CITY OF ALBUQUERQUE

Planning Department
Alan Varela, Director

Mayor Timothy M. Keller

October 6, 2022

Birkie Ayer, PE
Ayer Design Group
215 Johnston St.
Houston TX 77024

RE: Lexus of Albuquerque
4821 Pan American Frwy
Grading and Drainage Plan
Engineer's Stamp Date: 8/15/22
Hydrology File: F17D078

Dear Mr. Ayer:

Based upon the information provided in your submittal received 8/18/2022 the Grading & Drainage Plan **is not** approved for Grading Permit. The following comments need to be addressed for approval of the above referenced project:

PO Box 1293

Albuquerque

NM 87103

www.cabq.gov

General Notes

1. Please review the DPM Chapter 6 and submit necessary documents to follow 40 Acres or smaller section of the DPM.
2. Most of the submittal is not necessary so please review the DPM and ensure the documents match what is necessary.
3. The soil testing and other submittals are not necessary.

As a reminder, if the project total area of disturbance (including the staging area and any work within the adjacent Right-of-Way) is 1 acre or more, then an Erosion and Sediment Control (ESC) Plan and Owner's certified Notice of Intent (NOI) is required to be submitted to the Stormwater Quality Engineer (Doug Hughes, PE, jhughes@cabq.gov, 924-3420) 14 days prior to any earth disturbance.

If you have any questions, please contact me at 924-3695 or dggutierrez@cabq.gov

Sincerely,

David G. Gutierrez, P.E.
Senior Engineer, Hydrology
Planning Department

City of Albuquerque

Planning Department

Development & Building Services Division

DRAINAGE AND TRANSPORTATION INFORMATION SHEET

Project Title: Lexus of Albuquerque **Building Permit #**_____ **Hydrology File #**_____

DRB#_____ **EPC#**_____

Legal Description: Lot 3,Blk 0, Tract C of Tracts A,B,C LLD Subd. City Address OR Parcel 4821 Pan American Fwy

Applicant/Agent: Ayer Design Group **Contact:** Birkie Ayer, P.E.

Address: 215 Johnston St. Rock Hill, SC 29730 **Phone:** 803-328-5858

Email: birk@ayerdesigngroup.com

Applicant/Owner: Group 1 Realty, Inc. **Contact:** Christine Scott

Address: 800 Gessner,Suite 500, Houston TX 77024 **Phone:** 713-647-5700

Email: cscott@group1auto.com

TYPE OF DEVELOPMENT: ___PLAT (#of lots) __RESIDENCE _X_DRB SITE ___ ADMIN SITE: ____

RE-SUBMITTAL: _____YES _____X_____ NO

DEPARTMENT: _____TRANSPORTATION ___X__ HYDROLOGY/DRAINAGE

Check all that apply:

TYPE OF SUBMITTAL:

___ENGINEER/ARCHITECT CERTIFICATION
___PAD CERTIFICATION
___CONCEPTUAL G&D PLAN
_X_GRADING PLAN
___X_DRAINAGE REPORT
___DRAINAGE MASTER PLAN
___FLOOD PLAN DEVELOPMENT PERMIT APP.
___ELEVATION CERTIFICATE
___CLOMR/LOMR
___TRAFFIC CIRCULATION LAYOUT (TCL) ADMINISTRATIVE
___X_TRAFFIC CIRCULATION LAYOUT FOR DRB APPROVAL
___TRAFFIC IMPACT STUDY (TIS)
___STREET LIGHT LAYOUT
___OTHER (SPECIFY)
___PRE-DESIGN MEETING?

TYPE OF APPROVAL/ACCEPTANCE SOUGHT:

___BUILDING PERMIT APPROVAL
___CERTIFICATE OF OCCUPANCY
___CONCEPTUAL TCL DRB APPROVAL
___PRELIMINARY PLAT APPROVAL
___SITE PLAN FOR SUB'D APPROVAL
___X_SITE PLAN FOR BLDG PERMIT APPROVAL
___FINAL PLAT APPROVAL
___SIA/RELEASE OF FINANCIAL GUARANTEE
___FOUNDATION PERMIT APPROVAL
___GRADING PERMIT APPROVAL
___SO-19 APPROVAL
___PAVING PERMIT APPROVAL
___GRADING PAD CERTIFICATION
___WORK ORDER APPROVAL
___CLOMR/LOMR
___FLOOD PLAN DEVELOPMENT PERMIT
___OTHER (SPECIFY)_____

DATE SUBMITTED: 8-15-2022

FORM P: PRE-APPROVALS/SIGNATURES

Please refer to the DRB public meeting schedule for meeting dates and deadlines. Your attendance is required.

Legal Description & Location: 4821 Pan American Freeway (Lexus of Albuquerque)
Lot 3,Block 0,Tract C of Tracts A, B & C LLD Subdivision containing 3.91 ac

Job Description: Expansion of building from 22,800 sf to 38,336 sf

❑ ***Hydrology:***

• Grading and Drainage Plan	____ Approved	_____ NA
• AMAFCA	____ Approved	_____ NA
• Bernalillo County	____ Approved	_____ NA
• NMDOT	____ Approved	_____ NA
• MRGCD	____ Approved	_____ NA

_____ _____
Hydrology Department Date

❑ ***Transportation:***

• Traffic Circulations Layout (TCL)	____ Approved	_____ NA
• Traffic Impact Study (TIS)	____ Approved	_____ NA
• Neighborhood Impact Analysis (NIA)	____ Approved	_____ NA
• Bernalillo County	____ Approved	_____ NA
• MRCOG	____ Approved	_____ NA
• NMDOT	____ Approved	_____ NA
• MRGCD	____ Approved	_____ NA

_____ _____
Transportation Department Date

❑ ***Albuquerque Bernalillo County Water Utility Authority (ABCWUA):***

• Water/Sewer Availability Statement/Serviceability Letter	____ Approved	_____ NA
• ABCWUA Development Agreement	____ Approved	_____ NA
• ABCWUA Service Connection Agreement	____ Approved	_____ NA

_____ _____
ABCWUA Date

❑ Infrastructure Improvements Agreement (IIA*)	____ Approved	_____ NA
❑ Solid Waste Department Signature on the plan	____ Approved	_____ NA
❑ Fire Marshall Signature on the plan	____ Approved	_____ NA

* Prior to Final Site Plan approval submittals (include a copy of the recorded IIA)

DRAINAGE REPORT

For

Lexus of Albuquerque

4821 Pan American Fwy. NE
Albuquerque, New Mexico

August 15, 2022

Prepared For:

GROUP 1 AUTOMOTIVE®

Group 1 Automotive, Inc.
800 Gessner, Suite 500
Houston, Texas 77024

Prepared by:

AYER DESIGN GROUP
PROFESSIONAL ENGINEERING SERVICES
215 Johnston Street
Rock Hill, SC 29730
Phone: 803-328-5858

BIRKIE AYER JR
NEW MEXICO
25848
PROFESSIONAL ENGINEER
8-15-2022

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12	Project Plans Entitled “Site Construction Drawings For Lexus of Albuquerque”	By Reference

I. EXECUTIVE SUMMARY

Group 1 Automotive, Inc. plans to renovate and expand the existing Lexus of Albuquerque automotive dealership located at 4821 Pan American Freeway NE in Albuquerque, New Mexico. The project consists of renovating and expanding the existing showroom and service area. The existing site parking and circulation will be adjusted to accommodate the building expansion. The existing site does not have stormwater infrastructure and the proposed project will reduce the existing impervious cover by app. 1,606 SF.

II. INTRODUCTION & PROJECT DATA

A.	Project location:	4821 Pan American Fwy. NE
B.	Legal Description:	Lot 3, Blk 0, Tract C of Tracts A, B & C LLD Subdivision
C.	FEMA FIRM Panel:	35001C0138H, effective 8/16/2012
D.	Special Flood Hazard Area:	Zone X, Area of Minimal Flood Hazard
E.	Site Area:	3.91 Acres
F.	UPC#:	101706102726220107
G.	Precipitation Zone:	Zone 2, Between Rio Grande and San Mateo

III. Site Topography

The site is currently fully developed as an automotive dealership. The proposed building expansion area replaces existing pavement area with a net reduction in impervious area of 1606 sf. There are no existing storm drain structures on the site. The site slopes generally from east to west with storm water runoff leaving the site via overland flow. Existing slopes ranges from less than 0.5% to 2.5%. Proposed finish grades range from 0.6% to 5%.

IV. Sediment & Erosion Control

Erosion control measures consisting of silt fence, diversion ditches, stone construction entrance will be utilized during construction to minimize sediment and dust from leaving the site. Final stabilization will be accomplished by paving and with a vegetative cover established by landscaping and stone mulch cover.

V. Storm Drainage

The proposed site will have concrete curb & gutter, paved swales, paving, utilities and landscaping. Because the impervious area of the site will be reduced from existing conditions, peak runoff will be reduced below runoff levels prior to the expansion. No storm piping or inlets are proposed. The site will continue to drain via sheet flow.

VI. BACKGROUND DOCUMENTS

A.	Site Location Map	Figure A
B.	IDO Zone Atlas	Figure B
C.	USGS Topo	Figure C
D.	FEMA Firm Map	Figure D
E.	SOIL Map	Figure E
F.	Geotechnical Investigation Report	Appendix 4

VII. EXISTING CONDITIONS

The site was developed as a Lexus Dealership approximately 22 years ago (Circa 2000).

VIII. DEVELOPED CONDITIONS

The proposed building expansion adds approximately 15,336 sf to the existing building to expand the number of service bays and to provide additional showroom, visitor lounge and office space. Onsite parking stalls for inventory storage will be reduced. Landscape islands are being added to provide landscaping and reduce the impervious footprint of the site.

IX. CONCLUSION

Peak runoff from the site is reduced below pre-project levels due to the reduction in impervious cover.

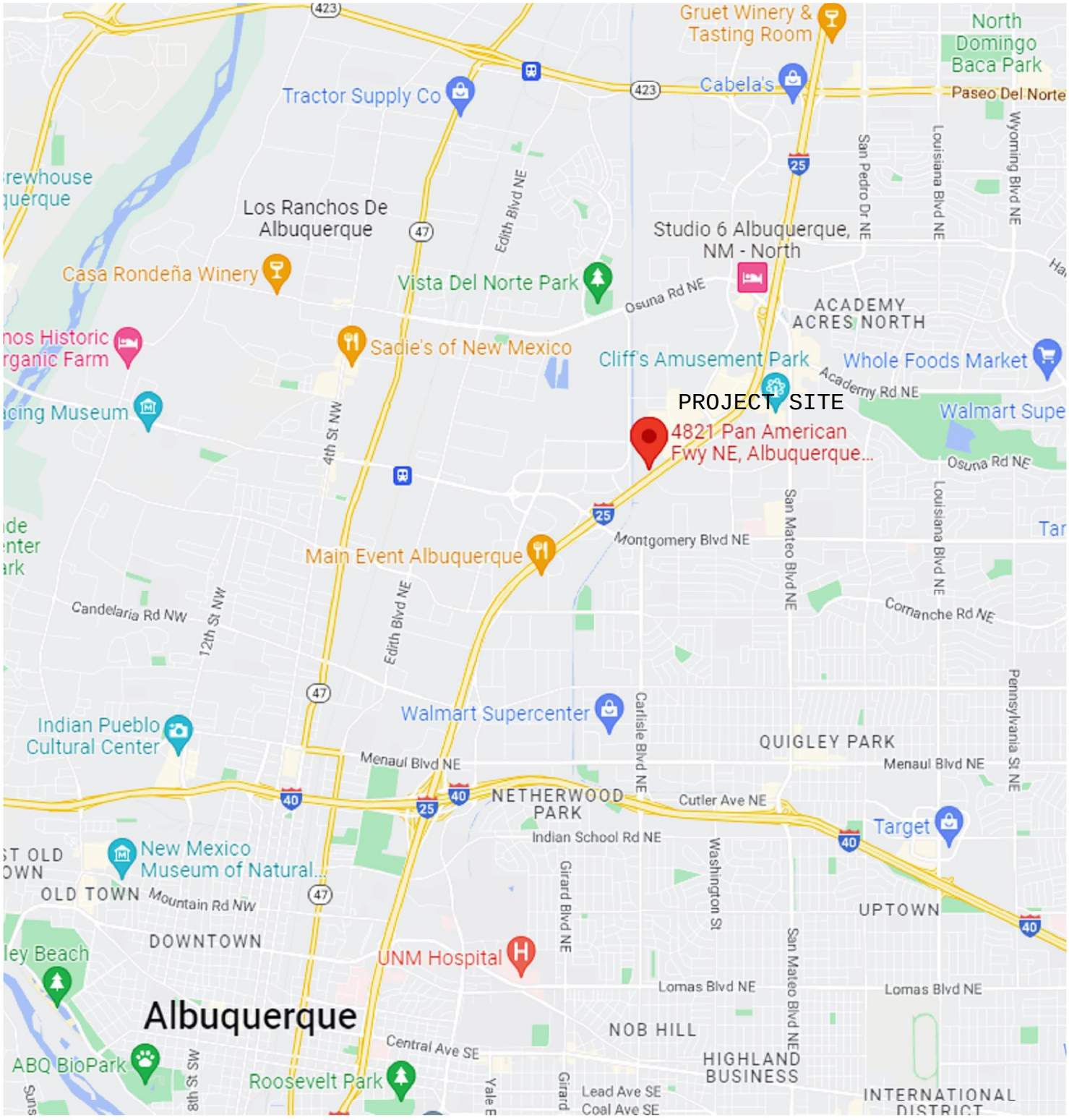
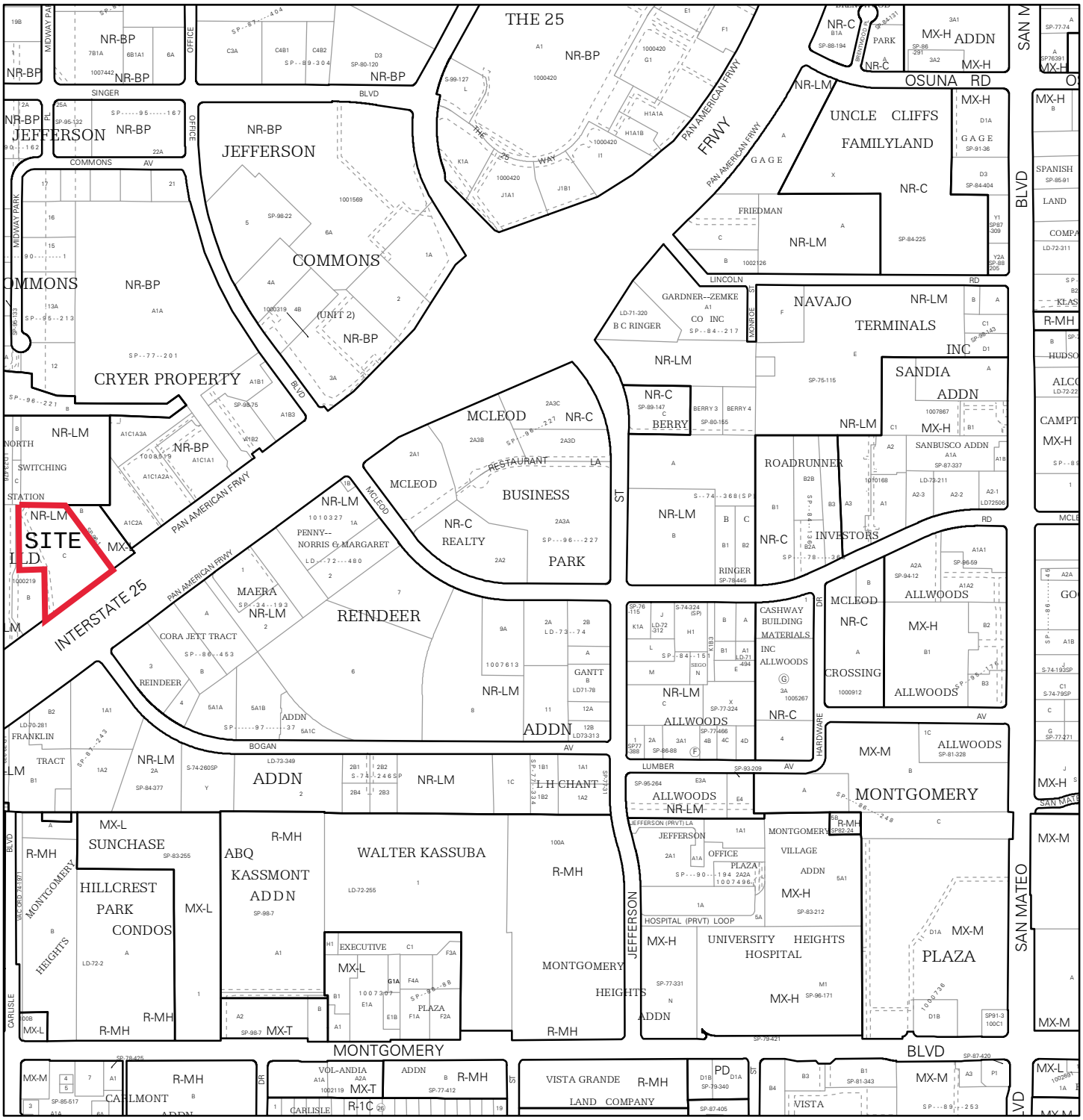


FIGURE A: VICINITY MAP



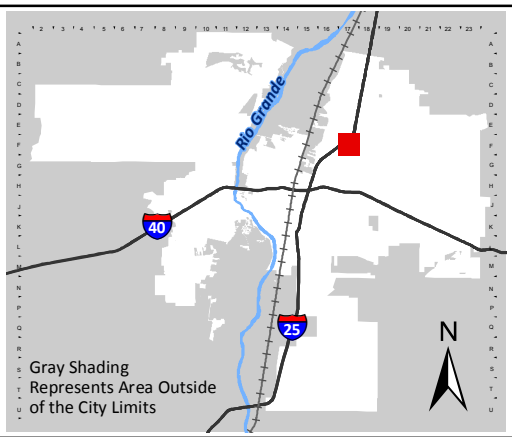
For more details about the Integrated Development Ordinance visit: http://www.cabq.gov/planning/codes-policies-regulations/integrated-development-ordinance

IDO Zone Atlas
May 2018

Albuquerque Geographic Information System

IDO Zoning information as of May 17, 2018

The Zone Districts and Overlay Zones are established by the Integrated Development Ordinance (IDO).



