REPORT

GEOTECHNICAL INVESTIGATION

PROPOSED 10-LOT SUBDIVISION

APN 527-27-047
14915 Shannon Road
Los Gatos, California

for
Bud Elam
Elam Family Trust-A
14915 Shannon Road
Los Gatos, California. 95032

Project No. 205220
May 2021

MILSTONE GEOTECHNICAL

1 7 0 2 0 Melody Lane
Los Gatos, California 95033
www.milstonegeo.com

Tel 408.353.5528
Fax 802.448.1025
bsm@milstonegeo.com

MILSTONE
GEOTECHNICAL

May 17, 2021
Project No. 205220

Bud Elam
Elam Family Trust-A
14915 Shannon Road
Los Gatos, CA 95032

SUBJECT: Geotechnical Investigation
RE: Proposed 10-Lot Subdivision
14915 Shannon Road
Los Gatos, California

Dear Mr. Elam

Milstone Geotechnical has completed a geotechnical investigation for the above referenced site, in accordance with your authorization. The accompanying report presents the results of the investigation with conclusions and recommendations for the geotechnical aspects of the proposed development.

Based on the work performed for this investigation, we are pleased to report that, from a geotechnical perspective, the site is suitable for the proposed development if properly designed and constructed. It has been a pleasure providing professional services to you on this project and I look forward to continued service. If you have any questions regarding the contents of this report, or require additional assistance, please phone.

Sincerely,
MILSTONE GEOTECHNICAL

Barry S Milstone

Barry S. Milstone, G.E. 2111
Principal Geotechnical Engineer

1 7 0 2 0 Melody Lane
Los Gatos, California 95033
www.milstonegeo.com
Tel 408.353.5528
Fax 802.448.1025
bsm@milstonegeo.com

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INTRODUCTION

This report presents the findings and conclusions of a geotechnical feasibility investigation related to the development of a 10-lot subdivision with new single-family residences in Los Gatos, California (Figure 1). This investigation represents the initial phase of our proposal dated October 3, 2020.

Project Description

Based on communications with, and review of preliminary design documents provided by, Terry Szewczyk of TS Civil, it is our understanding that the project will involve subdividing the subject property into 10 individual lots in anticipation of the construction of new single-family residences and associated site improvements. It is our understanding that the properties will be serviced by the municipal sanitary sewer system.

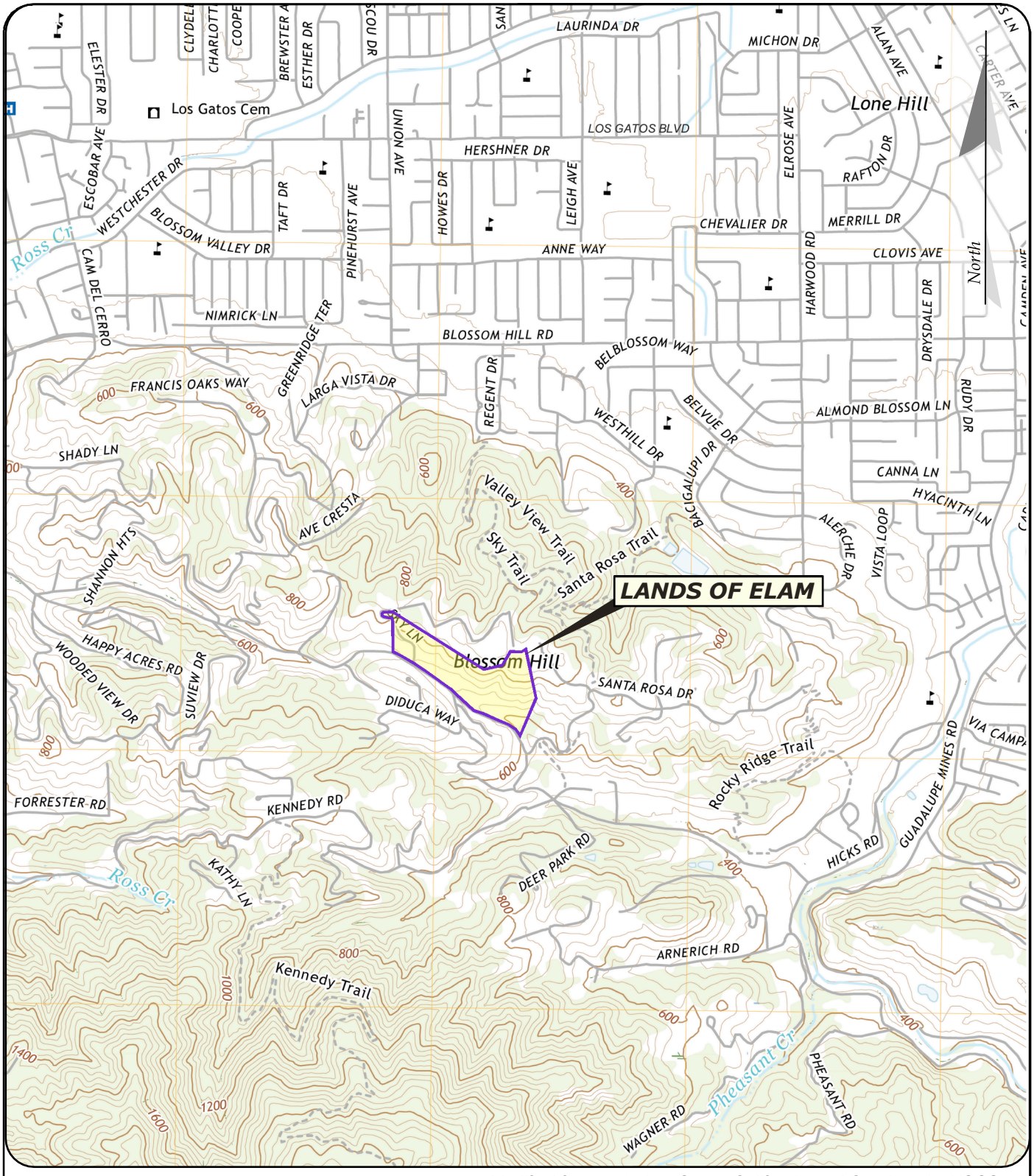
Purpose and Scope of Investigation

The investigation was predicated on the data and conclusions presented in a Engineering Geologic Investigation[1] performed by Steven Connelly, CEG, with whom we collaborated during the undertaking of our investigation. The purposes of the investigation were to characterize the geotechnical conditions of the proposed development areas and evaluate the feasibility of site development from a perspective of geotechnical constraints.

The scope of services undertaken for this investigation included the following tasks:

- Compilation and review of available published and unpublished engineering and geologic documents relevant to site development, including the geologic report prepared by Connelly[1];
- Coordination of subsurface investigations and consultation with the project geologist;
- Visual site reconnaissance to note pertinent geotechnical site conditions, identify potential borehole locations, and mark the site for utility notification of intended drilling;
- Logging and sampling of 11 exploratory test pits that were advanced and documented by Connelly[1];

[1] Connelly, Steven F., CEG, 2/5/21, Engineering Geologic Investigation, Proposed Subdivision, APN 537-27-04714915 Shannon Road, Los Gatos, California.



Modified from 2018 Los Gatos, California, 7.5' Quadrangle, USGS.

MILSTONE GEOTECHNICAL	**TOPOGRAPHIC LOCATION MAP** **LANDS OF ELAM** **14715 Shannon Road** **Los Gatos, California**	FIGURE NO. **1**
Date: May 2021	Scale: 1 inch = 2,000 feet	Drawn by: BSM
		Project No. 205220

- Drilling, logging, in-situ testing, and sampling of 19 small-diameter exploratory boreholes;
- Laboratory testing of representative subsurface materials to verify field classifications and determine index properties and pertinent engineering characteristics
- Analysis of the resulting data; and
- Preparation of this report and the accompanying illustrations describing the findings, conclusions, and recommendations.

SITE GEOLOGY

Geologic Setting

Site geology, including geologic and seismic settings, faulting, and landsliding, have recently been investigated and reported by Steven Connelly[1], project geologist. The investigation included review of previous nearby geologic studies and pertinent geologic documents, analysis of aerial photographs, visual reconnaissance, logging of 11 exploratory test pits, and review of data derived during the geotechnical investigation. The reader is referred to the referenced report for complete description of the investigation and discussion of their findings.

Based on the results of his investigation, Connelly[1], identified no evidence of "recent landsliding or faulting , in the form of fresh scarps, ground cracking, soil lineations, or disturbed vegetation." His subsurface investigation revealed that "resistant weathered bedrock of the Monterey Shale underlies the property at varying depths", and that, "thick soil deposits mantle the level or gently-inclined areas on the lower portion of the subject property". Furthermore, Connelly[1], reports that an active fault traverses the southwest portion of the property and he identifies three (3) potential debris flow source areas noting, however, that no recent debris flow tracks were observed. Consequently, he recommends further study to determine appropriate building setbacks from the fault and recommends avoiding, or structurally protecting against, the potential debris flow hazards.

In conclusion, Connelly[1] opines that "the soil or weathered bedrock should provide good support for the proposed residences" and that "the potential hazard from liquefaction, ground subsidence, lateral spreading, tsunamis, seiches, or flooding to the proposed subdivision is very low to minimal."

Seismicity

Connelly indicates that moderate to strong ground shaking is likely to occur at the site due to movement on one of the range front faults such as the Blossom Hill fault. Additionally, he indicates the possibility of secondary fissures or ground cracks that could damage the property.

Based on the most recent earthquake forecasts published by the Working Group on California Earthquake Probabilities[2], there is estimated to be a 72 percent chance of at least one magnitude 6.7 or greater earthquake occurring in the Bay Area region between 2014 and 2044. The property is expected to experience violent ground shaking during large earthquakes on the nearby segment of the San Andreas fault, similar to the level experienced in the 1906 earthquake.

The National Earthquake Hazard Reduction Program, the USGS[3] has classified the subject area to be within a Site Class C shaking hazard zone. This is generally consistent with a shear wave velocity of 471 meters per second (m/s) reported by Hartzell and others for similar South Bay deposits.

Anticipated Ground Surface Acceleration

The property is expected to experience violent ground shaking during large earthquakes on the nearby segment of the San Andreas fault, similar to the level experienced in the 1906 earthquake. Connelly[1] reports an anticipated peak site acceleration of 0.75g. The site modified peak ground acceleration is estimated to be 1.206g using the probabilistic parameters provided by the California OSHPD[4].

As a minimum, the proposed structure should be designed in accordance with the current California Building Code (CBC) standards for static and seismic design. More specific seismic design criteria are presented in the Geotechnical Design Criteria section. It should be noted that there is a paucity of data

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2 Field, E.H., Biasi, G.P., Bird, P., Dawson, T.E., Felzer, K.R., Jackson, D.D., Johnson, K.M., Jordan, T.H., Madden, C., Michael, A.J., Milner, K.R., Page, M.T., Parsons, T., Powers, P.M., Shaw, B.E., Thatcher, W.R., Weldon, R.J., II, and Zeng, Y., 2013, Uniform California earthquake rupture forecast, version 3 (UCERF3)—The time-independent model: U.S. Geological Survey Open-File Report 2013–1165, 97 p., California Geological Survey Special Report 228, and Southern California Earthquake Center Publication 1792, http://pubs.usgs.gov/of/2013/1165/.

3 United States Geological Survey, undated, Soil type and shaking hazard in the San Francisco Bay Area, https://earthquake.usgs.gov/hazards/urban/sfbay/soiltype/.

4 California Office of Statewide Health Planning and Development, 2008, Seismic Design Maps, https://seismicmaps.org.

available for near field sites, such as the subject site, and that it is possible that actual ground surface accelerations will exceed the current estimates.

SITE CONDITIONS

Site Setting

The approximately 26-acre property is situated on a southwest-facing hillside that descends from a northwest-trending ridgeline in the foothills near the base of the northeast flank of the Santa Cruz Mountains. The site is located on the north side of Shannon Road, approximately 2.2 miles east of its intersection with Los Gatos Boulevard (Figure 1) and three (3) miles east of the Los Gatos town center. The southwest property line that includes seven (7) proposed lots fronting Shannon Road extends from about 300 feet east of Sky View Terrace to about 1,500 feet west of Sky Lane. Three (3) of the proposed lots are located at the upper, northeast portion of the property and are accessed by a private drive extending off the east end of Sky Lane.

Surface Topography

The property descends southwesterly from an elevation of about 865 at the northeast corner to approximately 575 at the south east corner. The northeast development areas extend southwesterly from a ridgetop knoll area with a maximum slope inclinations at the outboard edges ranging from about 10 to 14 degrees. The slopes located below the northeastern development areas and the lower development areas descend southwesterly at inclinations approaching 30 degrees and include a number of mature broad drainage swales. The proposed development areas within the lower southwestern portion of the property area level to gently inclined with portions located at the base of the mid-slope inclined at up to about 15 degrees. An approximately ten feet tall prism of artificial fill supports a generally level, outdoor arena located near the mid-point of the southwest length of the property.

Surface Drainage

The development area drains generally by uncontrolled sheet flow toward the low-lying southwestern portion of the property, thence southeasterly along Shannon Road.

Existing Development

Historic aerial photographs indicate that the proposed development areas previously functioned as orchards beginning more than 65 years ago and we understand that portions of the property have been used for animal husbandry. A single-level, single-family residence, detached garage, and a number of barns and associated outbuildings are located within the lower western portion

of the property and appear to be part of the original farmstead. A number of unimproved graded trails network the hillsides.

Vegetation

The development areas are covered with local grasses and weeds with scattered oak and fruit trees, some isolated and others occurring in dense stands.

SUBSURFACE CONDITIONS

Milstone Geotechnical investigated the subsurface conditions of the site by examining the Connelly[1] test pits and by drilling, logging, in-situ testing, and sampling of 19 small-diameter exploratory boreholes to depths ranging from 12.5 to 30.0 feet using a track-mounted drill rig. The purpose of the subsurface investigation was to supplement data presented by Connelly[1], characterize the geotechnical subsurface conditions of the site, and obtain representative undisturbed samples for testing. The field investigation is discussed in more detail in Appendix A. Representative soil samples were transported to the laboratory to verify field descriptions and perform index testing. Laboratory test results are summarized following the material descriptions.

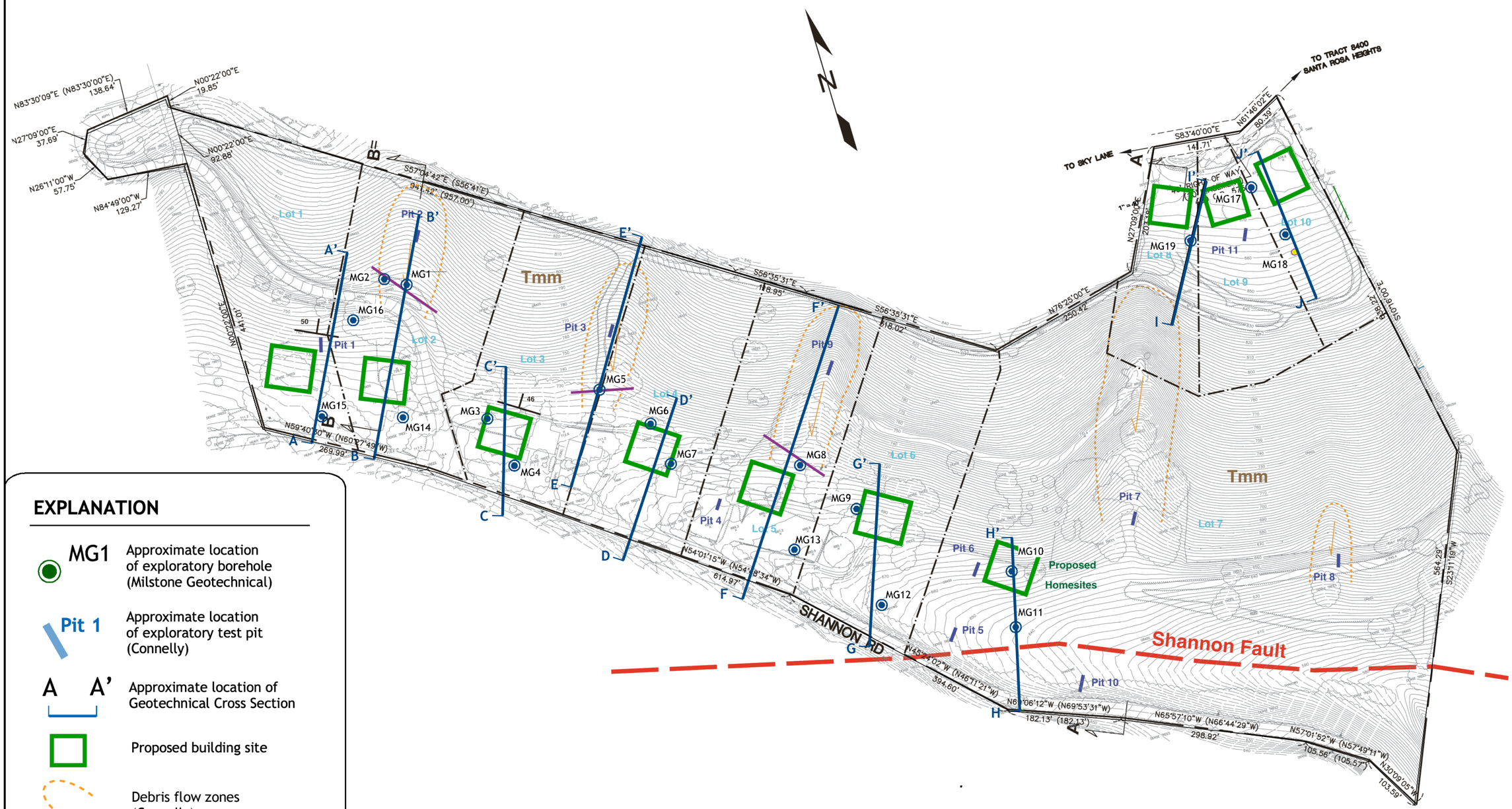
Subsurface Investigation

Subsurface exploration locations are depicted on Figure 2. Graphical logs of the small-diameter boreholes are presented in Appendix A of this report. Our interpretations of the available subsurface information across the proposed development areas are depicted on the Idealized Subsurface Cross Sections A-A' through J-J' (Figures 3 through 7).

Subsurface Materials

The findings of our subsurface investigation are consistent with those of Connelly[1], exposing colluvial and alluvial soils overlying weathered siltstone and shale. The subsurface materials are described in more detail below in order of decreasing age. More detailed descriptions of the encountered subsurface materials are presented in the exploratory borehole logs (Appendix A).

The following discussions present representative ranges and averages of the engineering properties of the encountered soils used for the purposes of this feasibility investigation. It is notable that all of the encountered subsurface material conditions are considered to be favorable with respect to the proposed development using foundation design and construction methods that can be considered conventional for the surrounding area. Although most of the



EXPLANATION

- MG1 — Approximate location of exploratory borehole (Milstone Geotechnical)
- Pit 1 — Approximate location of exploratory test pit (Connelly)
- A A' — Approximate location of Geotechnical Cross Section
- Proposed building site
- Debris flow zones (Connelly)

NOTES: Base map derived from 5/18/19 Geologic Map prepared by Steven Connelly using 3/13/19 Lot Layout Plan by TS Civil Engineering as base map. Locations of exploratory boreholes determined by tape and compass methods and are accurate only to the degree implied by this technique. This figure is not intended to be used for construction purposes.

