CONTACT INFORMATION

PREPARER INFORMATION

AAG PROJECT NUMBER:	**AAG21-092**
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EMAIL ADDRESS:	**CURTIS.CUSHMAN@COMCAST.NET**

CLIENT INFORMATION

CLIENT:	**FULLER DESIGN**
TELEPHONE:	**(360) 880-4927**
BILLING ADDRESS:	**1101 KRESKY VENUE** **CHEHALIS, WASHINGTON 98531**
SITE ADDRESS:	**0 JACKSON ROAD** **CHEHALIS, WASHINGTON** **SECTION 03 TOWNSHIP 13N RANGE 02W PT LT 8 SE RD BLK 1 RICHARDT'S RPLT BLK 4-6 PARCUVIA ADD PRCL B BL-09-148 335384**
PARCEL:	**010799001000**
GPS LOCATION:	**46.641138 -122.926586 (DD)**

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SITE VISIT AND EVALUATION

FULLER DESIGNS
645 SE PROSPECT STREET
CHEHALIS, WA 98532

RE: JACKSON VILLAS LANDSLIDE HAZARD SITE VISIT
0 JACKSON ROAD CHEHALIS, WASHINGTON
SECTION 03 TOWNSHIP 13N RANGE 02W PT LT 8 SE RD BLK 1 RICHARDT'S RPLT BLK 4-6 PARCUVIA ADD PRCL B BL-09-148 335384
PARCEL: 010799001000
AUGUST 14, 2021

Dear Fuller Designs:

This report is a follow-up to the initial site visit report of November 24, 2020. All American Geotechnical, Inc (AAG) was commissioned by Fuller Designs (client) in November, 2020, to do a site visit to determine the geology and landslide potential for the above parcel. This is in reference to a proposed development of multiple family dwellings on the parcel. The site visit was done by Curtis D Cushman, L.G., L.E.G., on November 13, 2020. The client representative was not on site. The day was rainy.

A pitting program to determine the nature of underlying soils and landslide deposits in select locations was undertaken on July 13, 2021. The day was sunny and Curtis D Cushman L.E.G. and Blaise Jelinek E.I.T. both of AAG were on site. Excavation was done by Jason Alvis in a SANY S4650C backhoe excavator. The client representative, Aaron Fuller ,was on site at the end of the pitting program. The program will be described below.

This report supersedes that of November, 2020 and any earlier report from 2021. The purpose of this report is to incorporate sub-surface pitting information into the site evaluation. This was at the request of the client and was done following the original report of November 2020.

SITE

The parcel is an imperfect rectangle, long to the northeast-southwest. A square section of the southernmost corner is omitted from the rectangle as it is not part of the parcel. This forms a blunt panhandle on the parcel's southwestern side which faces Jackson Highway. The northwest side is along Kennicott Road and the northeast side is along Hosanna Lane. The parcel looks like Nebraska.

The parcel slopes down to the southwest with the steepest area near the center of approximately16%. The edges of the roads commonly drop off steeply near the parcels southern end, less so to the north. The lower land is locally designated wetlands.

Site observation indicated various lithologies, dominantly silt with sand, and rare gravel present locally. According to the client, the area of material lining Hosanna Lane contains fill to a depth of 10 feet at least, including rubble, organic refuse, and blocks of concrete.

At the time of the pitting program, much of the upper part of the parcel had been scraped revealing the soil underneath. The initial site description was validated by the pitting program including the presence of fill which includes concrete and old pipes, fill soil, some rebar, etc.

SITE GEOLOGY

The parcel is overall mapped (Lewis County GIS and confirmed on the Centralia 100:000 Quadrangle) as being a "mass wasting deposit(s), mostly landslide" (**Qls**). This is a general description and is not site-specific. These deposits are common in the Centralia-Chehalis region where they are commonly associated with erosion and mass wasting of the **Qlh** Logan Hill Formation sediments at the end of the last glacial epoch.

Allen Fiksdal, in *Slope Stability of the Centralia-Chehalis Area Lewis County, Washington* (OF Report 78-2, 1978), mapped these features as **Ols -** Old Landslides. He wrote: "*...these areas are not generally observed to be unstable, but because of the nature of subsurface materials, low density development is recommended. Engineering studies should be required if natural slopes are over30 percent*." No such slopes were observed.

Site observation indicated various lithologies, dominantly sand and silt with minor gravel present as well. According to the client, the area of soil lining Hosanna Lane contains fill to a depth of 10 feet at least, including rubble, organic refuse, and concrete. This fill blankets much of the upper part of the parcel but to a lesser amount than at the northern property line. A "wedge" of fill, diminishing to the south, is inferred from this and appears to be confirmed in site observations and pitting.

Along this area and looking into the higher banks of material (as along Kennecott Road and Hosanna Lane) and the overall surface, there was no evidence of faulting, failure, or cracking on a large scale. There is abundant vegetation locally, mainly to the south, so some features may be obscure. *However, overall, there is no evidence of movement or downslope displacement.*

Liquefaction is **Low to Moderate**, and the site class is **D** which is **Stiff Soil.** Please see References**,** below**.**

The classification of the soil is based on the Washington DNR Site Class Map for Lewis County Washington. It is mapped as site class D. The DNR maps contain the following wording:

Because the data used in producing this site class map is based on regional geologic mapping, this map cannot be used to make a final determination at any specific locality. This determination requires a site-specific evaluation performed by a qualified practitioner.

In pitting, we found there to be silts on top of elastic silts. There is possibly some clay content in the latter, but Site Class E is specifically "Soft Clay Soil" and does not apply as this material is silt. A major difference in the two, despite some similarities, is that clays are chemically altered minerals with

characteristics different from silts. Clays are plastic, and silts are elastic. The difference is that silts do not change volume when under pressure whereas clays plastically deform and swell when hydrated.

