

# ADDENDUM # 3

#### INVITATION TO BID NO: ITB 2022-799

#### PROJECT: NM173 PHASE 1 WATERLINE RELOCATION

BID DUE DATE/ TIME: Monday, February 28, 2022, 3:00 PM

**NON-MANDATORY PRE-BID MEETING:** Tuesday, February 22, 2022, 10:00 AM, East Aztec Pump Station, 1891 Navajo Dam Road, HWY 173, Aztec, NM 87410

LAST DAY FOR QUESTIONS: Thursday, February 24, 2022, 10:00 AM

This addendum includes:

1. Geotechnical report.

GEOMATING

#### GEOTECHNICAL ENGINEERING REPORT NM 173 WATERLINE IMPROVEMENT AZTEC, NEW MEXICO

Submitted To:

Paul O'Neil, P.E. Short, Elliot, Hendrickson, Inc. 934 Main Avenue Durango, Colorado 81301

Submitted By:

GEOMAT Inc.

915 Malta Avenue Farmington, New Mexico 87401

July 30, 2021 GEOMAT Project 212-3731



July 30, 2021

**Paul O'Neil, P.E.** Short, Elliot, Hendrickson, Inc. 934 Main Avenue Durango, Colorado 81301

RE: Geotechnical Engineering Study NM 173 Waterline Improvement Aztec, New Mexico GEOMAT Project No. 212-3731

GEOMAT Inc. (GEOMAT) has completed the geotechnical engineering exploration for the proposed Waterline Improvement along NM 173 in Aztec, New Mexico. This study was performed in general accordance with the scope of work described in our Proposal No. 192-12-19, dated January 29, 2020.

The results of our engineering study, including the geotechnical recommendations, site plan, boring records, and laboratory test results are attached.

We have appreciated being of service to you in the geotechnical engineering phase of this project. If you have any questions concerning this report, please contact us.

Sincerely yours, GEOMAT Inc.

Douglas N. Hood Staff Professional Matthew J. Cramer, P.E. President, Principal

Copies to: Addressee (1)

#### TABLE OF CONTENTS

<u>Page No.</u>
INTRODUCTION
PROPOSED CONSTRUCTION 1
SITE EXPLORATION
Field Exploration1
Laboratory Testing
SITE CONDITIONS
SUBSURFACE CONDITIONS
Soil Conditions
Groundwater Conditions
Laboratory Test Result
EARTHWORK RECOMMENDATIONS
General Considerations
Excavation
Excavation Safety
Pipe Foundation
Pipe Embedment
Backfill7
Compliance
PAVEMENT REPAIRS 8
ADDITIONAL OPINIONS AND RECOMMENDATIONS
Corrosion and Cement Type
Site Classification
Lateral Earth Pressures 10
GENERAL COMMENTS

**TABLE OF CONTENTS (continued)** 

#### **APPENDIX A**

Site Plans Logs of Borings and Test Pits Unified Soil Classification

#### **APPENDIX B**

Laboratory Test Results Laboratory Test Procedures

#### **APPENDIX C**

Important Information About This Geotechnical Engineering Report (Taken From GBA)



# GEOTECHNICAL ENGINEERING REPORT NM 173 WATERLINE IMPROVEMENT AZTEC, NEW MEXICO GEOMAT PROJECT NO. 212-3731

#### INTRODUCTION

This report contains the results of our geotechnical engineering exploration for the proposed NM 173 Waterline Improvements in Aztec, New Mexico, as shown on the Site Plans in Appendix A of this report.

The purpose of these services is to provide information and geotechnical engineering recommendations about:

earthwork

excavation conditions

pipeline backfill

- subsurface soil conditions
- groundwater conditions
- lateral soil pressures
- soil resistivity and corrosivity

The opinions and recommendations contained in this report are based upon the results of field and laboratory testing, engineering analyses, and experience with similar soil conditions, structures, and our understanding of the proposed project as stated below.

# PROPOSED CONSTRUCTION

We understand that approximately 20,600 feet of new 8", C900 waterline will be installed along NM Hwy 173 to replace an existing 6" and 8" line. The new waterline will begin near the intersection of NM Hwy 173 and Old Spanish Trail then continue east along NM Hwy 173 for approximately 20,600 feet, then northeast along County Road 2550, where it will tie into an existing storage tank east of County Road 2550.

#### SITE EXPLORATION

Our scope of services performed for this project included a site reconnaissance by a staff professional, a subsurface exploration program, laboratory testing and engineering analyses.

#### **Field Exploration:**

Subsurface conditions along the proposed waterline were explored on July 13, 19, 20 & 23, 2021, by drilling 16 exploratory borings and excavating 30 test pits at the approximate locations shown on the Site Plans in Appendix A. The borings and test pits were drilled and excavated at

client designated spacing of approximately 450 to 850 foot intervals along the proposed waterline to depths of approximately 10 feet below the existing ground surface (bgs). The boring and test pit were numbered to correspond with the client provided designations.

The borings were advanced using CME-45 and CME-55 truck-mounted drill rigs with continuous-flight, 7.25-inch O.D. hollow-stem auger. Borings drilled on July 13<sup>th</sup> were drilled using the CME-55 drill rig, while borings drilled on July 23<sup>rd</sup> were drilled using the CME-45 drill rig. The borings were continuously monitored by a staff professional from our office who examined and classified the subsurface materials encountered, obtained representative samples, observed groundwater conditions, and maintained a continuous log of each boring.

The test pits were excavated on July 19<sup>th</sup> & 20<sup>th</sup> using a CASE 580 Super M Extendahoe with a 24" bucket that did not contain rock teeth. The test pits were continuously monitored by a professional from our office who examined and classified the subsurface materials encountered, obtained representative samples, observed groundwater conditions, and maintained a continuous log of each test pit.

Soil samples were obtained from the borings using a standard 2-inch O.D. split spoon sampler. The sampler was driven using a 140-pound hammer falling 30 inches. The standard penetration resistance was determined by recording the number of hammer blows required to advance the sampler in six-inch increments. Representative bulk samples of subsurface materials were also obtained from both borings and test pits. Soils were classified in accordance with the Unified Soil Classification System described in Appendix A. Boring and test pit logs were prepared and are presented in Appendix A.

Groundwater evaluations were made in each boring at the time of site exploration. Soils were classified in accordance with the Unified Soil Classification System described in Appendix A. Boring logs were prepared and are presented in Appendix A.

# Laboratory Testing:

Samples retrieved during the field exploration were transported to our laboratory for further evaluation. At that time, the field descriptions were confirmed or modified as necessary, and laboratory tests were performed to evaluate the index properties of the subsurface materials.

# SITE CONDITIONS

NM 173 is located on the northern edge of Aztec, New Mexico, to the east of highway 550. In general, there is a moderate increase in surface elevation from west to east along NM173. The highway is bordered on the north and south extents by rising hills with bedrock outcroppings.

#### Geotechnical Engineering Report NM 173 Waterline Improvement

The ground surface along the highway ranged from sharp downward slopes away from the highway to relatively level surfaces. CR 2550 is in a subdivision to the west of NM 173, and is bordered by residential land on all sides. The ground surface along CR 2550 also ranges from sharp downward slopes away from the road to relatively level surfaces. The vegetation along the highway ranges small bushes and trees to large bushes and medium-sized trees at the time of exploration. The following photographs depict a boring and test pit.



View of Drill Rig at Boring B-29 View to the East



View of Backhoe at Boring TP-8 View to the West

# SUBSURFACE CONDITIONS

# **Soil Conditions:**

As presented on Boring and Test Pit Logs in Appendix A, in the borings and test pits we generally encountered loose to very dense soils. Sandy or clayey soils were encountered to the full depth explored (10 feet) in borings and test pits TP-4, TP-6, B-7, TP-9 through TP-13, TP-15, TP-16, TP-19, TP-21 through B-23, TP-25, TP-28, TP-30, TP-31, TP-34, B-35, and TP-38. In the remaining borings and test pits rock was encountered within the 10-foot exploration. Borings B-5, and Test Pits TP-8, TP-18, TP-24, TP-36, TP-39, TP-40, TP-41, TP-42, TP-43, TP-44, and TP-47 were all terminated short of their planned depths of 10 feet due to bucket refusal on bedrock. Boring B-11 was terminated short of its planned depth of 10 feet due to conflict with an unmarked utility.

#### **Groundwater Conditions:**

Groundwater was not encountered in the borings to the depths explored. Groundwater elevations can fluctuate over time depending upon precipitation, irrigation, runoff and infiltration of surface water. We do not have any information regarding the historical fluctuation of the groundwater level in this vicinity.

#### Laboratory Test Results:

Laboratory analyses of representative samples indicate the sandy and silty soils have fines contents (silt- and/or clay-sized particles passing the U.S. No. 200 sieve) ranging from approximately 6 to 68 percent. Plasticity indices of the soils ranged from 0 to 26. Representative samples of the clay soils have a fines content ranging from approximately 54 to 68 percent with plasticity indices ranging from 15 to 16. The in-place moisture of the soils ranges from approximately 2.1 to 11.4 percent.

Corrosivity and resistivity analyses were conducted on samples taken from test pits TP-6, TP-21, TP-34, and TP-46 along the alignment. Results are discussed in detail in the following report section.

Results of all laboratory tests are presented in Appendix B.

#### EARTHWORK RECOMMENDATIONS:

#### **General Considerations:**

The opinions contained in this report for the proposed construction are contingent upon compliance with recommendations presented in this section. The presence of underground utilities, including gas, electric, water, and communication lines, should be expected and appropriate precautions taken during excavation.

#### **Excavation:**

We present the following general comments regarding our opinion of the excavation conditions for the designers' information with the understanding that they are opinions based on our boring and test pit data. More accurate information regarding the excavation conditions should be evaluated by contractors or other interested parties from test excavations using the equipment that will be used during construction.

Based on our subsurface evaluation it appears that shallow excavations in soils at the site will be possible using standard excavation equipment. Excavations that encounter formational rock are expected to be difficult in some areas. The test pits were excavated using a CASE 580 Super M Extendahoe with a 24" bucket equipped with standard teeth. We anticipate that heavy-duty equipment and/or specialized methods may be necessary to advance excavations to the planned depths. Consideration could be given to the use of a trackhoe with rock teeth, hydraulic hoe ram, bulldozer with ripper claw, a rock trencher, etc. Although unanticipated, if it is determined that blasting is required, the contractor shall contact the owner to determine any restrictions associated with blasting. We recommend that the contractors or other interested parties evaluate

the excavatability of the rock using the equipment or methods that will be used during construction prior to submitting bids.

Excavations deeper than a few feet are likely to experience caving or sloughing. Sloping, shoring, or bracing of excavation walls, along with dewatering techniques, are likely to be necessary to maintain safe, stable excavations.

# **Excavation Safety:**

Construction of stable temporary excavations is the responsibility of the contractor. Temporary slopes and excavations should be designed and constructed in accordance with the Department of Labor Occupational Safety and Health Administration 29 CFR Part 1926, Subpart P, <u>Occupational Safety and Health Standards – Excavations</u> ("OSHA Construction Standards for Excavations").

According to *OSHA Construction Standards for Excavations*, all excavations greater than four feet in depth must be sloped, shored, or braced. Spoils must be placed at least two feet from the edge of the excavation to reduce the potential for sidewall failure due to excessive lateral pressures. Other details regarding excavation safety, as described in Subpart P, shall be followed.

Conditions affecting stability of slopes and excavations can change over time depending on variables such as weather, vibration or surcharges due to nearby equipment, etc. The contractor's designated Competent Person (as defined in subpart P) shall monitor and assess conditions affecting soil stability during construction.

# **Pipe Foundation:**

Pipes should be bedded on a stable subgrade which is free of water. Any areas where pumping soils or otherwise unstable subgrade conditions are encountered must be stabilized before laying pipe. If such conditions are encountered during construction, GEOMAT should be contacted to provide specific recommendations for stabilization.

#### **Pipe Embedment:**

As required in the NMSSPWC specifications, a minimum thickness of eight (8.0) inches of embedment (bedding) material should be placed on top of the subgrade to support and protect the pipe. Once the pipe has been placed and aligned, shading material should be placed to a minimum of eight (8.0) inches above the top of the pipe. Hand tamping or similar techniques should be employed to ensure that the bedding material completely supports the haunch of the pipe.

Embedment material below the pipe should be compacted to a minimum density of 95 percent of the ASTM D1557 maximum dry density. To avoid damage to the pipe, mechanical compaction equipment should not be used over the pipe in the embedment zone.

Embedment material should be a granular soil such as sand, silty/clayey sand, or fine-grained gravel. It should be free of coarse-grained gravel particles or cobbles. Silt, clay, or organic soils are not suitable for use as embedment material. Soils used for embedment should have a fines content (percentage of silt and/or clay-sized particles passing the U.S. No. 200 sieve) of less than 50 percent.

Alternatively, flowable fill could be used as embedment material. The use of flowable fill could be appropriate in situations where placing personnel and/or compaction equipment in excavations is impractical due to closely-spaced adjacent utilities or unstable excavations.

# **Backfill:**

Excavations should be backfilled to the planned finished grades using native or imported soils that are free of debris, rubble, frozen soil, organic material, or other deleterious material. Fill material should be free of cobbles or boulders greater than six inches in diameter. Additionally, backfill material should conform to any specifications provided by the pipe manufacturer.

Backfill material in non-structural areas should be compacted to a minimum of 90 percent of the maximum dry density as determined by ASTM D1557. Soils should be compacted at moisture contents near optimum. Material should be placed in horizontal lifts in thicknesses that permit compaction to the required densities with the equipment being used.

Backfill under pavements or other structures should conform to NMDOT or NMSSPWC specifications as applicable.

The existing soils along some of the alignment are fine-grained, and as such, are expected to be moisture sensitive. The fine-grained native soils may pump or become unstable or unworkable

at high water contents. It is anticipated that proper moisture-density control during placement and compaction will be required.

#### **Compliance:**

The recommendations in this report depend upon compliance with **Earthwork** recommendations. To assess compliance, observation and testing should be performed by GEOMAT.