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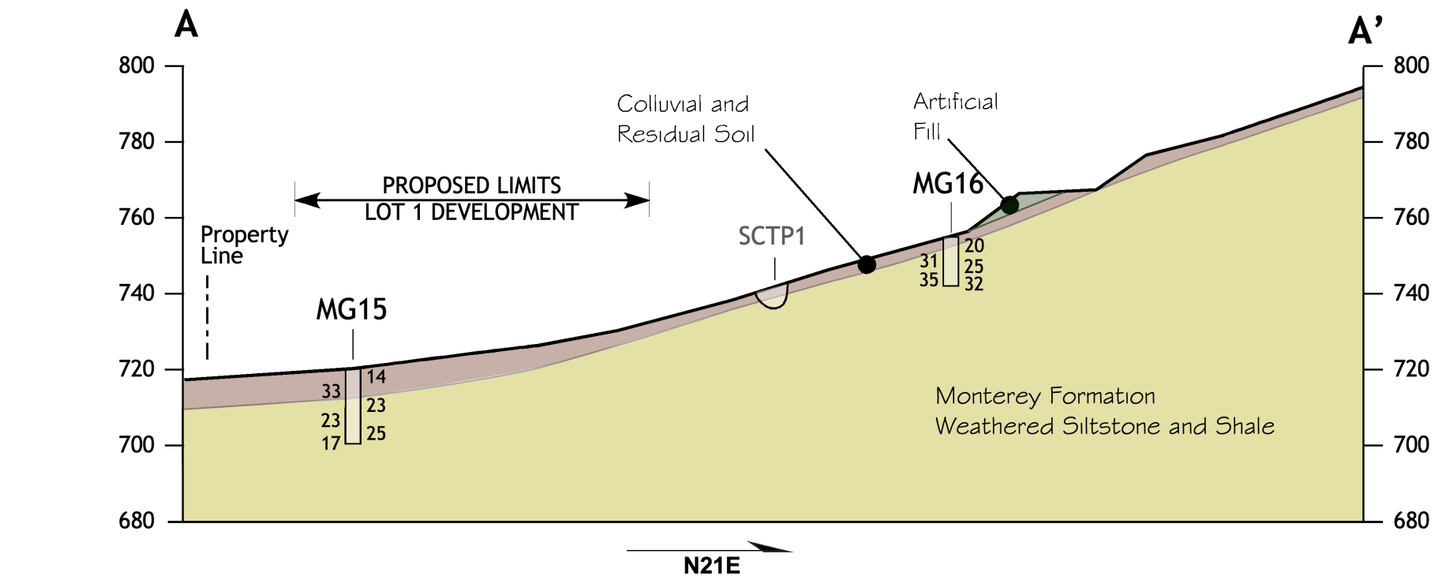
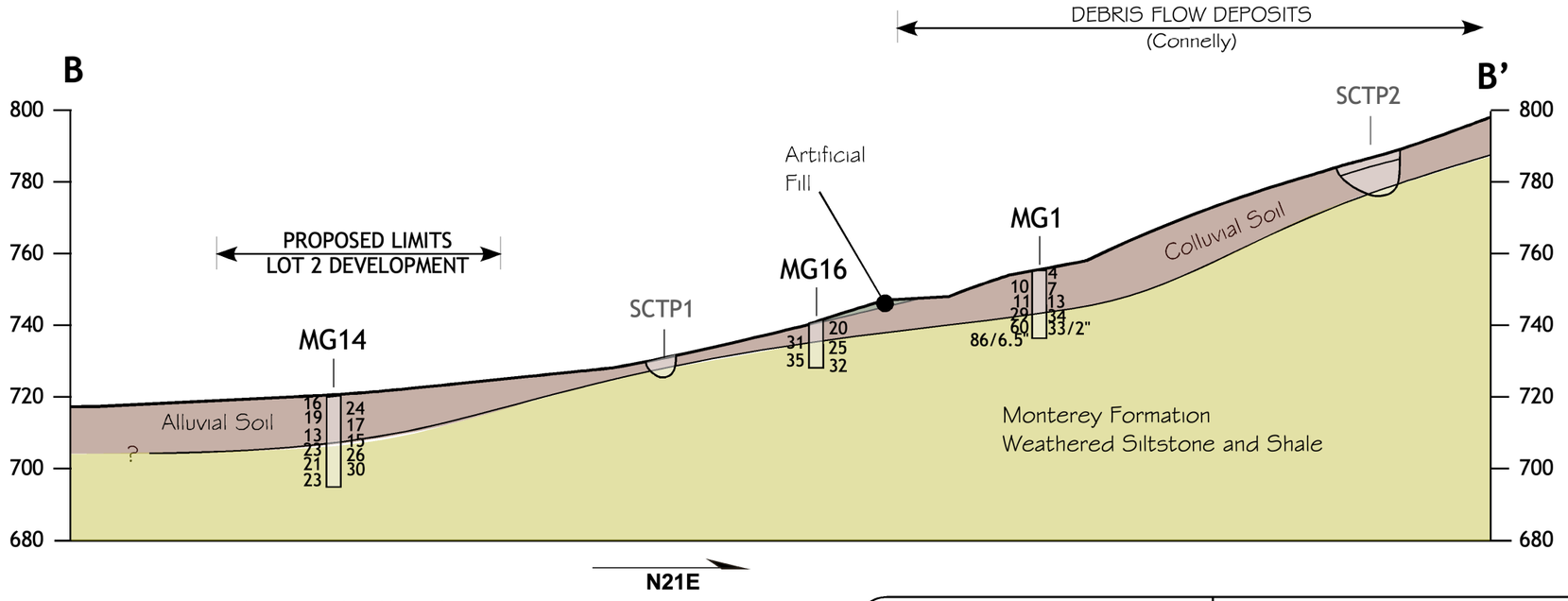
SITE PLAN AND EXPLORATION MAP

LANDS OF ELAM
14915 Shannon Road
Los Gatos, California

FIGURE NO. 2

Date:	Scale:	Drawn by:	Project No.
May 2021	1 inch = 160 feet	BSM	205220





NOTES: Surface topography derived from January 31, 2019 Topographic Map produced by Ruth and Going, Inc.. Locations of Milstone Geotechnical exploratory boreholes determined by tape and compass methods. Locations of test pits and limits of proposed developments derived from February 5, 2021 Geologic Site Map prepared by Steven Connelly. This figure is accurate only to the extent implied by the methods used.

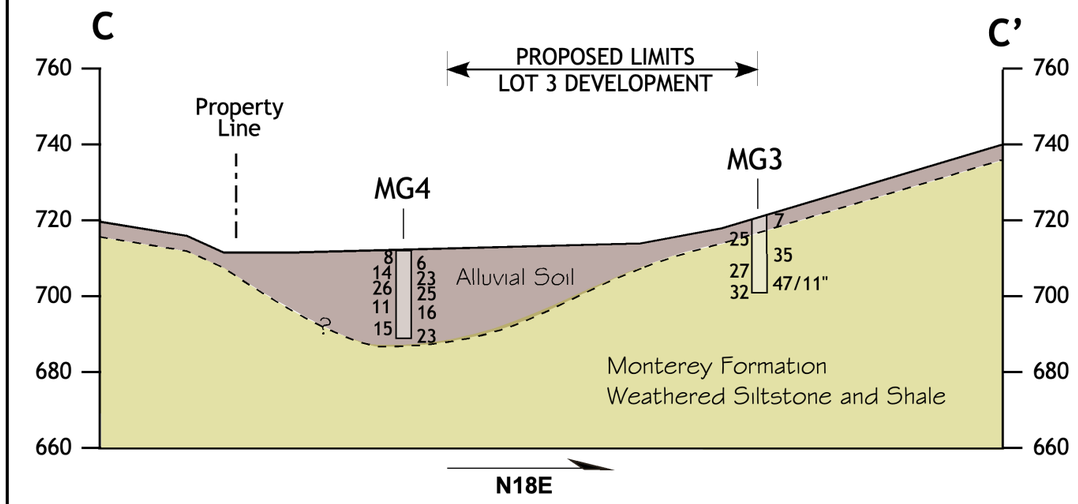
MILSTONE GEOTECHNICAL

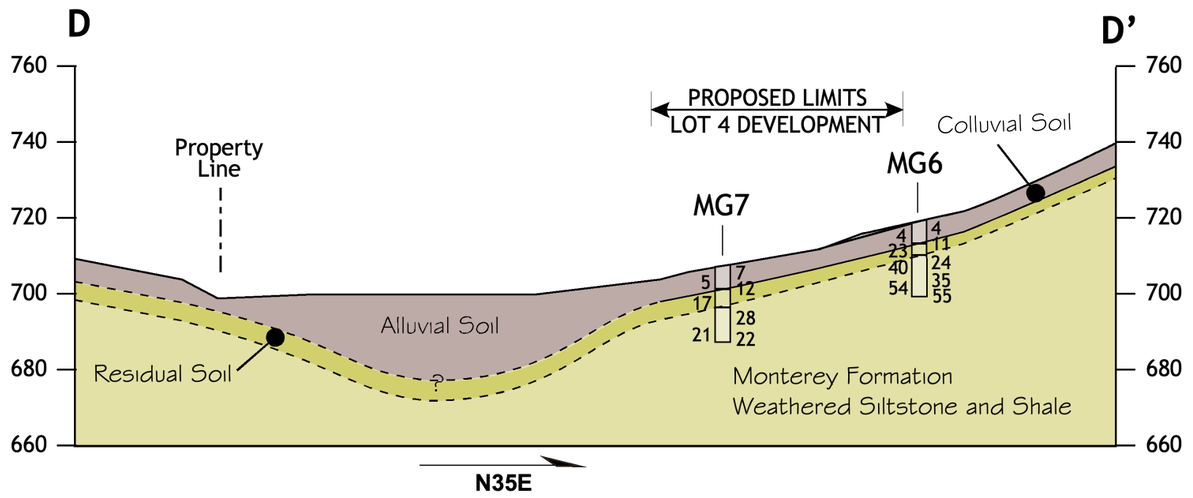
GEOTECHNICAL SECTIONS A-A' and B-B'

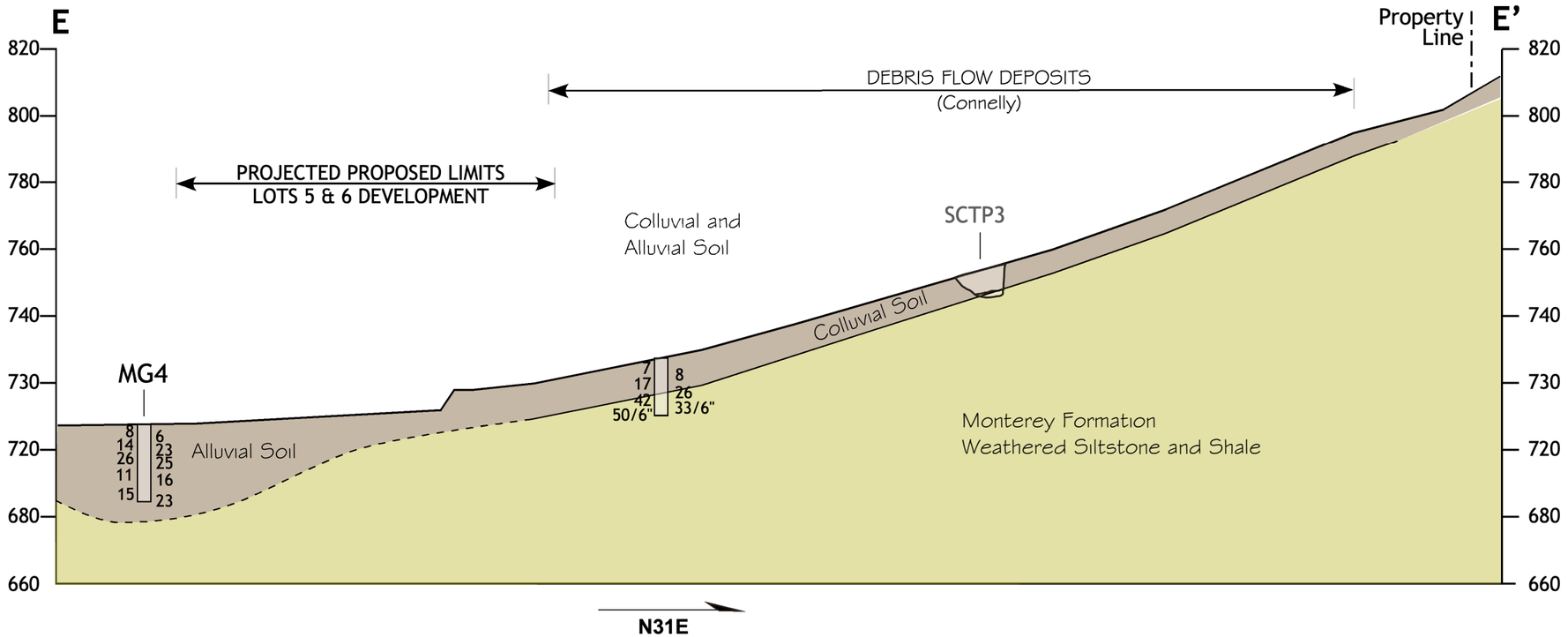
LANDS OF ELAM
14715 Shannon Road
Los Gatos, California

FIGURE NO. 3

Date:	Scale:	Drawn by:	Project No.
May 2021	1 inch = 40 feet	BSM	205220







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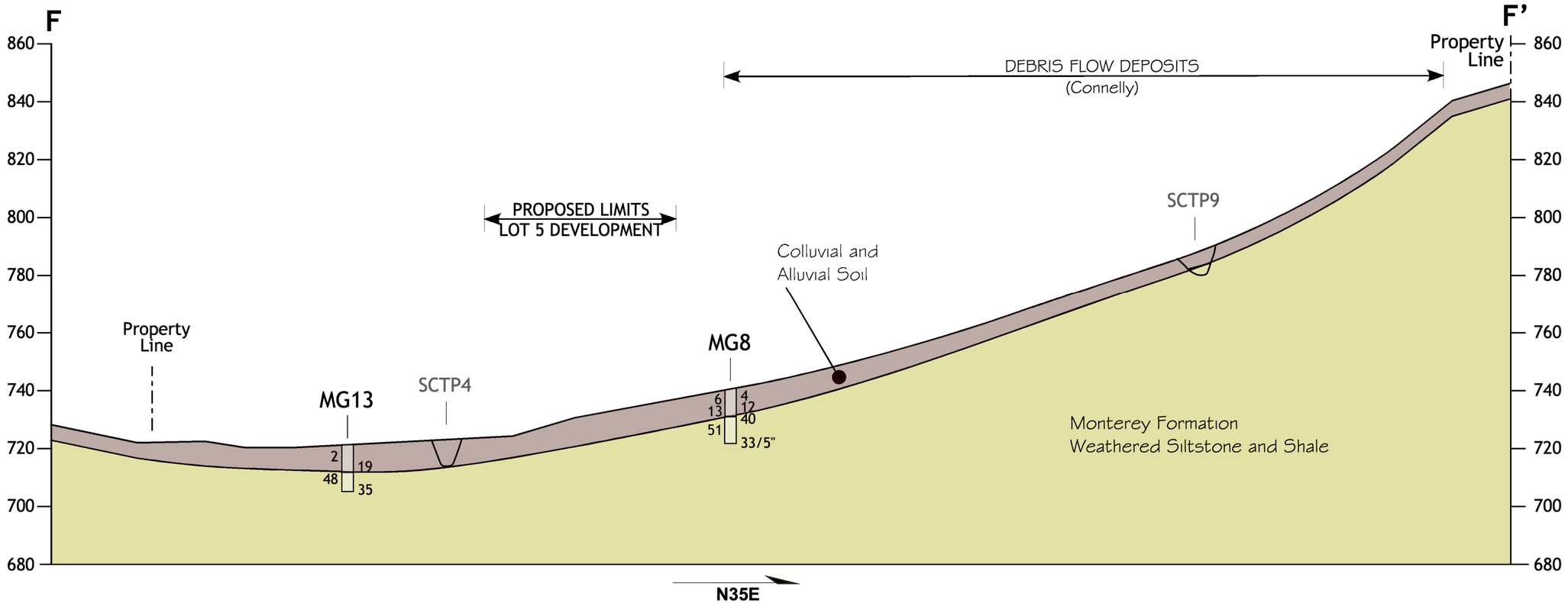
MILSTONE GEOTECHNICAL

GEOTECHNICAL SECTIONS C-C', D-D', and E-E'

LANDS OF ELAM
14715 Shannon Road
Los Gatos, California

FIGURE NO. 4

Date:	Scale:	Drawn by:	Project No.
May 2021	1 inch = 40 feet	BSM	205220



NOTES: Surface topography derived from January 31, 2019 Topographic Map produced by Ruth and Going, Inc.. Locations of Milstone Geotechnical exploratory boreholes determined by tape and compass methods. Locations of test pits and limits of proposed developments derived from February 5, 2021 Geologic Site Map prepared by Steven Connelly. This figure is accurate only to the extent implied by the methods used.

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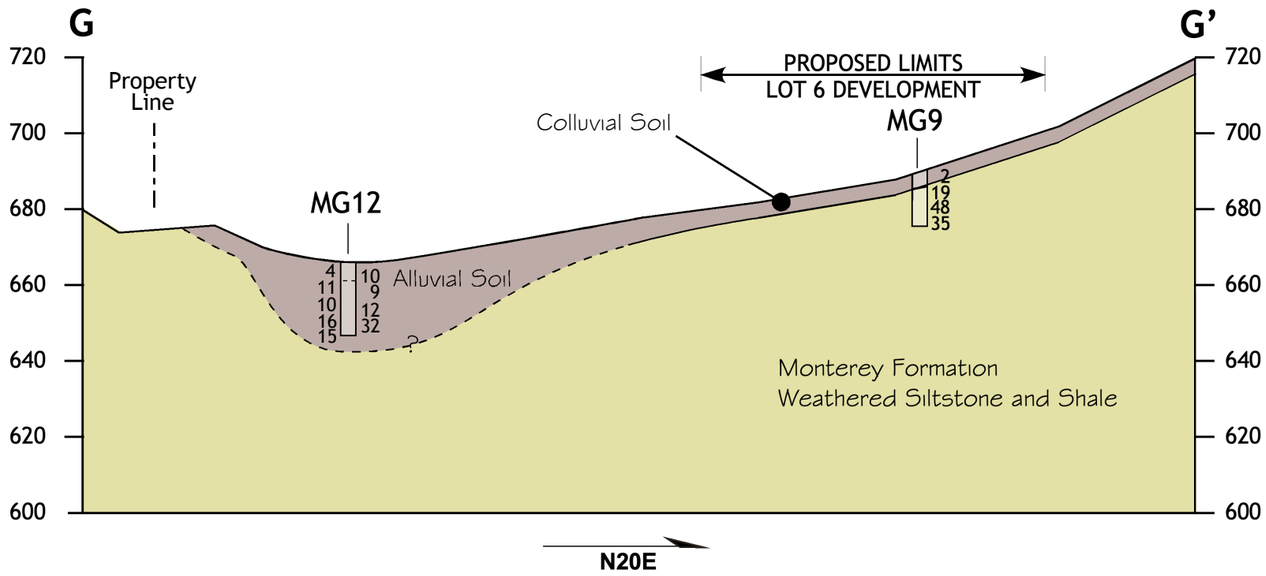
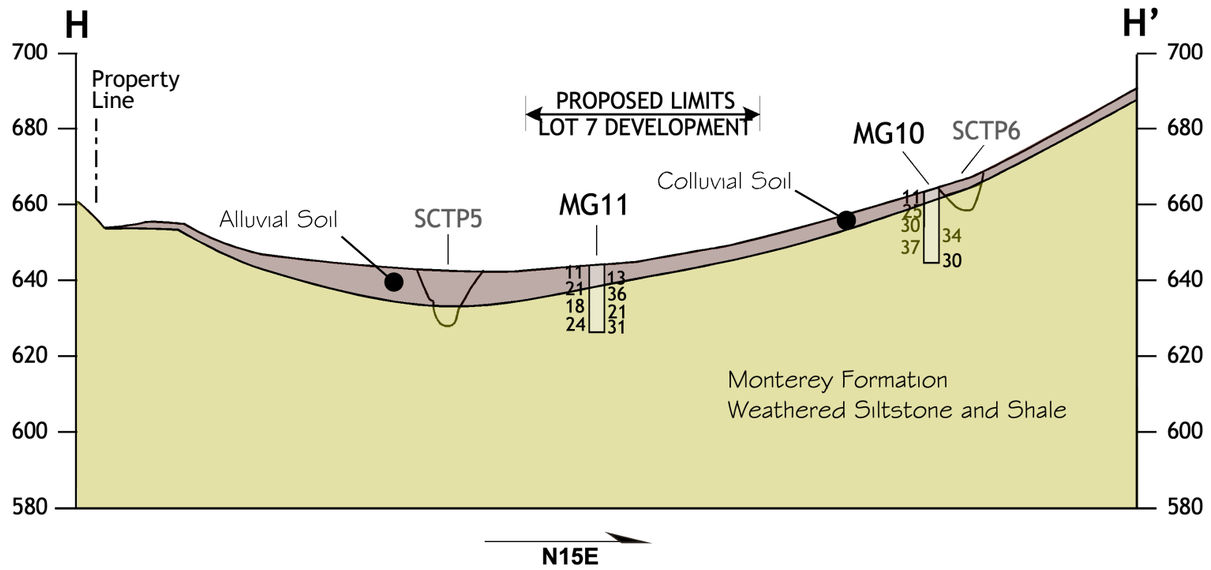
GEOTECHNICAL SECTION F-F'