The definition for Groups A to E in ASCE 7 is based on the top 100 feet of "soil and rock" measured below the base of the building. It is for this reason that soil types and underlying geology are commonly "lumped" into one classification or the other. At least one source (TSIB) considers Class D as "default." So design for the overall structure should follow design criteria for class D with the understanding that clay may be present, but, according to the lab analysis, it would be minor.

SITE HYDROLOGY

There was no ponding seen on the upper part of the property during the rain at the time of the first visit, but light sheet water flow was entering the parcel from the slope descending from Hosanna Lane. There is a wetlands delineated in the center of the property.

SITE SOILS

The USDA WSS maps most of the site as *Galvin silt loam, 0 to 8 percent slopes*.

89—Galvin silt loam, 0 to 8 percent slopes

Map Unit Setting

- *National map unit symbol:* 2hht
- *Elevation:* 100 to 1,770 feet
- *Mean annual precipitation:* 40 to 70 inches
- *Mean annual air temperature:* 52 degrees F
- *Frost-free period:* 150 to 200 days

Map Unit Composition

- *Galvin and similar soils:* 85 percent
- *Minor components:* 15 percent

Description of Galvin

Setting

- *Landform:* Alluvial fans
- *Parent material:* Alluvium derived from sandstone and shale

Typical profile

- *H1 - 0 to 14 inches:* silt loam
- *H2 - 14 to 41 inches:* silty clay loam
- *H3 - 41 to 60 inches:* silty clay

This corresponds in part, but same sandy material was seen. The description is generic, so the clay at the parcel is likely elastic silt. As there is fill on site, coarser sediments as well as concrete rubble and other fill materials are to be expected in the northern part of the parcel.

SITE VEGETATION

The site of the proposed development has been cleared to grass and scrub with the exception of isolated trees scattered on-site with some fringing trees and shrubs. The upper part has been mostly cleared as noted above. Fringing vegetation and growth along the property line to the southeast was mostly intact. The upper part of the lot was already cleared of most of the vegetation at the time of the pitting program. Areas in the mapped wetlands and fringing areas to the south of the proposed development are still vegetated but there is no evidence of landslides in these areas based on traverses.

PITTING

A total of six pits were dug and are described below. Please see site map after the text.

Pit 1

0-12" Brown sand. At 12" some concretion clots seen

12" – 6' Possibly ML as grain size is very fine. Grey layers are present and concretions with hematite mottling are present. Sample #1. The test results from MTC Labs indicates this is a sandy silt, with silt/clay (-200 sieve) fraction at 61.5% passing. Field tests indicate this is dominantly silt.

6' – 8' Picking up clay in grey material. There is silt/clay deposition to 8' T.D. Sample #2 is from this interval. This was classified as **MH** – *Elastic silt with sand*. While silt and sand dominate, there is a potential that there is a clay fraction of 38.8%. Plasticity index was 23.2%. Liquid limit was 55.8%. This sample has likely a large fraction of clay.

Pit 2

0 – 18" Dry dusty grey silty sand/sandy silt. First mottling seen at 18".

2' Material is clumping and excavating out in "plates." Composition appears silt-dominated.
2 ½' More mottling in greyer material – silt but minor clay present.

6' Heavily mottled – into richer clay layer w/manganese staining.

8' T.D. in material similar to same depth in Pit 1

Pit 3

0 – 5' Dry sandy silt

5' Takes on a clayey aspect as part of grey material with mottling

7' T.D. "Plates" of clay/mottled material sheen of water on surface of "plate."

Pit 4

0 to 3’ or 4’ Silty sand with gravel. Dark brown. Likely fill.

5’ Still the same but with small concretions. Looks like the native as seen in the top of Pits 1 to 3.

6’ – 7’ Manganese in deposits. No clay yet except in minor “blobs.”

T.D. 8’ Native silt/sand with clay. Abundant manganese stain.

Pit 5

Soil is mixed with concrete and brick

T.D. 2 ½’ Heavy concrete chunks in soil. No further progress.

Pit 6

0 – 4’ Apparent sand/silt dominant fill.

4’ Brown fine-grained native material

6’ – 8’ Sample #3. (Mislabeled Pit 2 by MTC). This sample is again a MH – *Sandy elastic silt*. The silt/clay fraction was -67.7%. Clays were only found to be 9.7% with the Plastic Index of 12%. The liquid limit was. 34.9%. This is a silt.

Note that buried turf was found at 5’ or 6’. Appears surface was pushed over and buried under a layer of import fill. (?)

The results of the tests of sample #1, #2, and #3 indicate this site is typical of the Logan Hill weathered “rind” and landslides derived from this material. It is a silt/clay mix with sand present all, in varying proportions. From the field work and lab analyses it is evident that the material sampled and described as “clay” in the notes is dominantly elastic silt.

The presence of fill in Pits 5 and 6 indicates that the fill that anecdotally was shoved into place from Hosanna Lane south is indeed prevalent in the development area of the parcel. At least 3 to 4 feet of fill was also found in pit 4. As the composition and compaction of this fill is unknown for the entire site, it is the task of the builders to insure that the footings they place are on competent and unyielding soil or structural fill at the individual building sites.

SITE WORK

Any material that is clearly fill may be built on if it is removed to a solid base and developed with structural fill. The removed existing fill must be disposed of in a manner in accord with local regulations. The native

material is too fine-grained to be used as structural fill for buildings, but it is suitable for landscaping and non-structural backfill.

Although the material is predominantly silt, the classification considers it elastic silt and there is the possibility of some clay present. Firm silts and stiff clays can easily be developed at1500 psf or greater (See "Conclusions, below), but wetting conditions can be critical in this case. The slope of the parcel, while not considered liable to deep-seated failure, is subject to creep and possible low-angle failure especially with applied loads. On the multiplex unit, keying of load-bearing slabs is recommended, and the spread footings should be designed to insure movement is resisted on the downslope side.