#### **PAVEMENT REPAIRS:**

Existing bituminous pavement removed in connection with construction shall be cut with a saw or other suitable tool. Care shall be taken to assure that the edge of removed pavement does not vary from a straight line more than two inches for any given section of removed pavement.

Patching of removed pavement shall conform to applicable NMDOT or NMSSPWC specifications.

No edge of a pavement patch shall be in a wheel path; the edge shall be either between wheel paths or on the centerline of the road. If the outer edge of the paved surface is damaged, the paving shall be replaced to between the wheel paths of the lane damaged. If the damage extends beyond the outer wheel, the paving shall be replaced to the centerline of the road.

Trench backfill under pavements, and within 5 feet of the edge of the pavement, should be compacted to a minimum of 95 percent of the ASTM D1557 maximum dry density.

For trenching that will be within 5 feet of the outside edge of the pavement, the backfill should be compacted to a density of not less than 90 percent of the maximum dry density, as determined by ASTM D1557 or in accordance with applicable NMDOT or NMSSPWC specifications.

# ADDITIONAL OPINIONS AND RECOMMENDATIONS

# **Corrosion and Cement Type:**

A representative sample of soil from the borings was tested to evaluate the potential for the onsite soils to corrode buried metal and/or concrete. The samples were tested for pH, electrical resistivity, and soluble sulfates and chlorides. Results of these tests are summarized in the following table.

Corrosivity Test Results												
Sample	Boring No	Sample	nH	Resistivity	Sulfates	Chlorides						
No.	Doring 100	Depth (ft)	PII	(ohm-cm)	(%)	(%)						
4105	TP-6	2	7.27	764	0.104	ND						
4110	TP-21	2	7.68	439	0.171	ND						
4114	TP-34	9	8.27	3480	0.007	0.002						
4139	TP-46	3	8.47	6090	ND	ND						

\*ND - Not Detected

#### Corrosion of Concrete:

The soluble sulfate content of the samples tested ranged from Not Detected to 0.171 percent (by weight), which may be characterized as mild to moderate potential for corrosion (IBC Table 1904.3). According to the American Concrete Institute Building Code 318, there are no restrictions on the type of cement to be used. All concrete should be designed, mixed, placed, finished, and cured in accordance with the guidelines presented by the American Concrete Institute (ACI).

#### Corrosion of Metals:

Corrosion of buried ferrous metals can occur when electrical current flows from the metal into the soil. As the resistivity of the soil decreases, the flow of electrical current increases, increasing the potential for corrosion. A commonly accepted correlation between soil resistivity and corrosion of ferrous metals is shown in the following table.

Resistivity (ohm-cm)	Corrosivity
0 to 1,000	Severely Corrosive
1,000 to 2,000	Corrosive
2,000 to 10,000	Moderately Corrosive
>10,000	Mildly Corrosive

The samples tested had a resistivity value ranging from 439 to 6090 ohm-cm. Based on these laboratory results and the table above, the on-site soils would be characterized as severely to moderately corrosive toward ferrous metals. The potential for corrosion should be taken into account during the design process.

#### Site Classification:

Based on the subsurface conditions encountered in the borings and test pits, we estimate that a Site Class of C is appropriate for the site according to Table 20.3-1 of the ASCE 7-10 Standard in accordance with the 2015 International Building Code. This parameter was estimated based on extrapolation of data beyond the deepest depth explored, using methods allowed by the code. Actual shear wave velocity testing/analysis and/or exploration to a depth of 100 feet were not performed as part of our scope of services for this project.

#### Lateral Earth Pressures:

Recommended equivalent fluid pressures for unrestrained foundation elements are presented in the following table:

Active:	
Granular soil backfill (on-site sand)	35 psf/ft
Undisturbed subsoil	
	1
• <u>Passive</u> :	
Foundation walls	250 psf/ft
<u>Coefficient of base friction</u> :	0.40
The coefficient of base friction should be reduced to 0.30 who	en used in
conjunction with passive pressure.	

Where the design includes restrained elements, the following equivalent fluid pressures are recommended:

 At rest: Granular soil backfill (on-site sand)......50 psf/ft Undisturbed subsoil......60 psf/ft

Fill against retaining walls should be compacted to densities specified in **Earthwork** Medium to high plasticity clay soils should not be used as backfill against the vault walls. Compaction of each lift adjacent to walls should be accomplished with hand-operated tampers or other lightweight compactors. Over compaction may cause excessive lateral earth pressures that could result in wall movement.

#### **GENERAL COMMENTS**

It is recommended that GEOMAT be retained to provide a general review of final design plans and specifications in order to confirm that earthwork recommendations in this report have been interpreted and implemented. In the event that any changes of the proposed project are planned, the opinions and recommendations contained in this report should be reviewed and the report modified or supplemented as necessary.

GEOMAT should also be retained to provide services during the construction phase of the project. Construction testing, including field and laboratory evaluation of fill and/or backfill materials, should be performed to determine whether applicable project requirements have been met.

The analyses and recommendations in this report are based in part upon data obtained from the field exploration. The nature and extent of variations beyond the location of test excavations may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities at the same time. No warranty, express or implied, is intended or made. We prepared the report as an aid in design of the proposed project. This report is not a bidding document. Any contractor reviewing this report must draw his own conclusions regarding site conditions and specific construction equipment and techniques to be used on this project.

This report is for the exclusive purpose of providing geotechnical engineering and/or testing information and recommendations. The scope of services for this project does not include, either specifically or by implication, any environmental assessment of the site or identification of contaminated or hazardous materials or conditions. If the owner is concerned about the potential for such contamination, other studies should be undertaken. This report has also not addressed any geologic hazards that may exist on or near the site.

This report may be used only by the Client and only for the purposes stated, within a reasonable time from its issuance. Land use, site conditions (both on and off site), or other factors may change over time and additional work may be required with the passage of time. Any party, other than the Client, who wishes to use this report, shall notify GEOMAT in writing of such intended use. Based on the intended use of the report, GEOMAT may require that additional work be performed and that an updated report be issued. Non-compliance with any of these requirements, by the Client or anyone else, will release GEOMAT from any liability resulting from the use of this report by an unauthorized party.

# Appendix A











<b>~</b>	SITE PLAN	PROJECT	
	Boring Locations (approximate)	NM 173	
Approximate	GEOMAT Project No. 212-3731	Waterline Improvement Project	
Not to Scale	Date of Exploration: July 13, 19,20 &23, 2021	Aztec, New Mexico	



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	Pro	bject	t Nar	ne:	Ν	IM 17	73 W	/aterlii	ne Impr	ovemer	nt Date Drilled: 7/23/2021
	Pro	oject	t Nur	nber	: _ 2	12-3	731		ł		Latitude: Not Determined
	Cli	ent:			S	hort,	Ellic	ot, He	ndrickso	on, Inc.	Longitude: Not Determined
	Sit	e Lo	catio	on: _	A	ztec,	Nev	v Mex	lico		Elevation: Not Determined
	Rig	д Ту	pe:		C	ME-4	45				Boring Location: See Site Plan
	Dri	illing	Met	hod:	7	.25" (	0.D.	Hollo	w Stem	n Auger	Groundwater Depth: <u>None Encountered</u>
	Sa	mpli	ing N	1ethc	od: <u>S</u>	<u>iplit s</u>	poor	n sam	ple		Logged By: DH
	Ha	mm	er W	eight	t: <u>1</u>	40 lb	S				Remarks: <u>None</u>
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2-3731										14 _	
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									Malta Ave ington, N 505) 327- (505) 326	nue M 87401 7928 -5721	Test Pit TP-3 Page 1 of 1
	Project Name:       NM 173 W         Project Number:       212-3731         Client:       Short, Ellic         Site Location:       Aztec, Nev         Rig Type:       Case 580         Excavation Method:       24" Bucket         Sampling Method:       Bulk samp         Hammer Weight:       N/A         Hammer Fall:       N/A								ne Impro	ovemer	nt       Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
	Dry Density (pcf)	% Passing 101 tota 10	Plasticity K	Moisture Content (%)	Field Dry Density (pcf)	Field Moisture Content (%)	Sample Type	USCS	Soil Symbol	Depth (ft)	Soil Description
5T PIT 212-3731.GPU 7/30/21		32	26	11.4			GRAE	SM SC		1 - 2 - 3 - 4 - 5 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 13 - 14 - 15 -	Silty SAND, tan/brown, fine- to medium- grained, damp Clayey SAND, brown/grey, fine- to medium- grained, damp SANDSTONE, brown/red, fine- to coarse- grained, well cemented, sligthly weathered, slightly damp tan/brown, weakly cemented claystone lense, black/brown, damp tan/brown, weakly cemented, moderately weathered, slightly damp Total Depth 10 feet
TEST PIT 212-3731.GF	GF	RAB =	Grab S	Sample	MC =	Modifie	ed Ca	lifornia	(Ring Sam	14 _  	= Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

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		915 Malta Avenue Farmington, NM 8740 Tel (505) 327-7928 Fax (505) 326-5721	Test Pit TP-4
Project Name: Project Number: Client: Site Location: Rig Type: Excavation Method: Sampling Method: Hammer Weight: Hammer Fall:	NM 173 Wa 212-3731 Short, Ellio Aztec, New Case 580 E 24" Bucket Bulk sampl N/A N/A	aterline Improvem t, Hendrickson, In v Mexico Extendahoe les from backhoe	ent       Date Excavated:       7/19/2021         Latitude:       Not Determined         c.       Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Dry Density (pcf) (pcf) (pcf) % Passing #200 Sieve Plasticity Index Moisture Field Dry	Density (pct) Field Moisture Content (%) Sample Type	USCS Soil Symbol Depth (ft)	Soil Description
GRAB = Grab Sample M	GRAB	SC 1 2 3 4 5 6 7 8 9 10 11 11 12 13 14 15 formia (Ring Sample) S	Clayey SAND, brown/grey, fine- to medium- grained, slightly damp Silty SAND, brown, fine- to coarse- grained, damp

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	P	niec	t Nar	ne.	N	IM 17	73 W	aterli	ne Impr	ovemer	nt Date Drilled: 7/23/2021
	Pi	roiec	t Nur	nber	: 2	12-37	731				Latitude: Not Determined
	С	, lient:			S	hort,	Ellic	ot, He	ndrickso	on, Inc.	Longitude: Not Determined
	Si	te Lo	ocatio	on: _	A	ztec,	Nev	v Mex	(ico		Elevation: Not Determined
	R	ig Ty	pe:		C	ME-4	45				Boring Location: <u>See Site Plan</u>
	D	rilling	l Met	hod:	7	.25" (	0.D.	Hollo	w Stem	n Auger	Groundwater Depth: <u>None Encountered</u>
	Sa	ampl	ing N	letho	od: <u>S</u>	plit s	poor	n sam	ple		Logged By: DH
	H	amm	er W	eight	t: <u>1</u>	40 lb	s				Remarks: <u>None</u>
	H	amm	er Fa	all: _	3	0 inc	hes				
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					6-9-10					5_	CANDETONE ton lubits find to modium ansing modium
						SS	X			$\mathcal{N}$	dense, weakly cemented, slightly weathered, slightly damp
							$ \land$	RK		6_	
										7	
F									· · · · · · · ·		Auger Refusal, Well cemented sandstone
										8	Total Depth 7 feet
										9_	
										10 _	
_											
/30/2										11 _	
DT 7											
1AT.G										12 _	
BEON										12	
GPJ (										13 _	
3731.(										14	
212-(											
MAT										15	
GEC	A =	Auge	r Cutti	ngs R	= Ring-l	Lined E	Barrel	Sample	er SS = S	plit Spoon	GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetrometer

-	$\phi \epsilon$	GE	0	MA			915 N Farm Tel ( Fax (	/lalta Avei ington, NI 505) 327- (505) 326	nue M 87401 7928 -5721	Test Pit TP-6 Page 1 of 1
F F C S F E S F F	Projec Projec Client: Site Lo Rig Ty Excava Sampl Hamm Hamm	t Nar t Nur ocatio pe: ation ing M er W er Fa	ne: nber: nr: Metho letho all:	N 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NM 17 212-3 Short, Aztec, Case 2 24" Bu 24" Bu 24" Bu 3ulk s V/A	73 W 731 Ellic Nev 580 Icket amp	/aterlii ot, Hei w Mex Exten t les fro	ne Impro	t Date Excavated: 7/19/2021 Latitude: Not Determined Longitude: Not Determined Elevation: Not Determined Test Pit Location: See Site Plan Groundwater Depth: None Encountered Logged By: DH Remarks: None	
Dry Density (pcf)	% Passing 10 10 10 10 10 10 10 10 10 10 10 10 10	Plasticity A Index	Moisture Content (%)	Field Dry Density (pcf)	Field Moisture Content (%)	Sample Type	nscs	Soil Symbol	Depth (ft)	Soil Description
1.GPJ 7/30/21	12	NP	2.2			GRAE	SW-SM		$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Well-graded SAND with silt, tan/brown, fine- to coarse- grained, slightly damp light tan
D	RAB =	Grab S	Sample	MC =	Modifie	ed Cal	lifornia	(Ring Sam	15 iple) SS	- Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