LANDS OF ELAM
14715 Shannon Road
Los Gatos, California

FIGURE NO. 5

Date:	Scale:	Drawn by:	Project No.
May 2021	1 inch = 40 feet	BSM	205220





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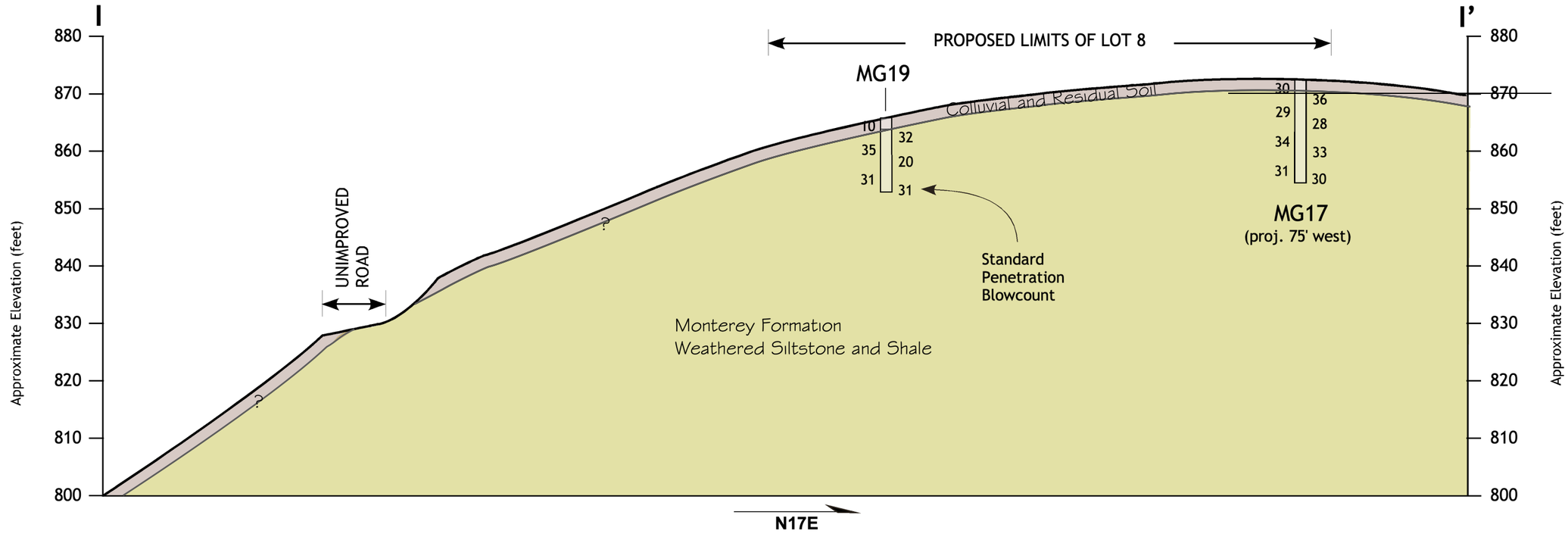
MILSTONE GEOTECHNICAL

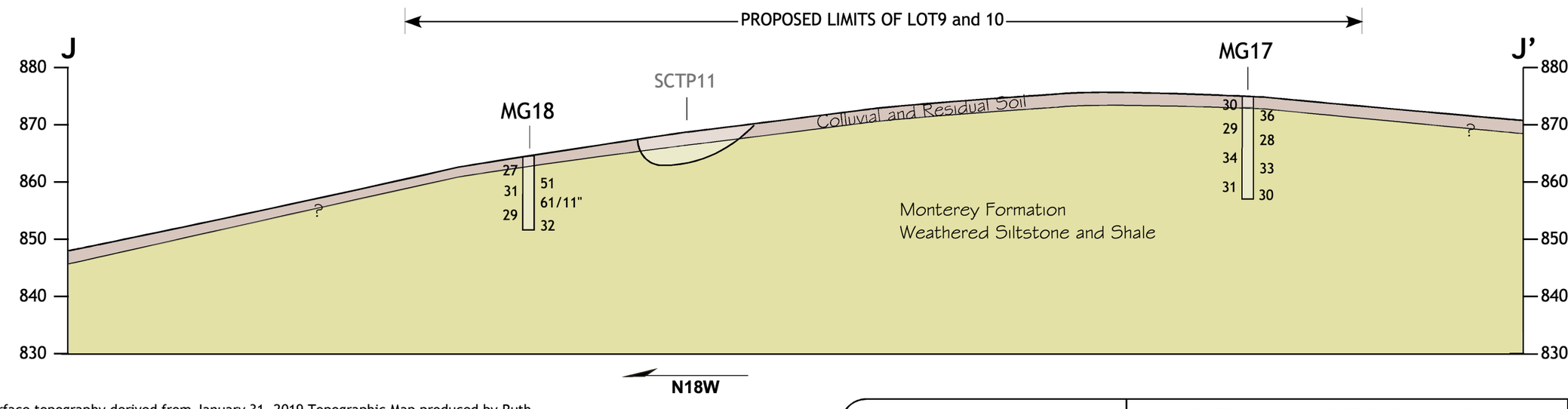
GEOTECHNICAL SECTIONS G-G' and H-H'

LANDS OF ELAM
14715 Shannon Road
Los Gatos, California

FIGURE NO. 6

Date:	Scale:	Drawn by:	Project No.
May 2021	1 inch = 40 feet	BSM	205220





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MILSTONE GEOTECHNICAL

GEOTECHNICAL SECTIONS I-I' AND J-J'

LANDS OF ELAM
14715 Shannon Road
Los Gatos, California

FIGURE NO. 7

Date:	Scale:	Drawn by:	Project No.
May 2021	1 inch = 20 feet	BSM	205220

encountered materials exhibit generally similar characteristics across the property, local variations require that site specific geotechnical design parameters be determined using the provided field and laboratory test data following final siting and configuration of the proposed improvements.

Weathered Monterey Formation

At depth, the site is underlain by weathered bedrock of the Monterey Shale formation as identified by Connelly[1]. The encountered weathered bedrock is generally consistent throughout the property and is characterized predominantly as weathered to severely weathered siltstone that is soft, weak, friable, moist, and intensely fractured, with soft to medium hard siltstone clasts and exhibiting remnant rock structure. These materials are encountered at or within two (2) feet of the ground surface at the uppermost knoll area in the northeast portion of the study area, are mantled by about seven (7) to 12 feet of colluvial soils within the mapped swale areas, and beneath up to about 14 feet of alluvial soils in the lower-lying southern portion of the property. The upper two to five (2 to 5) feet of the encountered bedrock often demonstrates somewhat more advanced weathering to a residual soil.

Standard penetration blowcounts in these materials consistently range from about 20 to in excess of 50 blows per foot (bpf) throughout the depths explored, typically averaging about 34 bpf. Pocket penetrometer resistance within the weathered bedrock typically exceeds 4.5 tons per square foot (tsf).

The dry density and moisture content of 26 undisturbed samples of the weathered siltstone demonstrates little variability across the property with the exception of a number of isolated samples, yielding an average dry density and moisture content of 81 pounds per cubic foot (pcf) and 33 percent. Eleven unconfined compression tests yielded unconfined compressive strengths ranging from 4,851 to 10,426 pounds per square foot (psf). Neglecting the three highest test results yields a more representative average unconfined compressive strength of 5,873 psf. Saturated direct shear testing of a representative sample of the siltstone exhibited a peak friction angle of 32 degrees with apparent cohesion of 1,761 psf.

The residual soils and weathered bedrock are considered to provide favorable foundation conditions for the proposed development.

Alluvial Deposits

At the lower, more gently inclined locations along the southwestern portion of the property, the Monterey formation is overlain by up to 14 feet of locally derived alluvial soils where encountered with the exception of Lot 3 and the lower reaches of Lot 4 where bedrock was not encountered through the full 23-feet depths explored. The alluvial soils typically consist of variably low- to high-plasticity, stiff to hard, moist silty and sandy clay with up to about 10 percent fine siltstone gravel and up to 40% very fine- to fine-grained sand with lesser amounts of medium dense to dense clayey sand.

Standard penetration blowcounts in these materials typically ranged from four (4) to 31 bpf with a number of outlying results and demonstrate a generally increase with depth, averaging about 15 bpf within the upper 10 feet and 20 bpf below. The alluvial soils encountered at Lot 6 were observed to be lower, ranging from 4 to 12 bpf with an average of 10 bpf below three (3) feet. Unconfined compressive strengths estimated from pocket penetrometer tests within the alluvial soils typically range from 3.0 to greater than 4.5 tons per square foot (tsf) with the exception of Lot 6 where pocket penetrometer resistance ranged from 1.6 to 2.3 tsf.

The dry density and moisture content of 16 undisturbed samples of the encountered alluvial soils averaged 81 pcf and 32 percent, respectively. Seven (7) unconfined compression tests exhibited unconfined compressive strengths typically ranging from 4,376 to 7,266 psf with one uncharacteristically high and one low result. Saturated direct shear testing of four (4) representative samples of the alluvial soils demonstrated peak friction angle and apparent cohesions pairs of 13.3 degrees/1,133 psf, 20 degrees/178 psf, 24.5 degrees/488 psf, and 32.1 degrees, 1,237 psf.

Surficial and Colluvial Soil

The hillsides are blanketed by up to about six (6) feet of colluvial soils derived by advanced weathering and downslope creep of the underlying weathered materials. Up to 12 feet of these soils also fill the three swales identified by Connelly[1] to be potential debris flow sources at the upper portions of Lots 2 through 5. These materials typically consist dark grayish brown and brownish yellow, firm to stiff, damp to moist, silty and sandy clay, and lesser amounts of clayey silt) with over 60 percent fine-grained materials and up to 20 percent

fine- to coarse-grained sand and fine siltstone and shale clasts. By appearance and field characterization, these soils appear to exhibit low to medium plasticity with lesser amounts of high plasticity soil. However, Atterberg Limits testing of three representative samples reveal liquid limits ranging from 63 to 75 with plasticity indices ranging from 33 to 43 indicative of highly plastic clay and silt. The anticipated performance of the colluvial and alluvial soils should be verified with supplemental testing prior to final development design.

Twenty three penetration tests demonstrated a range of two (2) to 13 bpf with an average of seven (7) bpf. average standard penetration blowcount of 14 blows per foot (bpf). One vane shear test performed in surficial soils at a depth of one (1) foot indicate an undrained shear strength of 1.5 tsf and two (2) tests performed below five (5) feet suggest shear strengths in excess of 2.7 tsf. Pocket penetrometer testing in the colluvial clays estimate unconfined compressive strengths ranging from 1.8 to 3.5 tsf.

Thirteen samples of the surficial and colluvial soils reveal general similarity across the with an average dry density of 74 psf and average moisture content of 33 percent. Three (3) unconfined compression tests yielded an unconfined compressive strength range of 2,003 to 2,939 psf. Saturated direct shear testing of two (2) representative sample of the colluvial soils obtained near the mouths of swales demonstrated peak friction angles and apparent cohesion pairs of 23 degrees/639 psf and 22 degrees/130 psf with corresponding ultimate strength pairs of 29 degrees/154 psf and 35 degrees/139 psf

Artificial Fill

Up to about ten feet of artificial fill has been identified at the outboard portion of the arena are located on Lots 5 and 6 with lesser amounts identified at the outboard edges of the unimproved trails. Where encountered in borehole MG13, the fill consists of clayey sand and firm sandy clay with medium to high plasticity fines that appear to have been derived from local sources. One standard penetration blowcount of five (5) bpf suggests that the fill was not adequately compacted at the time of placement.

GROUND WATER

Ground water was not encountered in any of the 19 boreholes advanced for this investigation to a maximum depth of 30 feet. It should be noted that ground water conditions at other locations and times, or during different weather conditions might differ from those encountered in our test boreholes. Nevertheless, based on the results of our subsurface investigation and collected data, it is anticipated that construction of the proposed improvements will not be adversely affected by ground water if constructed during the dry season.

DEBRIS FLOW SOURCE STABILITY

Connelly[1] has identified four (4) bowl-shaped drainage swales that "appear to be potential debris flow source terrains." Three (3) of the swales are located upslope of proposed development areas. Debris flows are typically initated as soils liquefy and flow rapidly downslope in response to increased pore pressures during periods of intense rainfall. Consequently, screening level slope stability analyses were performed to assess the relatively likelihood of debris flow activity on the Lot 2 swale, which represents the thickest swale infill, and the Lot 5 swale, which represents the steepest of these features.

Methodology

Slope stability was evaluated using SLIDE[5], a limit equilibrium computer program developed by Rocscience, Inc. An idealized slope model was developed using site geometry, subsurface stratigraphy, ground water conditions, engineering properties of the site soils, and anticipated seismic loading conditions as described previously in this report. Thousands of potential failure surfaces were evaluated with the SLIDE program using Spencer's method of analysis with continued model refinement to result in the lowest factor of safety. The factor of safety is defined as the ratio of forces resisting failure to those that could drive failure. A factor of safety of 1.5 is generally considered to be the minimum acceptable factor of safety under static conditions.

Geometry

The analyzed surface geometries were developed from the topographic map prepared by Ruth and Going. The subsurface material contacts were interpreted from the borehole and test pit data collected for this investigation.

[5] Rocscience, Inc., SLIDE version 5.044.

Soil Properties

The following table summarizes the soil strength properties used in the stability analyses. The shear strengths were determined from saturated and undrained direct shear testing with the lowest result of three tested samples used for the colluvium. Saturated densities were estimated based on assumed specific gravities of 2.65.

Soil Properties for Stability Analyses

	Moist Density (pcf)	Saturated Density (pcf)	Apparent Cohesion (psf)	Friction Angle (deg)	Pore Pressure Ratio
Colluvial Soil	98	111	639	23	0.5
Weathered Monterey Fm.	108	114	1,761	32	0.0

Ground Water

Although no ground water was encountered in any of the subsurface exploration locations advanced for this investigation, the presence of precipitates indicates previous increased levels of moisture. To model potential debris flow conditions, the analyses presume that antecedent and intense episodic rainfall will permeate the generally cohesive colluvial soils causing the ground water level within the swales to rise to the ground surface resulting in a pore pressure ratio (r_u) of 0.5.

Analysis and Results

This analysis yielded a factor of safety against failure of the colluvial soils in the Lot 2 swale of 2.52 (Figure 8) resulting from rainfall-induced saturation. Critical failure surfaces within the Lot 5 swale colluvium exceeded 3.0 (Figure 9) The current analyses suggest a low potential for rainfall induced debris flows within the subject drainage swales. These results are supported by other site observations and conditions as described in a subsequent section.

DISCUSSIONS and CONCLUSIONS

Based on the findings of this investigation and our review of the Connelly[1] geologic investigation, it is our opinion that the geotechnical conditions of the site are suitable for the proposed subdivision and anticipated residential development using site specific geotechnical design based on the final proposed location and configuration of site improvements. Furthermore, it is our opinion that all encountered geotechnical site conditions can be successfully addressed using design and construction techniques that are typical for Bay Area hillside development. We conclude that the primary geotechnical factors affecting the design and construction of anticipated improvements are the hillside setting, relatively weak and creep-prone near-surface soil, presence of potential debris-flow source areas, potentially expansive near-surface soils, areas of variable foundation conditions, and the potential for significant ground shaking caused by an earthquake on the nearby active San Andreas and Berrocal fault systems.

The following discussions summarize our findings and conclusions regarding the geotechnical aspects of the proposed improvements as determined from the presented data.

Foundation Design

Based on the results of this investigation, we believe that each of the proposed 10 lots are suitable for residential development of either ground level or basement structures using foundation design and construction methods that are typical for Bay Area hillside development such as drilled piers-and-grade beams, stiffened shallow foundations such as rigid grids and reinforced mats, engineered fill pads, and lime treatment of near-surface expansive soils, not to the exclusion of other methods.

Although it is anticipated that proposed building site locations may change prior to final design. For initial planning purposes, the following three basic foundation soil conditions within the property may be considered:

a. Lots 1 through 7, Upper, moderate to steeply sloping areas - Resistant weathered bedrock was typically encountered below about two to five (2 to 5) feet of variably plastic, moderate strength silty clay that may be subject to downslope creep on the steeper portions of the lots.

b. Lots 1 through 7, Lower, gently sloping areas -
The lower portions of these lots are underlain by variable thicknesses of moderate strength alluvial soils that may experience shrink-swell behavior resulting from seasonal moisture fluctuations.

c. Lots 8, 9, and 10 -
Resistant weathered bedrock was encountered at these sites beneath approximately two (2) feet of medium dense clayey sand.

Expansive and Creep Prone Soil

The results Atterberg Limits testing of three (3) representative samples of the encountered colluvial and alluvial soils indicate that they consist of highly expansive silts and clays suggesting the likelihood shrink-swell behavior resulting from anticipated seasonal moisture fluctuations. The existence of expansive soils on the site's moderately steep slopes also produce a phenomenon referred to as soil creep whereby seasonal expansion and contraction of the site soils creates a condition where slow progressive downslope movement of the clayey soils occurs. Site development should be designed to avoid or accommodate the potential for creep and shrink-swell behavior. It is suggested that supplemental swell testing be considered to evaluate that anticipated shrink-swell performance of the surficial soils prior to final design.

Seismic Shaking

Like all properties in the Bay Area, the site is expected to experience strong ground shaking from earthquakes along active faults located within the during the design life of the project. The site is expected to experience strong ground shaking from earthquakes along active faults located within the region during the design life of the project. A site modified peak horizontal ground acceleration of 1.206g has been predicted using probabilistic methods. As a minimum, site improvements should be designed to resist lateral loads resulting from ground shaking as provided in the current California Building Code (CBC).

Excellent discussions of simple procedures to make a residence stronger and safer during a major earthquake can be found in "Peace of Mind in Earthquake Country" by Peter Yanev[6], at the Association of Bay Area Government

[6] Yanev, Peter and Andrew Thompson, 2009, Peace of Mind in Earthquake Country: How to Save Your Home, Business, and Life, Chronical Books.

earthquake information website[7], and in the United States Geologic Survey "Putting Down Roots in Earthquake Country" handbook[8]. As a minimum, the proposed structure should be designed in accordance with the current California Building Code (CBC) standards for static and seismic design.

Potential Debris Flow Zones

Connelly has identified four (4) potential debris flow source zones on the property. Of primary concern with respect to proposed development are the zones located up-gradient of Lots 2, 3, 4, and 5. Up to 12 feet of colluvial soil was encountered within the Lot 2 debris flow area and up to six (6) feet of colluvial soil was encountered in the swales that involve Lots 3, 4, and 5. The potential debris flow source zone on Lot 7 is situated sufficiently east of the development area currently under consideration and is therefore judged to not pose a hazard.