In these fine grained-materials, fabric would be advised for placement between the road subgrade and the engineered surface. There is no guarantee that if the road is to be paved that there shall be no infiltration into that area. If the design appears that water may enter and flow downslope, saturating the subgrade, then fabric is recommended to prevent the removal of fines and the subsequent settlement of the road.

Fabric is not considered necessary "beneath buildings." Adequate drainage and sufficiently designed footings in the fine-grained material are sufficient to prevent water infiltration and possible settlement. The concern is not so much swelling in clays, but simple washing out of fine-grained sediments which are nearly everything found on site where there isn't concrete rubble and other external fill. The Engineer of Record is assumed to be competent enough to keep the sub-grade and footings dry. It is on the EoR to determine the site-specific work needed to develop the parcel.

A vapor barrier is recommended beneath all slabs. This should be upon a gravel pad or as determined by the EoR.

CONCLUSIONS

The area is on landslide deposits which includes elastic silt and copious subsequent fill locally. The slope is low-angle, so all care needs to be done to ensure each building site is on competent deposits or structural fill.

In the case of the multiplex, it is recommended that design elements in the footing ensure the structure does not move en bloc downslope, although this is unlikely.

The material, as tested, would allow a bearing strength of 2200 lbs/ft^2. This is derived as the lower end of all three formulae presented on page 21 in the appendix: Terzaghi, Meyerhof, and Hansen.

Lateral pressures are:

Phi angle	25
ko	0.577
ka	0.406
kp	2.46

Based on the results of the site visits, pitting, and an extensive literature search, the parcel does not appear to pose a deep-seated landslide hazard. This determination is subject to change if, in construction, a glide

plane develops or there is mass wasting. Such an eventuality is not considered likely. Shallow creep is, however, possible and, due to the nature of the soils, moisture control shall be very important.

REPORT LIMITATIONS AND GUIDELINES FOR USE

We have prepared this report for the exclusive use of Fuller Designs and their authorized agents for the proposed building location in Lewis County, Washington. Within the limitations of scope, schedule and budget, our services have been executed in accordance with generally accepted practices in the field of geotechnical engineering in this area at the time this report was prepared. No warranty or other conditions, expressed or implied, should be understood.

READ THESE PROVISIONS CLOSELY

Some clients, design professionals, and contractors may not recognize that the geoscience practices (geotechnical engineering or geology) are far less exact than other engineering and natural science disciplines. This lack of understanding can create unrealistic expectations that could lead to disappointments, claims and disputes. All American Geotechnical includes these explanatory "limitations" provisions in our reports to help reduce such risks.

The equipment, techniques and personnel used to perform an environmental study differ significantly from those used to perform a geotechnical or geologic study and vice versa. For that reason, geotechnical engineering or geologic reporting does not usually relate any environmental findings, conclusions or recommendations; e.g., about the likelihood of encountering underground storage tanks or regulated contaminants. Similarly, environmental reports are not used to address geotechnical or geologic concerns regarding a specific project.

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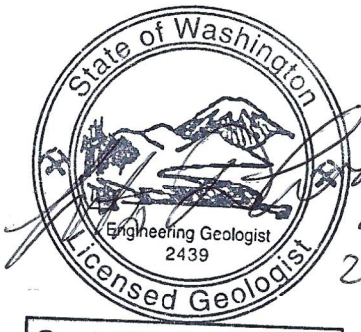
Respectfully Submitted,
GEOTECHNICAL TESTING LABORATORY



8/4/2021

Curtis D. Cushman, L.G., L.E.G.
Senior Engineering Geologist

REFERENCES

MAPS

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Palmer, Magsino, Poelstra, Bilderback, Folger, and Niggemann (September 2004), The *Liquefaction Susceptibility Map of Lewis County, Washington*, published by Washington State Department of Natural Resources.

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Ness, Fowler, Parvin (1987), The *Soil Survey of Lewis County, Washington, USDA Soil Conservation Service*, in cooperation with the United States Department of Agriculture, and Washington Agricultural Experimental Station, and the Soils Conservation Service.

Parks, Neal, Koloski, Laprade, Molinari, Butler, and Lorentson (November 2006), *Guidelines for Preparing Engineering Geology Reports in Washington*, published by Washington State Geologist Licensing Board, Olympia, Washington.

Sowers (1979), *Introductory Soil Mechanics and Foundations: Geotechnical Engineering*, Macmillan Publishing Co., Inc.

WEBSITES (FOUND COMMONLY ON GIS, WA GEO PORTAL, USDA WSS, AND OTHERS)

Lewis County Government Information Services
(http://www.co.lewis.wa.us)

Puget Sound Lidar Consortium (Through the Washington Geologic Portal)
(http://pugetsoundlidar.ess.washington.edu/lidardata/index.html)

Slope Stabilization Erosion Control Using Vegetation A Manual of Practice for Coastal Bluff
(http://www.ecy.wa.gov/biblio/9330.html)

United States Department of Agriculture Natural Resource Conservation Service
(http://soildatamart.nrcs.usda.gov)