	-(	$\mathbf{\dot{e}}$	GE	0	MA			915 N Farm Tel ( Fax	Malta Ave ington, N 505) 327- (505) 326	nue M 87401 7928 -5721	Boring B-7 Page 1 of 1
	Р	roiec	t Nar	ne:	Ν	JM 17	73 W	/aterli	ne Impr	ovemer	It Date Drilled <sup>.</sup> 7/13/2021
	P	roiec	t Nur	nber	2	12-3	731				Latitude: Not Determined
	C	lient <sup>.</sup>				Short.	Ellic	ot. He	ndricks	on. Inc.	Longitude: Not Determined
	S	ite I o	ocatio	n.	A	ztec	Ne	w Mex	kico	,	Elevation: Not Determined
	R	ia Tv	ne.	JII	,	CMF-	55				Boring Location: See Site Plan
	Rig Type:     CME-55       Drilling Method:     7.25" O.D. Hollow Stem Auger       Sampling Method:     Split spoon sample										Groundwater Denth: None Encountered
											Logged By: DH
	н	ampi	nig N er W	/eiaht	·u. <u>-</u> e	40 lb	s.	iii ouiii			Remarks: None
	н	amm		all.		0 inc	u hes				
		anni		an			100				
	Lab	orato	y Re	sults	=_			a)			
ł	_				er 6	j. De		, ype	lod	(ff	
	) )	sing	× ä	lre (%	d a	th (	qu	al T	L m	ر لک	Soil Description
	Der Der	ass 0 Si	astic nde;	aist L	Ň	nple	Syr	teri		)epi	
	ΣČ	#200	립고	Sont	Ē	& L		Mai	S		
ŀ											City CAND light top first to source grained loops slightly
											damp
										1 _	
										2_	
					3-3-4	ss	$\bigtriangledown$	1			
							$\square$			3_	
										Í	
								/	$\langle \rangle$	4_	
										E	
					3-3-3	SS		SM			loose
							X			E I	
							$\square$			- <sup>0</sup>	
							$\mathbf{V}$			7	
										′ _	
										8	
										a	
					4.0.0					10	
					4-6-6	SS	$\boxtimes$	1			medium dense
0/21										11	Total Depth 101/2 feet
T 7/3										•• -	
ED]						1				12	
TAMC										_	
GEC										13 _	
.GPJ											
-3731										14 _	
212						1					
MAT										15 _	
GEG	A	= Auge	er Cutti	ngs R	= Ring-	Lined E	Barrel	Sample	er SS = S	olit Spoon	GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetrometer

-	•	GE	0	MA			915 N Farm Tel ( Fax (	/lalta Ave ington, N 505) 327- (505) 326	nue M 87401 -7928 -5721	Test Pit TP-8
	Proje Proje Clien Site L Rig T Excav Samp Hamr Hamr	ct Nar ct Nur cocatio ype: vation vation oling N ner W ner Fa	me: mber on: _ Metho /eight all: _	I         I           :        2           :        2           :        2           :        2           :        2           :        2           :        2           :        2           :        2	NM 17 212-3 Short, Aztec, Case 24" Bu 24" Bu 3ulk s N/A N/A	73 W 731 Ellic Nev 580 Jcke amp	/aterlii ot, Hei w Mex Exten t les fro	ne Impr ndrickso kico dahoe om back	ovemer	t Date Excavated: 7/19/2021 Latitude: Not Determined Longitude: Not Determined Elevation: Not Determined Test Pit Location: See Site Plan Groundwater Depth: None Encountered Logged By: DH Remarks: None
Dry Density	(pcf) % Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Field Dry Density (pcf)	Field Moisture Content (%)	Sample Type	NSCS	Soil Symbol	Depth (ft)	Soil Description
						GRAE	SM		1 _ 2 _ 3 _	Silty SAND, tan/brown, fine- to coarse- grained, carbonate pocket, slightly damp
					<	5	RK		5 6 7 8	SANDSTONE, grey, fine- to medium- grained, weakly cemented, slight salt precipitation, slightly damp
									9 _ 10 _ 11 _	Bucket Refusal at 8 Feet Total Depth 8 feet
T PIT 212-3731.GPJ 7/30/21									12 _ 13 _ 14 _ 15 _	
TES	GRAB =	Grab S	Sample	MC =	Modifie	ed Ca	lifornia	(Ring Sam	nple) SS	= Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

									/alta Ave ington, N 505) 327- (505) 326	nue M 87401 -7928 -5721	Test Pit TP-9 Page 1 of 1
-	P C S R E S H H	rojec lient: ite Lo ig Ty xcava ampl amm amm	t Nar t Nur ocatio pe: ation ing N ier W ier Fa	me: mber: on: _ Meth /eight all: _	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NM 173 Waterline Improvement         212-3731         Short, Elliot, Hendrickson, Inc.         Aztec, New Mexico         Case 580 Extendahoe         24" Bucket         Bulk samples from backhoe         N/A					tt       Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
:	Propriem         Province           0         (pcf)           0         (pcf)           0         (pcf)           0         Passing           1         Plassing           1         Plassing           1         Index           1         Moisture           1         Content (%)           1         Field Dry					Field Moisture Content (%)	Sample Type	NSCS	Soil Symbol	Depth (ft)	Soil Description
30/21		30	NP	5.3			GRAE	SM		1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 _ 11 - 12 -	Silty SAND, tan/brown, fine- to medium- grained, slightly damp
T PIT 212-3731.GPJ										14 _ 15 _	
ШЦ	GF	RAB =	Grab S	Sample	MC =	Modifie	ed Ca	lifornia	(Ring Sam	nple) SS	= Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

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	-(		GE	0	MA			915 N Farm Tel ( Fax	Malta Ave ington, N 505) 327- (505) 326	nue M 87401 -7928 -5721	Test Pit TP-10 Page 1 of 1
	Project Name:       NM 173 Wa         Project Number:       212-3731         Client:       Short, Ellion         Site Location:       Aztec, New         Rig Type:       Case 580 E         Excavation Method:       24" Bucket         Sampling Method:       Bulk sampl         Hammer Weight:       N/A								ne Impr ndrickso idahoe om bacł	ovemer	t       Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
-	Dry Density     Properties       (pcf)     (pcf)       % Passing     #200 Sieve       % Passing     Index       % Passing     Moisture       Moisture     Content (%)       Field Dry					Field Moisture Content (%)	Sample Type	NSCS	Soil Symbol	Depth (ft)	Soil Description
21							GRAE	SM		1 _ 2 _ 3 _ 4 _ 5 _ 6 _ 7 _ 8 _ 9 _ 10 _ 11 _ 12 _	Silty SAND, tan/brown, fine- to medium- grained, slightly damp brown tan/brown
г PIT 212-3731.GPJ 7/;										13 _ 14 _ 15 _	
TES.	GF	RAB =	Grab S	Sample	MC =	Modifie	ed Ca	lifornia	(Ring Sam	nple) SS	= Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

	-(		GE	01	MA			915 N Farm Tel ( Fax (	/alta Ave ington, N 505) 327- (505) 326	nue M 87401 7928 -5721	Boring B-11 Page 1 of 1			
	P C S R D S H H	rojec lient: ite Lo ig Ty rilling ampl amm	t Nar t Nur ocatio pe: g Met ing M her W her Fa	ne: _ nber: on: _ hod: letho 'eight all: _	N 2 8 A 0 7 d: <u>5</u> 3	IM 17 (12-3) (hort, (xztec, (XE-4) (X	73 W 731 Ellic Nev 55 O.D. poor s hes	/aterlin ot, Hen w Mex Hollo n sam	ne Impr ndrickso kico w Stem ple	ovemer	Date Drilled:       7/13/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Boring Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None			
:	Dry DensityDry Density(pcf)(pcf)% Passing#200 SievePlasticityIndexMoistureContent (%)					Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description			
					3-3-4	GRAB SS		SM		1 _	Silty SAND, tan/brown, fine- to coarse- grained, loose, slightly damp			
							5			5 6 _ 7 _ 8 _ 9 _	terminated due to utility conflict Total Depth 4 feet			
GEOMAT.GDT 7/30/21										10 11 _ 12 _ 13 _				
GEOMAT 212-3731.GP	A =	= Auge	er Cutti	ngs R	= Ring-	Lined E	Barrel	Sample	er SS = S	14 _ 	RAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetromete			

									/lalta Ave ington, NI 505) 327- (505) 326	nue M 87401 7928 -5721	Test Pit TP-12 Page 1 of 1
	P C S R E S H H	rojec lient: ite Lo ig Ty xcava ampl amm	t Nar t Nur ocatio pe: ation ing M ner W	me: on: Metho /eight all:	nod: 2 bd:	NM 17 212-3 Short, Aztec, Case 24" Bu 24" Bu 24" Bu 3ulk s N/A	73 W 731 Ellic Nev 580 ucke amp	/aterlii ot, He w Me> Exten t les fro	ne Impro	ovemer	Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
	Dry Density (pcf) g	% Passing #200 Sieve	Plasticity AJ Index	Moisture Content (%)	Field Dry Density (pcf)	Field Moisture Content (%)	Sample Type	NSCS	Soil Symbol	Depth (ft)	Soil Description
T PIT 212-3731.GPJ 7/30/21		14	11	4.4			GRAE	SM SC		1 - 2 - 3 - 4 - 5 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 -	an/brown, slightly damp clayey SAND, tan/brown, slightly damp, slight weathering ilty SAND, tan/brown, fine- to coarse- grained, slightly damp
۳	GF	- 070		ampie		woulle	u Ud	morria	u ving Saff	ihie) 99	אונטאיי - אין איזאטאיי איזעטאיי איזעטאיי

- <b>G</b> EOM	915 Malta A Farmington, Tel (505) 3 Fax (505) 3	venue , NM 87401 27-7928 326-5721	Test Pit TP-13 Page 1 of 1
Project Name: Project Number: Client: Site Location: Rig Type: Excavation Method Sampling Method: Hammer Weight: Hammer Fall:	NM 173 Waterline Im 212-3731 Short, Elliot, Hendrick Aztec, New Mexico Case 580 Extendaho : 24" Bucket Bulk samples from ba N/A N/A	provement	Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Dry Density (pcf) % Passing #200 Sieve Plasticity Moisture Content (%) Field Dry	Density (pcf) Field Moisture Content (%) Sample Type USCS Soil Symbol	Depth (ft)	Soil Description
	SRAB SM/SC	Silty 1 - 2 - 3 - tan/t 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 - 0 -	clayey SAND, brown, fine- to medium- grained, damp brown, slightly damp, trace carbonate to coarse- grained, damp

TEST PIT 212-3731.GPJ 7/30/21

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-	•	GE	0	MA			915 N Farm Tel ( Fax	/alta Ave ington, Ni 505) 327- (505) 326	nue M 87401 7928 -5721	Boring B-14 Page 1 of 1	
	Projec Projec Client Site L	t Nar t Nur : ocatio	ne: nber	N 2 S A	IM 17 12-3 Short, Ztec,	7 <u>3 W</u> 731 Ellic Nev	/aterlin ot, Her w Mex	ne Impro ndrickso	ovemer on, Inc.	t Date Drilled: 7/13/2021 Latitude: Not Determined Longitude: Not Determined Elevation: Not Determined	
	Rig Ty Drilling	/pe: g Met	hod:	C	ME-	55 O.D.	Hollc	w Stem	Auger	Boring Location: <u>See Site Plan</u> Groundwater Depth: <u>None Encountered</u>	
	Samp Hamn Hamn	ling M ner W ner Fa	/lethc /eight all: _	od: <u>B</u> t: <u>1</u> 3	Bulk a 40 lb 0 inc	nd S s hes	<u>Split s</u>	ooon sa	mples	Logged By:DH Remarks:None	
Dry Density	(pcr) % Passing #200 Sieve	Plasticity Index	Moisture Content (%) stins	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description	
				6-9-9	GRAB SS SS		SM		1 _ 2 _ 3 _ 4 _ 5 _ 6 _ 7 _ 8 _ 9 _ 10	Silty SAND, tan/brown, fine- to coarse- grained, slightly damp SANDSTONE, brown, fine- to coarse- grained, medium dense, moderalty cemented, very poor recovery tan, medium dense, weakly cemented	
GEOMAT.GDT 7/30/21				0-12-12	SS		*		11 _ 12 _ 13 _	brown, medium dense, poor recovery Total Depth 10 <sup>1</sup> / <sub>2</sub> feet	
GEOMAT 212-3731.GPJ	A = Aug	er Cutti	ngs R	= Ring-I	Lined E	Barrel	Sample	er SS = S	14 _ 15	GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetromete	
	-(	$\diamond \epsilon$	GE	0	MA			915 N Farm Tel ( Fax (	/alta Ave ington, N 505) 327- (505) 326	nue M 87401 7928 -5721	Test Pit TP-15 Page 1 of 1
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	Project Name:       NM 173 W         Project Number:       212-3731         Client:       Short, Elling         Site Location:       Aztec, Ne         Rig Type:       Case 580         Excavation Method:       24" Bucket         Sampling Method:       Bulk samp         Hammer Weight:       N/A         Hammer Fall:       N/A						73 W 731 Ellic 580 ucke amp	/aterlin ot, Hen w Mex Exten t oles fro	ne Impr ndrickso dahoe om bacł	ovemer	nt       Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
:	Dry Density (pcf)	(pcf) % Passing #200 Sieve Plasticity Index Moisture Content (%)			Field Dry Density (pcf)	Field Moisture Content (%)		USCS Soil Symbol Depth (ft)		Depth (ft)	Soil Description
2-3731.GPJ 7/30/21							GRAE	SM		1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 -	Silty SAND, brown, fine- to medium- grained, damp to slightly damp clay lense Total Depth 10 feet
TEST PI1	GF	RAB =	Grab S	 Sample	 e MC =	Modifie	ed Ca	 lifornia (	 (Ring Sarr	15 nple) SS	= Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

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	915 Malta Avo Farmington, № Tel (505) 327 Fax (505) 32	enue NM 87401 7-7928 6-5721	Test Pit TP-16
Project Name: Project Number: Client: Site Location: Rig Type: Excavation Method: Sampling Method: Hammer Weight: Hammer Fall:	NM 173 Waterline Imp 212-3731 Short, Elliot, Hendricks Aztec, New Mexico Case 580 Extendahoe 24" Bucket Bulk samples from bac N/A N/A	son, Inc.	Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Dry Density       Dry Density       (pcf)       (pcf)       % Passing       #200 Sieve       Plasticity       Index       Moisture       Content (%)       Field Dry	Uensity (pcf) Field Moisture Content (%) Sample Type USCS Soil Symbol	Depth (ft)	Soil Description
GRAB = Grab Sample MO	GRAB SM	Silty 1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - Tota 11 - 12 - 13 - 14 - 15 - mple) SS = Split S	SAND, tan/brown, fine- to coarse- grained, slightly damp

	-(	$\diamond$	GE	0	MA		ŝ	915 N Farm Tel ( Fax (	/alta Aver ington, NI 505) 327- (505) 326	nue M 87401 7928 -5721	Boring B-17
	P C S R D S H H	rojec lient: ite Lo ig Ty rilling ampl amm	t Nar t Nur ocatio pe: g Met ing M ier W ier Fa	ne: nber on: hod: lethc all: _	N 2 3 4 0 0 1 5 1 3	IM 17 212-3 Short, Aztec, Aztec, CME-4 C.25" CME-4 C.25" CME-4 C.25" CME-4 C.25" CME-4 C.25" CME-4	73 W 731 Ellic Nev 45 0.D. poor s hes	/aterlin ot, Hei w Mex Hollo n sam	ne Impro ndricksc kico w Stem ple	ovemer on, Inc. Auger	tt       Date Drilled:       7/23/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Boring Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
:	Dry Density (pcf)	% Passing % Passing #200 Sieve	Plasticity A Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
					7-10-12 13-24- 50/6"	ss ss	X	SM RK	X X X X X X X X X X X X X X X X X X X	1 _ 2 _ 3 _ 4 _ 5 _ 6 _	Silty SAND, grey/white, fine- to medium- grained, damp SHALE, grey/tan, fine- to medium- grained, very stiff, slightly weathered, slightly damp SILTSTONE, grey/white, fine- grained, hard, moderatly cemented, slightly weathered, slightly damp
2-3731.GPJ GEOMAT.GDT 7/30/21					50/6"	SS	X	RK		7 _ 8 _ 9 _ 10 _ 11 _ 12 _ 13 _ 14 _	SHALE, grey/red, fine- to medium- grained, hard, moderatly cemented, moderatly weathered, slightly damp Total Depth 10½ feet
SEOMAT 21.	A =	= Auge	r Cutti	ngs R	= Ring-l	Lined E	 Barrel	Sample	er SS = Sp	15 olit Spoon	GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetrometer

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-9	JC.	<b>EC</b>		ΛA	INC.