Zone Atlas Page:

F-17-Z

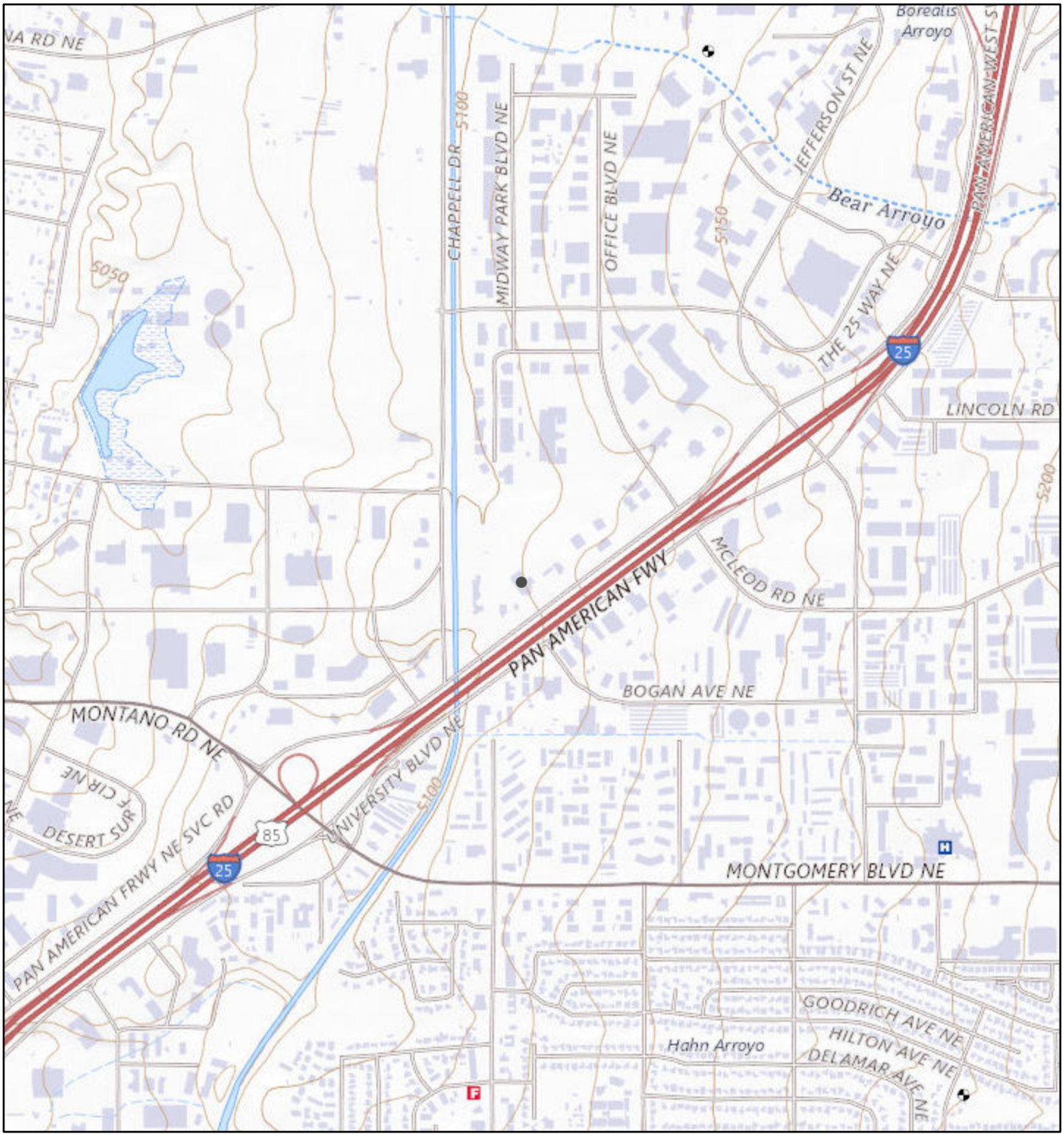
- Easement
- Escarpment
- Petroglyph National Monument
- Areas Outside of City Limits
- Airport Protection Overlay (APO) Zone
- Character Protection Overlay (CPO) Zone
- Historic Protection Overlay (HPO) Zone
- View Protection Overlay (VPO) Zone

Feet: 0 250 500 1,000

FIGURE B: ZONE ATLAS MAP

FIGURE C: USGS TOPO MAP

The National Map Advanced Viewer



8/15/2022, 5:22:28 PM

1:18,056

0 0.13 0.25 0.5 mi

0 0.2 0.4 0.8 km

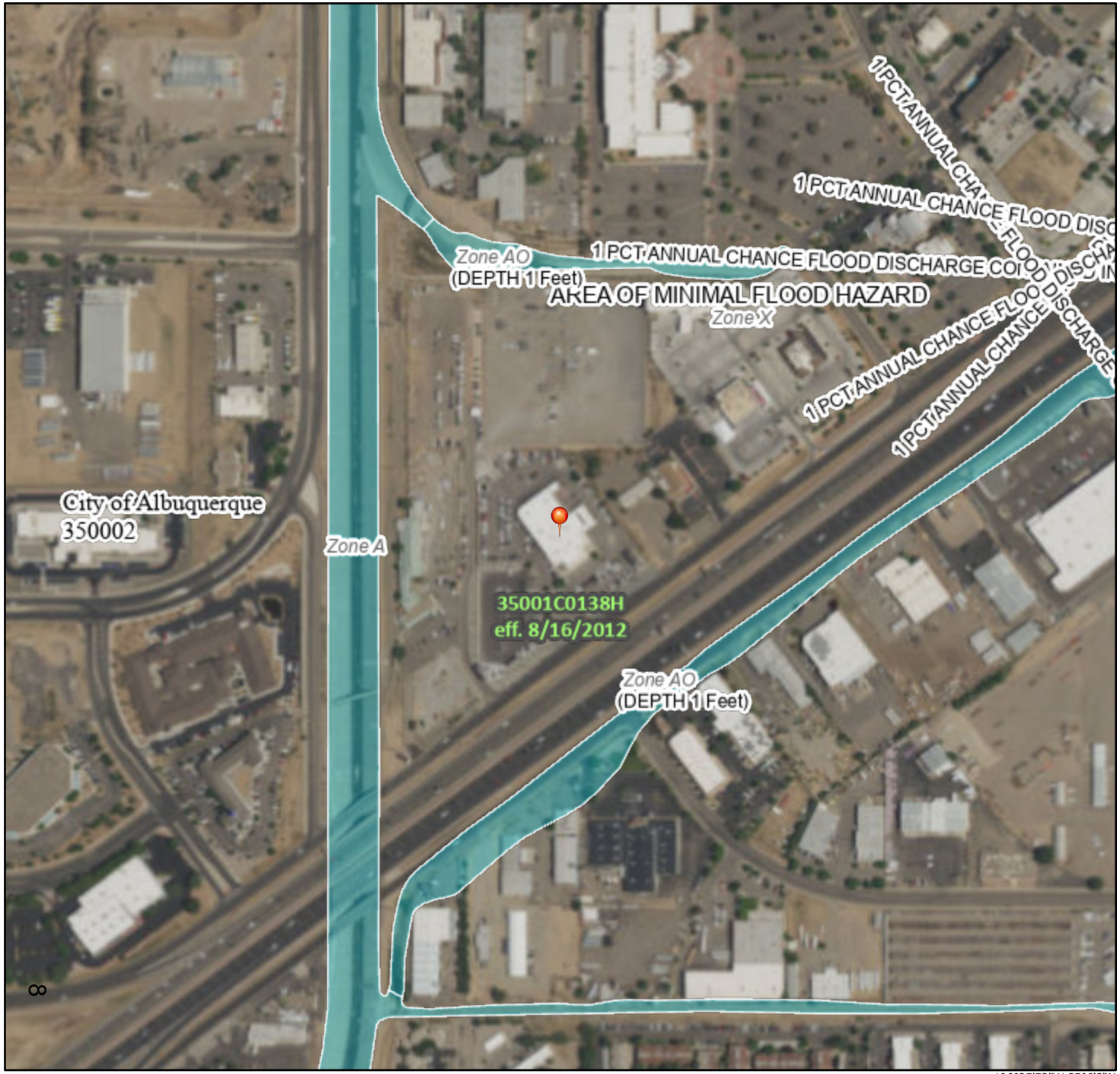
USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset, and National Transportation Dataset; USGS Global Ecosystems; U.S. Census

USGS
2021 USGS

National Flood Hazard Layer FIRMette

FEMA

106°36'30"W 35°8'32"N



106°35'53"W 35°8'2"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap: USGS National Map: Orthoimagery: Data refreshed October, 2020

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 / 17.5 Cross Sections with 1% Annual Chance / Water Surface Elevation
- Coastal Transect
- Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

FIGURE D: FEMA FIRMETTE

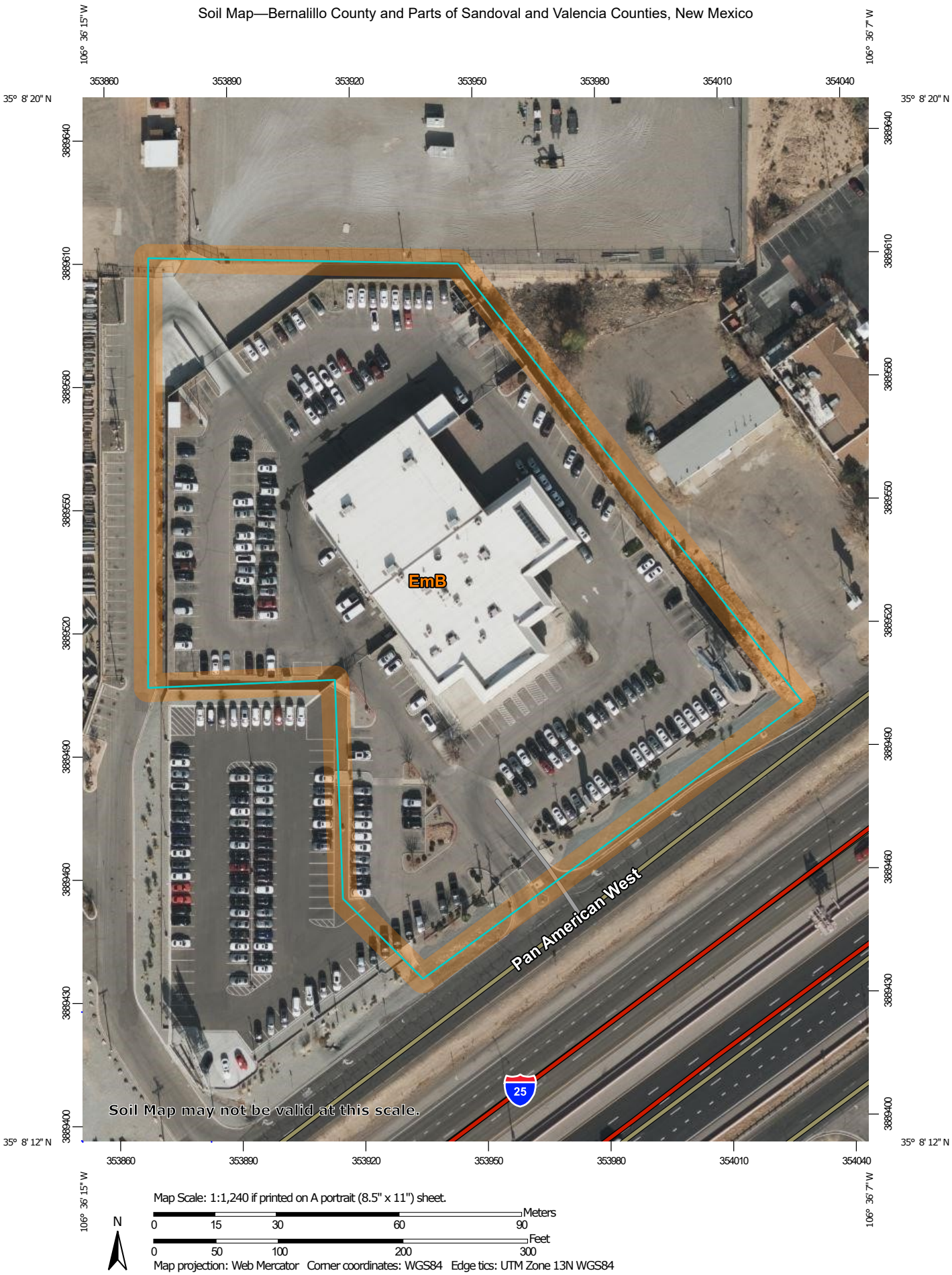
This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 1/5/2022 at 3:22 PM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

FIGURE E: NRCS SOILS MAP

Soil Map—Bernalillo County and Parts of Sandoval and Valencia Counties, New Mexico



Map Scale: 1:1,240 if printed on A portrait (8.5" x 11") sheet.

N

Meters: 0 15 30 60 90

Feet: 0 50 100 200 300

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 13N WGS84

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
EmB	Embudo gravelly fine sandy loam, 0 to 5 percent slopes	4.1	100.0%
Totals for Area of Interest		**4.1**	**100.0%**

GEOTECHNICAL ENGINEERING REPORT
LEXUS OF ALBUQUERQUE EXPANSION
ALBUQUERQUE, NEW MEXICO

Submitted To:

Chad Chastain, RLA
Ayer Design Group, LLC
215 Johnston Street
Rock Hill, SC 29730

Submitted By:

GEOMAT Inc.
4529 Arrowhead Ridge Dr. SE, Suite 102
Rio Rancho, New Mexico 87124

December 7, 2021
GEOMAT Project 212-3874R

GEOMAT INC.
4529 Arrowhead Ridge Dr. SE, Suite 102 ♦ Rio Rancho, NM 87124 ♦ (505) 300-5816

December 7, 2021

Chad Chastain, RLA
Ayer Design Group. LLC
215 Johnston Street
Rock Hill, SC 29730

RE: Geotechnical Engineering Report
Lexus of Albuquerque Expansion
Albuquerque, New Mexico
GEOMAT Project No. 212-3874R

GEOMAT Inc. (GEOMAT) has completed the geotechnical engineering exploration for the proposed Lexus of Albuquerque Expansion project to be located in Albuquerque, New Mexico. This study was performed in general accordance with our Proposal No 212-10-06, dated October 11, 2021, with the following exceptions: Boring B-11 and Test Pit TP-1 were not drilled/excavated due to the presence of underground utilities, all 12 borings were located around the existing and proposed building perimeters,

The results of our engineering study, including the geotechnical recommendations, site plan, boring records, and laboratory test results are attached. Based on the geotechnical engineering analyses, subsurface exploration and laboratory test results, the project site is considered suitable for the proposed addition as described herein. Additional design and construction details, based upon geotechnical conditions, are also presented in the report.

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.