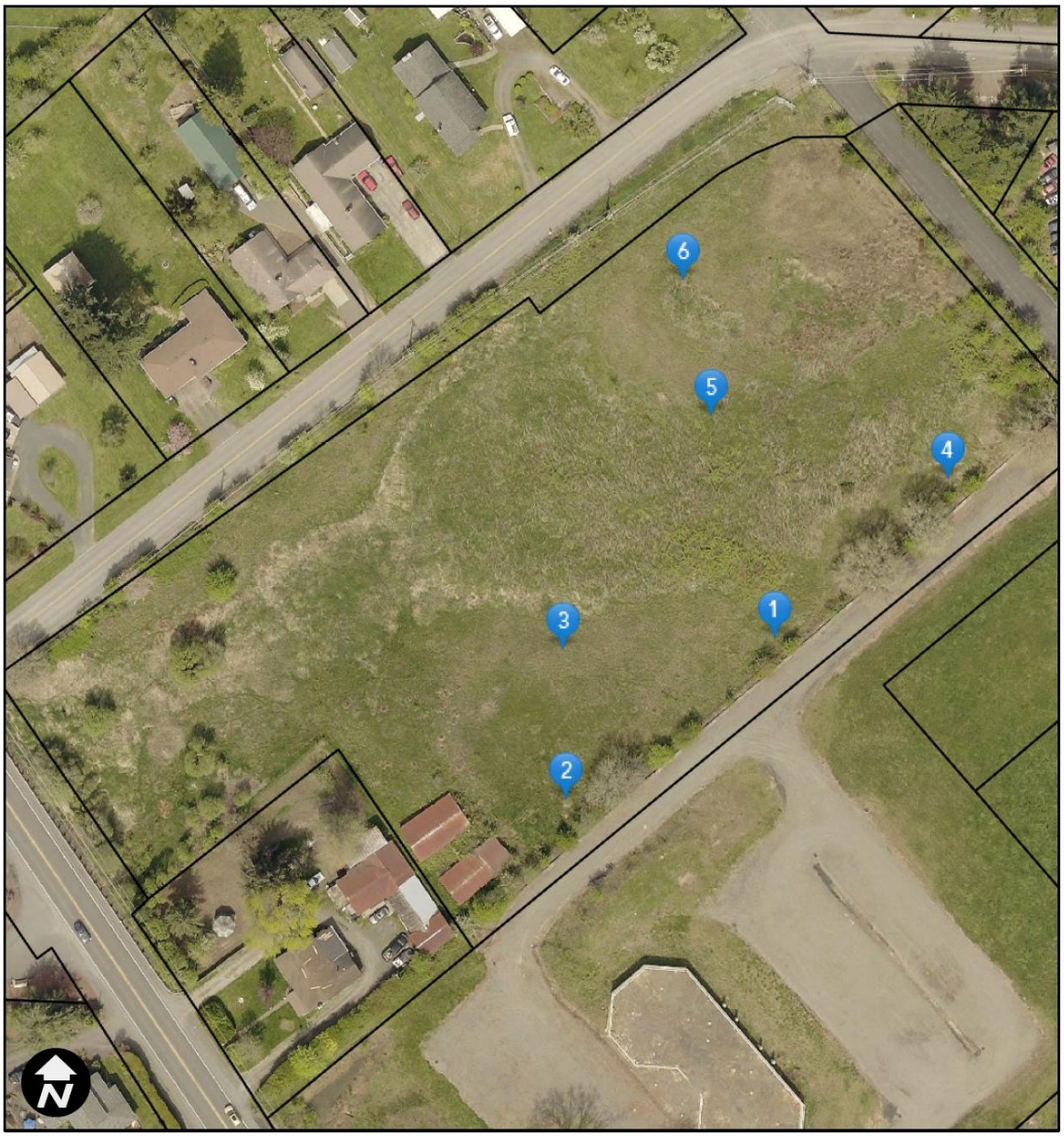
Washington Administrative Code

(http://apps.leg.wa.gov/wac/)

Washington Department of Ecology
(http://apps.ecy.wa.gov/welllog)
(https://fortress.wa.gov/ecy/coastalatlas/viewer.htm)

SAMPLING LOCATIONS

7-13-2021 program pit locations



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Parcels

0 50 100 200 ft

NAD 1983 StatePlane Washington South FIPS 4602 Feet

LEWIS COUNTY

Lewis County G.I.S.

LABORATORY RESULTS

SIEVE REPORT -- PIT 1 @ 6-FT BGS

Project: Q.C. All American Geotechnical - 2021
Project #: 21S031
Client: All American Geotechnical, Inc.
Source: Jackson Pit-1 @ 6 ft, sample #1
Sample#: B21-1067

Date Received: 13-Jul-21
Sampled By: Client
Date Tested: 16-Jul-21
Tested By: C. Kriss

Visual Soils Classification
Silt with Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

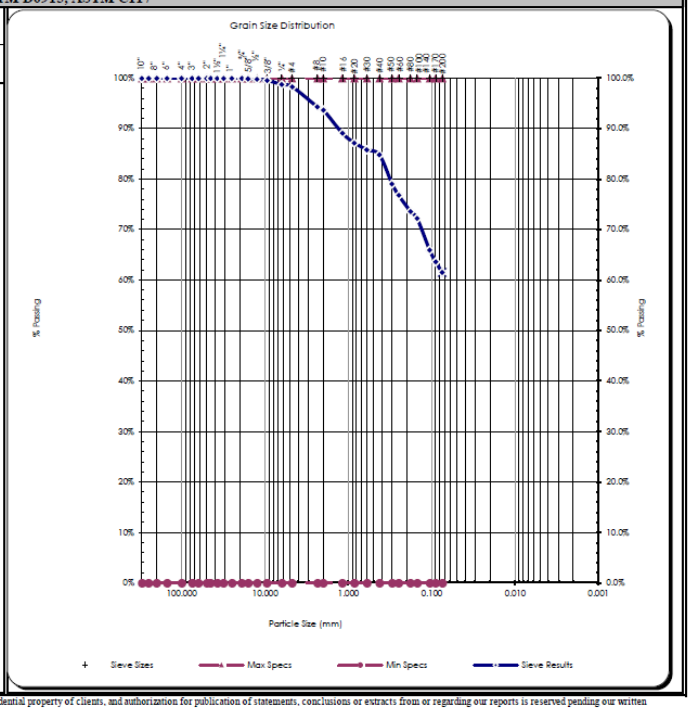
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ = 0.006 mm	% Gravel = 1.7%	Coeff. of Curvature, C_C = 1.50
$D_{(10)}$ = 0.012 mm	% Sand = 36.8%	Coeff. of Uniformity, C_U = 6.00
$D_{(15)}$ = 0.018 mm	% Silt & Clay = 61.5%	Fineness Modulus = 0.82
$D_{(30)}$ = 0.037 mm	Liquid Limit = n/a	Plastic Limit = n/a
$D_{(50)}$ = 0.061 mm	Plasticity Index = n/a	Moisture %, as sampled = n/a
$D_{(60)}$ = 0.073 mm	Sand Equivalent = n/a	Req'd Sand Equivalent =
$D_{(90)}$ = 1.343 mm	Fracture %, 1 Face = n/a	Req'd Fracture %, 1 Face =
Dust Ratio = 66/91	Fracture %, 2+ Faces = n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		99%	100.0%	0.0%
#4	4.75	98%	98%	100.0%	0.0%
#8	2.36		94%	100.0%	0.0%
#10	2.00	94%	94%	100.0%	0.0%
#16	1.18		89%	100.0%	0.0%
#20	0.850		87%	100.0%	0.0%
#30	0.600		86%	100.0%	0.0%
#40	0.425	85%	85%	100.0%	0.0%
#50	0.300		79%	100.0%	0.0%
#60	0.250		77%	100.0%	0.0%
#80	0.180		74%	100.0%	0.0%
#100	0.150	72%	72%	100.0%	0.0%
#140	0.106		66%	100.0%	0.0%
#170	0.090		64%	100.0%	0.0%
#200	0.075	61.5%	61.5%	100.0%	0.0%



