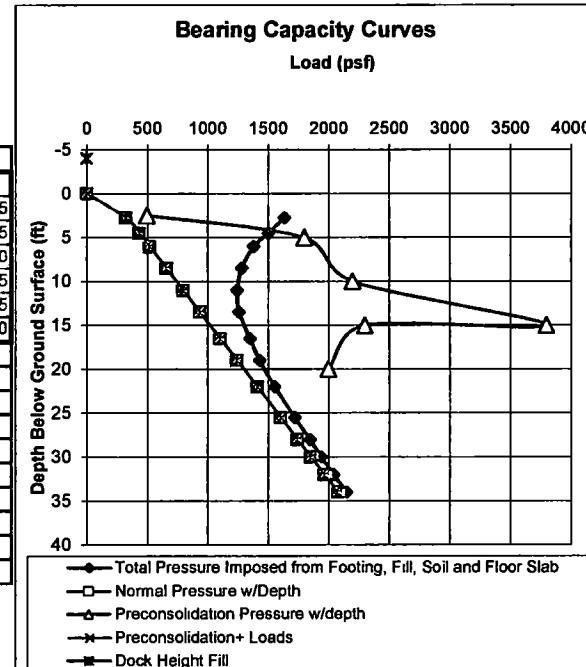
Depth of Footing (ft) = **15**  
 Depth of Water (ft) = **3**

Note if water table was not encountered this number has to be greater than the maximum depth you are calculating pressures for.

Depth Below Ground Surface	Average Depth Below Ground Surface	Average Depth Below Found * D	D/ width of Found	Influence of found load (from table)	P'o	$\Delta P + P'o$	(AP+P'o)		Log ( )	Cc	Thickness of Depth Increment	Unit Settlement	Total Settlement
							P'o	(AP+P'o)					
0.0	0.0	0.0	0.00	0.00	0	0	0.00	0.000	0.003	18.0	0.00	0.00	
1.5	2.8	1.3	0.10	0.88	325	1637	5.04	0.703	0.003	30.0	0.06	0.06	
4.0	4.5	3.0	0.25	0.71	437	1502	3.43	0.536	0.013	12.0	0.08	0.15	
5.0	6.0	4.5	0.37	0.58	521	1383	2.66	0.424	0.008	24.0	0.08	0.23	
7.0	8.5	7.0	0.58	0.42	660	1282	1.94	0.289	0.008	36.0	0.08	0.31	
10.0	11.0	9.5	0.78	0.30	799	1245	1.56	0.193	0.009	24.0	0.04	0.35	
12.0	13.5	12.0	0.99	0.22	938	1261	1.34	0.129	0.009	36.0	0.04	0.39	
15.0	16.5	15.0	1.24	0.16	1105	1352	1.22	0.088	0.019	36.0	0.06	0.45	
18.0	19.0	17.5	1.45	0.12	1244	1431	1.15	0.061	0.019	24.0	0.03	0.48	
20.0	22.0	20.5	1.69	0.10	1410	1555	1.10	0.042	0.023	48.0	0.05	0.53	
24.0	25.5	24.0	1.98	0.08	1605	1720	1.07	0.030	0.023	36.0	0.02	0.55	
27.0	28.0	26.5	2.19	0.07	1744	1845	1.06	0.025	0.023	24.0	0.01	0.57	
29.0	30.0	28.5	2.35	0.06	1855	1941	1.05	0.020	0.023	24.0	0.01	0.58	
31.0	32.0	30.5	2.52	0.05	1966	2041	1.04	0.016	0.023	24.0	0.01	0.59	
33.0	34.0	32.5	2.68	0.05	2078	2147	1.03	0.014	0.023	24.0	0.01	0.60	
35.0										Total Settlement	<b>0.60</b>	Inches	

Preload **0** psf  
 Floorslab **0** psf

$\delta P + P'o + L$ oads	Average Depth Below Ground Surface	P'o	Average Depth Below Ground Surface		Preconsolidation Pressures Depth
			PSF	Feet	
0	-4				
0	0	0	0	0	500 2.5
1637	2.75	325	324.5	2.75	1,800 5
1502	4.5	437	437.4	4.5	2200 10
1383	6	521	520.8	6	3800 15
1282	8.5	660	659.8	8.5	2300 15
1245	11	799	798.8	11	2000 20
1261	13.5	938	937.8	13.5	
1352	16.5	1105	1104.6	16.5	
1431	19	1244	1243.6	19	
1555	22	1410	1410.4	22	
1720	25.5	1605	1605	25.5	
1845	28	1744	1744	28	
1941	30	1855	1855.2	30	
2041	32	1966	1966.4	32	
2147	34	2078	2077.6	34	
0	0	0	0	0	