MATTHEW J. CRAMER
NEW MEXICO
18710
12/7/21
PROFESSIONAL ENGINEER

J. Aaron Ezzell, P.E. (AZ, CO)
Albuquerque Metro Branch Manager

Matthew J. Cramer, P.E.
President, Principal

Copies to: Addressee (1)

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Site Plan
Logs of Borings
Unified Soil Classification
Drilling and Exploration Procedures

APPENDIX B

Laboratory Test Results
Corrosivity Test Report
Laboratory Test Procedures

APPENDIX C

Geolines Report

APPENDIX D

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

GEOTECHNICAL ENGINEERING REPORT
LEXUS OF ALBUQUERQUE EXPANSION
ALBUQUERQUE, NEW MEXICO
GEOMAT PROJECT NO. 212-3874R

INTRODUCTION

This report contains the results of our geotechnical engineering exploration for the proposed Lexus of Albuquerque Expansion project to be located in Albuquerque, New Mexico. As shown on the Site Plan in Appendix A of this report.

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

- subsurface soil conditions
- groundwater conditions
- foundation design and construction
- soil pressures
- earthwork
- drainage

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 the proposed building additions will be located on the northern, western and eastern sides of the existing building and will be approximately 1,600, 10,200 and 5,700 sf in plan size, respectively. All of the additions will be single-story. We anticipate the additions and buildings will be supported on conventional spread footings with a concrete slab-on-grade floor and that the maximum column and wall loads will be 100 kips and 2 klf, respectively. We understand that no significant cuts or fills will be required to achieve finished floor elevations for the building additions. We also understand the no basements or other below grade structures are planned. Based upon the information available to us at the time of this report, it is our understanding that the existing building is likely supported on conventional spread footings with concrete slabs-on-grade which have performed adequately.

SITE EXPLORATION

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

Field Exploration:

Subsurface conditions at the site were explored on November 11, 2021 by drilling twelve (12) exploratory borings at the approximate locations shown on the Site Plan in Appendix A. Borings B-1 through B-13 were drilled to approximate depths of 21 ½ feet below existing grade. Boring B-8 was drilled to an approximate depth of 7 feet below existing grade. In addition, two hand excavated test pits, designated TP-2 and TP-3 on the Site Plan, were advanced along the northwest and southwest perimeter of the existing building to evaluate the footing depths and geometry at those locations. Proposed boring B-11 and test pit TP-1 were not drilled/excavated due to subsurface utilities being present in the designated area.

The borings were advanced using a CME-75 truck-mounted drill rig with continuous-flight, 7.25-inch O.D. hollow-stem auger. The borings and test pits were continuously monitored by a staff engineer 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.

Soil samples were obtained from the borings using a combination of standard 2-inch O.D. split spoon and 3-inch O.D. ring-lined barrel samplers. The boring samplers were 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 the subsurface materials were also obtained.

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 engineering properties of the subsurface materials.

SITE CONDITIONS

The proposed building additions will be located on the northern, western, and eastern sides of the existing building and will be approximately 1,600, 10,200, and 5,700 sf in plan size, respectively. The site is currently occupied by a Lexus automobile dealership. The ground surface was observed to be relatively flat, with asphalt concrete pavement.

The following photographs depicts the site at the time of our exploration:

Proposed Addition Site,
Viewed from NW corner of existing building, facing NE

Proposed Addition Site, view from NW corner of existing building, facing SE

SUBSURFACE CONDITIONS

Soil Conditions:

Addition Borings:

As presented on the Boring Logs in Appendix A, all of the borings encountered asphalt pavement at the surface ranging in thickness from 1 to 3 inches, except for boring B-8. Clayey sand soils were encountered in all of the borings from below the pavement, where encountered, to the boring termination depths except for borings B-3 and B-13. In borings B-3 and B-13, silty sand soils were encountered from below the asphalt pavement to depths of 9 and 12 feet, respectively. The silty sand soils in those borings were underlain by clayey sand soils to the boring termination depths.

Exterior Excavations:

As depicted in the following photographs, based upon the hand excavations at the site, the concrete encountered at the area of TP-2 appears to be approximately 4 ½ inches thick, underlain by clayey sand soils. The concrete encountered at the area of TP-3 appears to be approximately 6 inches thick, topped with additional concrete pavement, and underlain by clayey sand soils. It is unclear if the concrete encountered constitutes a footing. However, further excavation was performed toward the building beneath the concrete encountered at both test pits for 6 to 12 inches, and no additional concrete was encountered. As previously mentioned, a third test pit (TP-1) was originally planned, but was not excavated due to underground utilities in the area.

Test Pit (TP-2). Concrete thickness, approximately 4 ½ inches

Test Pit (TP-2). View of excavation.

Test Pit (TP-3). Concrete thickness, approximately 12 inches

Groundwater Conditions:

Groundwater was not encountered in any of 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 samples obtained from the borings indicate that the silty and clayey sand soils have fines contents (silt- and/or clay-sized particles passing the U.S. No. 200 sieve) ranging from approximately 19 to 49 percent with plasticity indices ranging from non-plastic to 13. The in-place dry densities of samples of the soils were found to range from approximately 92 to 121 pounds per cubic foot (pcf), with in-situ natural moisture contents ranging from approximately 2 to 27 percent.

Laboratory consolidation/expansion testing was performed on undisturbed ring samples of the subgrade soils. Results of these tests indicate that the soils undergo slight to moderate compression when subjected to anticipated foundation stresses at the existing moisture contents. When subjected to increased moisture conditions at these stresses, the soils undergo moderate to significant additional compression.

Results of all laboratory tests are presented in Appendix B.

OPINIONS AND RECOMMENDATIONS

Geotechnical Considerations:

The site explored is considered suitable for the proposed structures based on the geotechnical conditions encountered and tested for this report. To reduce the risk of settlement and provide more uniform and higher allowable bearing pressures, we recommend that the proposed addition structures be founded on conventional spread footings bearing on engineered fill as stated in the **Foundations** section of this report.

Alternative foundation types, such as helical piers and micropiles for the additions are also feasible. These alternatives foundation types may have advantage in reducing the required earthwork adjacent to the existing buildings and reducing the amount of expected settlement. Recommendations for alternative foundation types are provided in this report. We recommend that the entire building additions be founded on one foundation type or another but not a combination of systems. GEOMAT should be contacted for further recommendations as required.

Due to the close proximity of the existing structures and utilities, care should be taken during construction to avoid affecting or undermining the foundations of the existing structures. Temporary shoring or other means and methods may be required to stabilize the existing structures during construction of the new addition. Differential movement is likely to occur between the new and existing structures. The structural and architectural design should take into account the potential for this movement.

If there are any significant deviations from the assumed base elevations, structure locations and/or loads noted at the beginning of this report, the opinions and recommendations of this report should be reviewed and confirmed/modified as necessary to reflect the final planned design conditions.

Foundations:

Our recommendations for the foundations of the proposed additions and renovations are presented below. The recommendations are based on our understanding of the types of structures to be built and the results of our field subsurface exploration and laboratory testing.

Shallow Spread-Type Footings Bearing on Engineered Fill:

The proposed building addition structures can be supported on conventional shallow spread-type footings bearing on engineered fill. In order to reduce the potential for differential settlement due to the footings bearing on differing materials, the footings should bear entirely on engineered fill.

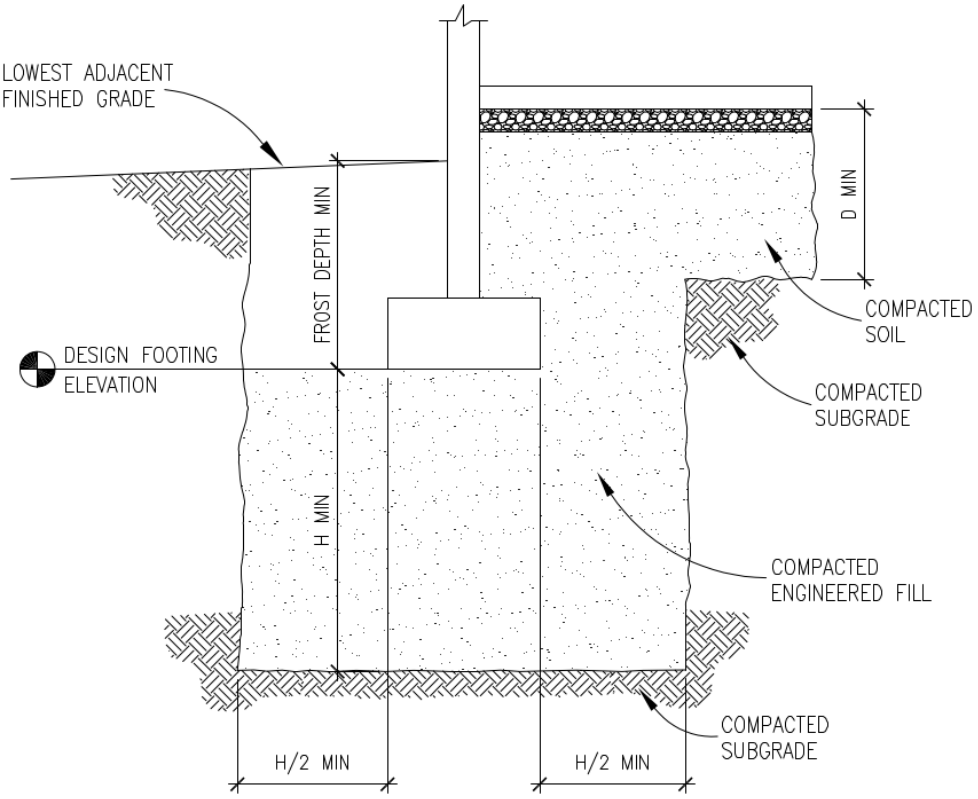
Footings should bear a minimum of 24 inches below finished grade to provide protection against frost heaving. The recommended design bearing capacity and footing depths are presented in the following table.

Footing Depth (ft) [1]	Allowable Bearing Pressure (psf)	Bearing Material
2.0 [2]	2,000	Engineered Fill

[1] Footing depth referenced below lowest adjacent finished grade. Finished grade is the lowest adjacent grade for perimeter footings and floor level for interior footings. New footings adjacent to existing footings should bear at the same elevation as the existing.

[2] Minimum footing depth for frost protection.

A generalized depiction of a shallow spread footing supported on engineered fill and a floor slab supported on compacted soil is shown in the diagram below.



The engineered fill should extend a depth equal to the width of the overlying footing A minimum thickness, H, of (3.0) feet of engineered fill should be provided below the bottom of the footings. The engineered fill should extend a minimum distance of H/2 beyond the edge of the footings. Consideration could be given for reducing this distance adjacent to existing structures. GEOMAT should be contacted to evaluate these recommendations if necessary.

Recommendations for the ground floor slab can be found in the **Floor Slab Design and Construction** section of this report.

General Foundation Considerations:

Materials and compaction criteria for the engineered fill should be as recommended in the **Earthwork** section of this report. Adequate drainage should be provided to prevent the supporting soil from undergoing significant moisture changes.

If there are any significant deviations from the assumed floor elevations, structure locations and/or loads noted at the beginning of this report, the opinions and recommendations of this report should be reviewed and confirmed/modified as necessary to reflect the final planned design conditions.

Total and differential settlements resulting from the assumed structural loads are estimated to be on the order of 1/2 inch or less. Proper drainage should be provided in the final design and during construction and areas adjacent to the structure should be designed to prevent water from ponding or accumulating next to the structures. Total and differential settlements should not exceed predicted values, provided that:

- Foundations are constructed as recommended, and
- Essentially no changes occur in water contents of foundation soils.

For foundations adjacent to descending slopes, a minimum horizontal setback of five (5) feet should be maintained between the foundation base and slope face. In addition, the setback should be such that an imaginary line extending downward at 45 degrees from the nearest foundation edge does not intersect the slope.

Footings and foundations should be reinforced as necessary to reduce the potential for distress caused by differential foundation movement. A minimum width of two and 1.33 feet are recommended for square and continuous footings, respectively.

Foundation excavations should be observed by GEOMAT. If the soil conditions encountered differ significantly from those presented in this report, supplemental recommendations will be required.

Floor Slab Design and Construction:

The ground floor slab for the proposed building additions should be placed on a minimum of two (2.0) feet of engineered fill (including the base course). Imported or native soils with low expansive potentials should be used in fills that will support the floor slabs provide they meet the recommendations given in the *Fill Materials* section of this report.

Some differential movement of a slab-on-grade floor system is possible if the subgrade soils become elevated in moisture content. Such movements are considered within general tolerance for normal slab-on-grade construction. To reduce potential slab movements, the subgrade soils should be prepared as outlined in the **Earthwork** section of this report.

For structural design of concrete slabs-on-grade, a modulus of subgrade reaction of 250 pounds per cubic inch (pci) may be used for floors supported on compacted engineered fill.
Additional floor slab design and construction recommendations are as follows:

- Control joints should be provided in slabs to control the location and extent of cracking. Joint spacing should be designed by the structural engineer.

- Interior trench backfill placed beneath slabs should be compacted in accordance with recommended specifications outlined below.

- In areas subjected to normal loading, a minimum 4-inch layer of clean-graded gravel, aggregate base course should be placed beneath interior slabs. For heavy loading, re-evaluation of slab and/or base course thickness may be required.

- Other design and construction considerations, as outlined in the ACI Design Manual, Section 302.1R are recommended.

- If moisture sensitive floor coverings are used on interior slabs, consideration should be given to the use of membranes to help reduce the potential for vapor rise through the slab.

Subgrade preparation and moisture control recommendations provided in this report help to reduce soil related problems that may result in distress of concrete floor slabs on grade. However, concrete drying shrinkage, temperature induced volume change and curling can create cracking and distress in the concrete slab on grade. To reduce distress from these causes, properly proportioned concrete mixes with adequate curing and proper joint spacing must be provided. These options should be discussed with the project Architect/Engineer.

General Recommendations for Helical Piers:

Alternatively, the building footings could be supported on helical piers. Helical piers should be used in conjunction with conventional floor slab on grade constructed as described in the **Floor Slab Design and Construction** section of this report. Helical piers are a proprietary product, and are typically installed by a specialty contractor. Helical piers can be installed using a backhoe or skid-steer equipped with a hydraulic drill attachment. The piers are advanced into the ground using a combination of rotation and down-pressure until the construction monitoring procedure indicates that the capacity of the pier has been achieved.

Helical piers should be designed and installed in accordance with the manufacturer's recommended procedures by a licensed contractor with experience in pier installation. Test piers may be required to determine final pier capacities given the conditions encountered in our borings and the limitations of the depths drilled. The helical pier designer should recommend test piers if appropriate to determine capacities prior to final production. Final installation of piers should be monitored by a representative from GEOMAT to verify and document bearing depth and installation torque.

For specific design information for helical anchors, we recommend contacting the following:

- Ram Jack of New Mexico, attn: Lee Hopkins, lee@ramjacknm.com

General Recommendations for Micropiles:

Alternatively, the building footings could be supported on mciropiles. Micropiles should be used in conjunction with conventional floor slab on grade constructed as described in the **Floor Slab Design and Construction** section of this report. The micropiles are typically designed and installed by a specialty contractor. The process entails drilling a borehole to a specified depth, placing reinforcing steel as needed, and pumping grout into the hole as the drilling tools are removed.

For specific design information for micropiles, we recommend contacting either of the following:

- Ram Jack of New Mexico, attn: Lee Hopkins, lee@ramjacknm.com
- Hayward Baker, attn: Philip Gallet, pgallet@haywardbaker.com or (303) 469-1136

Pavement Design and Construction:

Design of pavements for the project has been based on the procedures outlined in the Guideline for Design of Pavement Structures by the American Association of State Highway and Transportation Officials (AASHTO), and on the Guide for the Design and Construction of Concrete Parking Lots by the American Concrete Institute (ACI 330). Based upon the results of our subsurface exploration and laboratory testing an estimate subgrade R-value of 13 was used for the design. Any fill material, native or imported, that may be required to achieve final site grades should have a minimum R-value of 13.

The recommended pavement sections are presented in the tables below.

Recommended Pavement Sections: Light Vehicle Drive Lanes and Parking Areas			
Option	**Hot Mix Asphalt** (inches)	**Aggregate Base Course** (inches)	**Portland Cement Concrete** (inches)
Asphalt/Base Course	3.0	6.0	--
Full-Depth Concrete	--	--	4.5

Recommended Heavy Duty Pavement Section	
Portland Cement Concrete (inches)	**Aggregate Base Course** (inches)
6.0	--

Construction Recommendations for Asphalt and Concrete Pavements:

In areas to be paved, the exposed ground surface should be scarified to a minimum depth of 12 inches and moisture conditioned as necessary to bring the upper 1.0 foot to within ± 2 percent of optimum moisture content and compacted to a minimum of 95 percent of ASTM D1557 maximum dry density prior to placement of fill or construction of pavement sections.