Comments:

Reviewed by: Meghan Blodgett-Carrillo

MTG MATERIALS TESTING & CONSULTING, INC.

SIEVE REPORT -- PIT 1 @ 8-FT BGS

Project:	Q.C. All American Geotechnical - 2021	**Date Received:**	13-Jul-21
Project #:	21S031	**Sampled By:**	Client
Client:	All American Geotechnical, Inc.	**Date Tested:**	16-Jul-21
Source:	Jackson Pit-1 @ 8 ft, sample #2	**Tested By:**	C. Kriss
Sample#:	B21-1068		

Unified Soils Classification System
MH, Elastic Silt with Sand
Sample Color:
brown

ACCREDITED
Certificate #: 1366.01

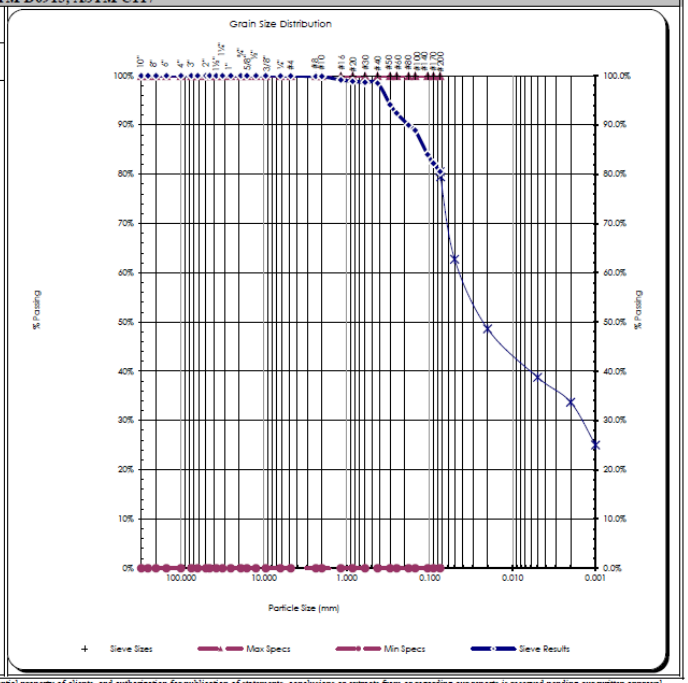
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.000	mm	% Gravel =	0.0%	Coeff. of Curvature, C_C = 0.07
$D_{(10)}$ =	0.000	mm	% Sand =	19.4%	Coeff. of Uniformity, C_U = 120.53
$D_{(15)}$ =	0.001	mm	% Silt & Clay =	80.6%	Fineness Modulus = 0.19
$D_{(30)}$ =	0.001	mm	Liquid Limit =	55.8%	Plastic Limit = 32.6%
$D_{(50)}$ =	0.035	mm	Plasticity Index =	23.2%	Moisture %, as sampled = n/a
$D_{(60)}$ =	0.048	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	0.181	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	9/11		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	100%	100%	100.0%	0.0%
1/4"	6.30		100%	100.0%	0.0%
#4	4.75	100%	100%	100.0%	0.0%
#8	2.36		100%	100.0%	0.0%
#10	2.00	100%	100%	100.0%	0.0%
#16	1.18		99%	100.0%	0.0%
#20	0.850		99%	100.0%	0.0%
#30	0.600		99%	100.0%	0.0%
#40	0.425	98%	98%	100.0%	0.0%
#50	0.300		94%	100.0%	0.0%
#60	0.250		92%	100.0%	0.0%
#80	0.180		90%	100.0%	0.0%
#100	0.150	89%	89%	100.0%	0.0%
#140	0.106		84%	100.0%	0.0%
#170	0.090		82%	100.0%	0.0%
#200	0.075	80.6%	80.6%	100.0%	0.0%



Comments:

Reviewed by: Meghan Blodgett-Carrillo

MTC MATERIALS TESTING & CONSULTING, INC.