# Test Pit TP-18

P	Project Name:NM 173 Waterline Improvement								ovemer	t Date Excavated:7/19/2021
P	rojec	t Nur	nber	:2	212-3	731				Latitude: <u>Not Determined</u>
C	lient:			ę	Short,	Ellic	ot, Hei	ndrickso	on, Inc.	Longitude: <u>Not Determined</u>
S	ite Lo	ocatio	on: _	ŀ	Aztec,	Nev	v Mex	lico		Elevation: <u>Not Determined</u>
R	lig Ty	pe:		(	Case	580	Exten	dahoe		Test Pit Location: See Site Plan
E	xcava	ation	Meth	nod: 4	24" Bi	icket	t			Groundwater Depth: <u>None Encountered</u>
S	ampl	ing N	1ethc	od: _E	Bulk s	amp	les fro	om back	khoe	Logged By: DH
н	lamm	er W	eigh	t: <u> </u>	N/A					Remarks: <u>None</u>
H	lamm	er Fa	all: _	1	N/A					
Lab	orator	y Res	sults	f)	e le	be		0		
sity	ve	ý	e)		oistu ht (%	Ţ	လ	d m	(ff.)	
ens ocf)	assil Sie	sticit	stur ent (	eld Isity	d Mo	ble	l SC	l S	epth	Soil Description
Dry D (p	% Pa #200	Plas	Conte	Den	Field Col	San		Soi	ð	
									•	Silty SAND, light tan/tan, fine- to coarse- grained, slightly damp
							SM		1 _	
							RK			SANDSTONE, white/tan, fine- to coarse- grained, moderatly
									2	cemented, slightly weathered, slightly damp
									3	Bucket Refusal at 2 feet
									4 _	
									5_	)
									$\langle \rangle$	
									6 _	
									7	
									′ _	
								/	8	
									9_	
									10_	
									11 _	
									10	
									12 _	
									13 _	
									14 _	
									15 _	
GF	RAB = (	Grab S	Sample	MC =	Modifie	ed Cal	lifornia	Ring Sam	nple) SS	= Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

-							915 N Farm Tel ( Fax	/lalta Ave ington, NI 505) 327- (505) 326	nue M 87401 7928 -5721	Test Pit TP-19 Page 1 of 1
F F C S F F S F F	Project Name: <u>NM 173 W</u> Project Number: <u>212-3731</u> Client: <u>Short, Ellio</u> Site Location: <u>Aztec, Nev</u> Rig Type: <u>Case 580</u> Excavation Method: <u>24" Bucket</u> Sampling Method: <u>Bulk samp</u> Hammer Weight: <u>N/A</u> Hammer Fall: <u>N/A</u> Laboratory Results							ne Impro	ovemer	tt       Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Dry Density (pcf)	(pou) % Passing #200 Sieve Plasticity Index Moisture Content (%)			Field Dry Density (pcf)	Density (pcf) Field Moisture Content (%) Sample Type		NSCS	Soil Symbol	Depth (ft)	Soil Description
5T PIT 212-3731.GPJ 7/30/21	44	17	7.3			GRAE	SM		$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Silty SAND, tan/brown, fine- to coarse- grained, damp to slightly damp Clayey SAND, brown, fine- to medium- grained, slightly damp Total Depth 10 feet
۳L G		Jiab C	ampie		mount		morria	ung Sall	ipic) 00	

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	Proiec	t Nar	ne:	N	IM 17	73 W	aterlii	ne Impr	ovemer	nt Date Drilled: 7/13/2021
	Projec	t Nur	nber	2	12-37	731				Latitude: Not Determined
	, Client:			S	hort,	Ellic	ot, Hei	ndrickso	on, Inc.	Longitude: Not Determined
	Site Lo	ocatio	on: _	A	ztec,	Nev	v Mex	lico		Elevation: Not Determined
	Rig Type:CME-55									Boring Location: See Site Plan
	Drilling Method: 7.25" O.D. Hollow Stem Auger							w Stem	Auger	Groundwater Depth: None Encountered
	Sampling Method: _Bulk and Split spoon samples_							boon sa	mples	Logged By: DH
	Hammer Weight: <u>140 lbs</u>									Remarks: <u>None</u>
	Hamm	ier Fa	all: _	3	0 inc	hes				
	borato	v Res	sults	-						
				er 6	e (i	-	ype	lod	(f)	
Jsity	) sing ieve	×ä	lre %	b d s	L T	nbc	al T	, my	ر. لک	Soil Description
Der	Das: Das: Das:	astic	oistu	Ň	mple eng	Syr	lteri	oil o	Dep	
Dry	%   #20	<u> </u>	βŞ	8	Sal & L		Ra	Ň		
										Silty SAND, white to tan, fine- to coarse- grained, medium
									1	dense, slightly damp
									2_	
	25	12	70	6-7-6			SM			
	20	12	1.5		SS				3	
						$\square$			<b>X</b>	
							-		4 _	
				8-14-17	SS	$\bigtriangledown$			. 5	SILTSTONE, grey, fine-grained, dense, slightly weathered,
									6	slightly damp
							PK	$\hat{\mathbf{x}} \times \hat{\mathbf{x}} \times \hat{\mathbf{x}}$	× -	
								$\begin{array}{c} x & x & x \\ x & x & x \\ x & x & x \\ x & x &$	7 _	
								× × × ×	8_	SANDSTONE brown to grow find to modium grained year
										dense, damp
									9_	
							RK	· · · · · · · · · · · ·	10	
				18-50/6"	SS	$\bigtriangledown$				
30/21									11	
DT 7/3										Total Depth 11 feet
AT.GD									12 _	
EOM										
PJ G									13 _	
31.G										
12-37									14 _	
AAT 2									15	
GEON	A = Auge	er Cutti	ngs R	= Ring-l	ined E	Barrel	Sample	er SS = S	olit Spoon	GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetrometer

								915 N Farm Tel ( Fax	/lalta Ave ington, N 505) 327- (505) 326	nue M 87401 -7928 -5721	Test Pit TP-21 Page 1 of 1
	Project Name:       NM 173 M         Project Number:       212-3731         Client:       Short, Ellic         Site Location:       Aztec, New         Rig Type:       Case 580         Excavation Method:       24" Bucke         Sampling Method:       Bulk samp         Hammer Weight:       N/A         Hammer Fall:       N/A							/aterlin ot, He w Mex Exten t lles fro	ne Impro	ovemer	tt       Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
:	Dry Density (pcf)	(pcf) % Passing #200 Sieve Plasticity Index Moisture Content (%) Field Dry			Field Dry Density (pcf)	Content (%) Content (%) Sample Type USCS		NSCS	Soil Symbol	Depth (ft)	Soil Description
-		17	14	5.6			GRAE	SM		1 _ 2 _ 3 _ 4 _ 5 _ 6 _ 7 _ 8 _ 9 _ 10 _	Silty SAND, tan/brown, fine- to medium- grained, slightly damp clayey sand lense tan, fine- to coarse- grained Total Depth 10 feet
212-3731.GPJ 7/30/21										11 _ 12 _ 13 _ 14 _	
TEST PIT	GF	RAB =	Grab S	 Sample	MC =	Modifie	ed Ca	lifornia	 (Ring Sarr	15 1ple) SS	= Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

	Farmington, NM 87401 Tel (505) 327-7928 Fax (505) 326-5721	Test Pit TP-22 Page 1 of 1
Project Name:       NM 173         Project Number:       212-373         Client:       Short, E         Site Location:       Aztec, N         Rig Type:       Case 58         Excavation Method:       24" Buc         Sampling Method:       Bulk sat         Hammer Weight:       N/A	Waterline Improvement 31 Illiot, Hendrickson, Inc. New Mexico 30 Extendahoe ket mples from backhoe	Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Dry Density (pcf)     Passing       #200 Sieve     ** Passing       #200 Sieve     Plasticity       Index     Moisture       Content (%)     Field Dry       Field Dry     Density (pcf)       Field Moisture     Content (%)	USCS USCS Soil Symbol Depth (ft)	Soil Description
TPIT 212-3731.GPU 7/30/21	SILV         1         2         3         4         4         5         6         7         8         9         10         Tota         11         12         13         14         15	SAND, brown, fine- to coarse- grained, slightly damp prown

								915 N Farm Tel ( Fax	Malta Ave ington, Ni 505) 327- (505) 326	nue M 87401 7928 -5721	Boring B-23
	Project Name:       NM 173 W         Project Number:       212-3731         Client:       Short, Ellie         Site Location:       Aztec, Net         Rig Type:       CME-45         Drilling Method:       7.25" O.D         Sampling Method:       Split spoo         Hammer Weight:       140 lbs         Hammer Fall:       30 inches								ne Impro	ovemer	nt       Date Drilled:       7/23/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Boring Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
	Labo	orator	y Res	sults					ō	(	
Concition	ry Density (pcf)	6 Passing 200 Sieve	Plasticity Index	Moisture ontent (%)	Blows per	ample Typ. Length (in	Symbol	/aterial Ty	Soil Symb	Depth (ft	Soil Description
	Ē	×#		- ŭ		N 90		2			Silty SAND, brown, fine, to medium, grained, damp
		68	NP	2.6	2-3-5 5-6-6	SS SS		SM ML SM		1 _ 2 _ 3 _ 4 _ 7 _ 8 _ 9 _	Silty SAND, brown, fine- to medium- grained, damp Sandy SILT, tan/brown, fine- to medium- grained, medium stiff to stiff, slightly damp Silty SAND, tan/brown, fine- to medium- grained, medium dense, slightly damp tan/brown
5					4-6-8	SS	$\square$			10	
DT 7/30/2							$\downarrow$		E 위스럽스 		Total Depth 11 feet
PJ GEOMAT.GE										12 _ 13 _	
212-3731.G										14 _	
OMAT	-									15	
ы В	A =	= Auge	er Cutti	ngs R	= Ring-	Lined E	Barrel	Sample	er SS = S	olit Spoon	GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetromete

- <b>O</b> GE	01	MA		2	915 M Farmi Tel ({ Fax (	lalta Avei ngton, Ni 505) 327- 505) 326	nue M 87401 7928 -5721	Test Pit TP-24 Page 1 of 1
Project Nar Project Nur Client: Site Locatic Rig Type: Excavation Sampling M Hammer W Hammer Fa	ne: _ nber: on: _ Meth lethor 'eight	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	NM 17 212-37 Short, Aztec, Case ( 24" Bu 24" Bu 24" Bu 3ulk s N/A N/A	73 W 731 Ellic Nev 580 Icket amp	/aterlir ot, Her w Mex Exten t les fro	ne Impro ndrickso ico dahoe om back	ovemer	nt       Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Laboratory Res	sults	f)	e (	ЭС		0		
Dry Density (pcf) % Passing #200 Sieve Plasticity Index	Moisture Content (%)	Field Dry Density (pc	Field Moistur Content (%	Sample Typ	NSCS	Soil Symbo	Depth (ft)	Soil Description
GRAB = Grab S	àmule	MC =	Modifie	GRAE	SM RK		1 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 -	SANDSTONE, tan/brown to grey/tan, fine- to coarse- grained, weakly cemented, slightly weathered, slightly damp Bucket Refusal at 8½ feet Total Depth 8½ feet

TEST PIT 212-3731.GPJ 7/30/21

Γ

-OGEOM	915 M Farmir Tel (5 Fax (5	alta Avenue ngton, NM 87401 05) 327-7928 505) 326-5721	Test Pit TP-25 Page 1 of 1
Project Name: Project Number: Client: Site Location: Rig Type: Excavation Method: Sampling Method: Hammer Weight: Hammer Fall:	NM 173 Waterlin 212-3731 Short, Elliot, Hen Aztec, New Mexi Case 580 Extend 24" Bucket Bulk samples fro N/A N/A	e Improvement drickson, Inc. co dahoe m backhoe	t       Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Dry Density       Dry Density       (pcf)       (pcf)       % Passing       #200 Sieve       Plasticity       Index       Moisture       Content (%)       Field Dry	Uensity (pcf) Field Moisture Content (%) Sample Type USCS	Soil Symbol Depth (ft)	Soil Description
1706/2 R05/162/162/162/162/162/162/162/162/162/162	SM GRAB	1 _ 2 _ 3 _ 4 _ 5 _ 6 _ 7 _ 8 _ 9 _ 10 _ 11 _ 12 _ 13 _ 14 _ 15 _ Ring Sample) SS =	Silty SAND, tan/brown, fine- to coarse- grained, slightly damp