## Strip Foundation

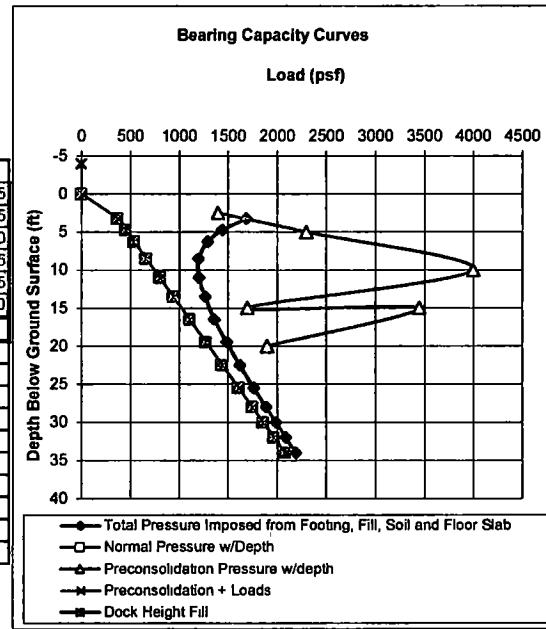
Assumed Bearing Capacity	BC= 1500	psf	Depth of Footing (ft)= 2.5	
Wall Load	L= 8	kips/ft	Depth of Water (ft) = 3	
Width of Footing	b= 5.33	feet	Note if water table was not encountered this number has to be greater than the maximum depth you are calculating pressures for.	
Unit Weight	$\gamma= 118$	pcf		

Depth Below Ground Surface	Average Depth Below Ground Surface	Average Depth Below Found * D	D/ width of Found	Influence of found load (from table)	P'o	$\Delta P+P'o$			Thickness of Depth Increment	Unit Settlement	Total Settlement
							$\frac{(\Delta P+P'o)}{P'o}$	Log ( )	Cc		
0.0	0.0	0.0	0.00	0.00	0	0	0.00	0.000	0.003	30.0	0.00
2.5	3.3	0.8	0.14	0.88	368	1686	4.58	0.661	0.003	18.0	0.04
4.0	4.8	2.3	0.42	0.66	451	1440	3.19	0.504	0.013	18.0	0.12
5.5	6.3	3.8	0.70	0.50	535	1291	2.41	0.383	0.008	18.0	0.06
7.0	8.5	6.0	1.13	0.36	660	1197	1.81	0.259	0.008	36.0	0.07
10.0	11.0	8.5	1.59	0.27	799	1200	1.50	0.177	0.009	24.0	0.04
12.0	13.5	11.0	2.06	0.22	938	1266	1.35	0.130	0.009	36.0	0.04
15.0	16.5	14.0	2.63	0.17	1105	1357	1.23	0.089	0.019	36.0	0.06
18.0	19.5	17.0	3.19	0.14	1271	1487	1.17	0.068	0.019	36.0	0.05
21.0	22.5	20.0	3.75	0.12	1438	1620	1.13	0.052	0.023	36.0	0.04
24.0	25.5	23.0	4.31	0.10	1605	1761	1.10	0.040	0.023	36.0	0.03
27.0	28.0	25.5	4.78	0.09	1744	1885	1.08	0.034	0.023	24.0	0.02
29.0	30.0	27.5	5.16	0.09	1855	1985	1.07	0.029	0.023	24.0	0.02
31.0	32.0	29.5	5.53	0.08	1966	2086	1.06	0.026	0.023	24.0	0.01
33.0	34.0	31.5	5.91	0.07	2078	2189	1.05	0.023	0.023	24.0	0.01
								Total settlement	0.61	Inches	