After preparation of the pavement subgrade, the areas to be paved should be proof-rolled under the observation of a representative of GEOMAT. The proof-rolling should be conducted utilizing a fully loaded, single axle water truck with a minimum 2,000-gallon capacity or other vehicle that will provide an equivalent weight on the subgrade. The proof-rolling should consist of driving the truck across all the areas to be paved with asphalt at a slow speed (less than 5 mph) and observing any deflections or distress caused to the subgrade. Areas that show distress should be repaired by removing and replacing the soft material with suitable fill.

Asphalt Pavements:

Aggregate base course should conform to Section 303 of the NMDOT specifications for Type I or II Base Course.

Aggregate base course should be placed in lifts not exceeding 6 inches and should be compacted to a minimum of 95% Modified Proctor density (ASTM D1557), within a moisture content range of 4 percent below, to 2 percent above optimum. In any areas where base course thickness exceeds 6 inches, the material should be placed and compacted in two or more lifts of equal thickness.

If the hot-mix asphalt (HMA) is placed in more than one mat, the surface of each underlying mat should be treated with a tack coat immediately prior to placement of the subsequent mat of hot-mix asphalt.

Asphalt concrete should be obtained from an engineer-approved mix design prepared in accordance with NMDOT specifications. The hot-mix paving should be placed and compacted in accordance with NMDOT specifications. HMA should be either an SP-III or SP-IV mix complying with the requirements of section 416, Minor Paving of the 2014 NMDOT Specifications. HMA lift thicknesses should comply with the following:

HMA Lift Thicknesses		
HMA Type	**Minimum Thickness** (inches)	**Maximum Thickness** (inches)
SP-III	2.5	3.5
SP-IV	1.5	3.0

Concrete Pavements:

Concrete should be placed directly on the prepared subgrade. Reinforcing steel and dowels are not required or recommended for rigid pavement sections. Concrete used for pavement sections should have a nominal aggregate size of ¾-inch or greater, be air-entrained to have an air content of 6 +/- 1.5 percent, and have a minimum 28-day compressive strength of 4,000 pounds per square inch (psi). Concrete materials and placement including jointing should be in accordance with recommendations in the latest edition of ACI-330R of the American Concrete Institute "*Guide for the Design and Construction of Concrete Parking Lots*".

General Pavement Considerations:

The performance of the recommended pavement sections can be enhanced by minimizing excess moisture that can reach the subgrade soils. The following recommendations should be considered at minimum:

- Site grading at a minimum 2% grade away from the pavements;
- Compaction of any utility trenches to the same criteria as the pavement subgrade.

The recommended pavement sections are considered minimal sections based on the anticipated traffic volumes and the subgrade conditions encountered during our exploration. They are expected to perform adequately when used in conjunction with preventive maintenance and good drainage. Preventive maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment.

Site Classification and Seismic Parameters:

Based on seismic shear wave velocity measurements and analysis performed at the project site, we estimate that Site Class C is appropriate for the building addition site in accordance with the International Building Code. The complete seismic shear wave velocity report is included in Appendix C.

Seismic design parameters for the project site were determined in accordance with the procedure in the International Building Code. These values are based on a Risk Category of II and Site Class of C. The seismic design parameters are presented in the table below.

Seismic Design Parameters	
S_S	0.430 g
S_1	0.120 g
S_{MS}	0.460 g
S_{M1}	0.180 g
S_{DS}	0.310 g
S_{D1}	0.120 g

S_S = mapped spectral response acceleration at short periods
S_1 = mapped spectral response acceleration at 1-second period
S_{MS} = maximum considered earthquake spectral response acceleration for short periods
S_{M1} = maximum considered earthquake spectral response acceleration for 1-second period
S_{DS} = five-percent damped design spectral response acceleration at short periods
S_{D1} = five-percent damped design spectral response acceleration at 1-second period
g = gravitational acceleration, approximately 9.8 m/sec^2 or 32.2 ft/sec^2

Corrosion and Cement Type:

A representative soil sample from boring B-13 was submitted to an independent analytical laboratory for testing to help evaluate the potential for the on-site soils to corrode buried metal and/or concrete. The sample was tested for pH, electrical resistivity, and soluble sulfates and chlorides. Results of these tests are summarized in the table below. The complete report of the results is included in Appendix B.

Corrosivity Test Results						
Sample No.	**Boring No.**	**Sample Depth (ft)**	**pH**	**Resistivity (ohm-cm)**	**Sulfates (% by weight)**	**Chlorides (% by weight)**
5889	B-13	0 – 5	9.36	4,800	0.0025	0.0022

Corrosion of Concrete:

The soluble sulfate content of the sample tested was 0.0025 percent (by weight), which may be characterized as having mild potential for corrosion (IBC Table 1904.3). According to the American Concrete Institute Building Code 318, when the sulfate content is less than 0.1 percent by weight in soil there are no restrictions placed on cement type. 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 sample tested had a resistivity value of 2,220 ohm-cm. Based on these laboratory results and the table above, the on-site soils would be characterized as moderately corrosive toward ferrous metals. The potential for corrosion should be taken into account during the design process.

Lateral Earth Pressures:

For soils above any free water surface - Recommended equivalent fluid pressures for unrestrained foundation elements are presented in the following table:

- Active:
  Granular soil backfill ……..... 35 psf/ft
  Undisturbed subsoil ..... 30 psf/ft

- Passive:
  Foundation walls ..... 350 psf/ft

- Coefficient of base friction: ..... 0.40 *
  * The coefficient of base friction should be reduced to 0.30 when used in conjunction with passive pressure.

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

- At rest**:**
  Granular soil backfill.....50 psf/ft
  Undisturbed subsoil.....60 psf/ft

Fill against below grade walls should be compacted to densities specified in the **Earthwork** section of this report. 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. Soils used as backfill against walls should comply with the recommendations given in the *Subsurface Drainage* section of this report.

Groundwater is not anticipated based upon the conditions encountered in our exploration, however, groundwater elevations can fluctuate and GEOMAT should be contacted to provide alternate lateral earth pressures should groundwater be encountered during construction.

Slopes:

Assuming fill specifications, compaction requirements, and recommended setbacks provided in this report are followed, cut and fill slopes as steep as to 2.5:1 (horizontal:vertical) should be stable. Depending upon specific project conditions, adequate factors of safety against slope failure may be available for steeper configurations. Such a determination would require additional analysis.

Earthwork:

General Considerations:

The opinions contained in this report for the proposed construction are contingent upon compliance with recommendations presented in this section. Although underground facilities such as foundations, septic tanks, cesspools, basements and irrigation systems were not encountered during site reconnaissance, such features could exist and might be encountered during construction.

Site Clearing:

1. Strip and remove all existing, fill, debris and other deleterious materials from the proposed building site areas. Any existing structures should be completely removed, including foundation elements and any associated development such as underground utilities, septic tanks, etc.

2. If unexpected fills or underground facilities are encountered during site clearing, we should be contacted for further recommendations. All excavations should be observed by GEOMAT prior to backfill placement.

3. Stripped materials consisting of vegetation and organic materials should be removed from the site, or used to re-vegetate exposed slopes after completion of grading operations. If it is necessary to dispose of organic materials on-site, they should be placed in non-structural areas, and in fill sections not exceeding 5 feet in height.

4. Sloping areas steeper than 5:1 (horizontal:vertical) should be benched to reduce the potential for slippage between existing slopes and fills. Benches should be level and wide enough to accommodate compaction and earth moving equipment.

5. All exposed areas which will receive fill, once properly cleared and benched where necessary, should be scarified to a minimum depth of eight inches, conditioned to near optimum moisture content, and compacted to at least 95 percent of modified proctor (ASTM D1557) density.

Excavation:

1. 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 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 excavations in soils at the site will be possible using standard excavation equipment.

2. On-site soils may pump or become unstable or unworkable at high water contents, especially if there are any excavations near and below a water table. If a water table exists, dewatering may be necessary to achieve a stable excavation. Workability may be improved by scarifying and drying. Over-excavation of wet zones and replacement with granular materials may be necessary. Lightweight excavation equipment may be required to reduce subgrade pumping.

3. Where excavations will adjoin existing foundations, the excavations should be vertical to the outside edge of the existing foundations. The excavations should be staged, so that a maximum horizontal distance of 6.0 feet of the excavation is open.

Slab Subgrade Preparation:

1. After site clearing is complete, the existing soil below the proposed structures should be prepared as recommended in the **Floor Slab Design and Construction** and *Site Clearing* sections of this report.

2. A minimum 4-inch layer of aggregate base course should be placed beneath floor slabs on grade.

Foundation Preparation:

The proposed structures should be founded as recommended in the **Foundations** section of this report. All loose and/or disturbed soils should either be compacted or removed from the bottom of the structure excavations prior to placement of engineered fill, reinforcing steel, and/or concrete.

Fill Materials:

1. Based upon the conditions encountered and tested, it is possible that the native sandy soils will be suitable for use as engineered fill. See discussion in item 4 below for additional information. Periodic testing should be performed during construction to confirm the suitability of the native soils for use as structural fill if they are intended to be used as

engineered fill. Imported or native soils with low expansive potentials could be used as fill material for the following:

- general site grading
- foundation areas
- exterior slab areas
- foundation backfill

2. Select granular materials should be used as backfill behind walls that retain earth.

3. Soils to be used as engineered fill (not including base course) should conform to the following:

Gradation	**Percent finer by weight (ASTM C136)**
3"	100
No. 4 Sieve	50-100
No. 200 Sieve	50 Max
Plasticity Index	12 Max
Maximum expansive potential (%) *	+ 1.5

* Measured on a sample compacted to approximately 95 percent of the ASTM D1557 maximum dry density at about 3 percent below optimum water content. The sample is confined under a 144-psf surcharge and submerged.

4. Some of the clayey sand soils encountered at the site and that were tested for this project have higher plasticity indices higher than what is recommended for structural (engineered) fill. Blending of these clayey sand soils with a material of lesser fines and/or lower plasticity may be required to meet the recommendations herein, if these soils are to be used as structural (engineered) fill. The contractor should be responsible for determining the most appropriate method for providing the required structural (engineered) fill (i.e. removal/replacement vs. blending vs. import) to meet the recommended requirements. This determination should be made prior to bidding the work.

5. Aggregate base should conform to Type I Base Course as specified in Section 303 of the 2019 New Mexico Department of Transportation (NMDOT) *"Standard Specifications for Road and Bridge Construction."*

Placement and Compaction:

1. Place and compact fill and base course in horizontal lifts, using equipment and procedures that will produce recommended moisture contents and densities throughout the lift.

2. Un-compacted fill and base course lifts should not exceed 10 inches loose thickness.

3. Materials should be compacted to the following:

Material	**Minimum Percent (ASTM D1557)**
Subgrade soils beneath structural areas	95
On site or imported soil fills (if required):	
Beneath footings and slabs	95
Aggregate base beneath slabs	95
Miscellaneous backfill	90

4. On-site and imported soils should be compacted at moisture contents near optimum.

Compliance:

Recommendations for the lift station supported on engineered fill depend upon compliance with **Earthwork** recommendations. To assess compliance, observation and testing should be performed by GEOMAT.

Drainage:

Surface Drainage:

1. Positive drainage should be provided during construction and maintained throughout the life of the proposed project. Infiltration of water into utility or foundation excavations must be prevented during construction. Surface features that could retain water in areas adjacent to the structures should be sealed or eliminated.

2. In areas where sidewalks or paving do not immediately adjoin the structures, we recommend that protective slopes be provided with a minimum grade of approximately 5 percent for at least 10 feet from perimeter walls. Backfill against footings, exterior walls, and in utility and sprinkler line trenches should be well compacted and free of all construction debris to reduce the possibility of moisture infiltration.

3. Downspouts, roof drains or scuppers should discharge into splash blocks or extensions when the ground surface beneath such features is not protected by exterior slabs or paving.

Subsurface Drainage:

Free-draining, granular soils containing less than five percent fines (by weight) passing a No. 200 sieve should be placed adjacent to walls which retain earth. A drainage system consisting of either weep holes or perforated drain lines (placed near the base of the wall) should be used to intercept and discharge water which would tend to saturate the backfill. Where used, drain lines

should be embedded in a uniformly graded filter material and provided with adequate clean-outs for periodic maintenance. An impervious soil should be used in the upper layer of backfill to reduce the potential for water infiltration.

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 grading and foundation 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 excavation, grading, foundation, and construction phases of the work. Observation of footing excavations should be performed prior to placement of reinforcing and concrete to confirm that satisfactory bearing materials are present and is considered a necessary part of continuing geotechnical engineering services for the project. Construction testing, including field and laboratory evaluation of fill, backfill, pavement materials, concrete and steel 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 borings may not become evident until construction. If variations then appear evident, it may be necessary to re-evaluate the recommendations of this report.

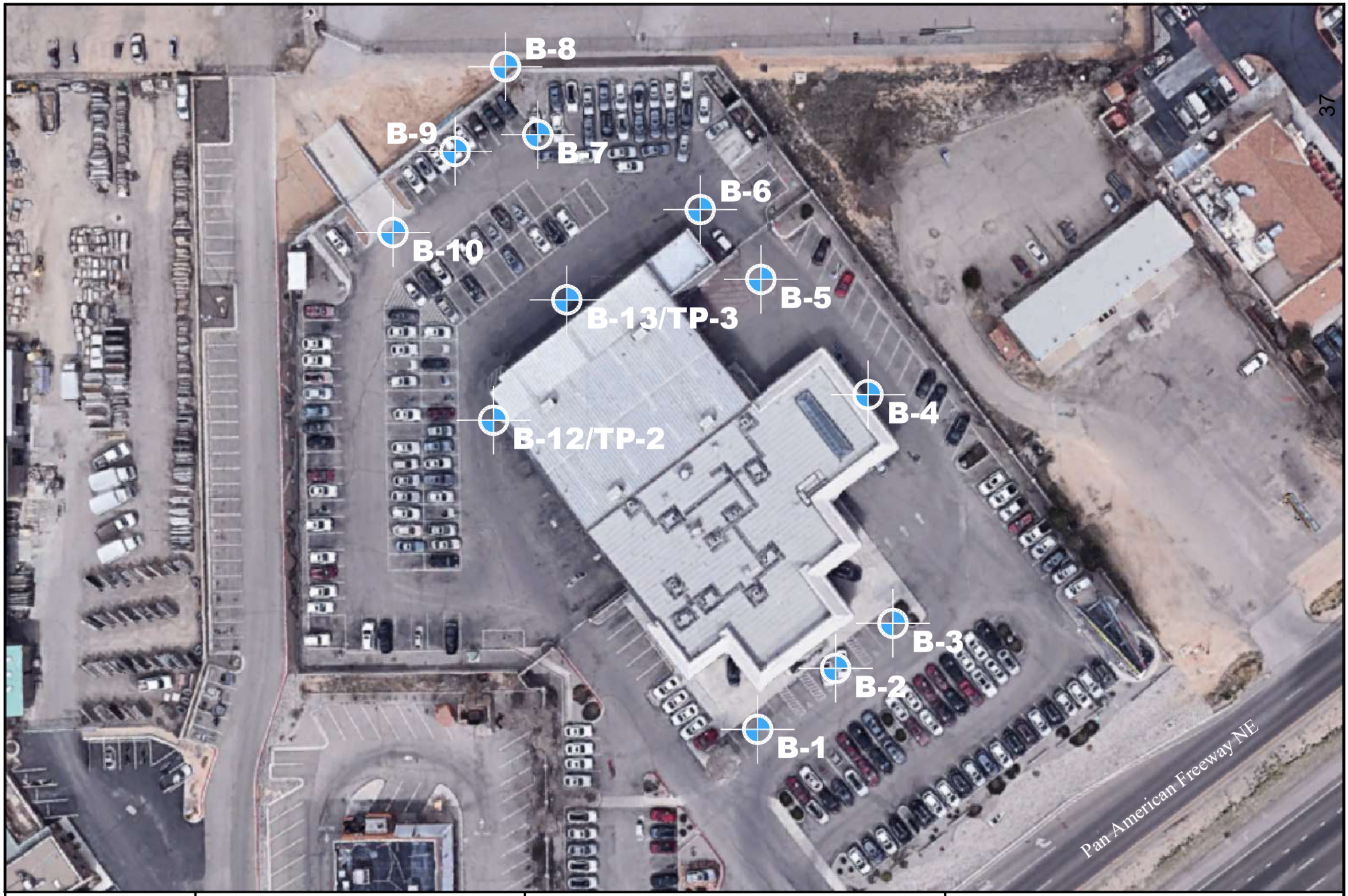
Our professional services were performed using that degree of care and skill ordinarily exercised, under similar circumstances, by reputable geotechnical engineers practicing in this or similar localities at the same time. No warranty, express or implied, is intended or made. We prepared the report as 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



Approximate Not to Scale	SITE PLAN Boring & Test Pit Locations (approximate) GEOMAT Project No. 212-3874R Dates of Exploration: 11/11 & 11/19/2021	PROJECT Lexus of Albuquerque Expansion 4821 Pan American Freeway NE Albuquerque, New Mexico

GEOMAT INC.