	-(	$\Rightarrow$	GE	0	MA			915 N Farm Tel ( Fax	/alta Aver ington, NI 505) 327- (505) 326	nue M 87401 7928 -5721	Boring B-26
	P C S R D S H H	rojec lient: ite Lo ig Ty rilling ampl amm	t Nar t Nur ocatio pe: g Met ing M ner W ner Fa	ne: nber: nn: hod: hod: /eight all:	N 2 2 5 7 0 7 0 0 1 1 3	VM 17 212-3 Short, Aztec, CME- CME- CME- CAS Split s 40 lb 30 inc	73 W 731 Ellic Nev 45 0.D. poor s hes	/aterlii ot, Hei w Me> Hollc n sam	ne Impro	ovemer	nt       Date Drilled:       7/23/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Boring Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
:	Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
					3-4-5 5-6-8	SS SS	X	SM		1 _ 2 _ 3 _ 4 _ 7 _ 8	Silty SAND, tan/brown, fine- to medium- grained, slightly damp fine- to coarse- grained, loose, damp white, medium dense
GDT 7/30/21					5-7-7	SS	X	RK		9 _ 10 _ 	SANDSTONE, white/tan, fine- to coarse- grained, medium dense, weakly cemented, slightly weathered, damp Total Depth 11 feet
MAT 212-3731.GPJ GEOMAT.										13 _ 14 _ 15 _	
GEON	A	= Auge	er Cutti	ngs R	= Ring-	Lined I	Barrel	Sample	er SS = Sp	olit Spoon	GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetrometer

	915 Farr Tel Fax	Malta Avenue nington, NM 87401 (505) 327-7928 (505) 326-5721	Test Pit TP-28 Page 1 of 1
Project Name: Project Number: Client: Site Location: Rig Type: Excavation Meth Sampling Metho Hammer Weight Hammer Fall:	NM 173 Waterl 212-3731 Short, Elliot, He Aztec, New Me Case 580 Exte nod: 24" Bucket d: Bulk samples fi :: N/A N/A	line Improvement endrickson, Inc. exico ndahoe	Date Excavated:       7/20/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Dry Density (pcf) % Passing #200 Sieve Plasticity Index Moisture Content (%)	Field Dry Density (pcf) Field Moisture Content (%) Sample Type USCS	Soil Symbol Depth (ft)	Soil Description
8.1 NP 4.6	GRAB	1       -         2       -         3       -         4       -         5       -         6       -         7       -         8       -         9       -         10       To         11       -         12       -         13       -         14       -         15       -	It present ND = Nuclear Descenter D = Dickeled Divisional

Γ

Project Name:NM 173 Waterline ImprovementDate Drilled:7/23/2021Project Number:212-3731Latitude:Not DeterminedClient:Short, Elliot, Hendrickson, Inc.Longitude:Not DeterminedSite Location:Aztec, New MexicoElevation:Not DeterminedRig Type:CME-45Boring Location:See Site PlanDrilling Method:7.25" O.D. Hollow Stem AugerGroundwater Depth:None EncounteredSampling Method:140 lbsRemarks:DHHammer Fall:30 inchesRemarks:None			915 Malta Avenue Farmington, NM 87401 Tel (505) 327-7928 Fax (505) 326-5721	Boring B-29 Page 1 of 1
	Project Name: Project Number: Client: Site Location: Rig Type: Drilling Method: Sampling Method Hammer Weight: Hammer Fall:	NM 173 W 212-3731 Short, Ellie Aztec, Net CME-45 7.25" O.D E Bulk and S 140 lbs 30 inches	Vaterline Improvemen iot, Hendrickson, Inc. ew Mexico D. Hollow Stem Auger Split spoon samples	nt       Date Drilled:       7/23/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Boring Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Plasticity     Blows per 6 <sup>m</sup> 6 <sup>m</sup> Ressing     % Passing       % Passing     % Passing	Dry Density (pcf) % Passing #200 Sieve Plasticity Index Moisture Content (%)	Blows per 6" Sample Type & Length (in) Symbol	Material Type Soil Symbol Depth (ft)	Soil Description
Clayey SAND, tan, fine- to coarse- grained, damp  Sc  Clayey SAND, tan, fine- to coarse- grained, damp  Sc  Clayey SAND, tan, fine- to coarse- grained, damp  Silty SAND, white/grey, fine- to coarse- grained, loose, slightly damp  Soler  Sc  RN  SN  Clayey SAND, tan, fine- to coarse- grained, damp  Silty SAND, white/grey, fine- to coarse- grained, loose, slightly damp  SN  SN  SN  SN  SN  SN  SN  SN  SN  S	212-3731.GPJ GEOMAT.GDT 7/30/21	3-3-4 SS 10-17- 50/3" SS GRAB 50/6" SS	SC 1	Clayey SAND, tan, fine- to coarse- grained, damp Silty SAND, white/grey, fine- to coarse- grained, loose, slightly damp SANDSTONE, grey/white, fine- to coarse- grained, very dense, weakly to moderatly cemented, slightly weathered, damp shale lense grey, fine- to medium- grained, very dense, moderatly cemented, slightly weathered Total Depth 10½ feet
A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetrome	A = Auger Cuttings R =	Ring-Lined Barrel	Sampler SS = Split Spoor	」 □ GRAB = Manual Grab Sample  D = Disturbed Bulk Sample  PP = Pocket Penetrometer 

	-(	$\diamond \epsilon$	ЭE	0	MA			915 N Farm Tel ( Fax (	/alta Ave ington, N 505) 327- (505) 326	nue M 87401 -7928 -5721	Test Pit TP-30 Page 1 of 1
	P C S R E S H H	rojec lient: ite Lo ig Ty xcava ampl amm amm	t Nar t Nur ocatio pe: ation ing N her W her Fa	ne: _ mber: on: _ Meth letho deight	12	NM 17 212-3 Short, Aztec, Case 24" Bu 24" Bu 3ulk s N/A N/A	73 W 731 Ellic Nev 580 Joke amp	/aterlin ot, Hen w Mex Exten t les fro	ne Imprindrickso dahoe	ovemer	tt       Date Excavated:       7/20/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
	Dry Density (pcf) g	% Passing 4200 Sieve	Plasticity is A Index	Moisture Content (%) stins	Field Dry Density (pcf)	Field Moisture Content (%)	Sample Type	NSCS	Soil Symbol	Depth (ft)	Soil Description
7/30/21		15	NP	2.3			GRAE	SM		1 - 2 - 3 = - 3	Silty SAND, tan/brown, fine- to coarse- grained, slightly damp
TEST PIT 212-3731.6	GF	RAB =	Grab S	Sample	MC =	Modifie	ed Cal	lifornia (	(Ring Sarr	14 _ 15 _ nple) SS	= Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

,	-(		GE	0	MA			915 N Farm Tel ( Fax	Malta Ave ington, N 505) 327- (505) 326	nue M 87401 -7928 5-5721	Test Pit TP-31 Page 1 of 1
	Pr Pr Cl Si E Sa Sa Ha Ha	rojec ient: te Lo g Ty ccava ampl amm	t Nar t Nur ocatio pe: ation ing N er W er Fa	me: mber on: _ Meth /eight all: _	1 2 3 4 4 4 6 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7 7	NM 17 212-3 Short, Aztec, Case 24" Bu 24" Bu 24" Bu 3ulk s N/A N/A	73 W 731 Ellic Nev 580 Jocke amp	/aterlin ot, Her w Mex Exten t oles fro	ne Impr ndrickso kico idahoe om bacł	ovemer	Date Excavated:       7/20/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Dry Density	_abc	% Passing at a tot with the second se	Plasticity A Index	Moisture Content (%) stins	Field Dry Density (pcf)	Field Moisture Content (%)	Sample Type	NSCS	Soil Symbol	Depth (ft)	Soil Description
PIT 212-3731.GPJ 7/30/21							GRAE	SM		1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 13 - 14 - 15 -	Silty SAND, tan/brown, fine-to coarse- grained, slightly damp race gravel
Ĕ	GR	AB =	Grab S	sample	• MC =	Modifie	ed Ca	litornia	(Ring Sam	nple) SS	piit Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

,									/alta Ave ington, NI 505) 327- (505) 326	nue M 87401 7928 -5721	Boring B-32 Page 1 of 1
	Pro	iect	Nan	ne:	N	IM 17	73 W	aterli	ne Impr	ovemer	nt Date Drilled: 7/23/2021
	Project Number:212-3731										Latitude: Not Determined
	Client:Short, Elliot, Hendrickson, Inc.									on, Inc.	Longitude: Not Determined
	Site Location: <u>Aztec, New Mexico</u>								lico		Elevation: Not Determined
	Rig Type:CME-45										Boring Location: See Site Plan
	Dril	Drilling Method: 7.25" O.D. Hold								Auger	Groundwater Depth: <u>None Encountered</u>
	Sar	mpli	ng N	1etho	d: <u>B</u>	lulk a	nd S	Split sp	boon sa	mples	Logged By: DH
	Har	mm	er W	eight	: <u>1</u>	40 lb	s				Remarks: <u>None</u>
	Har	mm	er Fa	all: _	3	0 inc	hes				
	abor	ator	v Res	sults	-						
F			,		er 6	a î	-	ype	lod	(t)	
Jsity		eve eve	x city	t (%	a b b b c b c c c c c c c c c c c c c c	ft (	nbd	al T	, my	th (	Soil Description
Del	(pcf		astic	oisti	No	-enc	Syl	ateri	oil o	Dep	
Dr	%	#20		SS		sa Na		Ξ	Ň	_	
											Silty SAND, brown, fine- to coarse- grained, medium dense,
										1	damp
								SM			
										2_	
					4-5-8						
						SS	X		11111	3	Clauray SAND gray fina to modium grained alightly down
							$\vdash$				Clayey SAND, grey, line- to medium- grained, signity damp
								-		4_	
										5	
					12-15-16	SS	$\square$	sc			grey/tan, very stiff
							$\square$			6 _	
							$\mathcal{O}$	-			
										7_	
									//////	_	SHALE dark brown fine grained damp
						GRAB				8_	GIALE, GAIN DIOWIL, IIIE- GIAINEG, GAINP
										O	
								_		ย_	
					26.47			RK		10	
	6	68	16	9.0	50/6"	SS	$\mathbb{N}/$				tan/grey, hard, moderatly cemented, moderatly weathered
30/21							X			11 _	
							$\downarrow $				Tatal Danth 111/ fact
AT.GI										12 _	
BEOM										40	
SPJ G										13 _	
731.C										1⊿	
212-3										· <del>·</del> ·	
MAT										15 _	
GEC	A = A	Augei	Cuttir	ngs R	= Ring-l	Lined E	Barrel	Sample	er SS = Sp	olit Spoon	GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetrometer

-	$\phi \epsilon$	ЭE	01	MA			915 M Farmi Tel (! Fax (	/alta Avei ington, NI 505) 327- (505) 326	nue M 87401 -7928 -5721	Test Pit TP-33 Page 1 of 1
F F C S F E S F F	Projec Projec Client: Site Lo Rig Ty Excava Sampl Iamm Iamm	t Nar t Nur ocatic pe: ation ing N her W	ne: nber:  Meth /eight all:	 	NM 17 212-3 Short, Aztec, Case 24" Bu 24" Bu Bulk s N/A N/A	73 W 731 Ellic Nev 580 Jcke amp	/aterlir ot, Her w Mex Exten t les fro	ne Impro	ovemer	nt       Date Excavated:       7/20/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Lab	orator	y Res	sults	cf)	e le	be				
Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Field Dry Density (po	Field Moistu Content (%	Sample Ty	NSCS	Soil Symbo	Depth (ft)	Soil Description
	12	NP	6.1			GRAE	SP- SM		1_	Silty SAND, brown, fine- to medium- grained,
G	RAB =	Grab S	Sample	MC =	Modifie	ed Ca	SM RK	Ring Sam	2 3 4 5 6 7 8 9 10 11 12 13 14 14 15 pple) SS	Sitty SAND, brown, fine- to medium- grained, damp SANDSTONE, brown/red, fine- to coarse- grained, weakly cemented, slight to moderatly weathered, damp Total Depth 10 feet = Split Spoon_ND = Nuclear Densometer_D = Disturbed Bulk Sample

TEST PIT 212-3731.GPJ 7/30/21

	915 Malta Avenue Farmington, NM 87401 Tel (505) 327-7928 Fax (505) 326-5721	Test Pit TP-34 Page 1 of 1
Project Name:       NM 173 W         Project Number:       212-3731         Client:       Short, Ellic         Site Location:       Aztec, New         Rig Type:       Case 580         Excavation Method:       24" Bucker         Sampling Method:       Bulk samp         Hammer Weight:       N/A	/aterline Improvement ot, Hendrickson, Inc. w Mexico Extendahoe t oles from backhoe	Date Excavated:       7/20/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Dry Density (pcf) % Passing #200 Sieve Plasticity Noisture Content (%) Field Dry Field Dry Density (pcf) Field Moisture Content (%) Sample Type	USCS Soil Symbol Depth (ft)	Soil Description
5.6 NP 2.1 GRAE	SIM 5 SIM 5	Al Depth 10 feet
GRAB = Grab Sample MC = Modified Cal	lifornia (Ring Sample) SS = Split S	Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

TEST PIT 212-3731.GPJ 7/30/21

		915 Malta Avenue Farmington, NM 87401 Tel (505) 327-7928 Fax (505) 326-5721				
Project Name:	NM 173	Waterline Improvement	Dat			
Project Number:	212-373	1	Lat			
Client:	Short, Elliot, Hendrickson, Inc.					