35

Preload	0	psf
Floorslab	0	psf

8P+P'o+Lo ads	Average Depth Below Ground Surface	P'o	P'o + Loads	Preconsolidation Pressures Depth	Average Depth Below Ground Surface	
					PSF	Feet
	0	-4				
	0	0	0	0	1,400	2.5
1686	3.25	368	367.9	3.25	2,300	5
1440	4.75	451	451.3	4.75	4000	10
1291	6.25	535	534.7	6.25	1700	15
1197	8.5	660	659.8	8.5	3450	15
1200	11	799	798.8	11	1900	20
1266	13.5	938	937.8	13.5		
1357	16.5	1105	1104.6	16.5		
1487	19.5	1271	1271.4	19.5		
1620	22.5	1438	1438.2	22.5		
1761	25.5	1605	1605	25.5		
1885	28	1744	1744	28		
1985	30	1855	1855.2	30		
2086	32	1966	1966.4	32		
2189	34	2078	2077.6	34		
0	0	0	0	0		
0	0	0	0	0		





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**ATTACHMENT 5**

**Historical High Groundwater Tables**



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## National Water Information System: Web Interface

USGS Water Resources

Data Category:

Groundwater

Geographic Area:

United States

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① Important: [Next Generation Monitoring Location Page](#)

**Search Results -- 1 sites found**

**site\_no list =**

- 402117111474701

**Minimum number of levels = 1**

[Save file of selected sites](#) to local disk for future upload

### USGS 402117111474701 (D- 5- 1)26dba- 1

Available data for this site

Groundwater: Field measurements

GO

Utah County, Utah

Hydrologic Unit Code 16020201

Latitude 40°21'17", Longitude 111°47'47" NAD27

Land-surface elevation 4,515.00 feet above NGVD29

The depth of the well is 160 feet below land surface.

The depth of the hole is 160 feet below land surface.

#### Output formats

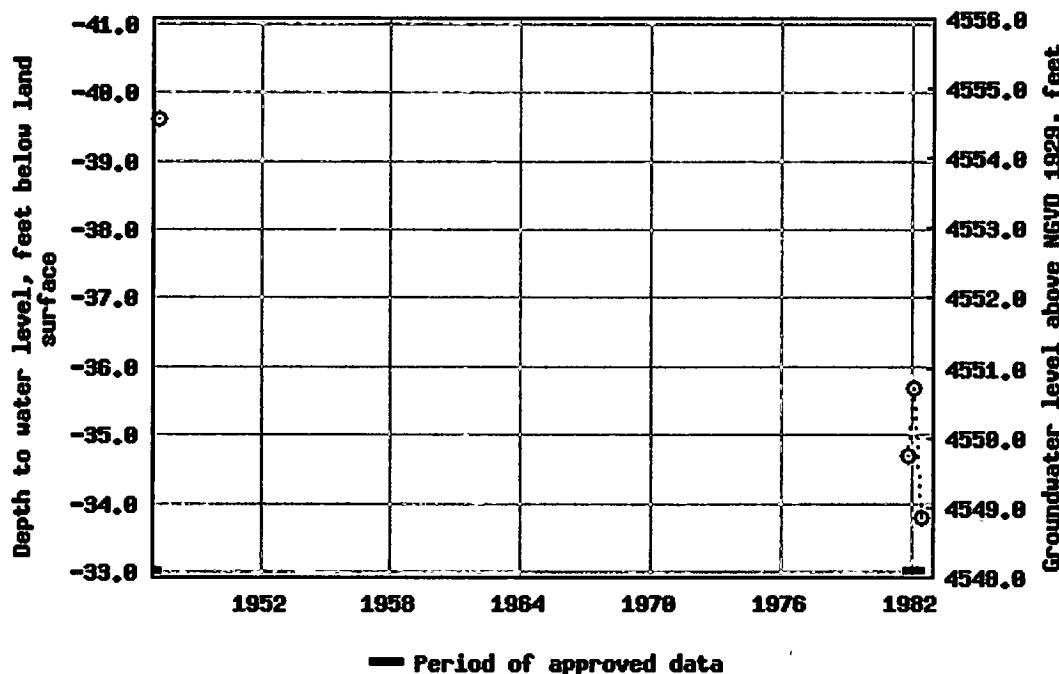
[Table of data](#)

[Tab-separated data](#)

[Graph of data](#)

[Reselect period](#)