GEOMAT INC.
4529 Arrowhead Ridge Dr. SE, Suite 102
Rio Rancho, New Mexico 87124
Tel (505) 300-5816

Boring B-1

Project Name:	Lexus of Albuquerque Expansion	Date Drilled:	11/11/2021
Project Number:	212-3874R	Northing:	Not Determined
Client:	Ayer Design Group, LLC.	Easting:	Not Determined
Site Location:	Albuquerque, New Mexico	Elevation:	Not Determined
Rig Type:	CME - 75	Boring Location:	See Site Plan
Drilling Method:	7.25" O.D. Hollow Stem Auger	Groundwater Depth:	Not Encountered
Sampling Method:	Ring and Split spoon samples	Logged By:	SA
Hammer Weight:	140 lbs	Remarks:	None
Hammer Fall:	30 inches		

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
							ACP		1	Asphalt Pavement (approx. 2" thick)
									2	Clayey SAND with Gravel, tan to brown, fine- to coarse-grained, very loose to medium dense, slightly damp to moist
				8-7-4	SS				3	
									4	
	43	13		5-6	R				5	
									6	white, sandy lenses
									7	
				3-3-5	SS				8	
									9	
				6-9	R		SC		10	
									11	
									12	
									13	
									14	
				5-6-6	SS				15	
									16	
									17	
									18	
									19	
									20	
111.6			14.2	6-12	R				21	lean clay lens
									22	Total Depth 21 feet
									23	
									24	
									25	

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

GEOMAT 212-3872R.GPJ GEOMAT.GDT 12/3/21

GEOMAT INC.
4529 Arrowhead Ridge Dr. SE, Suite 102
Rio Rancho, New Mexico 87124
Tel (505) 300-5816

Boring B-2

Project Name: Lexus of Albuquerque Expansion
Project Number: 212-3874R
Client: Ayer Design Group, LLC.
Site Location: Albuquerque, New Mexico
Rig Type: CME - 75
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 11/11/2021
Northing: Not Determined
Easting: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: SA
Remarks: None

Laboratory Results										
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
							ACP		1	Asphalt Pavement (approx. 2" thick)
									2	Clayey SAND with Gravel, tan to brown, fine- to coarse-grained, very loose to medium dense, slightly damp to moist
107.7			13.9	4-5	R				3	
									4	
				3-2-2	SS				5	
									6	white, sandy lenses
									7	
				4-8	R				8	
									9	
				6-6-7	SS		SC		10	
									11	
									12	
									13	
									14	
				5-9	R				15	
									16	with colored grains
									17	
									18	
									19	
				4-6-6	SS				20	
									21	
									22	Total Depth 21 ½ feet
									23	
									24	
									25	

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

GEOMAT 212-3872R.GPJ GEOMAT.GDT 12/3/21

GEOMAT INC.
4529 Arrowhead Ridge Dr. SE, Suite 102
Rio Rancho, New Mexico 87124
Tel (505) 300-5816

Boring B-3

Project Name: Lexus of Albuquerque Expansion
Project Number: 212-3874R
Client: Ayer Design Group, LLC.
Site Location: Albuquerque, New Mexico
Rig Type: CME - 75
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 11/11/2021
Northing: Not Determined
Easting: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: SA
Remarks: None

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
							ACP		1	Asphalt Pavement (approx. 3" thick)
				4-4-3	SS				2	Silty SAND, brown to tan, fine- to coarse-grained, very loose to medium dense, slightly damp to moist, trace gravel
									3	
									4	
	35	NP		4-4	R		SM		5	
									6	
									7	
				3-5-6	SS				8	
									9	
92			1.6	5-7	R				10	
									11	with coarse, colored grains
									12	
									13	Clayey SAND, brown to tan, fine- to coarse-grained, loose to medium dense, moist
									14	
									15	
				5-8-9	SS				16	with coarse, colored grains
							SC		17	
									18	
									19	
									20	
				5-9	R				21	
									22	Total Depth 21 feet
									23	
									24	
									25	

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

GEOMAT 212-3872R.GPJ GEOMAT.GDT 12/3/21

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Rio Rancho, New Mexico 87124
Tel (505) 300-5816

Boring B-4

Project Name: Lexus of Albuquerque Expansion
Project Number: 212-3874R
Client: Ayer Design Group, LLC.
Site Location: Albuquerque, New Mexico
Rig Type: CME - 75
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 11/11/2021
Northing: Not Determined
Easting: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: SA
Remarks: None

Laboratory Results										
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
							ACP		1	Asphalt Pavement (approx. 2" thick)
									2	Clayey SAND with Gravel, tan to brown, fine- to coarse-grained, very loose to medium dense, slightly damp
				10-9	R				3	
									4	
				3-4-3	SS				5	
									6	white, sandy lenses
									7	
103.7			5.4	4-5	R				8	
									9	
				4-6-8	SS		SC		10	
									11	
									12	
									13	
									14	
				2-6	R				15	
									16	
									17	
									18	
									19	
									20	
				8-9-7	SS				21	
									22	Total Depth 21 ½ feet
									23	
									24	
									25	

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

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Boring B-5

Project Name: Lexus of Albuquerque Expansion
Project Number: 212-3874R
Client: Ayer Design Group, LLC.
Site Location: Albuquerque, New Mexico
Rig Type: CME - 75
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 11/11/2021
Northing: Not Determined
Easting: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: SA
Remarks: None

Laboratory Results: 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
							ACP		1	Asphalt Pavement (approx. 2" thick)
									2	Clayey SAND, tan to brown, fine- to coarse-grained, very loose to medium dense, slightly damp, trace gravel
				10-7	R				3	white, sandy lens
									4	
				9-11-10	SS				5	
									6	lean clay lens
									7	
99.4			8.3	7-7	R				8	
									9	
				3-2-2	SS		SC		10	
									11	
									12	
									13	
									14	
103.9			2.3	8-12	R				15	with colored grains
									16	
									17	
									18	
									19	
				5-7-13	SS				20	
									21	
									22	Total Depth 21 ½ feet
									23	
									24	
									25	

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

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Boring B-6

Project Name: Lexus of Albuquerque Expansion
Project Number: 212-3874R
Client: Ayer Design Group, LLC.
Site Location: Albuquerque, New Mexico
Rig Type: CME - 75
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 11/11/2021
Northing: Not Determined
Easting: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: SA
Remarks: None

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
							ACP		1	Asphalt Pavement (approx. 2" thick)
									2	Clayey SAND, tan to brown, fine- to coarse-grained, very loose to medium dense, slightly damp to moist, trace gravel
	25	8		5-5-6	SS				3	
									4	
				5-6	R				5	
									6	
									7	
									8	
									9	
				3-2-2	SS		SC		10	
									11	
									12	
									13	
									14	
				6-12	R				15	
									16	with colored grains
									17	
									18	
									19	
									20	
				7-11-12	SS				21	with colored grains
									22	Total Depth 21 ½ feet
									23	
									24	
									25	

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

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Boring B-7

Project Name:	Lexus of Albuquerque Expansion	Date Drilled:	11/11/2021
Project Number:	212-3874R	Northing:	Not Determined
Client:	Ayer Design Group, LLC.	Easting:	Not Determined
Site Location:	Albuquerque, New Mexico	Elevation:	Not Determined
Rig Type:	CME - 75	Boring Location:	See Site Plan
Drilling Method:	7.25" O.D. Hollow Stem Auger	Groundwater Depth:	Not Encountered
Sampling Method:	Ring and Split spoon samples	Logged By:	SA
Hammer Weight:	140 lbs	Remarks:	None
Hammer Fall:	30 inches		

Laboratory Results: 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
							ACP		1	Asphalt Pavement (approx. 1" thick)
									2	Clayey SAND with Gravel, tan to brown, fine- to coarse-grained, loose to medium dense, slightly damp
				7-5-6	SS				3	
									4	
				8-7	R				5	
									6	
									7	
	41	13		7-11-9	SS				8	
									9	
				7-7	R		SC		10	
									11	
									12	
									13	
									14	
				6-7-10	SS				15	
									16	with colored grains
									17	
									18	
									19	
									20	
				6-8	R				21	with colored grains
									22	Total Depth 21 feet
									23	
									24	
									25	

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

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Boring B-8

Project Name: Lexus of Albuquerque Expansion
Project Number: 212-3874R
Client: Ayer Design Group, LLC.
Site Location: Albuquerque, New Mexico
Rig Type: CME - 75
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 11/11/2021
Northing: Not Determined
Easting: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: SA
Remarks: None

Laboratory Results										
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
113.7			8.9	4-3 4-50/3"	R SS		SC		1 2 3 4 5 6 7	Clayey SAND, brown, fine- to medium-grained, medium stiff, slightly damp to moist
									8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25	Auger Refusal on Possible Cobbles Total Depth 7 feet

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

GEOMAT 212-3872R.GPJ GEOMAT.GDT 12/3/21

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Tel (505) 300-5816

Boring B-9

Project Name: Lexus of Albuquerque Expansion
Project Number: 212-3874R
Client: Ayer Design Group, LLC.
Site Location: Albuquerque, New Mexico
Rig Type: CME - 75
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 11/11/2021
Northing: Not Determined
Easting: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: SA
Remarks: None

Laboratory Results										
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
							ACP		1	Asphalt Pavement (approx. 3" thick)
				3-2-4	SS				2	Clayey SAND, tan to brown, fine- to coarse-grained, very loose to medium dense, slightly damp to moist
									3	
									4	
99.8			27.2	5-5	R				5	
									6	
									7	
				2-3-2	SS				8	
									9	
				4-4	R		SC		10	
									11	
									12	
									13	
									14	
				5-8-9	SS				15	
									16	
									17	
									18	
									19	
118.9			7.3	7-11	R				20	
									21	
									22	Total Depth 21 feet
									23	
									24	
									25	

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

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Boring B-10

Project Name:	Lexus of Albuquerque Expansion	Date Drilled:	11/11/2021
Project Number:	212-3874R	Northing:	Not Determined
Client:	Ayer Design Group, LLC.	Easting:	Not Determined
Site Location:	Albuquerque, New Mexico	Elevation:	Not Determined
Rig Type:	CME - 75	Boring Location:	See Site Plan
Drilling Method:	7.25" O.D. Hollow Stem Auger	Groundwater Depth:	Not Encountered
Sampling Method:	Ring and Split spoon samples	Logged By:	SA
Hammer Weight:	140 lbs	Remarks:	None
Hammer Fall:	30 inches		

Laboratory Results: 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
							ACP		1	Asphalt Pavement (approx. 1 ½" thick)
									2	Clayey SAND, tan to brown, fine- to coarse-grained, very loose to medium dense, slightly damp to moist, trace gravel
121.9			6.6	15-13	R				3	
									4	
				6-7-11	SS				5	
									6	with colored grains
									7	
110.0			13.9	4-5	R				8	
									9	
				4-4-4	SS		SC		10	
									11	
									12	
									13	
									14	
				4-8	R				15	
									16	
									17	
									18	
									19	
				4-6-6	SS				20	
									21	
									22	Total Depth 21 ½ feet
									23	
									24	
									25	

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

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Boring B-12

Project Name: Lexus of Albuquerque Expansion
Project Number: 212-3874R
Client: Ayer Design Group, LLC.
Site Location: Albuquerque, New Mexico
Rig Type: CME - 75
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 11/11/2021
Northing: Not Determined
Easting: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: SA
Remarks: None

Laboratory Results										
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
							ACP		1	Asphalt Pavement (approx. 2" thick)
									2	Clayey SAND, tan to brown, fine- to coarse-grained, very loose to medium dense, slightly damp to moist
				5-7	R				3	with gravel
									4	
	49	11		3-3-4	SS				5	
									6	
									7	
97.4			10.0	5-3	R				8	
									9	
				2-1-1	SS		SC		10	
									11	
									12	
									13	
									14	
				8-12	R				15	
									16	with colored grains, with gravel
									17	
									18	
									19	
									20	
				7-9-8	SS				21	with colored grains, with gravel
									22	Total Depth 21 ½ feet
									23	
									24	
									25	

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

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Boring B-13

Project Name: Lexus of Albuquerque Expansion
Project Number: 212-3874R
Client: Ayer Design Group, LLC.
Site Location: Albuquerque, New Mexico
Rig Type: CME - 75
Drilling Method: 7.25" O.D. Hollow Stem Auger
Sampling Method: Bulk, Ring and Split spoon samples
Hammer Weight: 140 lbs
Hammer Fall: 30 inches

Date Drilled: 11/11/2021
Northing: Not Determined
Easting: Not Determined
Elevation: Not Determined
Boring Location: See Site Plan
Groundwater Depth: Not Encountered
Logged By: SA
Remarks: None

Laboratory Results: Dry Density (pcf)	Laboratory Results: % Passing #200 Sieve	Laboratory Results: Plasticity Index	Laboratory Results: Moisture Content (%)	Blows per 6"	Sample Type & Length (in)	Symbol	Material Type	Soil Symbol	Depth (ft)	Soil Description
							ACP		1	Asphalt Pavement (approx. 2 ½" thick)
	19	NP		5-8-7	SS A		SM		2 3 4	Silty SAND, tan to brown, fine- to coarse-grained, very loose to medium dense, slightly damp to moist, trace gravel
				6-7	R				5 6 7	
				3-3-3	SS				8 9	
107.5			10.1	4-4	R				10 11 12 13 14	Clayey SAND, tan to brown, fine- to coarse-grained, medium dense to loose, slightly damp to moist, trace gravel
				5-8-9	SS		SC		15 16 17 18 19	
				4-16	R				20 21	with colored grains
									22 23 24 25	Total Depth 21 feet

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

GEOMAT 212-3872R.GPJ GEOMAT.GDT 12/3/21

UNIFIED SOIL CLASSIFICATION SYSTEM					CONSISTENCY OR RELATIVE DENSITY CRITERIA					
Major Divisions			Group Symbols	Typical Names	**Standard Penetration Test** Density of Granular Soils			**Ring-Lined Sampler** Density of Granular Soils		
					Penetration Resistance, N (blows/ft.)	Relative Density		Penetration Resistance, N (blows/ft.)	Relative Density	
Coarse-Grained Soils More than 50% retained on No. 200 sieve	**Gravels** 50% or more of coarse fraction retained on No. 4 sieve	Clean Gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	0-4	Very Loose		0-11	Very Loose	
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines	5-10	Loose		12-26	Loose	
		Gravels with Fines	GM	Silty gravels, gravel-sand-silt mixtures	11-30	Medium Dense		27-74	Medium Dense	
			GC	Clayey gravels, gravel-sand-clay mixtures	31-50	Dense		75-120	Dense	
	Sands More than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines	>50	Very Dense		>120	Very Dense	
			SP	Poorly graded sands and gravelly sands, little or no fines	Standard Penetration Test Density of Fine-Grained Soils			Ring-Lined Sampler Density of Fine-Grained Soils		
		Sands with Fines	SM	Silty sands, sand-silt mixtures	Penetration Resistance, N (blows/ft.)	Consistency	Unconfined Compressive Strength (Tons/ft2)	Penetration Resistance, N (blows/ft.)	Consistency	Unconfined Compressive Strength (Tons/ft2)
			SC	Clayey sands, sand-clay mixtures						
Fine-Grained Soils 50% or more passes No. 200 sieve	**Silts and Clays** Liquid Limit 50 or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	<2	Very Soft	<0.25	<3	Very Soft	<0.25
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	2-4	Soft	0.25-0.50	3-6	Soft	0.25-0.50
			OL	Organic silts and organic silty clays of low plasticity	5-8	Medium Stiff	0.50-1.00	7-12	Medium Stiff	0.50-1.00
	Silts and Clays Liquid Limit greater than 50		MH	Inorganic silts, micaceous or diatomaceous free sands or silts, elastic silts	9-15	Stiff	1.00-2.00	13-25	Stiff	1.00-2.00
			CH	Inorganic clays of high plasticity, fat clays	16-30	Very Stiff	2.00-4.00	26-65	Very Stiff	2.00-4.00
			OH	Organic clays of medium to high plasticity	>30	Hard	>4.0	>65	Hard	>4.0
Highly Organic Soils			PT	Peat, mucic & other highly organic soils						

U.S. Standard Sieve Sizes

>12"	12"	3"	3/4"	#4	#10	#40	#200	
Boulders	Cobbles	Gravel		Sand				Silt or Clay
		coarse	fine	coarse	medium	fine		

MOISTURE CONDITIONS	
Dry	Absence of moist, dusty, dry to the touch
Slightly Damp	Below optimum moisture content for compaction
Moist	Near optimum moisture content, will moisten the hand
Very Moist	Above optimum moisture content
Wet	Visible free water, below water table

MATERIAL QUANTITY	
trace	0-5%
few	5-10%
little	10-25%
some	25-45%
mostly	50-100%

OTHER SYMBOLS

R Ring Sample
S SPT Sample
B Bulk Sample
▼ Ground Water

BASIC LOG FORMAT:

SOILS - Group name, Group symbol, color, consistency or relative density, grain size, moisture. Additional comments: odor, presence of roots, mica, gypsum, coarse particles, etc.
ROCK - Name, color, planing, porosity, moisture, weathering, relative strength, additional comments.