The colluvial soil encountered in the three (3) swales affecting Lots 2, 3, 4, and 5 is primarily firm, medium to high plasticity, silty clay that is generally dissimilar to loose cohesionless soils that are most likely to experience significant debris flow effects. It is notable that Connelly did not observe any down-gradient features, such as alluvial fans or slide deposits, that would have indicated past debris flow activity despite significant historic rainfall events that have resulted in debris flows at other Bay Area locations. With the exception of the uppermost reaches of the swale area on Lot 5, the ground surfaces within the identified debris flow source areas range from about 15 to 20 degrees which is at the lower threshold of inclinations generally recognized as requisite for the triggering of debris flows, presumably at locations involving the soils most prone to debris flow triggering. The presence of these features near the crest of the ridge limits the size of their individual watersheds and the resulting volumes of water that would be available to initiate and drive debris flows or mudflows. The soils encountered in the upper swale areas are generally clayey/cohesive soils and are expected to exhibit low levels of permeability, thus limiting the infiltration of surface runoff that would be needed to generate sufficient excess pore-pressure in the soil to trigger a debris flow. Furthermore, slope stability analyses designed to

[7] Association of Bay Area Governments, ABAG Earthquakes and Hazard Maps/Info, http://quake.abag.ca.gov/.

[8] US Geologic Survey, 2005, Putting Down Roots in Earthquake Country – Your Handbook for the San Francisco Bay Region, General Information Product 15, http://pubs.usgs.gov/gip/2005/15/.

model potential increased pore pressure conditions, should these occur, indicate factors of safety in excess of 2.5 against destabilization of the colluvial infill. Considering all these factors, the risk of debris flows is considered to be low, but cannot be ruled out entirely.

Although the risk of significant debris flow activity is considered to be low at the subject locations, The identified drainage swales present a risk of adverse impacts to downslope improvements resulting from concentrated drainage runoff, potential surface erosion, and, to a lesser extent, potential debris flow or mudflow activity. It is therefore recommended that development of downgradient lots mitigate these risks by identifying potential run-out channels and siting improvements to avoid them. Where this is not possible, potential runoff should be redirected by grading methods to avoid direct impacts to the proposed improvements.

LIMITATIONS

These services consist of professional opinions made in accordance with generally accepted engineering geologic and geotechnical engineering principles and practices in the San Francisco Bay Area at the time this report was written. The investigation was performed, and this report prepared, for the exclusive use of the client, and for specific application to proposed site development as outlined in the body of the report. No third-party shall have the right to rely on the findings, opinions, or recommendations rendered in connection with this investigation without the written consent of Milstone Geotechnical. No warranty, express or implied, or merchantability of fitness, is made or intended in connection with this work, by the proposal for consulting or other services, or by the furnishing of oral or written reports or findings.

Unanticipated soils and geologic conditions are commonly encountered during construction and cannot be fully determined from existing exposures. If conditions encountered in the field are different than those anticipated by this report, our firm should be contacted immediately to provide any necessary revisions to the recommendations.

This report is issued with the understanding that site specific foundation and site development recommendations will be provided in subsequent design-level reports or supplements. The findings contained herein are valid for one year, after which time they must be reviewed by a representative of Milstone Geotechnical to determine whether they are still applicable.

APPENDIX A
BOREHOLE INVESTIGATION

Description of Subsurface Investigation
Soil Classification Chart
Logs of Exploratory Boreholes MG1 through MG19

BOREHOLE INVESTIGATION DESCRIPTION

Our subsurface investigation involved drilling, logging, and sampling of 19 small-diameter exploratory boreholes to supplement subsurface data presented by Steven Connelly1. The boreholes were advanced by Britton Exploration, under the direction of Milstone Geotechnical, using a track-mounted CME45 drill rig with a six (6.0)-inch diameter solid-stem auger. The boreholes were drilled to depths ranging from 12.5 to 30.0 feet between February 22 and 24, 2021. Following completion of drilling and sampling, the boreholes were backfilled with loosely tamped soil cuttings to the ground surface. Subsequently, obtained samples were transported to the laboratory to verify field classification and perform index and strength testing. Borehole locations are depicted on Figure 2 located in the body of the report. Graphical logs of the boreholes and a key to soil classification follows in this appendix.

The encountered earth materials were continuously logged and described in the field by a registered geotechnical engineer. Relatively undisturbed samples were obtained at various depths with a three (3.0)-inch-outside-diameter, two-and-one-half (2.5)-inch-inside-diameter, split-barrel (Modified California) sampler with a series of six (6)-inch-long, thin walled brass liners. Resistance blowcounts were obtained with the samplers by repeatedly dropping a 140-pound auto-hammer through a free-fall distance of 30 inches using an automatic hammer. The samplers were driven 18 inches (or to apparent refusal) and the number of blows recorded for each six (6) inches of penetration. The blows per foot recorded on the borehole logs represent the accumulated number of blows to drive the sampler the last 12 inches of penetration corrected to represent standard penetration blowcounts with Modified California sampler results corrected to represent Standard Penetration test blowcounts.

The borehole logs and related information show our interpretation of the subsurface conditions at the dates and locations indicated, and it is not implied that they are representative of subsurface conditions at other locations or at other times.

CRITERIA FOR ASSIGNING GROUP SYMBOLS AND GROUP NAMES			SOIL CLASSIFICATION		
			GRAPHIC SYMBOL	USCS GROUP SYMBOL	TYPICAL NAMES
COARSE-GRAINED SOILS (MORE THAN HALF IS LARGER THAN NO. 200 SIEVE)	GRAVELS (MORE THAN HALF COARSE FRACTION IS LARGER THAN NO. 4 SIEVE SIZE)	CLEAN GRAVELS WITH LITTLE OR NO FINES		GW	Well graded gravel
				GP	Poorly graded gravel
		GRAVELS WITH MORE THAN 12% FINES		GM	Silty gravel
				GC	Clayey gravel
	SANDS (MORE THAN HALF COARSE FRACTION IS SMALLER THAN NO. 4 SIEVE SIZE)	CLEAN SANDS WITH LITTLE OR NO FINES		SW	Well graded sand
				SP	Poorly graded sand
		SANDS WITH MORE THAN 12% FIINES		SM	Silty sand
				SC	Clayey sand
FINE-GRAINED SOILS (MORE THAN HALF IS SMALLER THAN NO. 200 SIEVE)	SILTS AND CLAYS LIQUID LIMIT LESS THAN 50%	INORGANIC		ML	Low plasticity silt
				CL	Low plasticity clay, Lean clay
		ORGANIC		OL	Low plasticity organic silt, Low plasticity oganic clay
	SILTS AND CLAYS LIQUID LIMIT GREATER THAN 50%	INORGANIC		MH	High plasticity silt, Elastic silt
				CH	High plasticity clay, Fat clay
		ORGANIC		OH	Medium to high plasticity organic silt or clay
	HIGHLY ORGANIC SOILS	PRIMARILY ORGANIC MATTER		PT	Peat

Note: Blow-counts reported for samplers other than a Standard Penetration Split Spoon Sampler were obtained by empirically converting the number of blows required to drive the sampler through the last 12 inches of an 18-inch penetration to the equivalent number of blows using a Standard Penetration Split Spoon Sampler.

Note:The borehole logs depict our interpretation of the subsurface conditions at the dates and locations indicated. It is not warranted that they are representative of subsurface conditions at other times and locations. The lines separating strata on the boring logs represent approximate boundaries only. Actual transitions may be gradual.

ABBREVIATIONS

AD: Auger Drilling

MC: Modified California Sampler

SPT: Casagrande Sampler

T1: Tube Sample (undisturbed)

B1: Grab Sample (disturbed)

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SOIL CLASSIFICATION CHART AND KEY TO LOGS OF EXPLORATORY BOREHOLES

LOG OF EXPLORATORY BOREHOLE MG1

Project: Proposed Elam Subdivision
Location: Lot 2 swale
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~756 feet
Hole Diameter: 6" solid-stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/22/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0		CL-CH	**COLLUVIUM**
			16/18	4	MC	B1	1			Sandy CLAY with gravel: Very dark grayish brown (10YR3/2); ~5% white to pale brown and light yellowish brown (10YR6/3,6/4), angular shale gravel to 1/2-inch size; ~20% medium grained sand; 20% very fine to fine grained sand; ~55% high plasticity fines; very stiff; moist.
						T1	2			
					AD		3			
			14/18	10	MC	B2	4			@5' - Sandy fat CLAY with gravel: trace siltstone and shale gravel to 1/2-inch size; ~10% medium grained sand; ~10% very fine to fine grained sand; ~80% medium to high plasticity fines; hard; moist.
		1.9				T2	5			
					AD		6			
	>2.7		18/18	7	MC	T3	7			
		>4.5				T4	8			
		>4.5	15/18	11	CAL*	B3	9		CL-CH	Sandy lean CLAY with gravel: brown and very dark grayish brown (10YR4/3,3/2); ~5% yellowish brown, subangular shale gravel to 1/2-inch size; ~10% medium grained sand; ~30% very fine to fine grained sand; ~55% medium plasticity fines; very stiff; moist; abundant caliche veins and inclusions.
		>4.5	15/18	13	SPT	B4	10			
					AD		11			
		>4.5	14/18	29	MC	B5	12		CL/SC	**RESIDUAL SOIL** Sandy lean CLAY to clayey SAND: Dark yellowish brown (10YR3/4) mottled with white caliche staining; trace weathered shale to 1/2-inch size; trace very fine to fine grained sand; very stiff to hard; damp to moist.
						T5	13			
		>4.5	18/18	34	CAL*	B6	14		Wrx	**WEATHERED BEDROCK** Weathered SILTSTONE and SHALE: Light yellowish brown and grayish brown (10YR6/4,5/2) with mineral staining on fracture facies; severely weathered; weak; soft; friable; moist.
		>4.5	18/18	60	SPT	B7	15			
					AD		16			
		>4.5	18/18	33/2"	MC	T6	17			
			17/17	86/6.5"	SPT	B8	18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 18.9 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.
* No liners.

LOG OF EXPLORATORY BOREHOLE MG2

Project: Proposed Elam Subdivision
Location: Lot 2 swale
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~759 feet
Hole Diameter: 6" solid-stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/22/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		1			**COLLUVIUM**
		2.5	12/18	4	MC	B1	2			Sandy CLAY with gravel: Very dark grayish brown (10YR3/2); ~10-20% light yellowish brown (10YR6/8), angular to subangular shale gravel to one-inch size; ~20% fine to coarse grained sand; ~60-70% medium to high plasticity fines; very stiff; moist.
						T1				
			14/18	3	CAL*	B2	3		CH	
			14/18	6	SPT	B3	4			
					AD		5			
			18/18	10	MC	B4	6			
		>4.5				T2	7			**RESIDUAL SOIL**
			16/18	32	CAL*	B5	8		CL/ SC	Sandy lean CLAY to clayey SAND: Dark yellowish brown (10YR3/4) mottled with white caliche staining; trace weathered shale to 1/2-inch size; trace very fine to fine grained sand; very stiff to hard; damp to moist.
			18/18	43	SPT	B6	9			
					AD		10			**WEATHERED BEDROCK**
			18/18	39	MC	B7	11		Wrx	Weathered SILTSTONE and SHALE: Light yellowish brown and grayish brown (10YR6/4,5/2) with trace caliche inclusions; severely weathered; weak; soft to low hardness; friable; moist.
		>4.5				T3	12			
							13			
							14			
							15			
							16			
							17			
							18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 12.5 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.
* No liners.

LOG OF EXPLORATORY BOREHOLE MG3

Project: Proposed Elam Subdivision
Location: Lot 3
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~716 feet
Hole Diameter: 6" solid-stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/22/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0			**COLLUVIUM** Sandy fat CLAY : Dark yellowish brown (10YR3/4); ~10% medium to coarse grained sand and gravel to 3/8-inch size; ~20% very fine to fine grained sand; ~55% medium to high plasticity fines; very stiff; moist.
		3.5	16/18	4	MC	B1 T1	2		CH	
					AD		4			
			16/18	21	MC	T3 T2	6		Wrx	**RESIDUAL SOIL** Very severely to severly weathered SILTSTONE and SHALE: Payle brown and light yellowish brown with white (10YR6/3,6/4, 8/1); soft, weak, intensly fractured; caliche filled joints and veins.
		>4.5			AD		7			
			18/18	35	MC	B3 T3 T4	9 10			**WEATHERED BEDROCK** Weathered SILTSTONE and SHALE: Yellowish brown (10YR5/8); ~trace medium hard clasts to one-inch size; ~85% very fine to fine grained sand; ~15% non-plastic fines; slightly indurated; soft to medium hardness; damp to moist; severely weathered; weak; soft; friable; moist.
		>4.5			AD		11			
			18/18	27	MC	B4 T5	13 14		Wrx	
		>4.5			AD		15			
			15/18	47/11	MC	B5 T6	17 18			
		>4.5	18/18	32	SPT	B6	19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 20.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG4

Project: Proposed Elam Subdivision
Location: Lot 3
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~711 feet
Hole Diameter: 6" solid stem
Surface: wood chips

Project Number: 205220
Page: 1 of 2
Logged By: BSM
Date: 2/22/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD					**ALLUVIUM**
			18/18	8	MC	B1	1			Clayey SAND: Very dark grayish brown (10YR3/2); ~10% medium to coarse grained sand; ~60% very fine to fine grained sand; ~30% low to medium plasticity fines; loose; moist.
						T1	2		SC	
			16/18	6	SPT	B2	3			
					AD		4			
			18/18	14	MC	B3	5			Silty CLAY: Very dark grayish brown (10YR3/2); ~5% yellowish brown sandstone clasts; ~5% medium grained sand; ~90% medium to high plasticity fines; very stiff; moist to wet.
		3.5				T2	6		CL-CH	
		3.5	18/18	23	SPT	B4	7			
					AD		8			
			15/18	26	MC	B5	9			Sandy CLAY : Dark yellowish brown (10YR3/6); ~5% medium to coarse grained sand; ~65% very fine to fine grained sand; ~40% medium to high plasticity fines; very dense; damp to moist.
						T3	10			
		>4.5				T4				
		>4.5	18/18	25	SPT	B6	11			
					AD		12			
							13		CL-CH	Silty CLAY : Dark yellowish brown (10YR3/4); ~15% very fine to fine grained sand; ~85% medium to high plasticity fines; very stiff; moist to wet.
		3.0	18/18	11	MC	B7	14			
						T5				
		3.9				T6	15			
			18/18	16	SPT	B8	16			
							17			
							18			
							19		CH	Silty CLAY: Very dark brown (10YR2/2); ~100% medium to high plasticity fines; medium stiff; moist.

MILSTONE GEOTECHNICAL

Remarks:

LOG OF EXPLORATORY BOREHOLE MG4

Project Proposed Elam Subdivision Date 2/22/21 Page 2 of 2

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIGNATION	DEPTH (ft)	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
		2.5	18/18	15	MC	B9 T7	21		CH	Silty CLAY: Very dark brown (10YR2/2); ~5% medium grained sand;~95% medium to high plasticity fines; stiff to very stiff; moist.
		>4.5	18/18	23	SPT	B10	22 23			
							24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 23.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG5

Project: Proposed Elam Subdivision
Location: Lot 3-4 swale
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~727 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/22/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD	B1	0		SC	**SOIL** Clayey SAND: Dark brown (10YR3/3); ~60% very fine to fine grained sand; ~40% low to medium plasticity fines; loose; moist; monor rootlets.
		3.8	18/18	7	MC	T1	2		CH	**COLLUVIUM** Silty CLAY: Very dark brayish brown (10YR3/2); ~10% light yellowish brown fine gravel and medium to coarse grained sand; ~25% very fine to fine grained sand; ~65% medium to high plasticity fines; firm; damp to moist; rootlets within upper three feet.
			14/18	8	SPT	B2	3			
					AD		5			
		>4.5	18/18	17	MC	B3 T2 T3	7		ML-CL	**RESIDUAL SOIL** Clayey SILT to silty CLAY (Decomposed SANDSTONE): Yellowish brown (10YR5/4) laced with caliche staining and veining; ~30% very fine grained sand; ~70% medium to high plasticity fines; dense; damp to moist.
		>4.5	18/18	26	CAL*	B4	9			
			16/18	42	SPT	B5	10			
					AD		12		Wrx	**WEATHERED BEDROCK** Weathered SILTSTONE and SHALE: Light yellowish brown and grayish brown (10YR6/4,5/2) with mineral staining on fracture facies; severely weathered; weak; soft; moist; intensely fractured; remnant rock structure. @10.5 - Very pale brown and yellowish brown (10YR7/4,5/8) with white caliche; ~5% caliche nodules to 1/3-inch size.
		>4.5	12/12	33/6"	MC	B6 T4	15			
			12/12	50/6"	SPT	B8	16			
							17			
							18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 17.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG6

Project: Proposed Elam Subdivision
Location: Lot 4
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~719 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/22/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0			**COLLUVIUM**
			14/18	4	MC	B1	1			Clayey SAND to sandy CLAY: Dark brown (10YR3/3); ~50% very fine grained sand; ~50% medium plasticity fines; loose; moist; minor rootlets and dessicated within upper eight inches.
		3.2				T1	2		SC/ CL	
			8/18	4	SPT	B2	3			
					AD		4			
			12/18	11	MC	B3	5			@5.5 - rootlets
		>4.5				T2	6			
			18/18	23	SPT	B4	7		ML-CL	**RESIDUAL SOIL** Decomposed SILTSTONE and SHALE: Pale brown (10YR6/3) laced with white caliche; severely weathered; ~10% soft, v. pale brown siltstone clasts to 1/3-inch size; ~40% very fine grained sand; ~50% medium plastiticy fines; dense; moist.
					AD		8			
			16/18	24	MC	B5	9			**WEATHERED BEDROCK**
		>4.5				T3	10			Weathered SILTSTONE and SHALE: Light yellowish brown and grayish brown (10YR6/4,5/2) with mineral staining on fracture facies; severely weathered; weak; soft; moist; intensely fractured with 75° predominant fracture dip; remnant rock structure.
			18/18	40	SPT	B6	11		Wrx	
					AD		12			
			18/18	35	MC	B7	13			@ 14' - Slower drilling
		>4.5				T4	14			
			18/18	54	CAL*	B8	15			@ 14' - Remant rock structure with 75° bedding plane
		>4.5					16		Wrx	
			18/18	55	SPT	B9	17			
							18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 19.5 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.
* No liners.

LOG OF EXPLORATORY BOREHOLE MG7

Project: Proposed Elam Subdivision
Location: Lot 4
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~704 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
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Logged By: BSM
Date: 2/22/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0			**COLLUVIUM**
			18/18	7	MC	B1	1			Sandy CLAY: Dark grayish brown (10YR4/2); trace angular, white and yellow, shale clasts; ~5% medium grained sand; ~20% very fine to fine grained sand; ~75% medium to high plasticity fines; very stiff; moist.
		1.8				T1	2			
			14/18	5	SPT	B1	3		CL-CH	
					AD		4			
			16/18	12	MC	B3	5			
		>4.5				T2	6			
					AD		7			**RESIDUAL SOIL**
							8			Lean CLAY: Dark yellowish brown and yellowish brown (10YR4/6,5/8) with white caliche veining throughout; trace very fine grained sand; very stiff to hard; damp to moist; remnant rock structure.
							9		CL-CH	
			18/18	17	MC	B4	10			
		>4.5				T3				
						T4				
					AD		11			**WEATHERED BEDROCK**
							12			Weathered SILTSTONE and SHALE: Brown and dark yellowish brown (10YR5/3,4/6) with mineral staining on fracture facies and white caliche veining; very severely to severely weathered; weak to moderate strength; very soft to soft; closely fractured; moist.
			12/18	28	MC	B5	13			
		>4.5				T5	14			
						B6				
					AD		15			
							16		Wrx	
							17			
			14/18	21	MC	B7	18			
		>4.5				T6				
			18/18	22	SPT	B8	19			

MILSTONE GEOTECHNICAL

Remarks:
Borehole terminated at 20.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.
* No liners.