USGS 402117111474701 (D- 5- 1)26dba- 1



Breaks in the plot represent a gap of at least one year between field measurements.  
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**Title: Groundwater for USA: Water Levels**

**URL: <https://nwis.waterdata.usgs.gov/nwis/gwlevels?>**



Page Contact Information: [USGS Water Data Support Team](#)

Page Last Modified: 2021-10-04 15:19:07 EDT

0.57 0.5 nadww02



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## National Water Information System: Web Interface

USGS Water Resources

Data Category:

Groundwater

Geographic Area:

United States

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Groundwater levels for the Nation

**Important:** [Next Generation Monitoring Location Page](#)

### Search Results -- 1 sites found

**site\_no list =**

- 402118111475901

**Minimum number of levels = 1**

[Save file of selected sites](#) to local disk for future upload

### USGS 402118111475901 (D- 5- 1)26dbb- 1

Available data for this site

Groundwater: Field measurements

Utah County, Utah

Hydrologic Unit Code 16020201

Latitude 40°21'18", Longitude 111°47'59" NAD27

Land-surface elevation 4,515.00 feet above NGVD29

The depth of the well is 98.0 feet below land surface.

[Output formats](#)

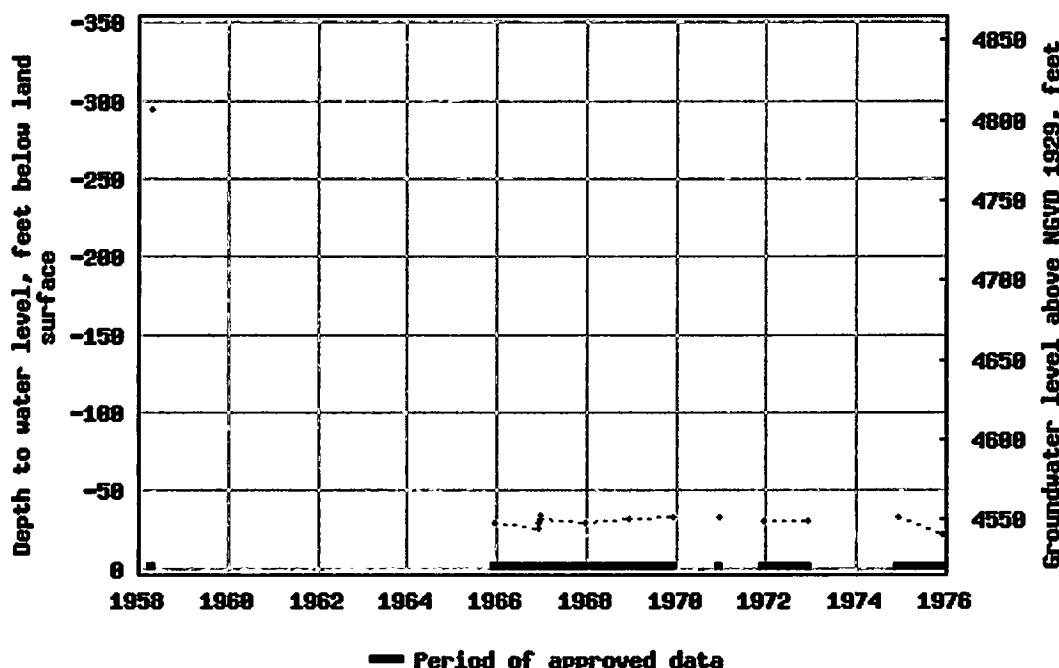
[Table of data](#)

[Tab-separated data](#)

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USGS 402118111475901 (D- 5- 1)26dbb- 1



— Period of approved data

Breaks in the plot represent a gap of at least one year between field measurements.  
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**Title:** [Groundwater for USA: Water Levels](#)