EXAMPLES:

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

BASALT, gray/black, irregular planes, porous, slightly damp, slightly weathered, medium strong (R3)

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.

Coring Equipment – 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

LAB NO.	BORING NO.	SAMPLE DEPTH (ft)	MOISTURE CONTENT (%)	DENSITY		ATTERBERG LIMITS			CONSOL TEST	% PASSING #200 SIEVE	CLASSIFICATION
				WET (pcf)	DRY (pcf)	Liquid Limit	Plastic Limit	Plasticity Index			
5872	B-1	5	-	-	-	30	17	13	-	43	Clayey **SAND** (SC)
5873	B-1	20	14.2	127.4	111.6	-	-	-	-	-	Clayey **SAND** (SC)
5874	B-2	2 ½	13.9	122.7	107.7	-	-	-	*	-	Clayey **SAND** (SC)
5875	B-3	5	-	-	-	NLL	NPL	NP	-	35	Silty **SAND** (SM)
5876	B-3	10	1.6	93.5	92.0	-	-	-	-	-	Silty **SAND** (SM)
5877	B-4	7 ½	5.4	109.3	103.7	-	-	-	-	-	Clayey **SAND** (SC)
5878	B-5	7 ½	8.3	107.7	99.4	-	-	-	*	-	Clayey **SAND** (SC)
5879	B-5	15	2.3	106.3	103.9	-	-	-	-	-	Clayey **SAND** (SC)
5880	B-6	2 ½	-	-	-	23	15	8	-	25	Clayey **SAND** (SC)
5881	B-7	7 ½	-	-	-	28	15	13	-	41	Clayey **SAND** (SC)
5882	B-8	2 ½	8.9	123.8	113.7	-	-	-	*	-	Clayey **SAND** (SC)
5883	B-9	5	27.2	126.9	99.8	-	-	-	*	-	Clayey **SAND** (SC)
5884	B-9	20	7.3	127.6	118.9	-	-	-	-	-	Clayey **SAND** (SC)
5885	B-10	2 ½	6.6	129.9	121.9	-	-	-	-	-	Clayey **SAND** (SC)
5886	B-10	7 ½	13.9	125.3	110.0	-	-	-	*	-	Clayey **SAND** (SC)
5887	B-12	5	-	-	-	24	13	11	-	49	Clayey **SAND** (SC)
5888	B-12	7 ½	10.0	107.1	97.4	-	-	-	*	-	Clayey **SAND** (SC)
5890	B-13	2 ½	-	-	-	NLL	NPL	NP	-	19	Silty **SAND** (SM)
5891	B-13	10	10.1	118.4	107.5	-	-	-	*	-	Clayey **SAND** (SC)

NLL = No Liquid Limit
NPL = No Plastic Limit
NP = Non-Plastic
* = Consolidation Results Attached

GEOMAT INC.

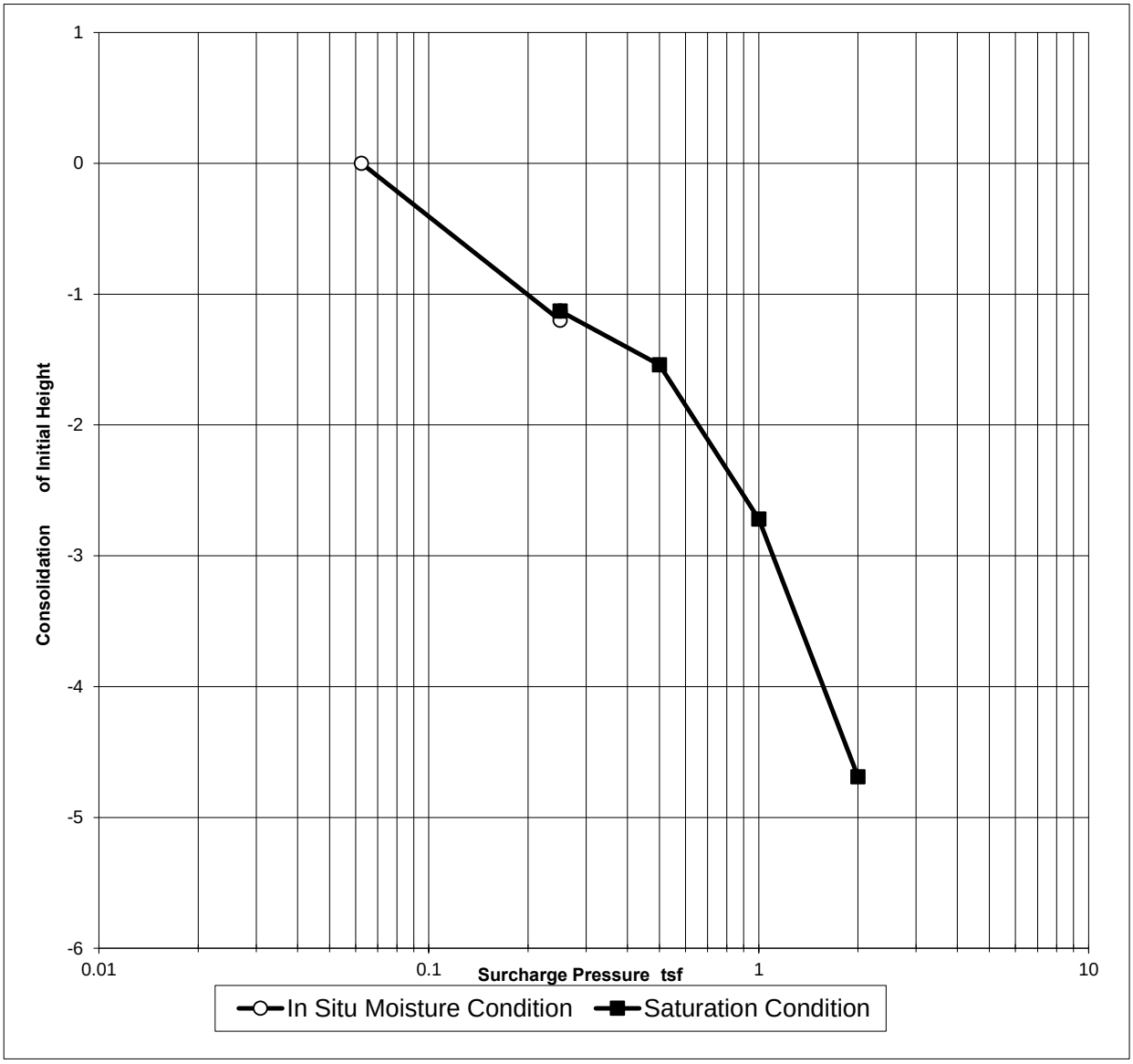
SUMMARY OF SOIL TESTS
Page 1 of 1

Project Name	Lexus of Albuquerque Expansion
Project No.	212-3874R
Location	Albuquerque, New Mexico
Date(s) of Exploration	11/11/2021

PROJECT:	Lexus of Albuquerque Expansion	**JO NO:**	212-3874R
CLIENT:	Ayer Design Group	**WOR ORDER NO:**	N/A
MATERIAL:	Clayey SAND (SC)	**LA NO:**	5874
SAMPLE SOURCE:	B-2 @ 2 ½'	**DATE SAMPLED:**	11/11/2021
SAMPLE PREP.:	In Situ	**SAMPLED Y:**	SA

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS ASTM D24 5

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.48
INITIAL MOISTURE CONTENT	13.9%	FINAL MOISTURE CONTENT	18.2%
INITIAL DRY DENSITY(pcf)	107.7	FINAL DRY DENSITY(pcf)	110.2
INITIAL DEGREE OF SATURATION	49%	FINAL DEGREE OF SATURATION	68%
INITIAL VOID RATIO	0.54	FINAL VOID RATIO	0.50
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf

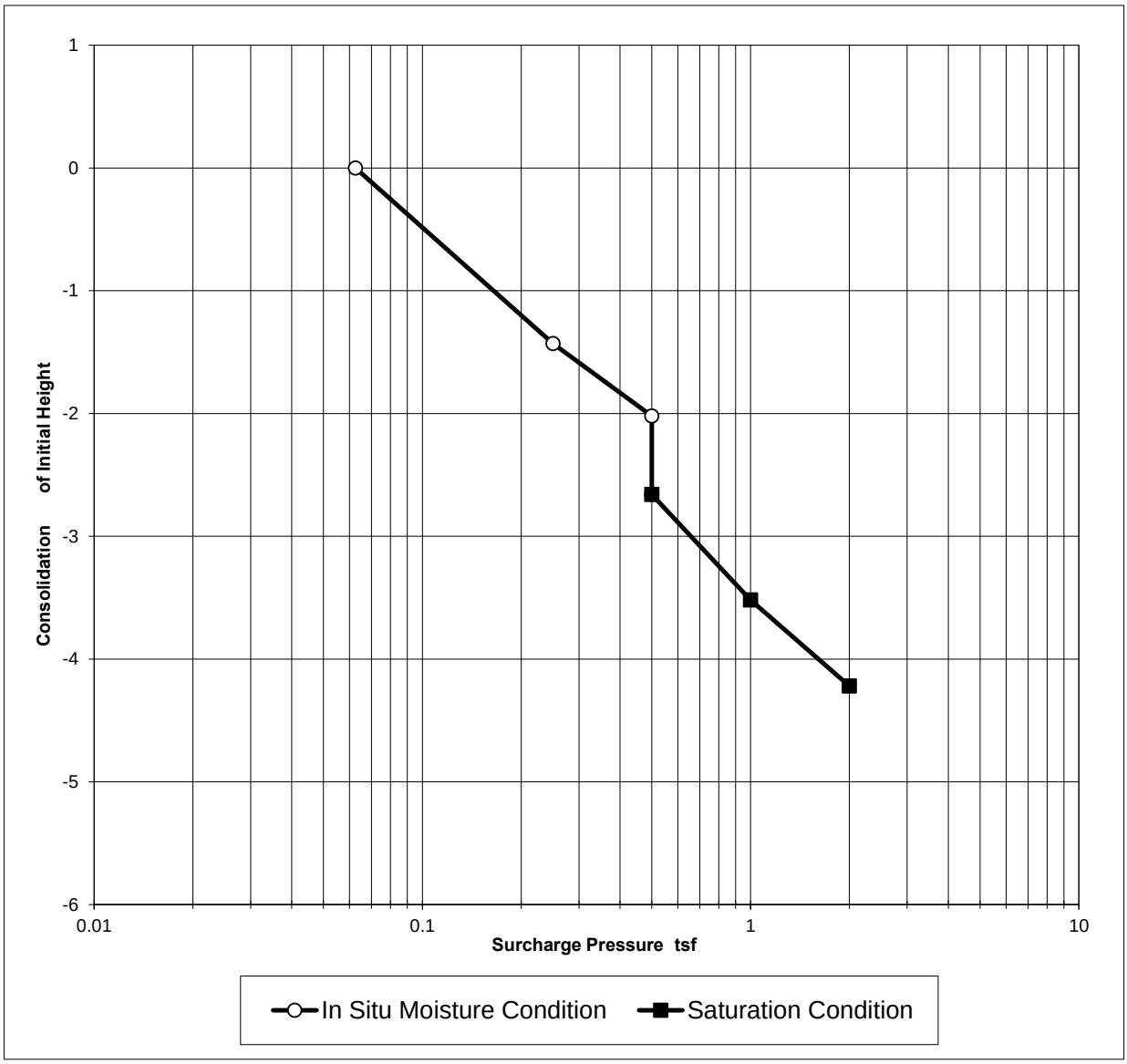


GEOMAT INC.

PROJECT:	Lexus of Albuquerque Expansion	**JO NO:**	212-3874R
CLIENT:	Ayer Design Group	**WOR ORDER NO:**	N/A
MATERIAL:	Clayey SAND (SC)	**LA NO:**	5878
SAMPLE SOURCE:	B-5 @ 7½'	**DATE SAMPLED:**	11/11/2021
SAMPLE PREP.:	In Situ	**SAMPLED Y:**	SA

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS ASTM D24 5

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.44
INITIAL MOISTURE CONTENT	8.3%	FINAL MOISTURE CONTENT	21.7%
INITIAL DRY DENSITY(pcf)	99.4	FINAL DRY DENSITY(pcf)	102.6
INITIAL DEGREE OF SATURATION	25%	FINAL DEGREE OF SATURATION	70%
INITIAL VOID RATIO	0.67	FINAL VOID RATIO	0.61
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.5 tsf

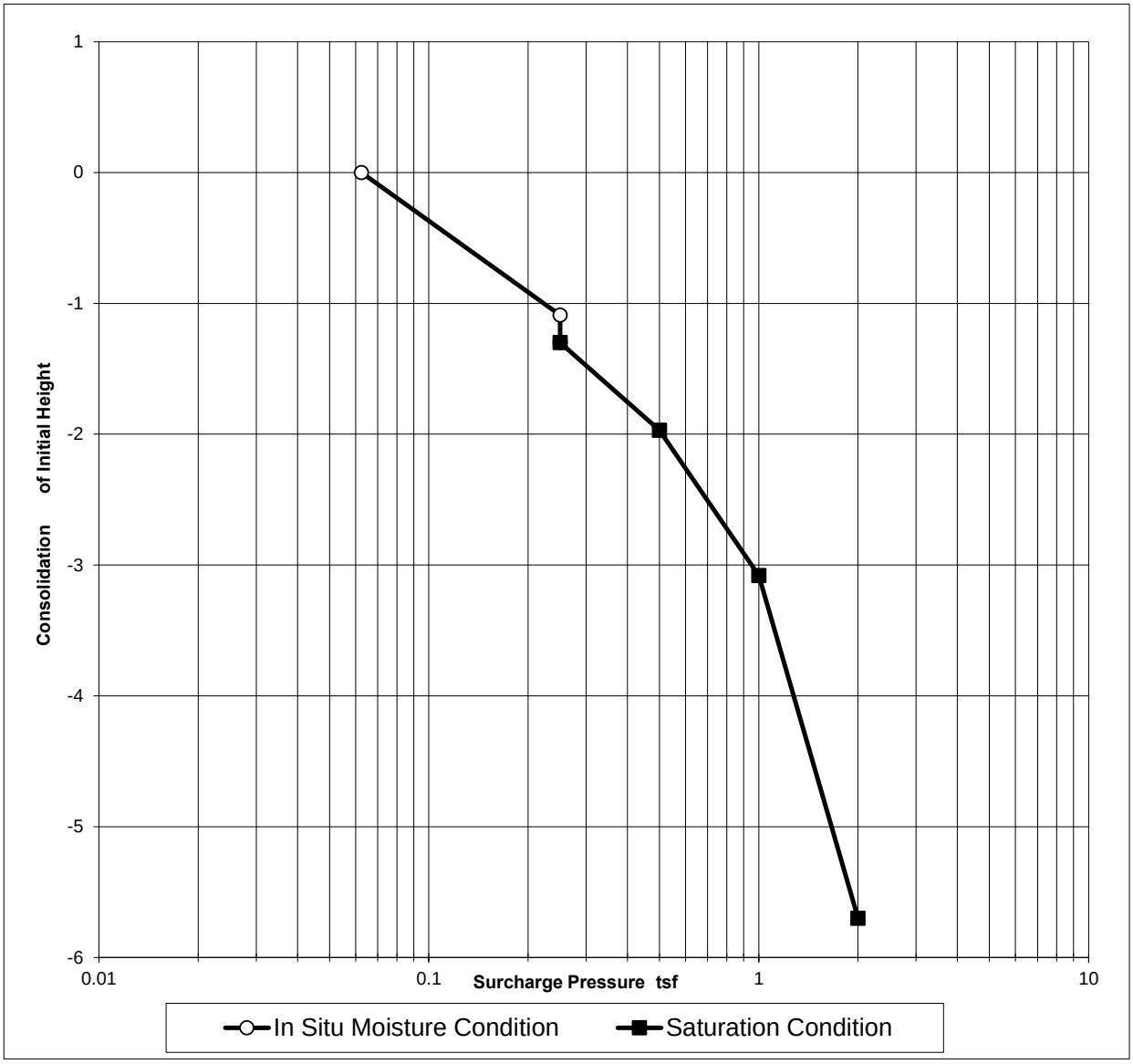


GEOMAT INC.