HYDROMETER REPORT -- PIT 1 @ 8-FT BGS

Project:	Q.C. All American Geotechnical - 2021	**Date Received:**	13-Jul-21
Project #:	21S031	**Sampled By:**	Client
Client :	All American Geotechnical, Inc.	**Date Tested:**	16-Jul-21
Source:	Jackson Pit-1 @ 8 ft, sample #2	**Tested By:**	C. Kriss
Sample#:	B21-1068		

Unified Soils Classification System
MH, Elastic Silt with Sand
Sample Color
brown

ASTM D422, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.70	
Sample Weight:	50.10	grams
Hydroscopic Moist.:	7.75%	
Adj. Sample Wgt :	46.50	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
2	23	48.9%	0.0336 mm
5	23	48.9%	0.0213 mm
15	22	46.8%	0.0124 mm
30	20	42.5%	0.0088 mm
60	19.5	41.5%	0.0063 mm
250	16.5	35.1%	0.0031 mm
1440	15.5	33.0%	0.0013 mm

% Gravel:	0.0%	**Liquid Limit:**	55.8 %
% Sand:	19.4%	**Plastic Limit:**	32.6 %
% Silt:	41.7%	**Plasticity Index:**	23.2 %
% Clay:	38.8%		

ASTM C136

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	100%	9.500 mm
1/4"	100%	6.300 mm
#4	100%	4.750 mm
#10	100%	2.000 mm
#20	99%	0.850 mm
#40	98%	0.425 mm
#100	89%	0.150 mm
#200	80.6%	0.075 mm
Silts	79.8%	0.074 mm
	61.4%	0.050 mm
	48.6%	0.020 mm
Clays	38.8%	0.005 mm
	33.8%	0.002 mm
Colloids	25.1%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Clay Loam

Comments:

Reviewed by: Meghan Blodgett-Carrillo

MTG MATERIALS TESTING & CONSULTING, INC.

ASTM D4318- LIQUID LIMIT, PLASTIC LIMIT, & PLASTICITY INDEX OF SOILS -- PIT 1 @ 8-FT BGS

Project:	Q.C. All American Geotechnical - 2021	**Date Received:**	13-Jul-21
Project #:	21S031	**Sampled By:**	Client
Client:	All American Geotechnical, Inc.	**Date Tested:**	16-Jul-21
Source:	Jackson Pit-1 @ 8 ft, sample #2	**Tested By:**	C. Kriss
Sample #:	B21-1068		

Unified Soils Classification System
MH, Elastic Silt with Sand
Sample Color
brown

Liquid Limit Determination

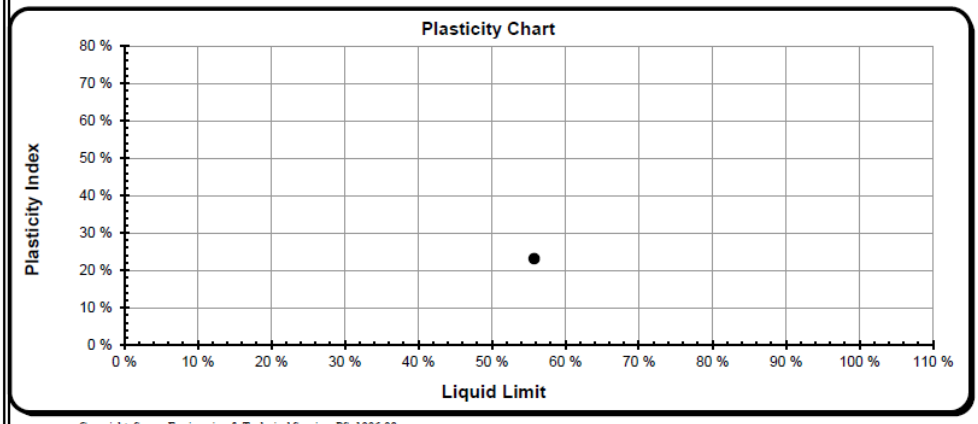
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	44.61					
Weight of Dry Soils + Pan:	38.89					
Weight of Pan:	28.63					
Weight of Dry Soils:	10.26					
Weight of Moisture:	5.72					
% Moisture:	55.8 %					
Number of Blows:	30					

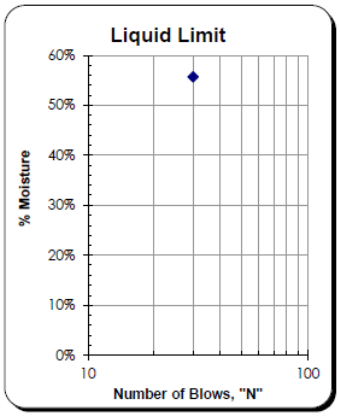
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: 56 %
Plastic Limit: 33 %
Plasticity Index, I_P: 23 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	37.72	37.19				
Weight of Dry Soils + Pan:	35.86	35.42				
Weight of Pan:	30.12	30.02				
Weight of Dry Soils:	5.74	5.40				
Weight of Moisture:	1.86	1.77				
% Moisture:	32.4 %	32.8 %				





Comments: _____

Reviewed by: Meghan Blodgett-Carrillo

MTG MATERIALS TESTING & CONSULTING, INC.

SIEVE REPORT -- PIT 2 @ 6-FT BGS

Project:	Q.C. All American Geotechnical - 2021	**Date Received:**	13-Jul-21
Project #:	21S031	**Sampled By:**	Client
Client:	All American Geotechnical, Inc.	**Date Tested:**	16-Jul-21
Source:	Jackson Pit-2 @ 6 ft, sample #3	**Tested By:**	C. Kriss
Sample#:	B21-1069		

Unified Soils Classification System
MH, Sandy Elastic Silt
Sample Color:
gray-brown