LOG OF EXPLORATORY BOREHOLE MG8

Project: Proposed Elam Subdivision
Location: Lot 5
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~705 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/23/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD					**SOIL**
	2.5		14/18	4	MC	B1	1		CH	Sandy CLAY with gravel: Very dark grayish brown (10YR3/2); ~20% angular to subangular gravel to one-inch size and medium to coarse grained sand; ~10% very fine to fine grained sand; ~70% medium to high plasticity fines; stiff; moist; minor rootlets; slight organic odor.
						T1	2			
			16/18	6	SPT	B2	3			**COLLUVIUM**
					AD		4			Sandy CLAY: Dark brown with brownish yellow (10YR3/3, 6/8); ~30% very fine to coarse grained sand and angular to subangular siltstone gravel to 3/8-inch size; ~70% medium to high plasticity fines; medium stiff; damp to moist.
	>2.7						5			
		>4.5	13/18	12	MC	B3	6		CH	
						T2				
			18/18	13	SPT	B4	7			
					AD		8			
							9			
			16/18	34	MC	T3	10			**WEATHERED BEDROCK**
		>4.5				T4				Weathered SILTSTONE and SHALE: Yellow and yellowish brown (10YR7/8,6/8) with white (10YR8/1) caliche veining throughout; severely weathered; weak; soft; moist; intensely fractured; white caliche nodules to one-inch size.
					AD		11			
							12			
							13			
			18/18	51	MC	B4	14		Wrx	
		>4.5				T5				
							15			
					AD		16			
							17			
							18			
		>4.5	11/11	33/5"	MC	T6				
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 18.9 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG9

Project: Proposed Elam Subdivision
Location: Lot 6
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~690 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/23/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		1			**RESIDUAL SOIL/COLLUVIUM**
			15/18	2	MC	B1	2		CH	Sandy CLAY with gravel: Brown (10YR3/2); ~5% weathered, angular to subanguler siltstone gravel to 1/2-inch; ~30 fine to coarse grained sand; ~65% medium to high plasticity fines; stiff to very stiff; very moist; minor rootlets and organic debris.
		1.8				T1	3			
					AD		4			
							5			**WEATHERED BEDROCK**
			18/18	19	MC	T2	6			Weathered SILTSTONE and SHALE: Brownish yellow and light yellowish brown (10YR6/6,6/4) with white (10YR8/1) caliche veining throughout; severely weathered; weak; soft; friable; damp to moist; intensely fractured with predominant joint inclined at 85 degrees; remant rock structure.
		4.0				T3	7			
					AD		8			
							9		Wrx	
			18/18	48	MC	B2	10			
		>4.5				T4	11			
					AD		12			
							13			
			18/18	35	SPT	B3	14			
		>4.5					15			
							16			
							17			
							18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 14.5 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG10

Project: Proposed Elam Subdivision
Location: Lot 7
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~663 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/23/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0			**COLLUVIUM**
			16/18	11	MC	T1	1		SM-SC	Silty to clayey SAND: Pale brown (10YR6/3) with grayish brown (10YR5/2) clasts; ~65% very fine to fine grained sand; ~35% low plasticity fines; medium dense; damp to moist.
		>4.5				T2	2			
					AD		3			
							4			**RESIDUAL SOIL**
			18/18	25	MC	T3	5		CL-CH	Silty CLAY with gravel: Light olive brown (2.5Y5/4 to yellowish brown (10YR5/4); trace yellowish brown medium to coarse grained, weathered siltstone gragments; trace carbonage nodules; faint remnant rock structure.
		>4.5				T4	6			**WEATHERED BEDROCK**
					AD		7			Weathered SILTSTONE and SHALE: Brown (10YR5/3,5/6) with strong brown (7.5YR4/6) oxidation staining on fracture facies; weathered sandstone clasts to at least one-inch size; severely weathered; weak; soft (scratchable); damp to moist; intensely fractured with predominant fracture inclined at 65 degrees; white caliche filling fracture voids up to 1/4-inch wide.
			16/18	30	MC	B1	8			
		>4.5				T5	9			
					AD		10			
							11		Wrx	
			18/18	34	MC	T6	12			
		>4.5					13			
			18/18	37	SPT	B2	14			
					AD		15			
							16			
			18/18	30	SPT	B3	17			
							18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 19.5 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG11

Project: Proposed Elam Subdivision
Location: Lot 7
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~643 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/23/21

GROUND WATER	TORVANE (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD					**COLLUVIUM**
			12/18	11	MC	T1	1–2		CH	Silty CLAY: Dark brown (10YR3/3); ~5% medium to coarse grained sand; ~95% medium to high plasticity fines; firm; moist.
		3.0	15/18	13	SPT	B1	3–4			
					AD					**ALLUVIUM**
			18/18	21	MC	T2	5–6			Silty CLAY to clayey SAND: Brown (10YR4/3) laced with white caliche and caliche nodules; ~5% medium to coarse grained sand; ~40 to 60% very fine to fine grained sand; ~35 to 55% medium to high plasticity fines; medium stiff to stiff; moist.
		>4.5	18/18	36	SPT	B4	7–8			
					AD		9		CH/ SC	
			16/18	18	MC	T3	10–11			
		4.0	18/18	21	SPT	B3	12–13			
					AD		14			**WEATHERED BEDROCK**
			18/18	24	MC	T4	15–16		Wrx	Severely weathered SILTSTONE and SHALE: Dark yellowish brown (10YR3/4); matrix of ssoft siltstone clasts to at least one-inch size with remnant rock structure in silty clay; very soft; weak; very moist.
		>4.5				T5				
			18/18	31	SPT	B4	17–18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 18.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG12

Project: Proposed Elam Subdivision
Project Number: 205220
Location: Lot 6
Project Elev.: ~665 feet
Page: 1 of 1
Drilling Equipment: Track-mounted CME45 - 140#/30"
Hole Diameter: 6" solid stem
Logged By: BSM
Drilling Contractor: Britton Exploration
Surface: wild grass
Date: 2/22/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0			**ALLUVIUM**
			15/18	4	MC	T1	1		SC/ CL	Sandy CLAY to Clayey SAND: Very dark grayish brown (10YR3/2); ~5% non-native rounded gravel to at least 3/4-inch size; ~5% medium to coarse grained sand; ~40% very fine to fine grained sand; ~50% medium plasticity fines; loose increasing to firm with depth; moist.
		1.9	18/18	10	SPT	B1	2			
					AD		3			
			18/18	11	MC	T2	4			
		1.6	18/18	9	SPT	B2	5			Sandy CLAY: Very dark grayish brown (10YR3/2); trace pale brown coarse grained sand; ~20% medium to coarse grained sand and gravel to 1/2-inch size; ~25% very fine to fine grained sand; ~55% medium to high plasticity fines; moist to wet.
					AD		6			
							7			Below 9’ - stiff
			18/18	10	MC	T3	8		Cl-CH	
	2.0	2.3	18/18	12	SPT	B3	9			
					AD		10			
			16/18	16	MC	T4	11			**WEATHERED BEDROCK**
		3.0					12			Severely weathered SILTSTONE and SHALE: Dark yellowish brown (10YR4/4); matrix of soft siltstone clasts to at least one-inch size with remnant rock structure in silty clay; very soft; very weak; wet.
			15/18	32	SPT	B4	13		Wrx	
		3.0					14			
			15/18	15	SPT	B5	15			
							16			
							17			
							18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 19.5 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG13

Project: Proposed Elam Subdivision
Location: Lot 5
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~686 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
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Logged By: BSM
Date: 2/22/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0			**ARTIFICIAL FILL**
			14/18	5	MC	B1	1		SC	Clayey SAND with gravel: Dark grayish brown (10YR4/2); ~10% rounded gravel to at least 3/4-inch size; ~10% medium to coarse grained sand; ~45% very fine to fine grained sand; ~35% medium plasticity fines; loose; moist.
	>2.7	1.5				T1	2			
					AD		3		CH/ SC	Sandy CLAY to Clayey SAND: Very dark grayish brown (10YR3/2); ~5% non-native rounded gravel to at least 3/4-inch size; ~5% medium to coarse grained sand; ~40% very fine to fine grained sand; ~50% medium to high plasticity fines; loose increasing to firm with depth; moist.
			15/18	10	MC	BA	4			
		>4.5				T2	5			
	1.1		15/18	11	SPT	B2	6			**ALLUVIUM**
					AD		7			Sandy lean CLAY: Brown and dark yellowish brown (10YR3/3,3/2); trace pale brown coarse grained sand; ~10 to 30% medium to coarse grained sand and angular shale gravel to 1/2-inch size; ~20 to 30% very fine to fine grained sand; ~70% medium to high plasticity fines; very stiff to hard; moist.
			18/18	11	MC		8			
		>4.5				T3	9			Below 8' - Trace caliche throughout.
			18/18	18	SPT	B3	10			
					AD		11		CL-CH	
			18/18	22	MC		12			
		>4.5				T4	13			
			18/18	22	SPT	B4	14			
					AD		15			
			18/18	16	MC		16			
		>4.5				T5	17			
			18/18	20	SPT	B5	18			
							19			

MILSTONE GEOTECHNICAL

Remarks:

LOG OF EXPLORATORY BOREHOLE MG13

Project Proposed Elam Subdivision Date 2/23/21 Page 2 of 2

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIGNATION	DEPTH (ft)	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
							21			**ALLUVIUM (Continued)**
							22			Sandy CLAY with gravel: Dark yellowish brown (10YR3/4); ~10% medium to coarse grained sand and subangular to angular shale gravel to 1/2-inch size; ~10% very fine to fine grained sand; ~80% medium to high plasticity fines; very stiff to hard; very moist.
							23			
		>4.5	12/18	23	MC	T6	24			
			18/18	23	SPT	B7	25			
					AD		26			
		>4.5	16/18	31	MC	T7	27			
			18/18	23	SPT	B7	28			
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 30.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG14

Project: Proposed Elam Subdivision
Location: Lot 2
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~720 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
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Date: 2/23/21

GROUND WATER	TORVANE (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0			**ALLUVIUM**
			12/18	16	MC	T1	1			Silty CLAY with gravel: Black (10YR3/4); ~5% medium to coarse grained sand and very pale brown, subangular to angular gravel to 1/2-inch size; ~5% very fine to fine grained sand; ~90% medium to high plasticity fines; very stiff to hard; moist.
		>4.5				T2	2			
			18/18	24	MC	B1	3			
					AD		4			
			18/18	19	MC	T3	5			Below 5" - Dark yellowish brown (10YR3/4)
		>4.5	18/18	17	SPT	B2	6		CL-CH	
					AD		7			
			18/18	13	MC	T4	8			
		3.1	18/18	15	SPT	B3	9			
					AD		10			
			18/18	23	MC	T5	11			
		>4.5	18/18	26	SPT	B4	12			**RESIDUAL SOIL** Decomposed SILTSTONE and SHALE: Dark yellowish brown (10YR3/4); ~5% subangular to angular siltstone and shale clasts to 1/2-inch; ~5% fine grained sand; 90% medium plasticity fines; soft; weak; moist.
					AD		13		Wrx	
			18/18	21	MC	T6	14			
		>4.5	18/18	30	SPT	B5	15			**WEATHERED BEDROCK** Severely Weathered SILTSTONE and SHALE: LIght yellowish brown (10YR6/4); ~50% soft to medium hard siltstone clasts to at least 3/4-inch size in matrix of 10% fine grained sand and 40% medium plasticity fines; soft; weak; moist.
							16			
							17			
							18		Wrx	
							19			

MILSTONE GEOTECHNICAL

Remarks:

LOG OF EXPLORATORY BOREHOLE MG14

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GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIGNATION	DEPTH (ft)	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
							21			**WEATHERED BEDROCK (continued)**
							22			Severely Weathered SILTSTONE and SHALE: LIght yellowish brown (10YR6/4); ~50% soft to medium hard siltstone clasts to at least 3/4-inch size in matrix of 10% fine grained sand and 40% medium plasticity fines; soft; weak; moist.
							23			
							24			
							25			
		>4.5	16/18	23	SPT	B6	26			
							27			
							28			
							29			
							30			
							31			
							32			
							33			
							34			
							35			
							36			
							37			
							38			
							39			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 26.5 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG15

Project: Proposed Elam Subdivision
Location: Lot 1
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~717 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/24/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0			**ALLUVIUM**
			16/18	14	MC	B1	1			Sandy CLAY: Very dark grayish brown with yellowish brown (10YR3/2,6/8); ~20% gravel to 3/8-inch and fine to coarse grained sand; 30% very fine grained sand; ~50% medium to high plasticity fines; medium stiff; damp to moist; minor roots.
		>4.5				T1	2			
					AD		3		CL	
							4			
							5			
			12/18	33	MC	B2	6			Silty CLAY: Light yellowish brown (10YR6/42) laced with white caliche; ~5% veryt pale brown sandstone clasts to 1/8-inch size; ~35% very fine grained sand; ~60% medium plasticity fines; very stiff to hard; damp to moist.
		>4.5				T2				
					AD		7		CL	
							8			
							9		Wrx	**WEATHERED BEDROCK**
			18/18	23	MC	B3	10			Severely weathered SANDSTONE and SILTSTONE: Brownish yellow and yellowish brown (10YR6/8,5/6); ~20% soft, weak, very pale b brown (10YR8/3) siltstone clasts to one-inch size; ~50% very fine grained sand; ~ 30% low plasticity fines; dense to very dense; moist.
		>4.5				T3				
					AD		11			
							12			
							13		Wrx	Weathered SANDSTONE: Olive yellow (2.5Y6/8); with minor caliche on facies; ~70% very fine to fine grained sand; ~30% low plasticity fines; dense to very dense; damp; weak; crushable.
			18/18	23	MC	B4	14			
		>4.5				T4				
					AD		15			
							16			
							17		Wrx	Decomposed SILTSTONE and SHALE: Brownish yellow (10YR6/6); with minor caliche nodules; soft; weak; friable; damp to moist..
			18/18	25	MC	B5	18			
		>4.5								
			18/18	17	SPT	B6	19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 20.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG16

Project: Proposed Elam Subdivision
Location: Lots 1 & 2
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~743 feet
Hole Diameter: 6" solid stem
Surface: bare

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/24/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0			**WEATHERED BEDROCK**
			10/18	20	MC	B1	1			Weathered SILTSTONE and SHALE: Light yellowish brown (10YR6/4) with white caliche on facies; medium hard siltstone clasts to at least two-inch size; trace very fine grained sand; soft; weak; damp; remnant rock structure..
		>4.5				T1	2			
					AD		3			
							4			
			18/18	31	MC	B2	5			
		>4.5				T2	6		Wrx	
			18/18	25	SPT		7			
						B3	8			@7.5 - 11.3' - increased very fine grained sand content; more advanced weathering.
					AD		9			
							10			
			18/18	35	MC	B4	11			
		>4.5				T3				
			18/18	32	SPT		12			
						B5	13			
							14			
							15			
							16			
							17			
							18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 13.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG17

Project: Proposed Elam Subdivision
Location: Lots 9 & 10
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~874 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/24/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		0			**SOIL** Silty CLAY to clayey SAND: Very dark grayish brown (10YR3/2); ~5% decomposed sandstone clasts; ~5% medium to coarse grained sand; ~40% very fine to fine grained sand; ~50% low to medium plasticity fines; firm; moist; minor tootlets; slight organic odor.
		>4.5	16/18	30	MC	B1 T1	1 2		CL/ SC	
			18/18	36	SPT	B2	3 4			**WEATHERED BEDROCK** Weathered SILTSTONE and SHALE: Pale brown and light yellowish brown (10YR6/3,5/4) with strong brown (7.5YR4/6) oxidation staining on fracture facies and white (10YR8/1) caliche veining; weathered sandstone clasts to at least 3/4-inch size; severely weathered; weak; soft to very soft; damp to moist; intensely fractured with predominant fracture inclined at 65 degrees; white caliche nodules to 1/2-inch size; remnant rock structure.
					AD		5			
		>4.5	18/18	29	MC	B3 T2	6			
			18/18	28	SPT	B4	7			
					AD		8 9			
		>4.5	18/18	34	MC	B5 T3	10 11		Wrx	
			18/18	33	SPT	B6	12			
					AD		13 14			
		>4.5	18/18	31	MC	B7	15 16			
			18/18	30	SPT	B8	17			
							18 19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 18.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG18

Project: Proposed Elam Subdivision
Location: Lot 10
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~860 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/24/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD		1		CL/ SC	**SOIL** Clayey SAND: Dark brown (10YR3/3); ~5% pale brown, decomposed, sandstone clasts to 1/2-inch size; ~70% fine grained sand; ~25% low to medium plasticity fines; medium dense; damp.
		>4.5	18/18	27	MC	B1 T1	2			
			18/18	51	SPT	B2	3			**WEATHERED BEDROCK** Weathered SILTSTONE and SHALE: Pale brown and light yellowish brown (10YR6/3,5/4) with strong brown (7.5YR4/6) oxidation staining on fracture facies and white (10YR8/1) caliche veining; weathered sandstone clasts to at least 3/4-inch size; severely weathered; weak; soft to very soft; damp to moist; intensely fractured with predominant fracture inclined at 65 degrees; white caliche nodules to 1/2-inch size; remnant rock structure.
					AD		4			
		>4.5	18/18	31	MC	B3 T2	5 6		Wrx	
			18/18	61/11"	SPT	B4	7			
					AD		8 9			
		>4.5	18/18	29	MC	T3	10 11			
			18/18	32	SPT	B5	12			
							13			
							14			
							15			
							16			
							17			
							18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 13.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

LOG OF EXPLORATORY BOREHOLE MG19

Project: Proposed Elam Subdivision
Location: Lot 8
Drilling Equipment: Track-mounted CME45 - 140#/30"
Drilling Contractor: Britton Exploration

Project Elev.: ~863 feet
Hole Diameter: 6" solid stem
Surface: wild grass

Project Number: 205220
Page: 1 of 1
Logged By: BSM
Date: 2/22/21

GROUND WATER	VANE SHEAR (tsf)	POCKET PENET. (tsf)	RECOVERY (in./in.)	SPT (bpf) or PRESS. (psi)	SAMPLE OR DRILL MODE	SAMPLE DESIG-NATION	DEPTH IN FEET	GRAPHIC LOG	USCS DESIG.	GEOTECHNICAL DESCRIPTION
					AD	B1	1		SC	**SOIL** Clayey SAND: Dark brown (10YR3/3); ~5% pale brown, decomposed, sandstone clasts to 1/2-inch size; ~70% fine grained sand; ~25% low to medium plasticity fines; medium dense; damp; slightly dessicated; slight organic odor.
		>4.5	15/18	10	MC	B2	2			
						T1				
			18/18	32	SPT	B2	3		Wrx	**WEATHERED BEDROCK** Weathered SILTSTONE and SHALE: Pale brown and light yellowish brown (10YR6/3,5/4) with strong brown (7.5YR4/6) oxidation staining on fracture facies and white (10YR8/1) caliche veining; weathered sandstone clasts to at least 3/4-inch size; severely weathered; weak; soft to very soft; damp to moist; intensely fractured with predominant fracture inclined at 65 degrees; white caliche nodules to 1/2-inch size; remnant rock structure.
					AD		4			
			18/18	35	MC	B3	5			
		>4.5				T2	6			
			18/18	20	SPT	B4	7			
					AD		8			
							9			
							10			
			18/18	31	MC	B5	11			
		>4.5				T3				
			18/18	31	SPT	B6	12			
							13			
							14			
							15			
							16			
							17			
							18			
							19			

MILSTONE GEOTECHNICAL

Remarks: Borehole terminated at 13.0 feet.
No ground water encountered.
Borehole backfilled with tamped cuttings.