PROJECT:	Lexus of Albuquerque Expansion	**JO NO:**	212-3874R
CLIENT:	Ayer Design Group	**WOR ORDER NO:**	N/A
MATERIAL:	Clayey SAND (SC)	**LA NO:**	5882
SAMPLE SOURCE:	B-8 @ 2 ½'	**DATE SAMPLED:**	11/11/2021
SAMPLE PREP.:	In Situ	**SAMPLED Y:**	SA

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS ASTM D24 5

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.46
INITIAL MOISTURE CONTENT	8.9%	FINAL MOISTURE CONTENT	12.9%
INITIAL DRY DENSITY(pcf)	113.7	FINAL DRY DENSITY(pcf)	116.8
INITIAL DEGREE OF SATURATION	36%	FINAL DEGREE OF SATURATION	55%
INITIAL VOID RATIO	0.46	FINAL VOID RATIO	0.42
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf

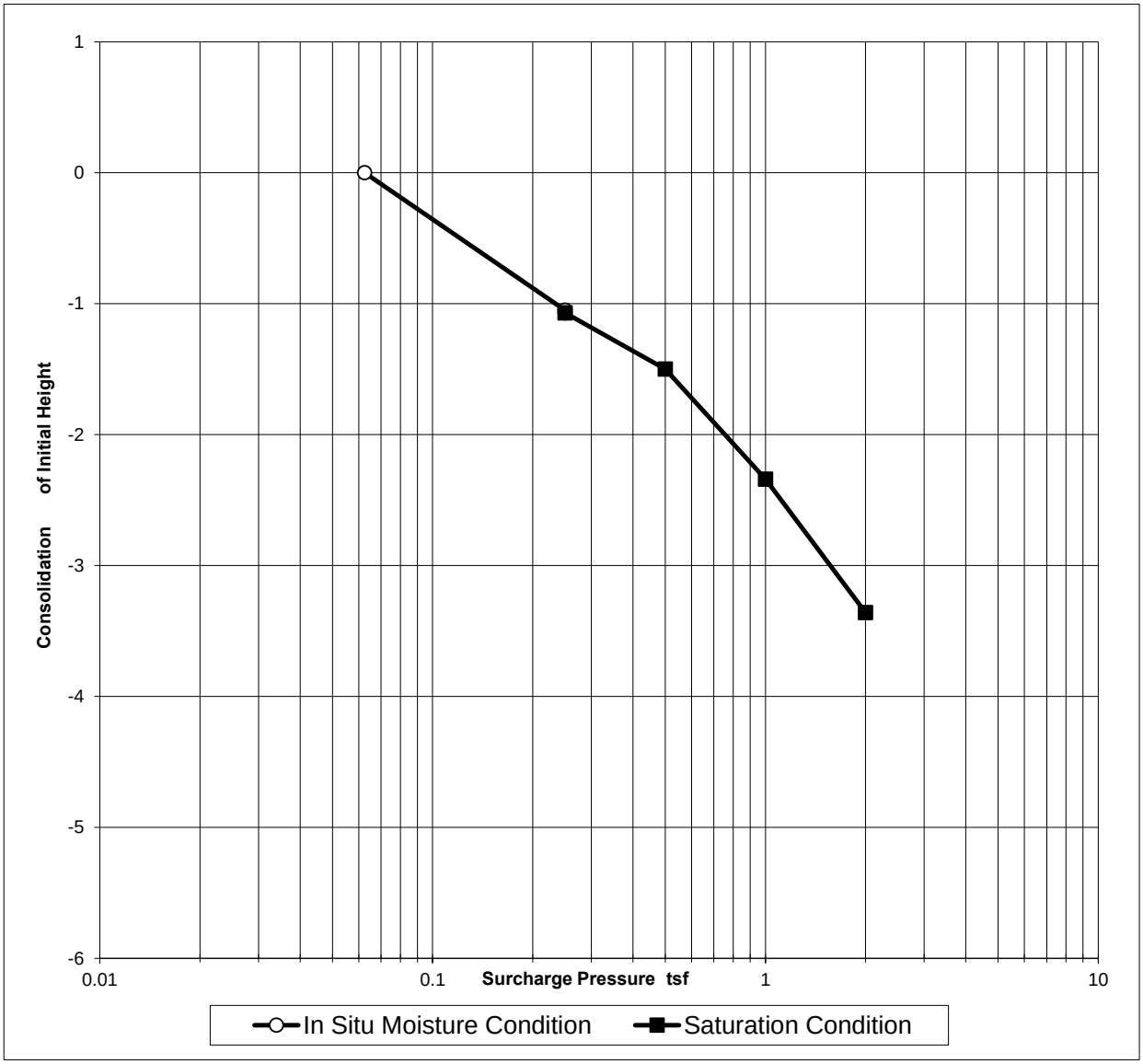


GEOMAT INC.

PROJECT:	Lexus of Albuquerque Expansion	**JO NO:**	212-3874R
CLIENT:	Ayer Design Group	**WOR ORDER NO:**	N/A
MATERIAL:	Clayey SAND (SC)	**LA NO:**	5883
SAMPLE SOURCE:	B-9 @ 5'	**DATE SAMPLED:**	11/11/2021
SAMPLE PREP.:	In Situ	**SAMPLED Y:**	SA

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS ASTM D24 5

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.50
INITIAL MOISTURE CONTENT	27.2%	FINAL MOISTURE CONTENT	34.0%
INITIAL DRY DENSITY(pcf)	99.8	FINAL DRY DENSITY(pcf)	101.7
INITIAL DEGREE OF SATURATION	83%	FINAL DEGREE OF SATURATION	108%
INITIAL VOID RATIO	0.67	FINAL VOID RATIO	0.63
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.25 tsf



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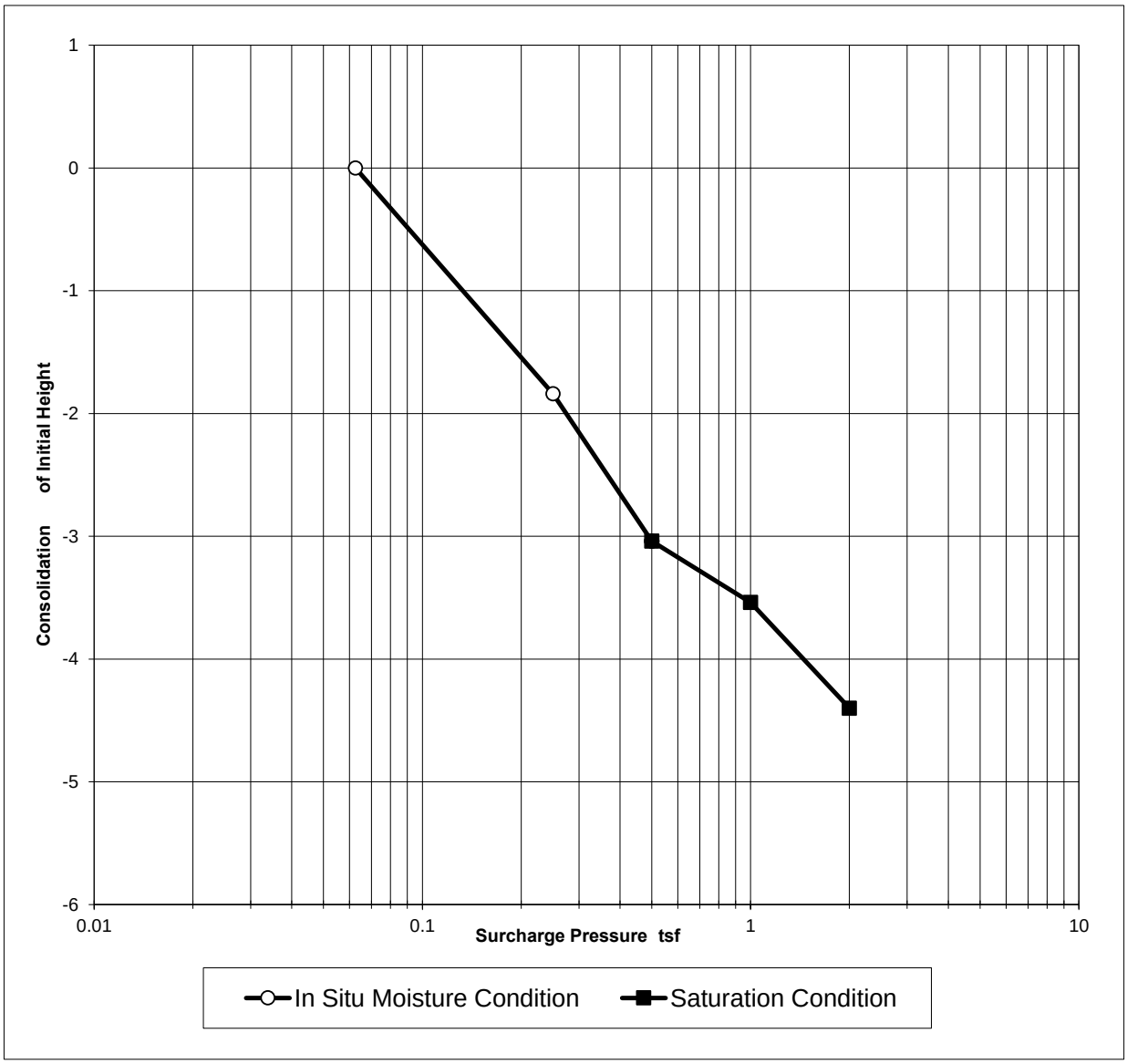
PROJECT:	Lexus of Albuquerque Expansion	**JO NO:**	212-3874R
CLIENT:	Ayer Design Group	**WOR ORDER NO:**	N/A
MATERIAL:	Clayey SAND (SC)	**LA NO:**	5886
SAMPLE SOURCE:	B-10 @ 7½'	**DATE SAMPLED:**	11/11/2021
SAMPLE PREP.:	In Situ	**SAMPLED Y:**	SA

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS ASTM D24 5

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.44
INITIAL MOISTURE CONTENT	13.9%	FINAL MOISTURE CONTENT	16.3%
INITIAL DRY DENSITY(pcf)	110.0	FINAL DRY DENSITY(pcf)	113.5
INITIAL DEGREE OF SATURATION	52%	FINAL DEGREE OF SATURATION	65%
INITIAL VOID RATIO	0.51	FINAL VOID RATIO	0.46
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.5 tsf

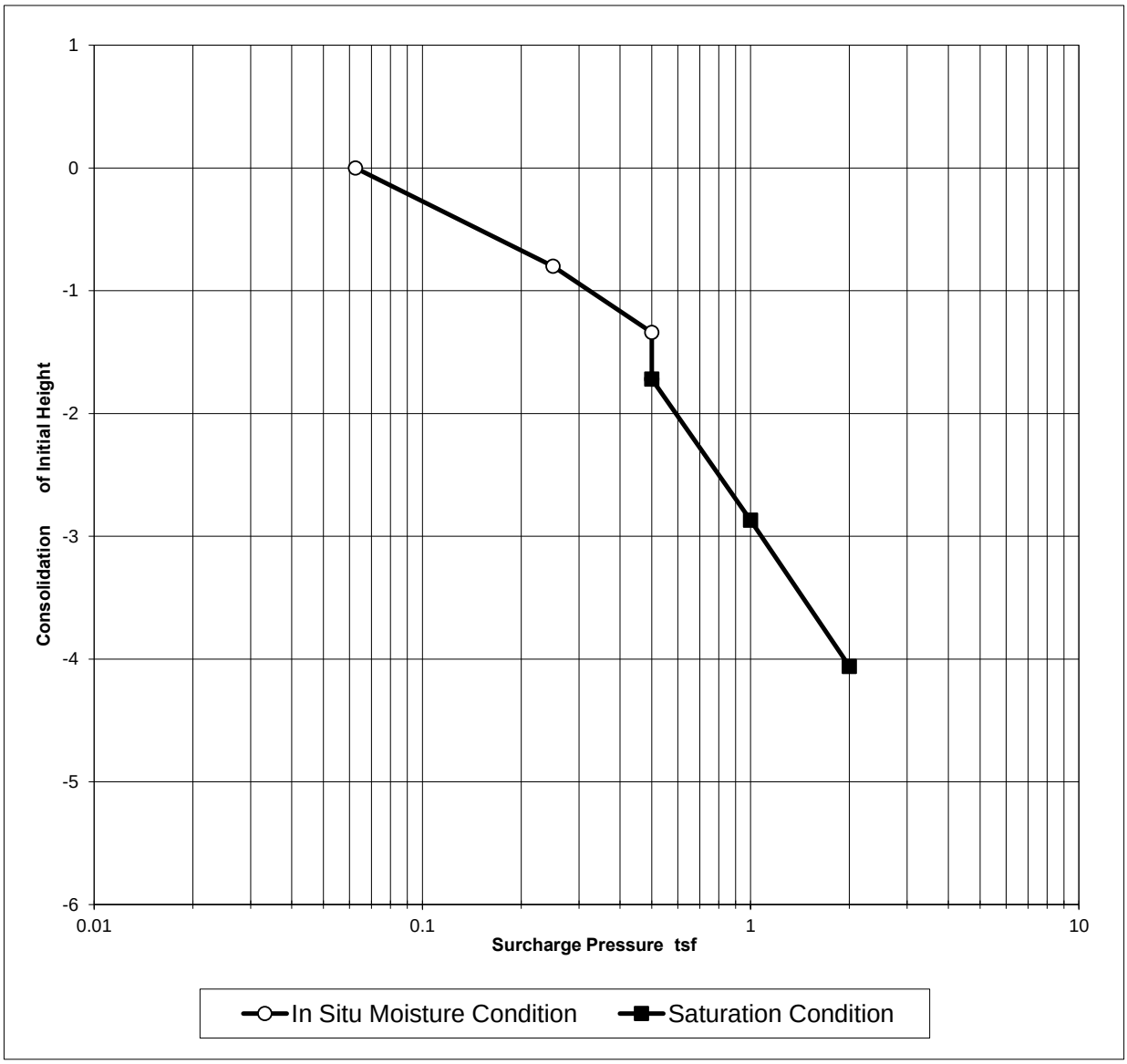


GEOMAT INC.

PROJECT:	Lexus of Albuquerque Expansion	**JO NO:**	212-3874R
CLIENT:	Ayer Design Group	**WOR ORDER NO:**	N/A
MATERIAL:	Clayey SAND (SC)	**LA NO:**	5888
SAMPLE SOURCE:	B-12 @ 7½'	**DATE SAMPLED:**	11/11/2021
SAMPLE PREP.:	In Situ	**SAMPLED Y:**	SA

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS ASTM D24 5

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.47
INITIAL MOISTURE CONTENT	10.0%	FINAL MOISTURE CONTENT	22.2%
INITIAL DRY DENSITY(pcf)	97.4	FINAL DRY DENSITY(pcf)	99.8
INITIAL DEGREE OF SATURATION	29%	FINAL DEGREE OF SATURATION	68%
INITIAL VOID RATIO	0.71	FINAL VOID RATIO	0.66
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.5 tsf

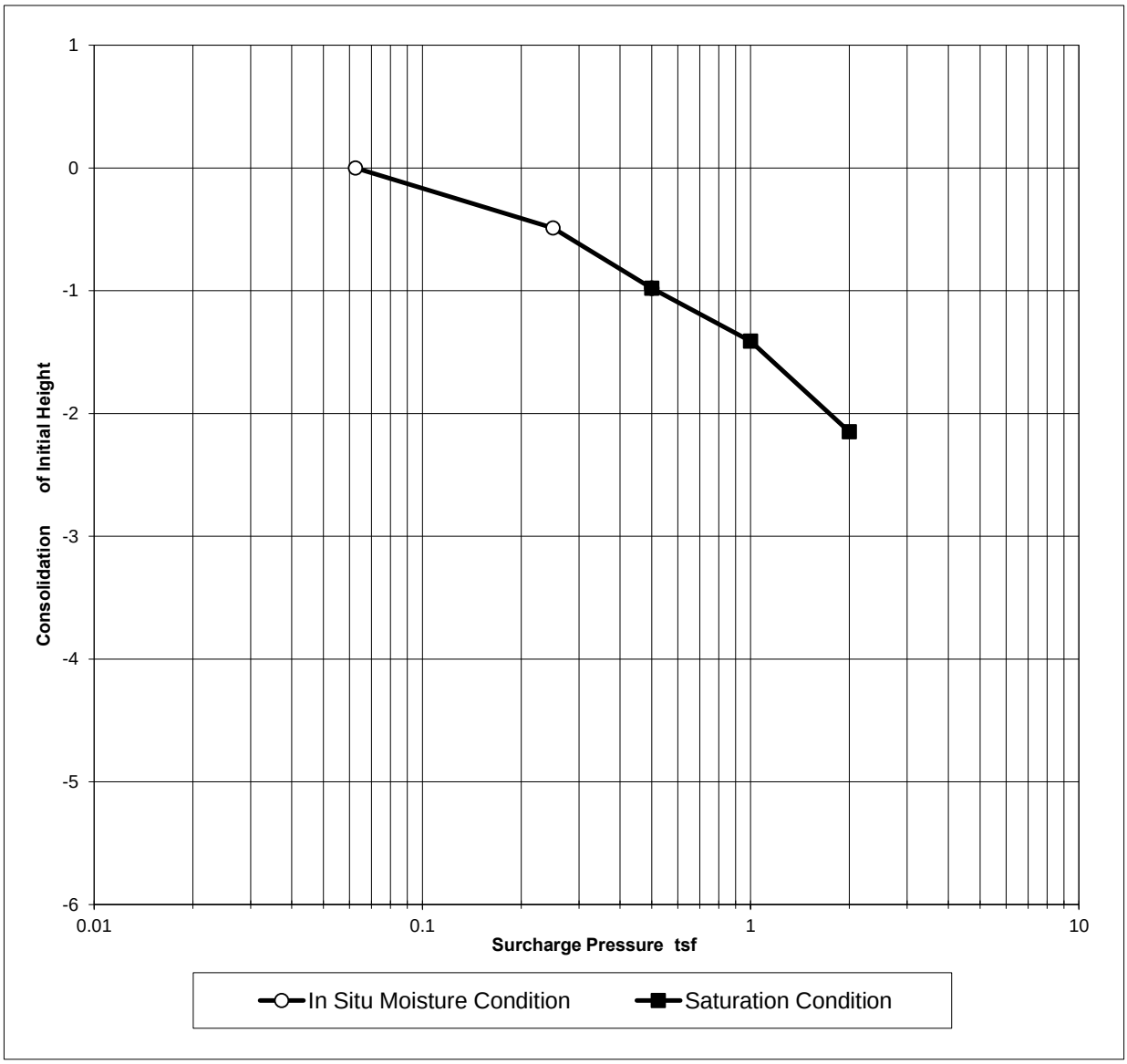


GEOMAT INC.