ACCREDITED
Certificate #: 1366.01

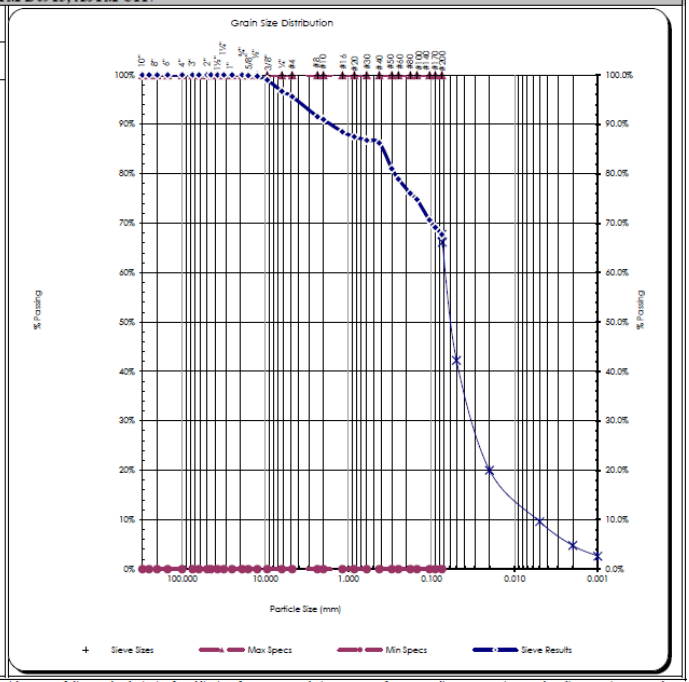
ASTM D2216, ASTM D2419, ASTM D4318, ASTM D5281

Specifications
No Specs
Sample Meets Specs ? N/A

$D_{(5)}$ =	0.002	mm	% Gravel =	4.4%	Coeff. of Curvature, C_C = 5.05
$D_{(10)}$ =	0.005	mm	% Sand =	27.9%	Coeff. of Uniformity, C_U = 13.06
$D_{(15)}$ =	0.010	mm	% Silt & Clay =	67.7%	Fineness Modulus = 0.83
$D_{(30)}$ =	0.043	mm	Liquid Limit =	34.9%	Plastic Limit = 23.2%
$D_{(50)}$ =	0.060	mm	Plasticity Index =	11.7%	Moisture %, as sampled = n/a
$D_{(60)}$ =	0.068	mm	Sand Equivalent =	n/a	Req'd Sand Equivalent =
$D_{(90)}$ =	1.677	mm	Fracture %, 1 Face =	n/a	Req'd Fracture %, 1 Face =
Dust Ratio =	11/14		Fracture %, 2+ Faces =	n/a	Req'd Fracture %, 2+ Faces =

ASTM C136, ASTM D6913, ASTM C117

Sieve Size US	Sieve Size Metric	Actual Cumulative Percent Passing	Interpolated Cumulative Percent Passing	Specs Max	Specs Min
12.00"	300.00		100%	100.0%	0.0%
10.00"	250.00		100%	100.0%	0.0%
8.00"	200.00		100%	100.0%	0.0%
6.00"	150.00		100%	100.0%	0.0%
4.00"	100.00		100%	100.0%	0.0%
3.00"	75.00		100%	100.0%	0.0%
2.50"	63.00		100%	100.0%	0.0%
2.00"	50.00	100%	100%	100.0%	0.0%
1.75"	45.00		100%	100.0%	0.0%
1.50"	37.50		100%	100.0%	0.0%
1.25"	31.50		100%	100.0%	0.0%
1.00"	25.00	100%	100%	100.0%	0.0%
3/4"	19.00	100%	100%	100.0%	0.0%
5/8"	16.00		100%	100.0%	0.0%
1/2"	12.50	100%	100%	100.0%	0.0%
3/8"	9.50	99%	99%	100.0%	0.0%
1/4"	6.30		97%	100.0%	0.0%
#4	4.75	96%	96%	100.0%	0.0%
#8	2.36		92%	100.0%	0.0%
#10	2.00	91%	91%	100.0%	0.0%
#16	1.18		89%	100.0%	0.0%
#20	0.850		88%	100.0%	0.0%
#30	0.600		87%	100.0%	0.0%
#40	0.425	86%	86%	100.0%	0.0%
#50	0.300		81%	100.0%	0.0%
#60	0.250		79%	100.0%	0.0%
#80	0.180		76%	100.0%	0.0%
#100	0.150	75%	75%	100.0%	0.0%
#140	0.106		71%	100.0%	0.0%
#170	0.090		69%	100.0%	0.0%
#200	0.075	67.7%	67.7%	100.0%	0.0%



Comments:

Reviewed by:
Meghan Blodgett-Carrillo

MTG MATERIALS TESTING & CONSULTING, INC.

HYDROMETER REPORT -- PIT 2 @ 6-FT BGS

Project:	Q.C. All American Geotechnical - 2021	**Date Received:**	13-Jul-21
Project #:	21S031	**Sampled By:**	Client
Client :	All American Geotechnical, Inc.	**Date Tested:**	16-Jul-21
Source:	Jackson Pit-2 @ 6 ft, sample #3	**Tested By:**	C. Kriss
Sample#:	B21-1069		

Unified Soils Classification System
MH, Sandy Elastic Silt
Sample Color
gray-brown

ASTM D422, HYDROMETER ANALYSIS

Assumed Sp Gr :	2.70	
Sample Weight:	50.09	grams
Hydroscopic Moist.:	3.60%	
Adj. Sample Wgt :	48.35	grams

ACCREDITED
Certificate #: 1366.01

Hydrometer Reading Minutes	Corrected Reading	Percent Passing	Soils Particle Diameter
2	12	22.4%	0.0359 mm
5	11.5	21.4%	0.0229 mm
15	9	16.8%	0.0134 mm
30	8	14.9%	0.0095 mm
60	6.5	12.1%	0.0068 mm
250	4	7.5%	0.0034 mm
1440	2	3.7%	0.0014 mm

% Gravel:	4.4%	**Liquid Limit:**	34.9 %
% Sand:	27.9%	**Plastic Limit:**	23.2 %
% Silt:	58.0%	**Plasticity Index:**	11.7 %
% Clay:	9.7%		