**URL:** <https://nwis.waterdata.usgs.gov/nwis/gwlevels?>



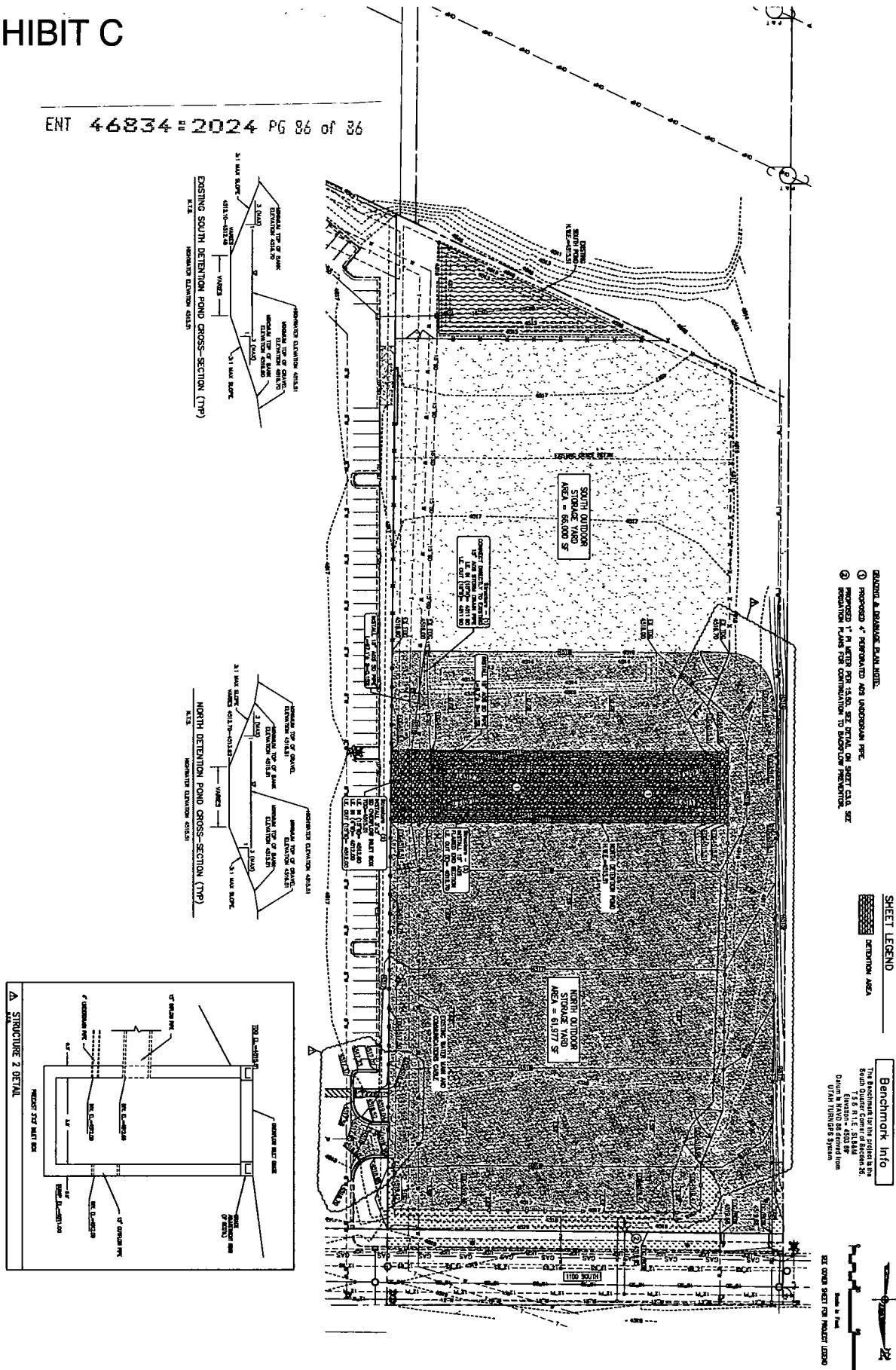
Page Contact Information: [USGS Water Data Support Team](#)

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## EXHIBIT C

ENT 46834 2024 PG 86 of 36



DEER PARK LOT 3 - NORTH STORAGE YARD  
51 WEST 1100 SOUTH, AMERICAN FORK, UTAH

## GRADING & DRAINAGE PLAN



2

**C2.1**

**CIR** | CIVIL ENGINEERING  
+ SURVEYING

10716 S BECKSTEAD LANE, SUITE 102  
South Jordan, Utah - 840-4238

1	CITY COMMENTS	ROW	04/08/24
2	CITY COMMENTS	ROW	04/08/24
NO	REVISIONS	BY	DATE
DESIGNER: SDT	PROJECT ENGINEER: SDT		