APPENDIX B
LABORATORY INVESTIGATION

Summary of Laboratory Test Results
Unconfined Compression
Direct Shear
Atterberg Limits

Summary of Laboratory Test Results
Proposed 10-Lot Subdivision
14519 Shannon Road
Los Gatos, California

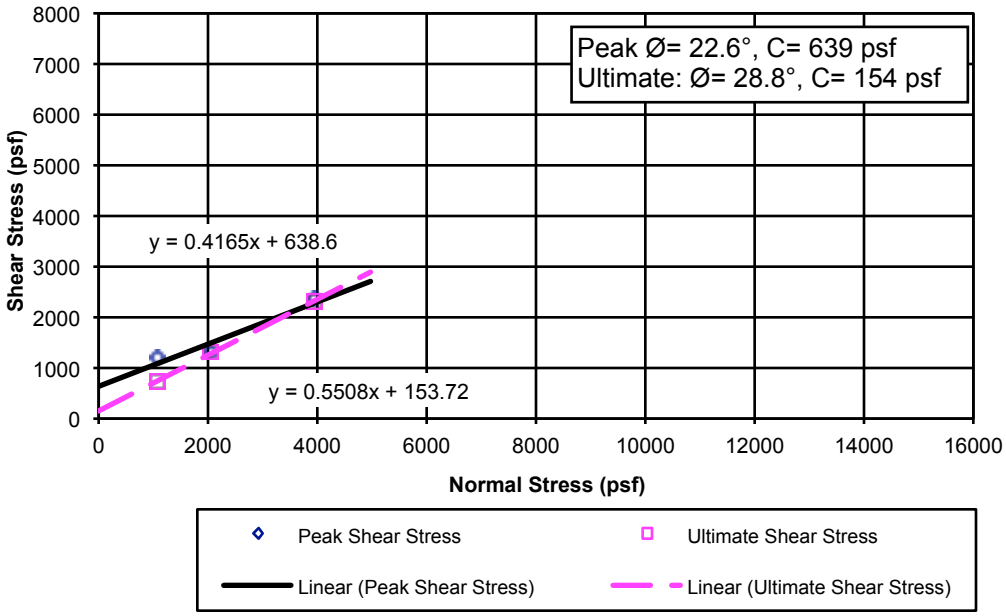
Borehole/ Sample No.	Depth (ft)	Earth Material	Moisture Content (%)	Dry Density (pcf)	Unconfined Compressive Strength (psf)	Direct Shear (PHI / C) (deg / psf)	Atterberg Limits (LL / PI) (% / %)	Passing #200 Sieve (%)
MG1/T1	2.0	CL-CH	36.8	67.7	-	-	-	65.7
MG1/T2	5.0	CL-CH	35.7	76.2	-	22.6 / 639 P 28.8 / 154 U	-	-
MG1/T4	8.0	CL-CH	29.9	68.2	-	-	-	-
MG1/T5	13.0	CL-CH	32.6	80.7	10,426	-	-	-
MG1/T6	17.0	Siltstone	34.5	80.3	-	-	-	-
MG2/T1	2.0	CL-CH	37.0	68.1	-	-	-	-
MG2/T2	7.0	Siltstone	29.7	77.2	9,917	-	-	-
MG2/T3	12.0	Siltstone	31.4	79.3	-	-	-	-
MG3/T1	2.0	CH	35.2	74.8	-	-	-	-
MG3/T2	6.0	Siltstone	24.2	81.1	-	-	-	-
MG4/T1	2.0	CL-CH	34.9	84.8	-	19.7 / 178 P 37.8 / 0 U	-	-
MG4/T2	6.0	CH	28.8	83.5	6,451	-	-	-
MG4/T3	9.5	CH	28.6	83.4	-	-	-	-
MG4/T5	14.5	CH	32.1	84.5	4,851	-	-	-
MG4/T6	15.0	CH	32.0	86.5	-	-	-	-
MG5/T1	2.0	CL-CH	35.8	76.6	2,939	-	-	-
MG5/T3	8.0	CL-CH	24.7	73.2	4,851	-	-	-
MG5/T4	15.5	Siltstone	30.7	86.2	-	-	-	-
MG6/T1	2.0	SC-CL	33.9	77.0	2,147	-	-	-
MG6/T2	6.0	ML-CL	22.2	78.0	5,007	-	-	-
MG6/T3	10.0	Siltstone	20.8	69.7	-	-	-	-
MG6/T4	16.0	Siltstone	28.7	82.0	-	-	-	-
MG7/T1	2.0	CL-CH	34.1	74.8	-	-	-	-
MG7/T2	6.0	CL-CH	23.7	76.1	-	-	-	-
MG7/T4	10.0	CL-CH	26.1	76.0	-	-	-	-
MG7/T5	14.0	Siltstone	33.5	86.4	9,840	-	-	-
MG7/T6	18.5	Siltstone	31.6	84.9	-	-	-	-
MG8/T1	2.0	CL-CH	32.8	73.0	-	-	-	-
MG8/T2	6.0	CL-CH	24.9	79.2	-	22.3 / 130 P 35.5 / 139 U	-	-
MG8/T4	10.0	Siltstone	23.4	80.2	7,772	-	-	-
MG8/T5	14.0	Siltstone	25.8	87.4	5,987	-	-	-
MG9/T1	2.0	CL-CH	32.3	71.9	-	-	-	-
MG9/T3	6.0	Siltstone	24.6	74.3	-	-	-	-
MG9/T4	10.0	Siltstone	24.8	85.9	-	-	-	-
MG10/T2	2.0	SC	31.6	78.6	-	-	-	-
MG10/T5	10.0	Siltstone	34.6	85.2	-	-	-	-
MG11/T1	2.0	CH	33.0	76.2	2,003	-	-	-
MG11/T2	6.0	CH/SC	29.2	75.9	-	-	75 / 43	-
MG11/T3	11.0	CH/SC	32.7	81.9	7,266	-	-	-
MG11/T5	16.0	Siltstone	32.7	83.0	6,537	-	-	-

P = Peak strength at 5% areal strain; U = Ultimate strength

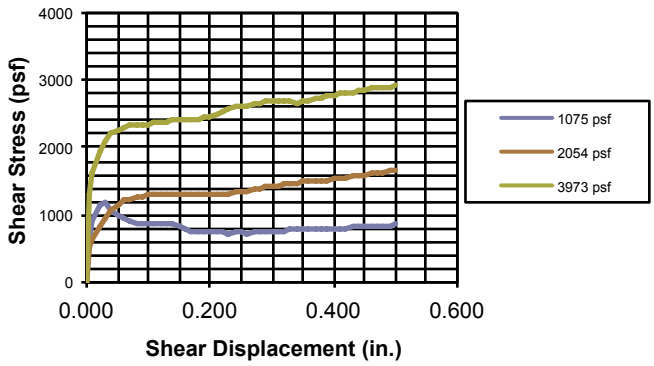
Borehole/ Sample No.	Depth (ft)	Earth Material	Moisture Content (%)	Dry Density (pcf)	Unconfined Compressive Strength (psf)	Direct Shear (PHI / C) (deg / psf)	Atterberg Limits (LL / PI) (% / %)	Passing #200 Sieve (%)
MG12/T1	2.0	CL-CH	108.8	81.0	-	24.5 / 488 [P] 40.0 / 0 [U]	-	-
MG12/T2	6.0	CH	35.9	78.6	-	-	-	-
MG12/T3	11.0	CH	38.5	81.1	-	13.3 / 1,133 [P] 27.2 / 531 [U]	-	-
MG12/T4	16.0	Siltstone	37.4	81.3	6,103	-	-	-
MG13/T1	2.0	CL-CH	24.7	93.2	-	-	-	-
MG13/T2	5.0	CL-CH	29.2	74.7	-	-	-	-
MG13/T3	9.0	CL-CH	27.3	68.5	2,460	-	-	-
MG13/T5	18.0	CL-CH	30.6	75.8	5,203	-	-	-
MG13/T7	28.0	CL-CH	29.7	86.2	-	-	-	-
MG14/T2	2.0	CH	34.0	76.3	4,376	-	-	-
MG14/T3	6.0	CL-CH	33.1	81.0	10,736	-	-	-
MG14/T5	14.0	CL-CH	29.1	84.4	-	-	-	-
MG14/T6	18.0	Siltstone	33.8	78.5	-	-	-	-
MG15/T1	2.0	CL-CH	32.9	79.0	-	32.1 / 1237 [P] 40.3 / 0 [U]	-	-
MG15/T2	6.1	CL-CH	28.8	80.4	5,312	-	-	-
MG15/T4	14.0	Sandstone	12.2	105.8	-	-	-	-
MG16/T1	2.0	Siltstone	70.5	74.8	-	-	-	-
MG16/T2	6.0	Siltstone	22.9	92.4	-	-	-	-
MG16/T3	10.5	Siltstone	31.0	86.3	5,421	-	-	-
MG17/T1	2.0	Siltstone	35.3	77.4	-	-	-	-
MG17/T2	6.0	Siltstone	31.8	77.3	-	-	-	-
MG17/T3	11.0	Siltstone	37.4	798.3	-	-	-	-
MG18/T1	2.0	Siltstone	34.7	81.7	-	-	-	-
MG18/T2	6.0	Siltstone	42.0	69.5	-	32.3 / 1,761 [P] 24.9 / 976 [U]	-	-
MG18/T3	11.0	Siltstone	40.2	73.1	-	-	-	-
MG19/T1	2.0	Siltstone	41.8	65.5	-	-	-	-
MG19/T2	6.0	Siltstone	35.1	82.3	-	-	-	-
MG19/T3	11.0	Siltstone	26.0	87.2	-	-	-	-
TP2/T1	3.5	CH	28.1	60.5	-	-	70 / 36	-
TP4/T1	3.5	CH	25.9	68.3	-	-	63 / 33	-

P = Peak strength at 5% areal strain; U = Ultimate strength

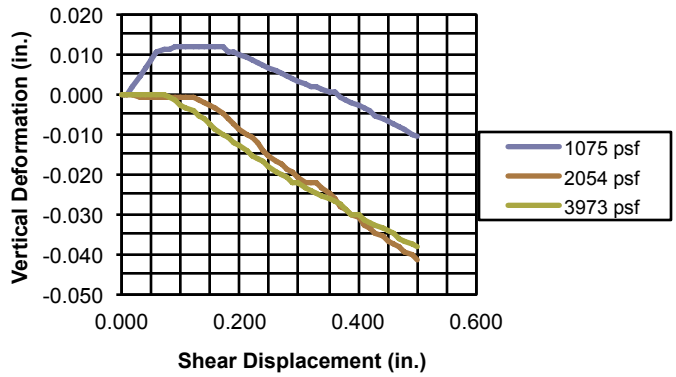
Shear Stress vs. Normal Stress



Shear Stress vs. Shear Displacement



Vertical Deformation vs. Shear Displacement



TEST DATA	Sample No.	1	2	3	4
Initial	Water Content (%)	40.6	37.7	37.2	
	Dry Unit Weight (pcf)	72.4	75.0	78.2	
	Saturation (%)	82.6	81.5	87.1	
	Void Ratio	1.33	1.25	1.15	
	Height (in.)	1.2000	1.2000	1.2000	
At Test	Water Content (%)	49.2	47.1	46.3	
	Dry Unit Weight (pcf)	72.6	76.3	80.9	
	Saturation (%)	100.0	100.0	100.0	
	Void Ratio	1.32	1.21	1.08	
	Height (in.)	1.197	1.1783	1.1601	
Normal Stress (psf)		1075	2054	3973	
Peak Failure Stress (psf)		1205	1315	2354	
Displacement (in.)		0.03	0.13	0.08	
Ultimate Failure Stress (psf)		730	1309	2334	
Displacement (in.)		0.23	0.15	0.09	
Sample Diameter (in.)		2.42	2.42	2.42	

Sample Location:
MG1,T2, 5.0'

Sample Description: Sandy Fat Clay (CH/CL), v dk gry brn (10yr3/2), ~10% vfg-fg ~10% mg-cg, trace siltstone/shale gravel to 1/2"

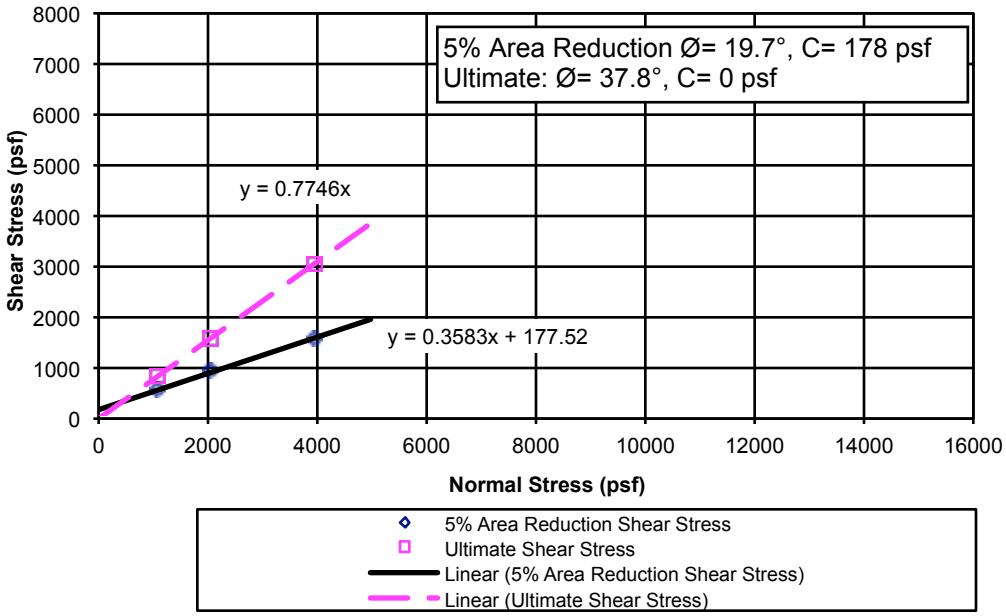
Notes:
Consolidated Undrained
Min. 4 hour min. inundation and load
G=2.70 assumed, strain rate 0.029"/min.
At-test density, void ratio, and saturation are approximate based on test method limitations

Direct Shear Test
ASTM D 3080 Modified

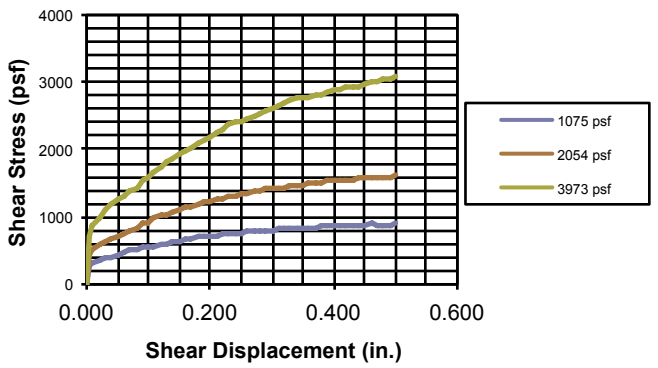
Client: **Milstone Geotechnical**
Project: **Elam**
Project No. **205220** Date: **4/3/21**

FISHER GEOTECHNICAL

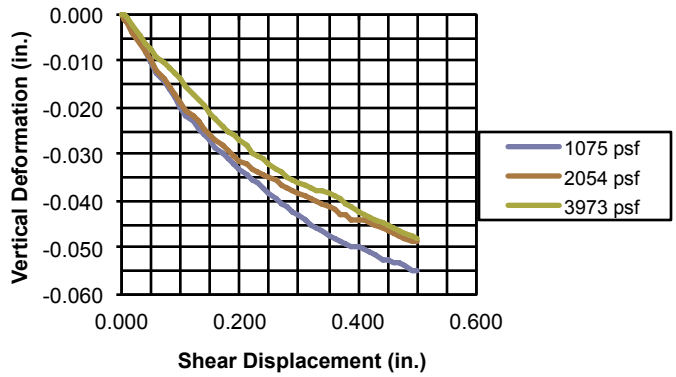
Shear Stress vs. Normal Stress



Shear Stress vs. Shear Displacement



Vertical Deformation vs. Shear Displacement



TEST DATA	Sample No.	1	2	3	4
Initial	Water Content (%)	27.9	28.1	28.2	
	Dry Unit Weight (pcf)	73.9	75.6	76.4	
	Saturation (%)	58.9	61.8	63.1	
	Void Ratio	1.28	1.23	1.21	
	Height (in.)	1.2000	1.2000	1.2000	
At Test	Water Content (%)	41.3	38.3	37.3	
	Dry Unit Weight (pcf)	76.1	83.9	85.1	
	Saturation (%)	100.0	100.0	100.0	
	Void Ratio	1.21	1.01	0.98	
	Height (in.)	1.1652	1.0809	1.0771	
Normal Stress (psf)		1075	2054	3973	
5% Area Red. Failure Stress (psf)		553	928	1596	
Displacement (in.)		0.10	0.10	0.10	
Ultimate Failure Stress (psf)		909	1605	3073	
Displacement (in.)		0.50	0.50	0.50	
Sample Diameter (in.)		2.42	2.42	2.42	

Sample Location:
MG4,T1, 2.0'

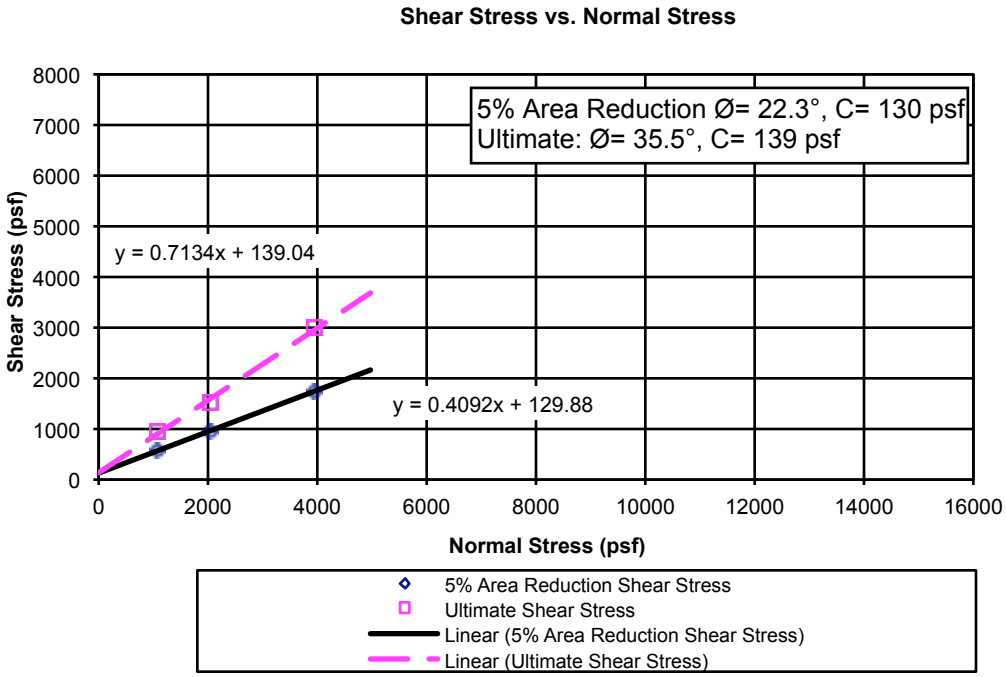
Sample Description: Sandy Lean Clay Gravel (CL), v dk gry brn (10yr3/2), ~30% vfg-cg, trace gravel to 1/2"
% consol: #1=2.9%, #2=9.9%, #3=10.2%