ASTM C136

Sieve Analysis
Grain Size Distribution

Sieve Size	Percent Passing	Soils Particle Diameter
3.0"	100%	75.000 mm
2.0"	100%	50.000 mm
1.5"	100%	37.500 mm
1.25"	100%	31.500 mm
1.0"	100%	25.000 mm
3/4"	100%	19.000 mm
5/8"	100%	16.000 mm
1/2"	100%	12.500 mm
3/8"	99%	9.500 mm
1/4"	97%	6.300 mm
#4	96%	4.750 mm
#10	91%	2.000 mm
#20	88%	0.850 mm
#40	86%	0.425 mm
#100	75%	0.150 mm
#200	67.7%	0.075 mm
Silts	66.6%	0.074 mm
	38.7%	0.050 mm
	20.0%	0.020 mm
Clays	9.7%	0.005 mm
	4.8%	0.002 mm
Colloids	2.6%	0.001 mm

USDA Soil Textural Classification

	Particle Size
% Sand:	2.0 - 0.05 mm
% Silt:	0.05 - 0.002 mm
% Clay:	< 0.002 mm

USDA Soil Textural Classification
Sandy Loam

Comments: _____

Reviewed by: Meghan Blodgett-Carrillo

MTG MATERIALS TESTING & CONSULTING, INC.

ASTM D4318- LIQUID LIMIT, PLASTIC LIMIT, & PLASTICITY INDEX OF SOILS -- PIT 2 @ 6-FT BGS

Project:	Q.C. All American Geotechnical - 2021	**Date Received:**	13-Jul-21
Project #:	21S031	**Sampled By:**	Client
Client:	All American Geotechnical, Inc.	**Date Tested:**	16-Jul-21
Source:	Jackson Pit-2 @ 6 ft, sample #3	**Tested By:**	C. Kriss
Sample #:	B21-1069		

Unified Soils Classification System
MH, Sandy Elastic Silt
Sample Color
gray-brown

Liquid Limit Determination

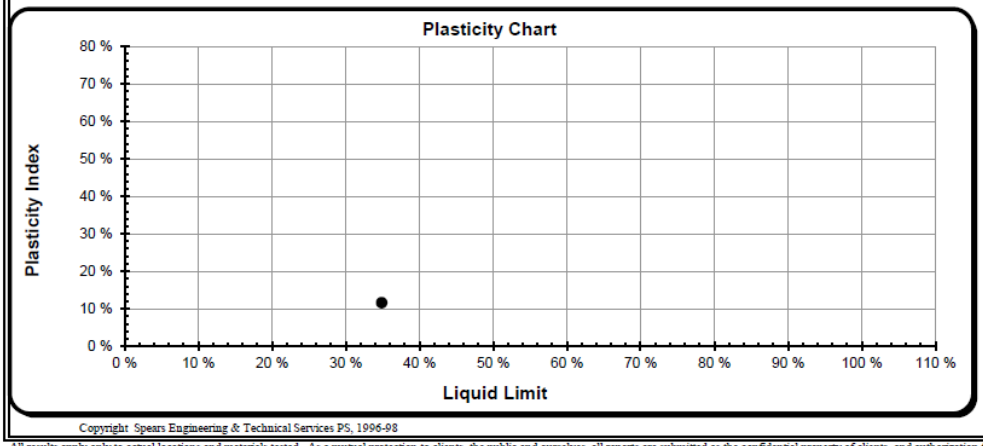
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	30.11	31.15	38.23			
Weight of Dry Soils + Pan:	27.36	28.09	32.98			
Weight of Pan:	19.47	19.94	19.47			
Weight of Dry Soils:	7.89	8.15	13.51			
Weight of Moisture:	2.75	3.06	5.25			
% Moisture:	34.9 %	37.6 %	38.9 %			
Number of Blows:	25	15	10			

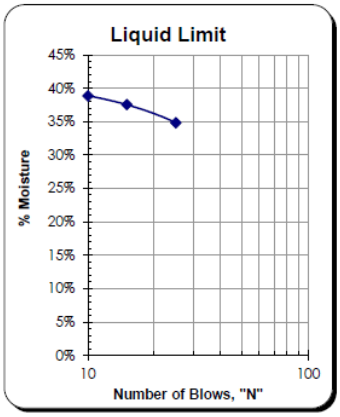
ACCREDITED
Certificate #: 1366.01

Liquid Limit @ 25 Blows: 35 %
Plastic Limit: 23 %
Plasticity Index, I_P: 12 %

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	34.76	36.94				
Weight of Dry Soils + Pan:	33.64	35.62				
Weight of Pan:	28.33	30.40				
Weight of Dry Soils:	5.31	5.22				
Weight of Moisture:	1.12	1.32				
% Moisture:	21.1 %	25.3 %				





Comments: _____

Reviewed by: Meghan Blodgett-Carrillo

MTG MATERIALS TESTING & CONSULTING, INC.

BEARING ANALYSIS

UNIT WEIGHTS

	lb	oz	decimal oz					Ny	Nc	Nq	
	7	2	0.125	7.125 lb/halfgal	14.25 lb/gallon	106.5974 lb/ft^3					
MH	clayey silts										
200 Cohesion											
25 Ø							25°	10.12	25.13	12.72	Terzaghi
MH	7	2	0.125	7.125	14.25	106.5974					
200 Cohesion											
25 Ø							25°	6.77	20.72	10.66	Meyerhof
MH	7	2	0.125	7.125	14.25	106.5974					
200 Cohesion											
25 Ø							25°	6.76	20.72	10.66	Hansen

BEARING

1/2 'y *		B *	Ny	+	c *	Nc	+	(pq+ ignored)	y *	Df *	Nq)	Bearing	F. O. S.	ULTIMATE BEARING	
0.5	107	1	10.12	+	200	25.13	+	0	106.5974	2	12.72				
			539.3829		5026				2711.838			8277.221	3	**2759.074**	Terzaghi
0.5	107	1	6.77		200	20.72		0	106.5974	2	10.66				
			360.8322		4144				2272.657			6777.489	3	**2259.163**	Meyerhof
0.5	107	1	6.76		200	20.72		0	106.5974	2	10.66				
			360.2992		4144				2272.657			6776.956	3	**2258.985**	Hansen