Boring	B-35
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P C S R D S H H	rojec lient: ite Lo ig Ty rilling ampl amm	t Nar t Nur ocatic pe: Met ing M er W er Fa	me: on: hod: /eight all:	N 2 3 3 3 4 7 4 3 3	IM 17 12-3 Short, Stec, ZEC, CME-4 .25" ( Split s 40 lb 0 inc	73 W 731 Ellic Nev 45 0.D. poor s hes	aterli ot, He v Me> Hollo	ne Impro ndrickso kico w Stem ple	ovemer on, Inc.	tt       Date Drilled:       7/23/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Boring Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
ensity (f)	ssing Sieve	icity ex	ture nt (%)	vs per 6"	le Type igth (in)	/mbol	rial Type	Symbol	pth (ft)	Soil Description
Dry De (pc	% Pas #200 \$	Plast	Mois: Conter	Blow	Samp & Len	ŝ	Matei	Soil	Del	
MAT.GDT 7/30/21				4-4-5 4-3-3 2-3-2	ss ss ss		SM		1 _ 2 _ 3 _ 4 _ 5 _ 6 _ 7 _ 8 _ 9 _ 10 _ 11 _ 12 _	Silty SAND, tan/brown, fine- to coarse- grained, damp loose loose
EOMAT 212-3731.GPJ GEO	= Auge	r Cutti	nas P	= Ring-I			Sample	er SS = S	13 _ 14 _ 15 _	GRAB = Manual Grab Sample, D = Disturbed Bulk Sample, PP = Pocket Penetrometer

# Test Pit TP-36

P	rojec	t Nar	ne:	١	VM 17	73 W	aterli	ne Impr	ovemen	t Date Excavated:7/20/2021
P	rojec	t Nur	nber:	2	212-3	731				Latitude: <u>Not Determined</u>
C	lient:			5	Short,	Ellic	ot, Hei	ndrickso	on, Inc.	Longitude: <u>Not Determined</u>
s	ite Lo	ocatio	on: _	ŀ	Aztec,	Nev	v Mex	lico		Elevation: Not Determined
R	ig Ty	pe:		(	Case	580	Exten	dahoe		Test Pit Location: See Site Plan
E	xcava	ation	Meth	nod: 2	24" Bu	icket	t			Groundwater Depth: <u>None Encountered</u>
s	ampl	ing N	1etho	od: _E	Bulk s	amp	les fro	om bacl	khoe	Logged By: DH
H	amm	er W	eight	t: <u> </u>	N/A					Remarks: None
H	amm	er Fa	all: _	1	N/A					
Lab	orator	y Res	sults		۵	e		_		
≥	с е		. (•	(pcf	stur (%)	Typ	S	oqu	(ft)	
ensi	ssin	ex	ture 1 (%	sity [	Moi tent	ole.	SC	Syr	pth	Soil Description
۲ الم الم	Pa: 00 (	last	Aois Inter	Fie	Con	am		Soil	De	
D	% #2	<u>n</u>	≤ °		ΞŪ	S				
										Silty SAND, tan, fine- to coarse- grained, slightly damp
						GRAR	SM		1	
							RK		2	SANDSTONE, tan/brown, tine- to coarse- grained, weakly to moderatly cemented slightly weathered slightly damp
										Bucket Refusal at 2 feet
									3	Total Depth 2 feet
							-		4 _	
									5	
									6 _	
						$\mathcal{O}$	/			
									7 _	
								Y		
									8_	
									9 _	
									10	
									10	
									11	
									12 _	
30/21										
ž									13 _	
11.GP										
2-373									14	
IT 21.										
	 RΔR = 4	Grah	ample		Modifie	d Cal	ifornia	Ring Sam	<u>15</u>	= Snlit Snoon ND = Nuclear Densometer D = Dicturbed Bulk Sample
۳L G	- U		ample	, wic -	would		norrid	ung Sali	ihie) 33.	- סאוג סאסטר דע - דעטופמו שבוואסווובנבו ש - שוגנעושע שנוג סמווואב

Dry Density (pcf) % Passing #200 Sieve

# ta Avenue ton, NM 87401 5) 327-7928

# Boring B-37

						Fax	(505) 326	-5721	Page 1 of 1
Proje	ct Nar	ne:	N	M 17	'3 W	/aterlii	ne Impro	ovemer	nt Date Drilled: 7/23/2021
Proje	ct Nur	nber:	2	12-37	731				Latitude: Not Determined
Clien	t:		S	hort,	Ellic	ot, Hei	ndrickso	on, Inc.	Longitude: <u>Not Determined</u>
Site L	ocatio	on: _	A	ztec,	Nev	v Mex	lico		Elevation: Not Determined
Rig T	ype:		С	ME-4	15				Boring Location: See Site Plan
Drillir	ng Met	hod:	7	.25" (	D.D.	Hollo	w Stem	Auger	Groundwater Depth: <u>None Encountered</u>
Sam	oling N	1etho	d: <u>S</u>	plit s	poor	n sam	ple		Logged By: DH
Ham	mer W	'eight	:	40 lb	s				Remarks: <u>None</u>
Ham	mer Fa	all: _	3	0 incl	hes				
Laborate	ory Res	sults				e			
<u>א</u> מ	D _	%)	ber (	ype (in)	0	T Z	nbc	(ft)	
ensi Ssin	ex licity	ture nt (%	vs p	le T lgth	/mb	rial	Syr	pth	Soil Description
	last	<i>l</i> lois Inte	30	Ler	Ś	ate	Soil	De	
ה אין	¥  <sup>LL</sup>	20	Ш	ഗ്∝		Σ			
						SM			Silty SAND, tan/brown, fine- to coarse- grained, slightly damp
								1_	SANDSTONE white/tan/grey fine- to coarse- grained dense
							· · · · · · · · · · · · · · · · · · ·	2	to very dense moderatly cemented, moderatly weathered,
							· · · · · · · · · ·	۷ -	slightly damp
			14-21-24	SS	$\bigtriangledown$	1	· · · · · · · · · · · · · · · · · · ·	3	
					$\square$				
								4 _	
			30-50/6"					5 _	
				SS	X				
					$\sim$	RK		6_	
								_	
								/ _	
						$\mathbf{N}$		8	
							· · · · · · · · · · ·	0_	
							· · · · · · · · · · · · · · · · · · ·	9	
							· · · · · · · · · · · ·		
			29-50/6"		Ļ,			10 _	
				S	X		· · · · · · · · · · · · · · · · · · ·	11	tan/grey, fine- to medium- grained, weakly to moderatly cemented, slightly weathered, damp
									Total Depth 11 feet



A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetrometer

12

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								915 N Farm Tel ( Fax (	/alta Ave ington, N 505) 327- (505) 326	nue M 87401 -7928 -5721	Test Pit TP-38 Page 1 of 1
Project Name: Project Number: Client: Site Location: Rig Type: Excavation Method: _ Sampling Method: Hammer Weight: Hammer Fall:						NM 17 212-3 Short, Aztec, Case 24" Bu 24" Bu 24" Bu 3ulk s N/A N/A	73 W 731 Ellic Nev 580 ucke amp	/aterlin ot, Hen w Mex Exten t oles fro	ne Impr ndrickso dahoe om back	ovemer	t       Date Excavated:       7/20/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
	Dry Density       (pcf)       (pcf)       (pcf)       % Passing       #200 Sieve       Plasticity       Index       Moisture       Content (%)       Field Dry			Field Dry Density (pcf)	Density (pcf) Field Moisture Content (%) Sample Type USCS Soil Symbol Depth (ft)				Depth (ft)	Soil Description	
-3731.GPJ 7/30/21		7.5	NP	1.9			GRAE	SM		1 - 2 - 3 - 4 - 5 - 6 - 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 -	Silty SAND, tan/brown, fine- to coarse- grained, slightly damp light tan/brown damp Total Depth 10 feet
TEST PIT	GF	RAB =	Grab S	 Sample	MC =	Modifie	ed Ca	 lifornia (	 (Ring Sarr	15 nple) SS	= Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

# Test Pit TP-39

P	Project Name:NM 173 Waterline Improvement							ne Impre	ovemer	nt Date Excavated:7/20/2021
P	rojec	t Nur	nber	2	212-3	731				Latitude: <u>Not Determined</u>
C	lient:			5	Short,	Ellic	ot, Hei	ndrickso	on, Inc.	Longitude: <u>Not Determined</u>
s	ite Lo	catio	on: _	ŀ	Aztec,	Nev	v Mex	lico		Elevation: <u>Not Determined</u>
R	lig Ty	pe:		(	Case	580	Exten	dahoe		Test Pit Location: See Site Plan
E	xcava	ation	Meth	nod: 🏻	24" Bu	icket	t			Groundwater Depth: <u>None Encountered</u>
s	ampli	ng N	1ethc	od: _E	Bulk s	amp	les fro	om bacł	khoe	Logged By: DH
H H	lamm	er W	eight	t: <u> </u>	N/A					Remarks: None
H	lamm	er Fa	all: _	1	N/A					
Lab	orator	y Res	sults	cf)	ure ()	pe		ō	<u> </u>	
sity	ng Ve	₽	e %	لَحْ فَ	oistu nt (%	T Y	လ္လ	dm,	(ff	
)ens	assi Sie	stici	stur ent (	eld	d Mo	əlqr	US(	l S	ept	Soil Description
	% P; #200	Plas	Conte	Der Ti	Field	San		Soi	ŏ	
										Silty SAND, tan/brown, fine- to medium- grained, slightly damp
							SM		1 _	
									2	SANDSTONE, tan/brown, fine- to coarse- grained, weakly
							RK		2	cemented, slightly to moderatly weathered, slightly damp
								· · · · · · · · · · · · · · · · · · ·	3	
										Bucket Refusal at 3 Feet
									4 _	1 otal Depth 3 feet
										3
									5 _	
									$\mathbf{\mathcal{V}}$	
									<u> </u>	
									7_	
							$\mathbb{N}$		8	
									0	
									9_	
									10 _	
									11	
									12 _	
									13 _	
									14 _	
									15	
G	RAB = (	Grab S	i Sample	MC =	Modifie	d Cal	lifornia (	l (Ring Sam	iple) SS	= Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample
L								-		· · ·

### Test Pit TP-40

Project Number:       212-3731       Latitude:       Not Determined         Client:       Short, Elliot, Hendrickson, Inc.       Longitude:       Not Determined         Site Location:       Aztec, New Mexico       Elevation:       Not Determined         Rig Type:       Case 580 Extendahoe       Test Pit Location:       See Site Plan	ed
Client:       Short, Elliot, Hendrickson, Inc.       Longitude:       Not Determined         Site Location:       Aztec, New Mexico       Elevation:       Not Determined         Rig Type:       Case 580 Extendahoe       Test Pit Location:       See Site Plan	ed
Site Location:       Aztec, New Mexico       Elevation:       Not Determined         Rig Type:       Case 580 Extendahoe       Test Pit Location:       See Site Plan	ed
Rig Type:         Case 580 Extendahoe         Test Pit Location:         See Site Plan	ed
	ed
Excavation Method: 24" Bucket Groundwater Depth: None Encountered	
Sampling Method: _Bulk samples from backhoe Logged By:DH	
Hammer Weight:   N/A     Remarks:   None	
Hammer Fall:N/A	
Laboratory Results	
	alightly domp
Sitty SAND, tan/brown, line- to coarse- grained,	siightiy damp
RK	grained,
weakly to moderatly cemented, slightly weather	ered, slightly
3 - Bucket Refusal at 2 Feet	]
Total Depth 2 feet	
GRAB = Grab Sample MC = Modified California (Ring Sample) SS = Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sa	ample

		915 Malta Ave Farmington, N Tel (505) 327 Fax (505) 326	enue IM 87401 -7928 6-5721	Test Pit TP-41 Page 1 of 1			
Project Name: Project Number: _ Client: Site Location: Rig Type: Excavation Methoo Sampling Method: Hammer Weight:	NM 173 W 212-3731 Short, Ellic Aztec, Nev Case 580 I: 24" Bucke Bulk samp N/A N/A	/aterline Impr ot, Hendricks w Mexico Extendahoe t les from bac	on, Inc.	Date Excavated:       7/20/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None			
Dry Density           (pcf)           (pcf)           % Passing           #200 Sieve           Plasticity           Index           Moisture           Content (%)           Field Dry	Density (pcf) Field Moisture Content (%) Sample Type	USCS Soil Symbol	Depth (ft)	Soil Description			
T PTT 212-3731.GPU 7/30/21		SM RK	1       -         2       -         3       -         3       -         4       -         7       -         8       -         9       -         10       -         11       -         12       -         13       -         14       -         15       -	ilty SAND tan/white, fine- to medium- grained, slightly damp ANDSTONE, light tan/brown, fine- to coarse- grained, weakly cemented, slightly weathered, damp ucket Refusal at 3 Feet otal Depth 3 feet			

|--|

# Test Pit TP-42

Project Number: 212-3731 Latitude: Not Determined	
Client: Short, Elliot, Hendrickson, Inc Longitude: Not Determined	
Site Location:         Aztec, New Mexico         Elevation:         Not Determined	
Rig Type:    Case 580 Extendahoe    Test Pit Location:    See Site Plan	
Excavation Method: 24" Bucket Groundwater Depth: None Encountered	
Sampling Method: _Bulk samples from backhoe Logged By:DH	
Hammer Weight:   N/A   Remarks:	
Hammer Fall:N/A	
GRAB SM GRAB SM 1 Silty SAND, tan/white/brown, fine- to coarse- grained, slig	ntly
SANDSTONE, white/tan, fine- to coarse- grained, weakly	o
moderatly cemented, slightly weathered, slightly damp	
3	
Bucket Refusal at 3 Feet	
GRAB = Grab Sample MC = Modified California (Ring Sample) SS = Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample	

-(		GE	01	MA	Tinc	ŝ	915 M Farm Tel ( Fax (	/alta Avei ington, NI 505) 327- (505) 326	nue M 87401 7928 -5721	Boring B-43
Project Name:NM 173 WProject Number:212-3731Client:Short, EllioSite Location:Aztec, NewRig Type:CME-45Drilling Method:7.25" O.D.Sampling Method:Split spoorHammer Weight:140 lbsHammer Fall:30 inches								ne Impro	ovemer	t Date Drilled: 7/23/2021 Latitude: Not Determined Longitude: Not Determined Elevation: Not Determined Boring Location: See Site Plan Groundwater Depth: None Encountered Logged By: DH Remarks: None
Dry Density (pcf) % Passing #200 Sieve Plasticity Index Moisture Content (%)			Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description	
				24-50/6" 48-50/6"	ss ss		SM		1 _ 2 _ 3 _ 4 _ 5 _ 7 _ 8	Silty SAND, tan/brown, fine- to coarse- grained, damp SANDSTONE, brown/grey, fine- to coarse- grained, very dense, weakly to moderatly cemented, slightly weathered, slightly damp tan/grey/white, weakly cemented, moderatly weathered
				50/6"	SS	X			8 _ 9 _ 10 _ 11 _ 12 _ 13 _ 14 _	white/tan/black Total Depth 10½ feet