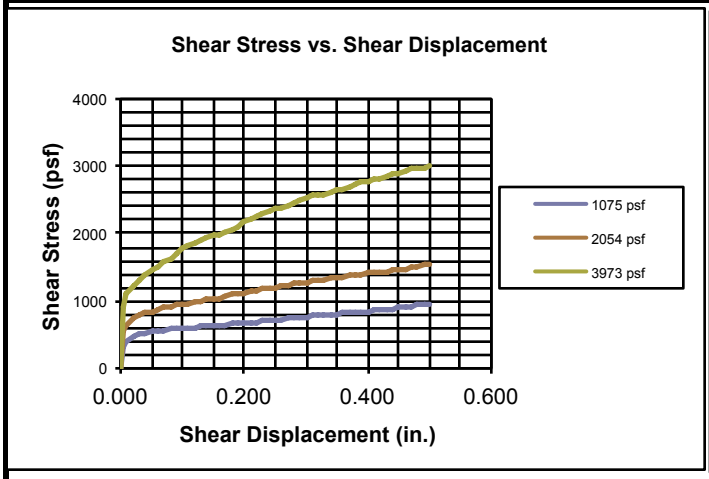
Notes:
Consolidated Undrained
Min. 8 hour min. inundation and load
G=2.70 assumed, strain rate 0.029"/min.
At-test density, void ratio, and saturation are approximate based on test method limitations

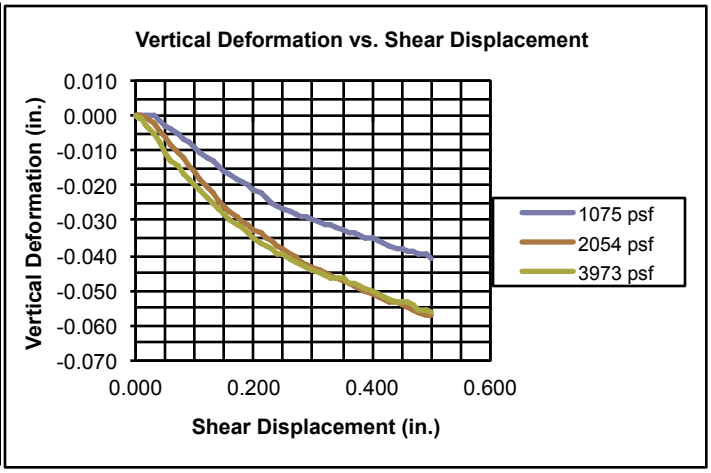
Direct Shear Test
ASTM D 3080 Modified

Client: **Milstone Geotechnical**
Project: **Elam**
Project No. **205220** Date: **4/5/21**

FISHER GEOTECHNICAL







TEST DATA	Sample No.	1	2	3	4
Initial	Water Content (%)	24.6	25.9	24.3	
	Dry Unit Weight (pcf)	78.6	79.0	80.1	
	Saturation (%)	58.1	61.6	59.4	
	Void Ratio	1.14	1.13	1.10	
	Height (in.)	1.2000	1.2000	1.2000	
At Test	Water Content (%)	43.7	42.4	39.7	
	Dry Unit Weight (pcf)	79.7	81.2	84.6	
	Saturation (%)	100.0	100.0	100.0	
	Void Ratio	1.11	1.07	0.99	
	Height (in.)	1.1836	1.1663	1.1358	
Normal Stress (psf)		1075	2054	3973	
5% Area Reduction Failure Stress (psf)		584	949	1763	
Displacement (in.)		0.10	0.10	0.10	
Ultimate Failure Stress (psf)		950	1538	2996	
Displacement (in.)		0.50	0.50	0.50	
Sample Diameter (in.)		2.42	2.42	2.42	

Sample Location:
MG8,T2, 6.0

Sample Description: Sandy Lean Clay (CL/CH), dk brn w/brn yel (10yr3/3,6/8), ~30% vfg-cg + grav<3/8", brn yel vsw SH grav + mw-vsw mg-cg

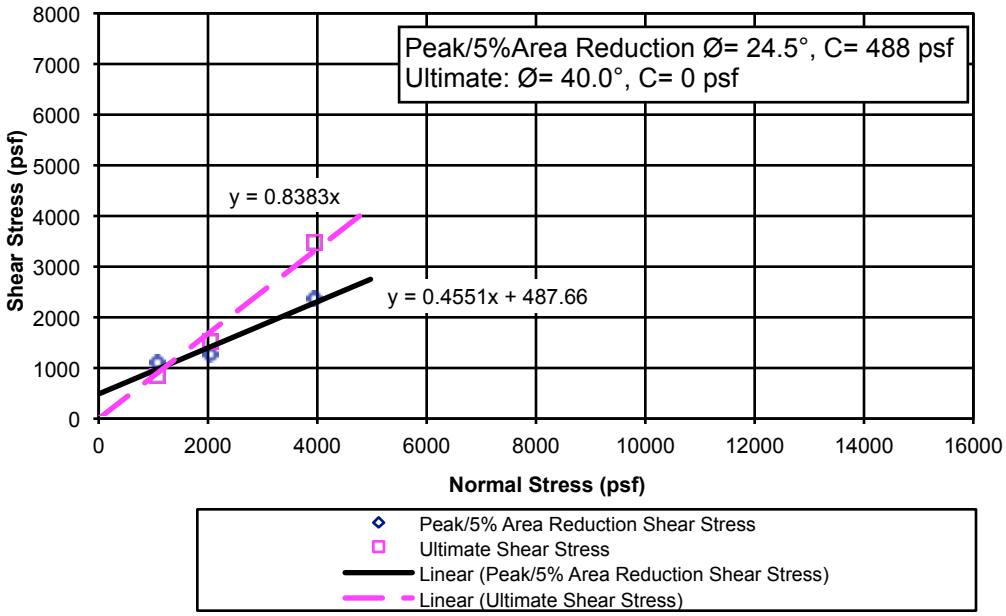
Notes:
Consolidated Undrained
Min. 8 hour min. inundation and load
G=2.70 assumed, strain rate 0.029"/min.
At-test density, void ratio, and saturation are approximate based on test method limitations

Direct Shear Test
ASTM D 3080 Modified

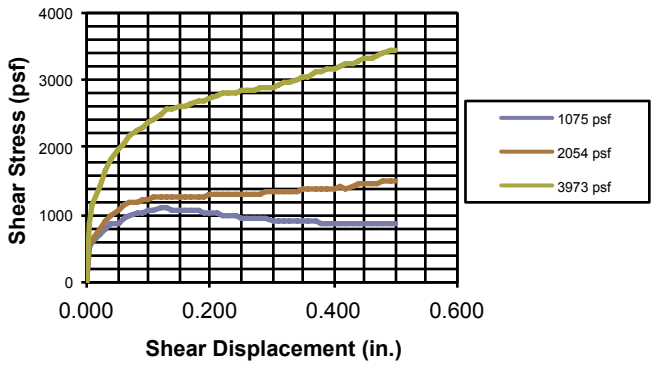
Client: **Milstone Geotechnical**
Project: **Elam**
Project No. **205220** Date: **4/20/21**

FISHER GEOTECHNICAL

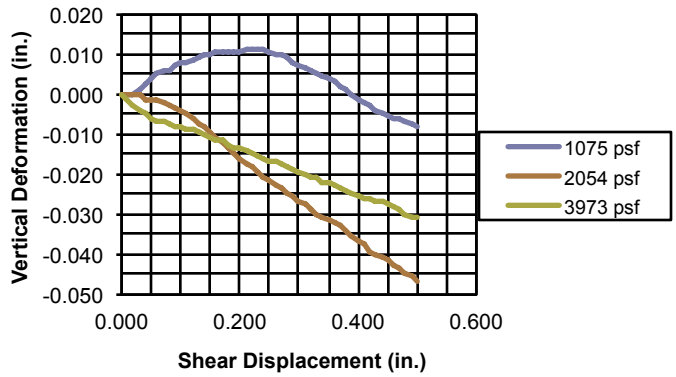
Shear Stress vs. Normal Stress



Shear Stress vs. Shear Displacement



Vertical Deformation vs. Shear Displacement



TEST DATA	Sample No.	1	2	3	4
Initial	Water Content (%)	20.2	17.1	16.5	
	Dry Unit Weight (pcf)	104.7	109.3	112.5	*5 clasts*
	Saturation (%)	89.7	85.0	89.5	*1/4"-3/8" on*
	Void Ratio	0.61	0.54	0.50	*shear plane*
	Height (in.)	1.2000	1.2000	1.2000	*No.3*
At Test	Water Content (%)	23.4	19.5	17.2	
	Dry Unit Weight (pcf)	106.3	111.2	116.2	
	Saturation (%)	100.0	100.0	100.0	
	Void Ratio	0.58	0.51	0.45	
	Height (in.)	1.1814	1.1789	1.1615	
Normal Stress (psf)		1075	2054	3973	
Peak/5% Area Red. Failure Stress (psf)		1097	1241	2357	
Displacement (in.)		0.12	0.10	0.10	
Ultimate Failure Stress (psf)		863	1511	3450	
Displacement (in.)		0.49	0.50	0.50	
Sample Diameter (in.)		2.42	2.42	2.42	

Sample Location:
MG12,T1, 2.0'

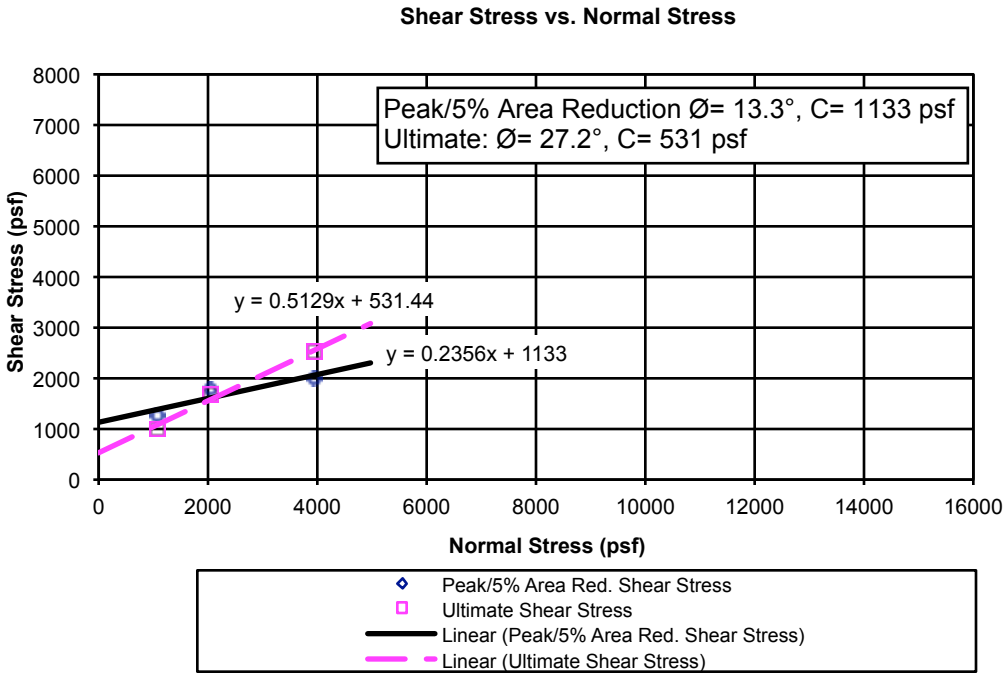
Sample Description: Sandy Lean Clay Gravel (CL/SC), mot v dk gry brn, dk gry brn w/yel brn (10yr4/2,3/2,5/4), ~40% vfg-fg, ~10% mg-cg+grav<3/4",rnd grav, fill?

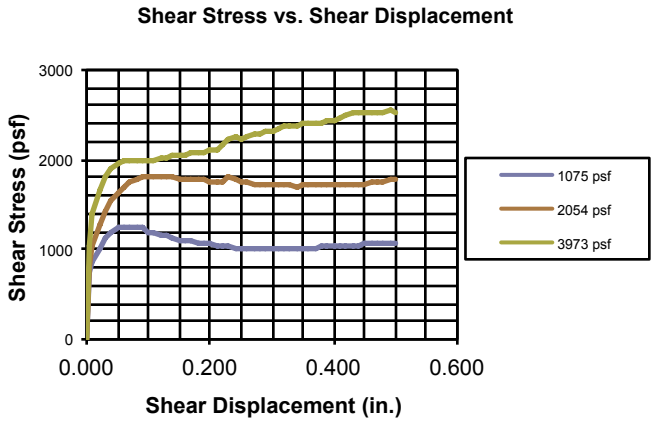
Notes:
Consolidated Undrained
Min. 4 hour min. inundation and load
G=2.70 assumed, strain rate 0.029"/min.
At-test density, void ratio, and saturation are approximate based on test method limitations

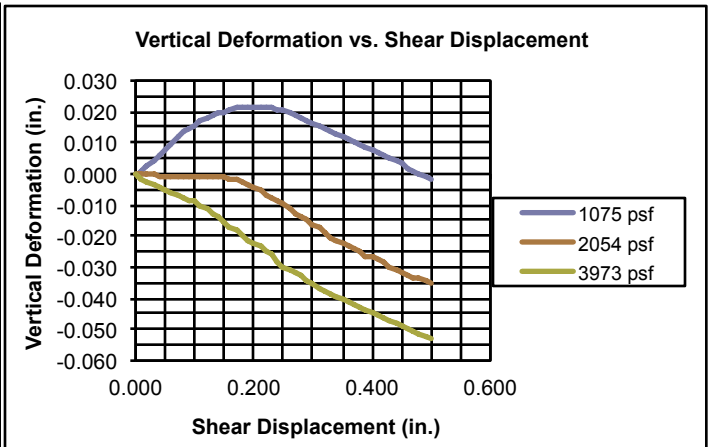
Direct Shear Test
ASTM D 3080 Modified

Client: **Milstone Geotechnical**
Project: **Elam**
Project No. **205220** Date: **4/17/21**

FISHER GEOTECHNICAL







TEST DATA	Sample No.	1	2	3	4
Initial	Water Content (%)	37.1	39.0	38.6	
	Dry Unit Weight (pcf)	81.1	80.6	81.4	
	Saturation (%)	93.0	96.5	97.6	
	Void Ratio	1.08	1.09	1.07	
	Height (in.)	1.2000	1.2000	1.2000	
At Test	Water Content (%)	42.5	42.8	42.7	
	Dry Unit Weight (pcf)	81.4	81.8	84.7	
	Saturation (%)	100.0	100.0	100.0	
	Void Ratio	1.07	1.06	0.99	
	Height (in.)	1.1951	1.1823	1.1545	
Normal Stress (psf)		1075	2054	3973	
Peak/5% Area Reduct. Failure Stress (psf)		1255	1815	2002	
Displacement (in.)		0.06	0.09	0.10	
Ultimate Failure Stress (psf)		1002	1707	2528	
Displacement (in.)		0.29	0.34	0.50	
Sample Diameter (in.)		2.42	2.42	2.42	

Sample Location:
MG12,T3, 11.0

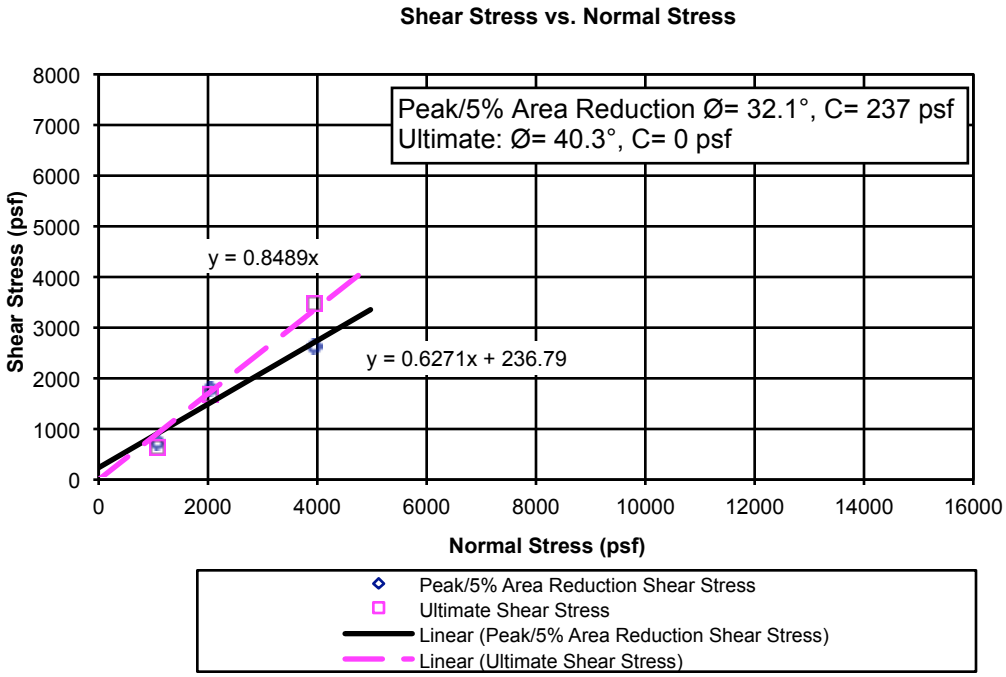
Sample Description: Fat Clay w/Sand (CH), dk yel brn w/pale brn (10yr3/4,6/3), 5%-10% fg-cg, very severely to completely weathered mg-cg pale brn shale clasts

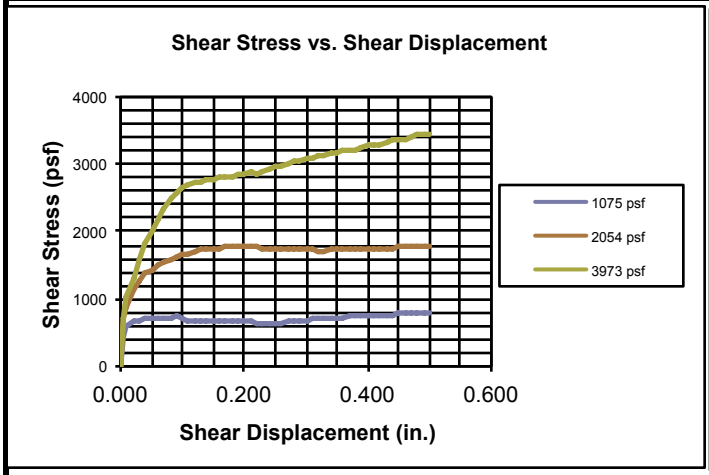
Notes:
Consolidated Undrained
Min. 8 hour min. inundation and load
G=2.70 assumed, strain rate 0.029"/min.
At-test density, void ratio, and saturation are approximate based on test method limitations

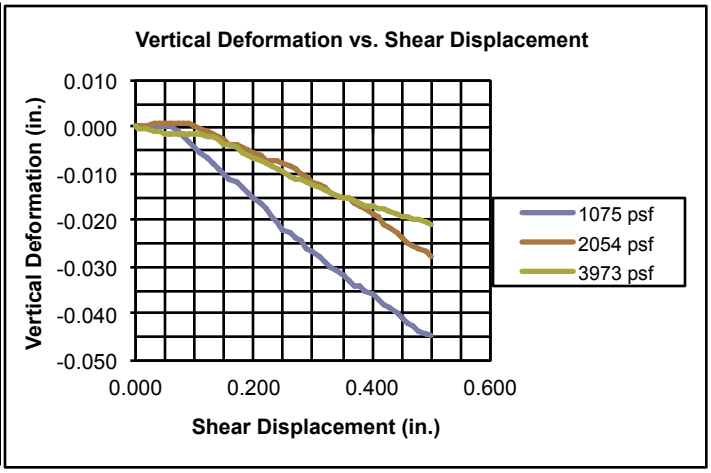
Direct Shear Test
ASTM D 3080 Modified

Client: **Milstone Geotechnical**
Project: **Elam**
Project No. **205220** Date: **4/23/21**

FISHER GEOTECHNICAL







TEST DATA	Sample No.	1	2	3	4
Initial	Water Content (%)	31.5	34.2	33.0	
	Dry Unit Weight (pcf)	77.6	78.0	81.4	
	Saturation (%)	72.6	79.5	83.3	
	Void Ratio	1.17	1.16	1.07	
	Height (in.)	1.2000	1.2000	1.2000	
At Test	Water Content (%)	44.6	41.9	39.7	
	Dry Unit Weight (pcf)	78.1	79.6	84.9	
	Saturation (%)	100.0	100.0	100.0	
	Void Ratio	1.16	1.12	0.98	
	Height (in.)	1.1924	1.1757	1.1509	
Normal Stress (psf)		1075	2054	3973	
5% Area Reduction Failure Stress (psf)		736	1789	2639	
Displacement (in.)		0.09	0.19	0.10	
Ultimate Failure Stress (psf)		641	1709	3464	
Displacement (in.)		0.23	0.33	0.50	
Sample Diameter (in.)		2.42	2.42	2.42	