PROJECT:	Lexus of Albuquerque Expansion	**JO NO:**	212-3874R
CLIENT:	Ayer Design Group	**WOR ORDER NO:**	N/A
MATERIAL:	Clayey SAND (SC)	**LA NO:**	5891
SAMPLE SOURCE:	B-13 @ 10'	**DATE SAMPLED:**	11/11/2021
SAMPLE PREP.:	In Situ	**SAMPLED Y:**	SA

ONE-DIMENSIONAL CONSOLIDATION PROPERTIES OF SOILS ASTM D24 5

INITIAL VOLUME (cu.in)	4.60	FINAL VOLUME (cu.in)	4.54
INITIAL MOISTURE CONTENT	10.1%	FINAL MOISTURE CONTENT	19.9%
INITIAL DRY DENSITY(pcf)	107.5	FINAL DRY DENSITY(pcf)	108.6
INITIAL DEGREE OF SATURATION	36%	FINAL DEGREE OF SATURATION	72%
INITIAL VOID RATIO	0.55	FINAL VOID RATIO	0.52
ESTIMATED SPECIFIC GRAVITY	2.651	SATURATED AT	0.5 tsf



GEOMAT INC.

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

November 05, 2021

GEOMAT Inc.
4915 Malta Avenue
Farmington, New Mexico 87401

Attention: Mr. Matt Cramer, P.E.

RE: **Shear Wave Velocity Profile**

Lexus of Albuquerque
4821 Pan American Fwy
Albuquerque, New Mexico
Geolines Project No. NM-210046

Dear Mr. Cramer:

This letter report presents the results of our refraction microtremor measurements and analysis for the referenced project. The purpose of our services was to provide a calculated average shear wave velocity of subsurface materials at the Lexus of Albuquerque Project site to a depth of 30 meters (100 feet). This information was used to establish a recommended Site Class in accordance with the 2015 International Building Code (IBC).

Fieldwork

The scope of our services for this project included measurement of surface waves on October 31, 2021 with one geophone array using standard p-wave geophones. Ambient noise/ refraction microtremor data was recorded using a geophone spacing of ten meters with 12 channels. Sampling was performed at a two-millisecond rate for 30 second periods.

The approximate location of the array is shown on Plate 1, Site Map. The array was located in the field by measuring from existing natural and cultural features. The location of the array is accurate only to the degree implied by the methods used.

Data reduction and results

The one-dimensional shear wave velocity profile and average shear wave velocity to 100 feet depth were modeled for each array data set using Optim Software's SeisOpt® ReMi™v4.0 software. The field data were reduced and processed by the software to produce a velocity spectrum by slowness-frequency (p-f) transformation of the records.

Using the processed data, the software produces a p-f image and the normal-mode dispersion trend is identified. Frequency-velocity pairs comprising the dispersion curve are picked at the

lower bounds of the trend of the high spectral ratio band identified in the p-f image. The p-f image and dispersion modeling picks for the array measurements are shown on Plate 2, Dispersion Curve and p-f Image. The dispersion curve modeling picks obtained from the p-f image were then used to develop a calculated dispersion curve and a one-dimensional shear wave velocity model for the site. Frequency-velocity picks and calculated dispersion curve fits are shown on Plate 2, Dispersion Curve and p-f Image. The shear wave velocity profile for the array is presented in Plate 3, Shear Wave Velocity Model.

Recommendations

The calculated average shear wave velocity for 100 feet depth at the geophone array is 1222 feet per second (f/s). Based on this finding, a Site Class C as presented in the 2015 IBC is appropriate.

Closure

Professional services for this project were performed using that degree of care and skill ordinarily exercised under similar circumstances by reputable geotechnical engineers practicing in this or similar localities. No warranties, express or implied, are intended or made.

Respectfully Submitted:

Zachary J. Rockhold
Project Manager

Reviewed By:

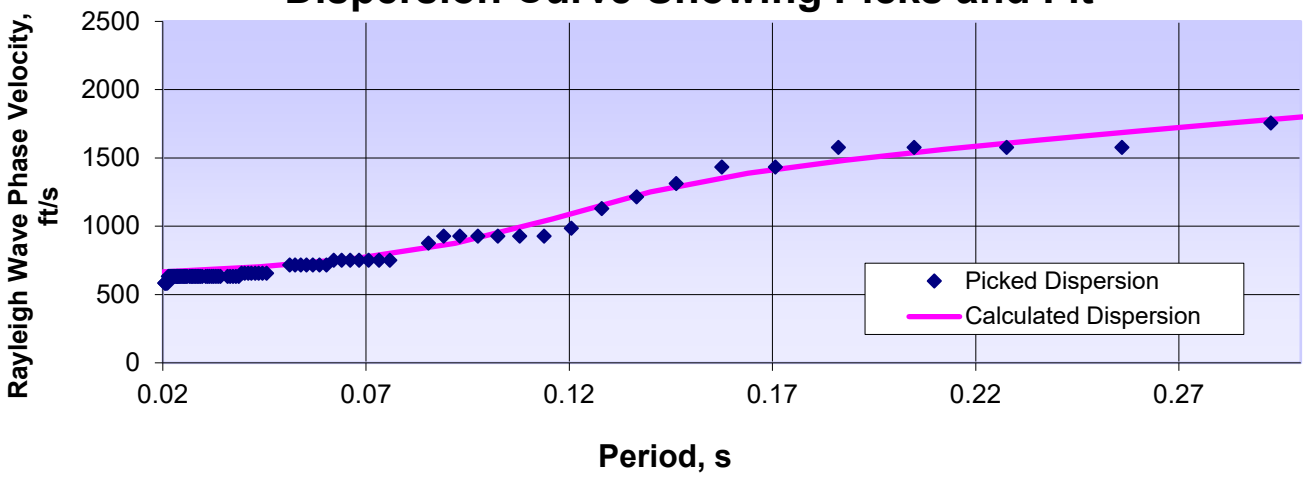
OTTO C. HOLMQUIST
NEW MEXICO
13286
PROFESSIONAL ENGINEER

Otto C. Holmquist, PE
Principal Engineer

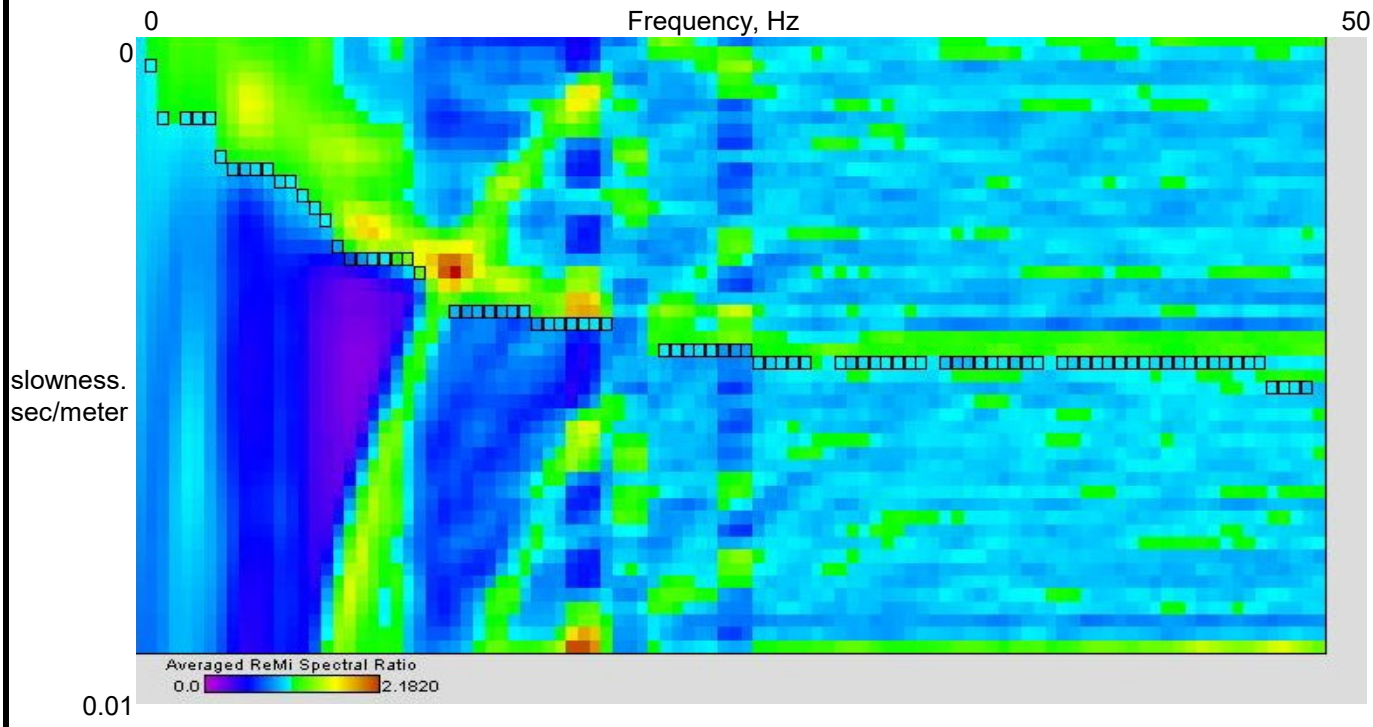
11/5/2021

GEOLINES	**GEOMAT Inc.** **4915 Malta Avenue** **Farmington, New Mexico 87401**	**SITE MAP**	
	Lexus of Albuquerque 4821 Pan American Fwy Albuquerque, New Mexico	PROJECT NO.:	PLATE NO.
		NM-210046	1

Dispersion Curve Showing Picks and Fit

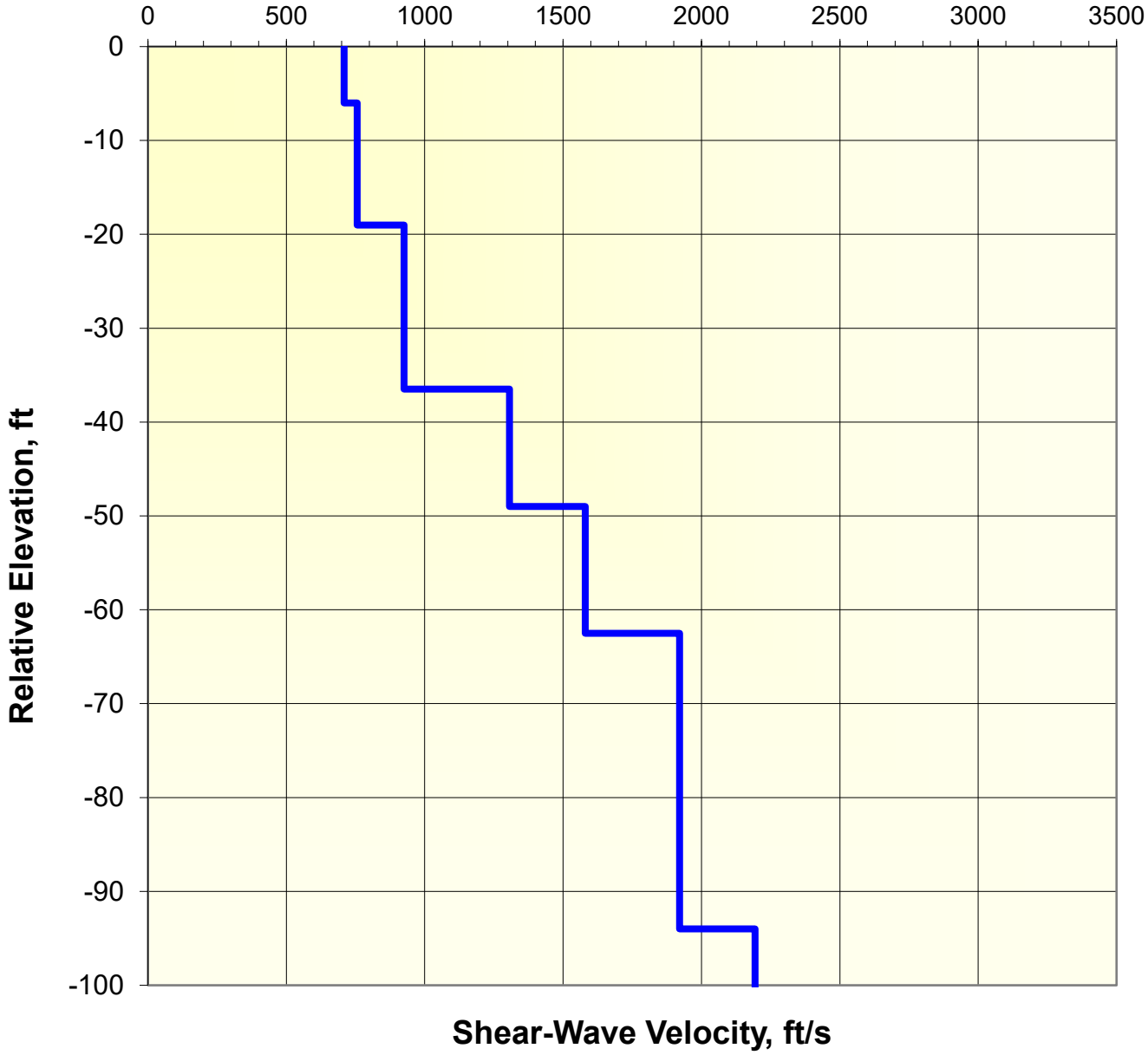


p-f Image and Dispersion Picks



GEOLINES	**GEOMAT Inc.** **4915 Malta Avenue** **Farmington, New Mexico 87401**	**Dispersion Curve and p-f Image**	
	Lexus of Albuquerque 4821 Pan American Fwy Albuquerque, New Mexico	PROJECT NO.:	PLATE NO.
		NM-210046	2

1-D Shear-Wave Velocity Profile



* The modeling methods used to calculate shear wave velocities do not necessarily have unique solutions, therefore velocities and depth to changes in velocities should be considered approximate.

GEOLINES	**GEOMAT Inc.** **4915 Malta Avenue** **Farmington, New Mexico 87401**	**SHEAR WAVE VELOCITY MODEL**
	Lexus of Albuquerque 4821 Pan American Fwy Albuquerque, New Mexico	PROJECT NO.: NM-210046 / PLATE NO.: 3

Appendix D

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 not 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 not be adequate to develop geotechnical design recommendations for the project.

Do not 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 geotechnical-engineering report did not read the report in its entirety. Do not rely on an executive summary. Do not 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 not 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 geotechnical-engineering 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 not 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 not building-envelope or mold specialists.***

GEOPROFESSIONAL BUSINESS ASSOCIATION

Telephone: 301/565-2733
e-mail: info@geoprofessional.org www.geoprofessional.org