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A = Auger Cuttings R = Ring-Lined Barrel Sampler SS = Split Spoon GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetrometer

GEOMAT 212-3731.GPJ GEOMAT.GDT 7/30/21

	915 Malta Farmingto Tel (505) Fax (505)	a Avenue con, NM 87401 ) 327-7928 5) 326-5721	Test Pit TP-44 Page 1 of 1			
Project Name: Project Number: Client: Site Location: Rig Type: Excavation Method: Sampling Method: Hammer Weight: Hammer Fall:	NM 173 Waterline I 212-3731 Short, Elliot, Hendr Aztec, New Mexico Case 580 Extendal 24" Bucket Bulk samples from N/A N/A	Improvement	Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None			
Dry Density       Dry Density       (pcf)       (pcf)       % Passing       #200 Sieve       Plasticity       Index       Moisture       Content (%)       Field Dry	Uensity (pcf) Field Moisture Content (%) Sample Type USCS	Soil Symbol Depth (ft)	Soil Description			
GRAB = Grab Sample MC	GRAB SM RK RK	Silty da 2 - 3 SAN 4 - 5 Buc 7 - 8 - 9 - 10 - 11 - 12 - 13 - 14 - 15 - g Sample) SS = Split S	Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample			

	MA	TINC.		915 M Farmi Tel (t Fax (	lalta Aver ngton, NI 505) 327- 505) 326	nue M 87401 7928 -5721	Boring B-45
Project Name: Project Number: Client: Site Location: Rig Type: Drilling Method: Sampling Method Hammer Weight Hammer Fall: _	N 2 S A C 7, od: S t: 14 30	M 17 12-37 hort, ztec, ME-4 25" ( 25" ( plit sp 40 lbs 0 inch	3 W 31 Ellio New 5 0.D. 0.D. 0.001 5 10001 100000 10001 100001 10001 100000 10000000 100000 10000000 100000000	aterlir it, Her v Mex Hollo n sam	ne Impro ndrickso ico w Stem ple	ovemen on, Inc.	tt       Date Drilled:       7/23/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Boring Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
Dry Density (pcf) % Passing #200 Sieve Index Moisture Content (%)	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description	
	12-13-24 21-32-42 37-50/6"	SS SS SS		SM		$ \begin{array}{cccccccccccccccccccccccccccccccccccc$	Sitty SAND, orange/tan, fine- to coarse- grained, slightly damp SANDSTONE, orange/tan, fine- to medium- grained, dense to very dense, moderatly cemented, moderatly weathered, slightly damp SANDSTONE with shale pockets, grey/brown tan/red/grey, weakly to moderalty cemented Total Depth 11 feet

GEOMAT 212-3731.GPJ GEOMAT.GDT 7/30/21

Project Name:       NM 173 Waterline Improvement 212-3731       Date Excavated:       7/19/2021 Not Determined         Client:       Short, Elliot, Hendrickson, Inc.       Latitude:       Not Determined         Site Location:       Acte:: New Maxico       Elevation:       Not Determined         Rig Type:       Case 580 Extendaboe       Test Pit Location:       Not Determined         Excavation Method:       Buckst       Groundwater Dept::       None Encountered         Sampling Method:       Buckst       Coged By:       DH         Hammer Fall:       NA       Perosecting Bit       None         Laboratory Results       Construction Bit       Sold       Sold       Description         12       NP       13       Base for B								915 M Farm Tel ( Fax (	/alta Ave ington, N 505) 327- (505) 326	nue M 87401 7928 -5721	Test Pit TP-46
Laboratory Results     Open of the second seco	Project Name:       NM 173 Waterli         Project Number:       212-3731         Client:       Short, Elliot, He         Site Location:       Aztec, New Mex         Rig Type:       Case 580 Exter         Excavation Method:       24" Bucket         Sampling Method:       Bulk samples fr         Hammer Weight:       N/A								ne Impro ndrickso dahoe om back	ovemer on, Inc. <hoe< td=""><td>t Date Excavated: 7/19/2021 Latitude: Not Determined Longitude: Not Determined Elevation: Not Determined Test Pit Location: See Site Plan Groundwater Depth: None Encountered Logged By: DH Remarks: None</td></hoe<>	t Date Excavated: 7/19/2021 Latitude: Not Determined Longitude: Not Determined Elevation: Not Determined Test Pit Location: See Site Plan Groundwater Depth: None Encountered Logged By: DH Remarks: None
12       NP       1.9       SRAE       SW. SM       2       3       4       4       4       4       4       5       Silty SAND with Gravel, tan/brown, fine- to coarse- grained, slightly damp         12       NP       1.9       SRAE       5       Silty SAND with Gravel, tan/brown, fine- to coarse- grained, slightly damp         12       NP       1.9       SRAE       6       Silty SAND with Gravel, tan/brown, fine- to coarse- grained, slightly damp         SRAE       SM       7       SILTSTONE, red/grey, fine- grained, weakly cemented, moderatly weathered, slightly damp         OPEN       RK       9       10       Total Depth 10 feet         11       12       13       14       15         13       14       15       14       15	Dry Density T (pcf)	% Passing #200 Sieve	Plasticity is A findex	Moisture Content (%)	Field Dry Density (pcf)	Field Moisture Content (%)	Sample Type	nscs	Soil Symbol	Depth (ft)	Soil Description
CDAR - Grah Sample MC - Modified Colifornia (Ping Sample) SE - Split Speen ND - Nuclear Denoameter D - Disturbed Built Sample	PIT 212-3731.GPJ 7/30/21	12	NP	1.9			GRAE	SW-SM		1 _ 2 _ 3 _ 4 _ 5 _ 6 _ 7 _ 8 _ 9 _ 10 _ 11 _ 12 _ 13 _ 14 _ 15 _	Well-graded SAND with silt, tan /brown, fine- to coarse- grained, slightyl damp Silty SAND with Gravel, tan/brown, fine- to coarse- grained, slightly damp SILTSTONE, red/grey, fine- grained, weakly cemented, moderatly weathered, slightly damp Total Depth 10 feet

	915 Malta Farmingto Tel (505) Fax (505)	Avenue n, NM 87401 327-7928 326-5721	Test Pit TP-47 Page 1 of 1			
Project Name:       NM 173 M         Project Number:       212-3731         Client:       Short, Ell         Site Location:       Aztec, Na         Rig Type:       Case 580         Excavation Method:       24" Buck         Sampling Method:       Bulk sam         Hammer Weight:       N/A	Waterline Ir 1 liot, Hendrid ew Mexico D Extendah et aples from b	mprovement ckson, Inc. oe packhoe	Date Excavated:       7/19/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Test Pit Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None			
Dry Density (pcf) % Passing #200 Sieve Plasticity Index Moisture Content (%) Field Dry Density (pcf) Field Moisture Content (%) Sample Type	USCS	Soll Symbol Depth (ft)	Soil Description			
	SM RK	1 - 2 - 3 - 5 - 7 - 8 - 9 - 10 - 11 - 12 -	Silty SAND, tan/brown, fine- to coarse- grained, slightly damp SANDSTONE with Shale Pockets, tan/brown/grey, fine- to coarse- grained, weakly to moderatly cemented, slightly to moderatly weathered Bucket Refusal at 4.5 Feet Fotal Depth 4½ feet			

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TEST PIT 212-3731.GPJ 7/30/21

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GRAB = Grab Sample MC = Modified California (Ring Sample) SS = Split Spoon ND = Nuclear Densometer D = Disturbed Bulk Sample

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								915 N Farm Tel ( Fax (	/alta Ave ington, N 505) 327- (505) 326	nue M 87401 7928 -5721	Boring B-48
	P C S R D S H H	rojec lient: ite Lo itg Ty rilling ampl amm	t Nar t Nur pcatio pe: g Met ing M ner W	ne:	N 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	VM 17 212-3 Short, Aztec, CME-4 C.25" ( Split s 40 lb 00 inc	73 W 731 Ellic Nev 45 0.D. pool s hes	<u>aterlin</u> ot, Hen w Mex Hollo n sam	ne Impr ndrickso kico w Stem ple	ovemer	nt       Date Drilled:       7/23/2021         Latitude:       Not Determined         Longitude:       Not Determined         Elevation:       Not Determined         Boring Location:       See Site Plan         Groundwater Depth:       None Encountered         Logged By:       DH         Remarks:       None
	Lab	orato	ry Res	sults	"9	e c		/be			
	Dry Density (pcf)	% Passing #200 Sieve	Plasticity Index	Moisture Content (%)	Blows per	Sample Typ & Length (ir	Symbol	Material T <sub>3</sub>	Soil Symb	Depth (ft	Soil Description
					50/6" 50/6"	SS SS SS	X	RK		1 - 2 - 3 - 4 - 5 - 7 - 8 - 9 - 10 -	SANDSTONE, tan/white, fine- to coarse- grained, very dense, moderalty cemented, slightly weathered, slightly damp to damp
MAT.GDT 7/30/21										11 _ 12 _	Total Depth 10½ feet
12-3731.GPJ GEO										13 _ 14 _	
GEOMAT 2	A	= Auge	er Cutti	ngs R	= Ring-	Lined E	Barrel	Sample	er SS = S	15 plit Spoon	GRAB = Manual Grab Sample D = Disturbed Bulk Sample PP = Pocket Penetrometer

	UNIFIE	CONS	CONSISTENCY OR RELATIVE					
	Major Division		Group			DENSITY CRITERIA		
	Major Divisions		Symbols	Typical Names				
		Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	<u>Si</u>	tandard Penetration	on Test r Soils	
	Gravels 50% or more of		GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	Penetration Resistance, N (blows/ft.)	Relative Density	,	
	retained on No. 4 sieve	Gravels with	GM	Silty gravels, gravel-sand-silt mixtures	0-4	0-4 Very Loose		
Grained Soils		Fines	GC	Clayey gravels, gravel-sand-clay mixtures	5-10	Loose		
More than 50% retained on No. 200 sieve		Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines	11-30	Medium De	nse	
	Sands More than 50% of		SP	Poorly graded sands and gravelly sands, little or no fines	31-50	Dense		
	coarse fraction passes No. 4 sieve	Sands with	SM	Silty sands, sand-silt mixtures	>50	Very Dense	1	
		Fines	SC	Clayey sands, sand-clay mixtures	<u>Si</u> Der	Standard Penetration Test Density of Fine-Grained Soils		
			ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	Penetration Resistance, N (blows/ft.)	Consistency	Unconfined Compressive Strength (Tons/ft2)	
Fine-Grained	<b>Silts an</b> Liquid Limi	<b>d Clays</b> t 50 or less	CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	<2	Very Soft	<0.25	
Soils			OL	Organic silts and organic silty clays of low plasticity	2-4	Soft	0.25-0.50	
50% or more passes No. 200 sieve			мн	Inorganic silts, micaceous or diatomaceous free sands or silts, elastic silts	4-8	Firm	0.50-1.00	
	<b>Silts an</b> Liquid Limit g	d Clays reater than 50	СН	Inorganic clays of high plasticity, fat clays	8-15	Stiff	1.00-2.00	
		N.	ОН	Organic clays of medium to high plasticity	15-30	Very Stiff	2.00-4.00	
н	ighly Organic So	ils	РТ	Peat, mucic & other highly organic soils	>30	Hard	>4.0	
U.S. Standard Sieve Sizes								
>12"	12" 3"	3/4" #4	#10	#40	#200	T		
Boulders	Cobbles	Gravel coarse fine	coarse	Sand medium	fine	Silt	or Clay	
	MOISTURE CO			ΜΔΤΕΡΙΔΙ ΟΠ			MBOLS	
Dry	Absence of moist, dus	ty, dry to the touch		trace	0-5%	0-5% B Ring Sample		
Slightly Damp	Below optimum moistu	5-10% S SPT Sample						

Wet Visible free water, below water table BASIC LOG FORMAT:

Group name, Group symbol, (grain size), color, moisture, consistency or relative density. Additional comments: odor, presence of roots, mica, gypsum, coarse particles, etc.

little 10-25%

some 25-45%

mostly 50-100%

B Bulk Sample

Ground Water

### EXAMPLE:

Very Moist

Moist

SILTY SAND w/trace silt (SM-SP), Brown, loose to med. Dense, fine to medium grained, damp

Near optimum moisture content, will moisten the hand

Above optimum moisture content

### UNIFIED SOIL CLASSIFICATION SYSTEM

### **TEST DRILLING EQUIPMENT & PROCEDURES**

### **Description of Subsurface Exploration Methods**

**Drilling Equipment** – Truck-mounted drill rigs powered with gasoline or diesel engines are used in advancing test borings. Drilling through soil or softer rock is performed with hollow-stem auger or continuous flight auger. Carbide insert teeth are normally used on bits to penetrate soft rock or very strongly cemented soils which require blasting or very heavy equipment for excavation. Where refusal is experienced in auger drilling, the holes are sometimes advanced with tricone gear bits and NX rods using water or air as a drilling fluid.

**<u>Coring Equipment</u>** – Portable electric core drills are used when recovery of asphalt or concrete cores is necessary. The core drill is equipped with either a 4" or 6" diameter diamond core barrel. Water is generally used as a drilling fluid to facilitate cooling and removal of cuttings from the annulus.

**Sampling Procedures** - Dynamically driven tube samples are usually obtained at selected intervals in the borings by the ASTM D1586 test procedure. In most cases, 2" outside diameter, 1 3/8" inside diameter, samplers are used to obtain the standard penetration resistance. "Undisturbed" samples of firmer soils are often obtained with 3" outside diameter samplers lined with 2.42" inside diameter brass rings. The driving energy is generally recorded as the number of blows of a 140-pound, 30-inch free fall drop hammer required to advance the samplers in 6-inch increments. These values are expressed in blows per foot on the boring logs. However, in stratified soils, driving resistance is sometimes recorded in 2- or 3-inch increments so that soil changes and the presence of scattered gravel or cemented layers can be readily detected and the realistic penetration values obtained for consideration in design. "Undisturbed" sampling of softer soils is sometimes performed with thin-walled Shelby tubes (ASTM D1587). Tube samples are labeled and placed in watertight containers to maintain field moisture contents for testing. When necessary for testing, larger bulk samples are taken from auger cuttings. Where samples of rock are required, they are obtained by NX diamond core drilling (ASTM D2113).

**Boring Records** - Drilling operations are directed by our field engineer or geologist who examines soil recovery and prepares boring logs. Soils are visually classified in accordance with the Unified Soil Classification System (ASTM D2487), with appropriate group symbols being shown on the logs.

# Appendix B
		SAMPLE	ASTN	ASTM D698		SIEVE ANALYSIS, CUMULA							TIVE PERCENT PASSING					ATTERBERG LIMITS			
LAB NO.	TEST PIT	(ft)	Density	Moisture	3/4"	1/2"	3/8"	No. 4	No. 8	No. 10	No. 16	No. 30	No. 40	No. 50	No. 100	No. 200	%	LL	PL	PI	CLASSIFICATION
4104	TP-3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	32	11.4	46	20	26	Clayey SAND (SC)
4105*	TP-6	2	-	-	100	100	100	100	99	99	92	62	47	35	21	12	2.2	NLL	NPL	NP	Well-graded SAND with silt (SW-SM)
4106	TP-9	7	-	-	100	100	100	100	99	99	97	83	70	57	39	30	5.3	NLL	NPL	NP	Silty SAND (SM)
4107	TP-12	4	-	-	100	100	100	100	98	98	92	67	53	43	29	14	4.4	29	18	11	Clayey SAND (SC)
4108	TP-13	1.5-4	119	11.5	100	99	99	98	98	97	95	83	71	61	38	17	4.0	23	18	5	Silty, clayey SAND (SC-SM)
4109	TP-19	5	-	-	-	-	-	-	-	-	-	-	-	-	-	44	7.3	33	16	17	Clayey SAND (SC)
4110*	TP-21	2	-	-	100	100	100	99	97	97	91	74	63	51	32	17	5.6	30	16	14	Clayey SAND (SC)
4111	TP-28	4	-	-	100	100	100	100	99	99	98	84	68	44	18	8.1	4.6	NLL	NPL	NP	Poorly-graded SAND with silt (SP-SM)
4112	TP-30	6	-	-	100	100	100	99	98	97	89	64	51	40	25	15	2.3	NLL	NPL	NP	Silty SAND (SM)
4113	TP-33	1	-	-	-	-	-	-	-	-	-	-	-	<u> </u>	-	12	6.1	NLL	NPL	NP	Poorly-graded SAND with silt (SP-SM)
4114*	TP-34	9	-	-	100	100	100	100	100	100	95	66	45	28	12	5.6	2.1	NLL	NPL	NP	Poorly-graded SAND with silt (SP-SM)
4138	TP-38	7	-	-	100	100	100	99	97	96	87	58	43	30	15	7.5	1.9	NLL	NPL	NP	Well-graded SAND with silt (SW-SM)
4139*	TP-46	3	-	-	100	100	100	99	97	96	85	49	39	32	19	12	1.9	NLL	NPL	NP	Well-graded SAND with silt (SW-SM)
4174	B-2	5	-	-	-	-	-	-	-	-	-	E	- /	-	<u>}</u>	54	9.9	35	20	15	Sandy lean CLAY (CL)
4175	B-23	3	-	-	-	-	-	-	-	-	- /		).		-	68	2.6	NLL	NPL	NP	Sandy SILT (ML)
4176	B-32	10	-	-	-	-	-	-	-	-	-	<u> </u>	-		2	68	9.0	37	21	16	Sandy Lean CLAY (CL)
4177	B-20	2.5	-	-	-	-	-	-	-	-			- (		μ.	25	7.9	38	26	12	Silty SAND (SM)
														()							
																					NLL = No Liquid Limit
																					NPL = No Plastic Limit
																					NP = Non-Plastic
																					* = Corrosivity sample
										· .		3									
										$\land$											
														Project			NM 173 Waterline Improvement				
																040.0704					
					SUMMARY OF SOIL TESTS					Job No.			212-3731								
											Location			Aztec, New Mexico							
									<i>r</i>									Date	of Explor	ation	July, 13, 19, 20 & 23, 2021

### **LABORATORY TESTING PROCEDURES**

Laboratory testing is performed by trained personnel in our accredited laboratory or may be subcontracted by GEOMAT through a qualified outside laboratory if necessary. Actual types and quantities of tests performed for any project will be dependent upon subsurface conditions encountered and specific design requirements.

The following is an abbreviated table of laboratory testing that may be performed by GEOMAT with the applicable standards listed. Testing for a specific project may include all or a selected subset of the laboratory work listed. Laboratory testing beyond those listed may be available and could be incorporated into the project scope at the discretion of GEOMAT.

PROCEDURE	ASTM	AASHTO
Moisture Content	ASTM D2216	AASHTO T 265
Sieve Analysis	ASTM C136	AASHTO T 27
Fines Content	ASTM D1140	T 11
Hydrometer	ASTM D422	T 88
Atterberg Limits	ASTM D4318	AASHTO T 89/T 90
Soil Compression/Expansion	ASTM D2435	T 216
Soil Classification	ASTM D2487	M 145
Direct Shear	ASTM D3080	T 236
Unconfined Compressive Strength of Soils	ASTM D2166	T 208
Unconfined Compressive Strength of Rock Cores	ASTM D4543	-

# Appendix C

# Important Information about This Geotechnical-Engineering Report

Subsurface problems are a principal cause of construction delays, cost overruns, claims, and disputes.

### While you cannot eliminate all such risks, you can manage them. The following information is provided to help.

The Geoprofessional Business Association (GBA) has prepared this advisory to help you – assumedly a client representative - interpret and apply this geotechnical-engineering report as effectively as possible. In that way, you can benefit from a lowered exposure to problems associated with subsurface conditions at project sites and development of them that, for decades, have been a principal cause of construction delays, cost overruns, claims, and disputes. If you have questions or want more information about any of the issues discussed herein, contact your GBA-member geotechnical engineer. Active engagement in GBA exposes geotechnical engineers to a wide array of risk-confrontation techniques that can be of genuine benefit for everyone involved with a construction project.

### Understand the Geotechnical-Engineering Services Provided for this Report

Geotechnical-engineering services typically include the planning, collection, interpretation, and analysis of exploratory data from widely spaced borings and/or test pits. Field data are combined with results from laboratory tests of soil and rock samples obtained from field exploration (if applicable), observations made during site reconnaissance, and historical information to form one or more models of the expected subsurface conditions beneath the site. Local geology and alterations of the site surface and subsurface by previous and proposed construction are also important considerations. Geotechnical engineers apply their engineering training, experience, and judgment to adapt the requirements of the prospective project to the subsurface model(s). Estimates are made of the subsurface conditions that will likely be exposed during construction as well as the expected performance of foundations and other structures being planned and/or affected by construction activities.

The culmination of these geotechnical-engineering services is typically a geotechnical-engineering report providing the data obtained, a discussion of the subsurface model(s), the engineering and geologic engineering assessments and analyses made, and the recommendations developed to satisfy the given requirements of the project. These reports may be titled investigations, explorations, studies, assessments, or evaluations. Regardless of the title used, the geotechnical-engineering report is an engineering interpretation of the subsurface conditions within the context of the project and does not represent a close examination, systematic inquiry, or thorough investigation of all site and subsurface conditions.

### Geotechnical-Engineering Services are Performed for Specific Purposes, Persons, and Projects, and At Specific Times

Geotechnical engineers structure their services to meet the specific needs, goals, and risk management preferences of their clients. A geotechnical-engineering study conducted for a given civil engineer will <u>not</u> likely meet the needs of a civil-works constructor or even a different civil engineer. Because each geotechnical-engineering study is unique, each geotechnical-engineering report is unique, prepared *solely* for the client.

Likewise, geotechnical-engineering services are performed for a specific project and purpose. For example, it is unlikely that a geotechnical-engineering study for a refrigerated warehouse will be the same as one prepared for a parking garage; and a few borings drilled during a preliminary study to evaluate site feasibility will <u>not</u> be adequate to develop geotechnical design recommendations for the project.

Do <u>not</u> rely on this report if your geotechnical engineer prepared it:
for a different client;

- for a different project or purpose;
- for a different site (that may or may not include all or a portion of the original site); or
- before important events occurred at the site or adjacent to it; e.g., man-made events like construction or environmental remediation, or natural events like floods, droughts, earthquakes, or groundwater fluctuations.

Note, too, the reliability of a geotechnical-engineering report can be affected by the passage of time, because of factors like changed subsurface conditions; new or modified codes, standards, or regulations; or new techniques or tools. *If you are the least bit uncertain* about the continued reliability of this report, contact your geotechnical engineer before applying the recommendations in it. A minor amount of additional testing or analysis after the passage of time – if any is required at all – could prevent major problems.

### **Read this Report in Full**

Costly problems have occurred because those relying on a geotechnicalengineering report did not read the report in its entirety. Do <u>not</u> rely on an executive summary. Do <u>not</u> read selective elements only. *Read and refer to the report in full.* 

## You Need to Inform Your Geotechnical Engineer About Change

Your geotechnical engineer considered unique, project-specific factors when developing the scope of study behind this report and developing the confirmation-dependent recommendations the report conveys. Typical changes that could erode the reliability of this report include those that affect:

- the site's size or shape;
- the elevation, configuration, location, orientation, function or weight of the proposed structure and the desired performance criteria;
- the composition of the design team; or
- project ownership.

As a general rule, *always* inform your geotechnical engineer of project or site changes – even minor ones – and request an assessment of their impact. *The geotechnical engineer who prepared this report cannot accept*  responsibility or liability for problems that arise because the geotechnical engineer was not informed about developments the engineer otherwise would have considered.

### Most of the "Findings" Related in This Report Are Professional Opinions

Before construction begins, geotechnical engineers explore a site's subsurface using various sampling and testing procedures. *Geotechnical engineers can observe actual subsurface conditions only at those specific locations where sampling and testing is performed.* The data derived from that sampling and testing were reviewed by your geotechnical engineer, who then applied professional judgement to form opinions about subsurface conditions throughout the site. Actual sitewide-subsurface conditions may differ – maybe significantly – from those indicated in this report. Confront that risk by retaining your geotechnical engineer to serve on the design team through project completion to obtain informed guidance quickly, whenever needed.

# This Report's Recommendations Are Confirmation-Dependent

The recommendations included in this report – including any options or alternatives – are confirmation-dependent. In other words, they are <u>not</u> final, because the geotechnical engineer who developed them relied heavily on judgement and opinion to do so. Your geotechnical engineer can finalize the recommendations *only after observing actual subsurface conditions* exposed during construction. If through observation your geotechnical engineer confirms that the conditions assumed to exist actually do exist, the recommendations can be relied upon, assuming no other changes have occurred. *The geotechnical engineer who prepared this report cannot assume responsibility or liability for confirmation-dependent recommendations if you fail to retain that engineer to perform construction observation.* 

### **This Report Could Be Misinterpreted**

Other design professionals' misinterpretation of geotechnicalengineering reports has resulted in costly problems. Confront that risk by having your geotechnical engineer serve as a continuing member of the design team, to:

- confer with other design-team members;
- help develop specifications;
- review pertinent elements of other design professionals' plans and specifications; and
- be available whenever geotechnical-engineering guidance is needed.

You should also confront the risk of constructors misinterpreting this report. Do so by retaining your geotechnical engineer to participate in prebid and preconstruction conferences and to perform construction-phase observations.

### **Give Constructors a Complete Report and Guidance**

Some owners and design professionals mistakenly believe they can shift unanticipated-subsurface-conditions liability to constructors by limiting the information they provide for bid preparation. To help prevent the costly, contentious problems this practice has caused, include the complete geotechnical-engineering report, along with any attachments or appendices, with your contract documents, *but be certain to note*  conspicuously that you've included the material for information purposes only. To avoid misunderstanding, you may also want to note that "informational purposes" means constructors have no right to rely on the interpretations, opinions, conclusions, or recommendations in the report. Be certain that constructors know they may learn about specific project requirements, including options selected from the report, only from the design drawings and specifications. Remind constructors that they may perform their own studies if they want to, and be sure to allow enough time to permit them to do so. Only then might you be in a position to give constructors the information available to you, while requiring them to at least share some of the financial responsibilities stemming from unanticipated conditions. Conducting prebid and preconstruction conferences can also be valuable in this respect.

### **Read Responsibility Provisions Closely**

Some client representatives, design professionals, and constructors do not realize that geotechnical engineering is far less exact than other engineering disciplines. This happens in part because soil and rock on project sites are typically heterogeneous and not manufactured materials with well-defined engineering properties like steel and concrete. That lack of understanding has nurtured unrealistic expectations that have resulted in disappointments, delays, cost overruns, claims, and disputes. To confront that risk, geotechnical engineers commonly include explanatory provisions in their reports. Sometimes labeled "limitations," many of these provisions indicate where geotechnical engineers' responsibilities begin and end, to help others recognize their own responsibilities and risks. *Read these provisions closely.* Ask questions. Your geotechnical engineer should respond fully and frankly.

### Geoenvironmental Concerns Are Not Covered

The personnel, equipment, and techniques used to perform an environmental study – e.g., a "phase-one" or "phase-two" environmental site assessment – differ significantly from those used to perform a geotechnical-engineering study. For that reason, a geotechnical-engineering report does not usually provide environmental findings, conclusions, or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. *Unanticipated subsurface environmental problems have led to project failures*. If you have not obtained your own environmental information about the project site, ask your geotechnical consultant for a recommendation on how to find environmental risk-management guidance.

### Obtain Professional Assistance to Deal with Moisture Infiltration and Mold

While your geotechnical engineer may have addressed groundwater, water infiltration, or similar issues in this report, the engineer's services were not designed, conducted, or intended to prevent migration of moisture – including water vapor – from the soil through building slabs and walls and into the building interior, where it can cause mold growth and material-performance deficiencies. Accordingly, proper implementation of the geotechnical engineer's recommendations will <u>not</u> of itself be sufficient to prevent moisture infiltration. Confront the risk of moisture infiltration by including building-envelope or mold specialists on the design team. Geotechnical engineers are <u>not</u> building-envelope or mold specialists.



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