Sample Location:
MG15,T1, 2.0

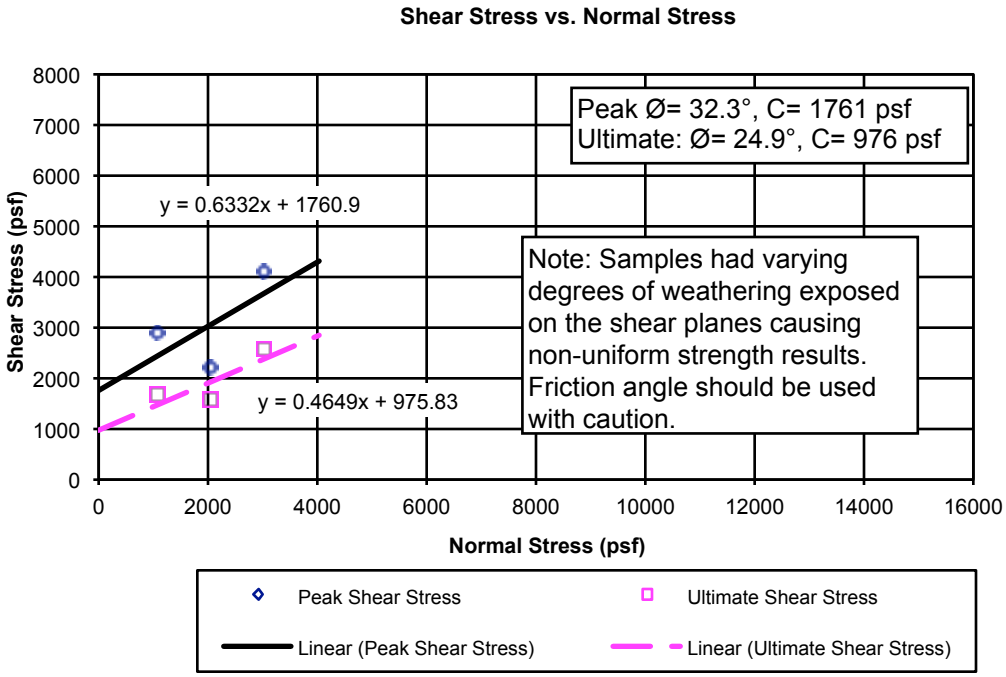
Sample Description: Sandy Lean Clay (CL/CH), v dk gry brn (10yr3/2), hard, moist, ~20% vfg-cg, w/ yel brn (10yr6/8) mg-cg and gravel (shale frag) to 3/8"

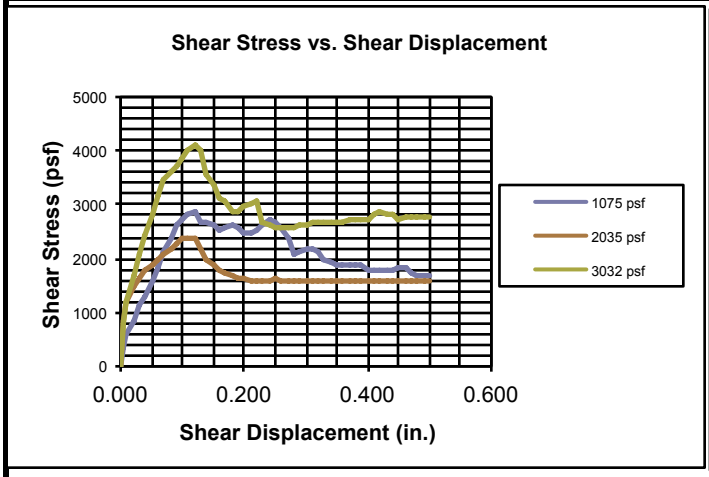
Notes:
Consolidated Undrained
Min. 4 hour min. inundation and load
G=2.70 assumed, strain rate 0.029"/min.
At-test density, void ratio, and saturation are approximate based on test method limitations

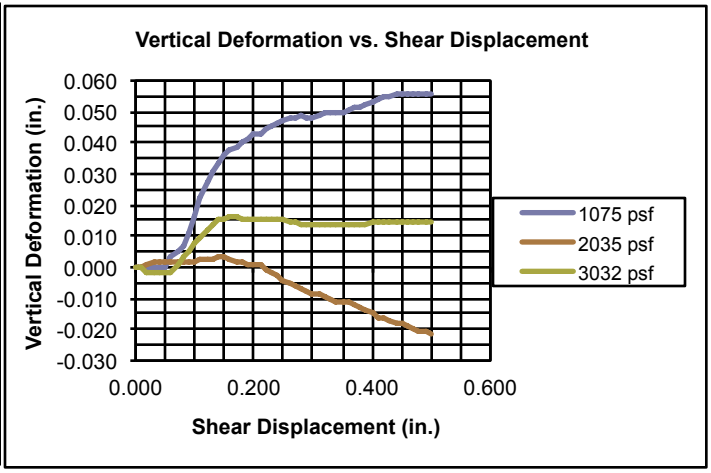
Direct Shear Test
ASTM D 3080 Modified

Client: **Milstone Geotechnical**
Project: **Elam**
Project No. **205220** Date: **4/19/21**

FISHER GEOTECHNICAL







TEST DATA	Sample No.	1	2	3	4
Initial	Water Content (%)	40.6	37.7	37.2	
	Dry Unit Weight (pcf)	72.4	75.0	78.2	
	Saturation (%)	82.6	81.5	87.1	
	Void Ratio	1.33	1.25	1.15	
	Height (in.)	1.2000	1.2000	1.2000	
At Test	Water Content (%)	49.2	47.1	46.3	
	Dry Unit Weight (pcf)	72.8	75.9	79.6	
	Saturation (%)	100.0	100.0	100.0	
	Void Ratio	1.31	1.22	1.12	
	Height (in.)	1.1936	1.1852	1.1789	
Normal Stress (psf)		1075	2035	4086	
Peak Failure Stress (psf)		2879	2191	4102	
Displacement (in.)		0.12	0.11	0.12	
Ultimate Failure Stress (psf)		1660	1560	2563	
Displacement (in.)		0.49	0.41	0.26	
Sample Diameter (in.)		2.42	2.42	2.42	

Sample Location:
MG18,T2, 6.0'(#1&2), MG19, T2,6.0' (#3)

Sample Description: Siltstone/Shale
Brn Yel (10yr6/6,6/8), variably sev. to mod. weath., soft to low hardness, w/CO3 bands
Shear planes #1 & 3 had hard zones

Notes:
Consolidated Undrained
Min. 8 hour min. inundation and load
G=2.70 assumed, strain rate 0.029"/min.
At-test density, void ratio, and saturation are approximate based on test method limitations

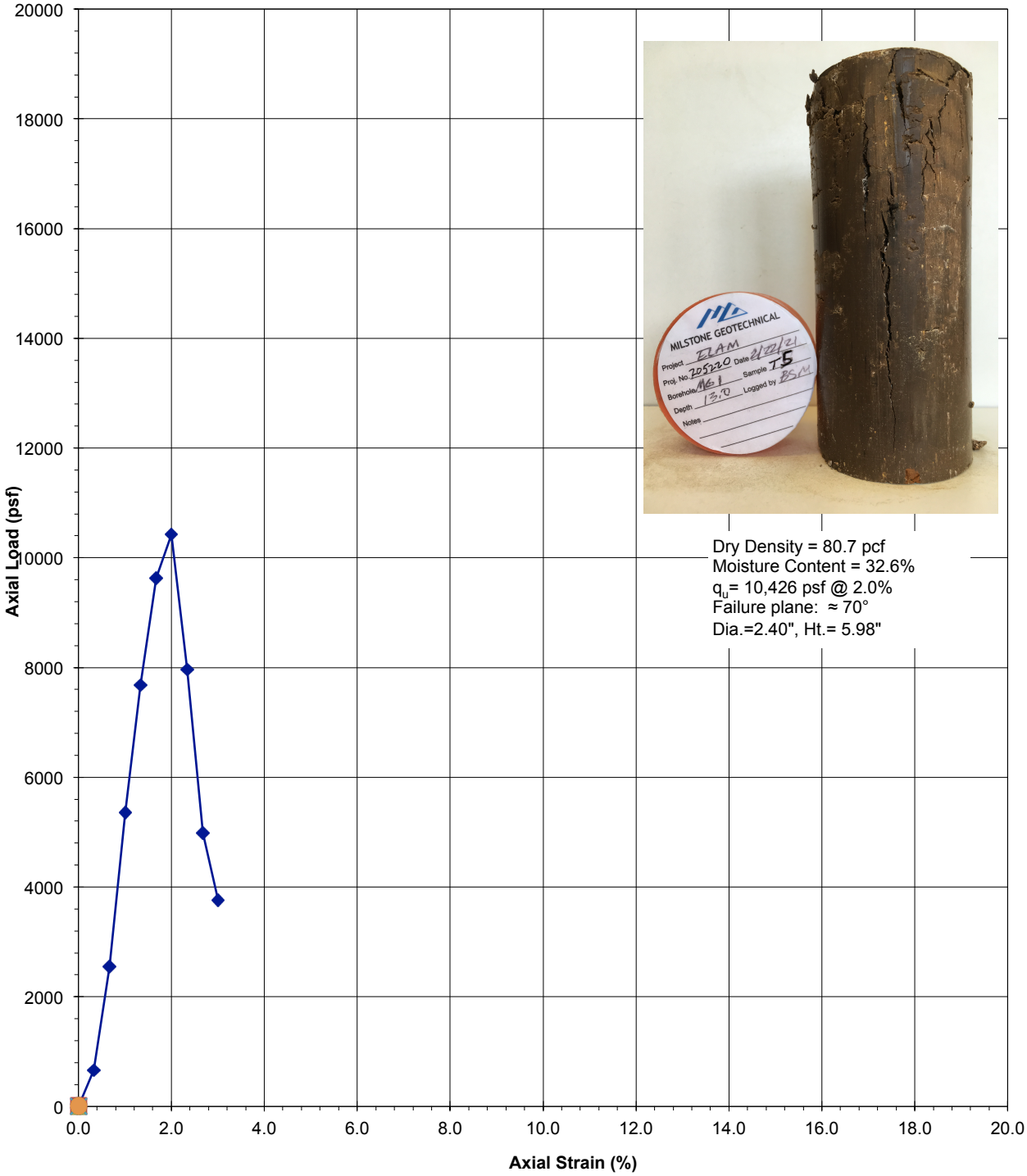
Direct Shear Test
ASTM D 3080 Modified

Client: **Milstone Geotechnical**
Project: **Elam**
Project No. **205220** Date: **3/25/21**

FISHER GEOTECHNICAL

Unconfined Compression Test Results
Elam, Project 205220
Boring MG1, T5 @ 13.0'
Lean Clay (CL) dk yel brn, tr vfg sand, v silty

Dry Density = 80.7 pcf
Moisture Content = 32.6%
q_u= 10,426 psf @ 2.0%
Failure plane: ≈ 70°
Dia.=2.40", Ht.= 5.98"

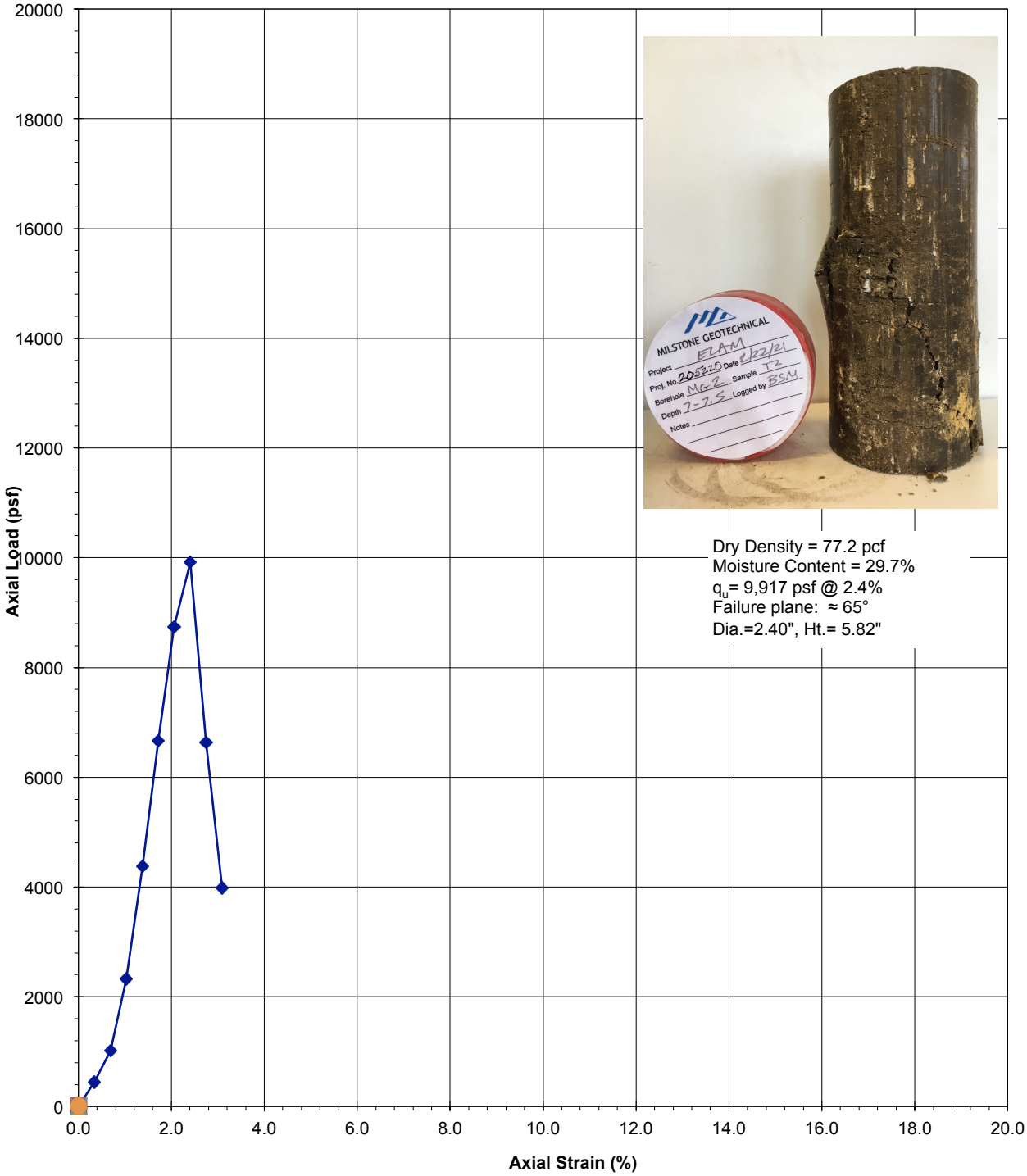


CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG2, T2 @ 7.0'
Sandy Lean Clay w/Gravel (CL/CH) dk yel brn, ~20% fg-cg, ~10% ang/sub-ang gravel

Dry Density = 77.2 pcf
Moisture Content = 29.7%
q_u= 9,917 psf @ 2.4%
Failure plane: ≈ 65°
Dia.=2.40", Ht.= 5.82"

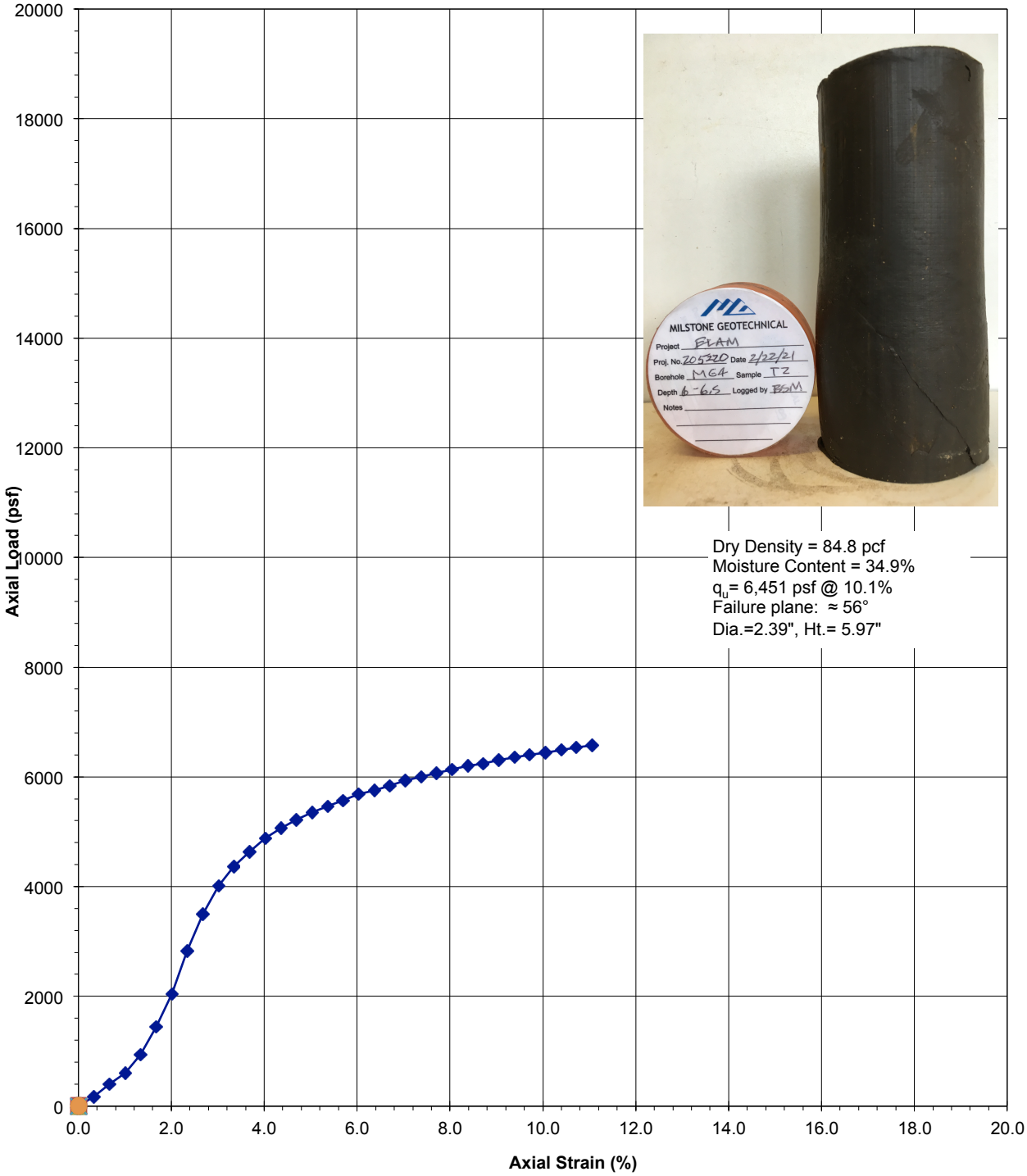


CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG4, T2 @ 6.0'
Fat Clay (CH) v dk gry, trace mg sand, uniform color, saturated

Dry Density = 84.8 pcf
Moisture Content = 34.9%
q_u = 6,451 psf @ 10.1%
Failure plane: ≈ 56°
Dia.=2.39", Ht.= 5.97"



CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG4, T5 @ 14.5'
Fat Clay (CH) dk yel brn w/~5%vfg-fg sand, uniform color

Dry Density = 84.5 pcf
Moisture Content = 32.1%
q_u= 4,851 psf @ 3.4%
Failure plane: ≈ n/a°
Dia.=2.41", Ht.= 5.86"

Axial Load (psf)

20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0

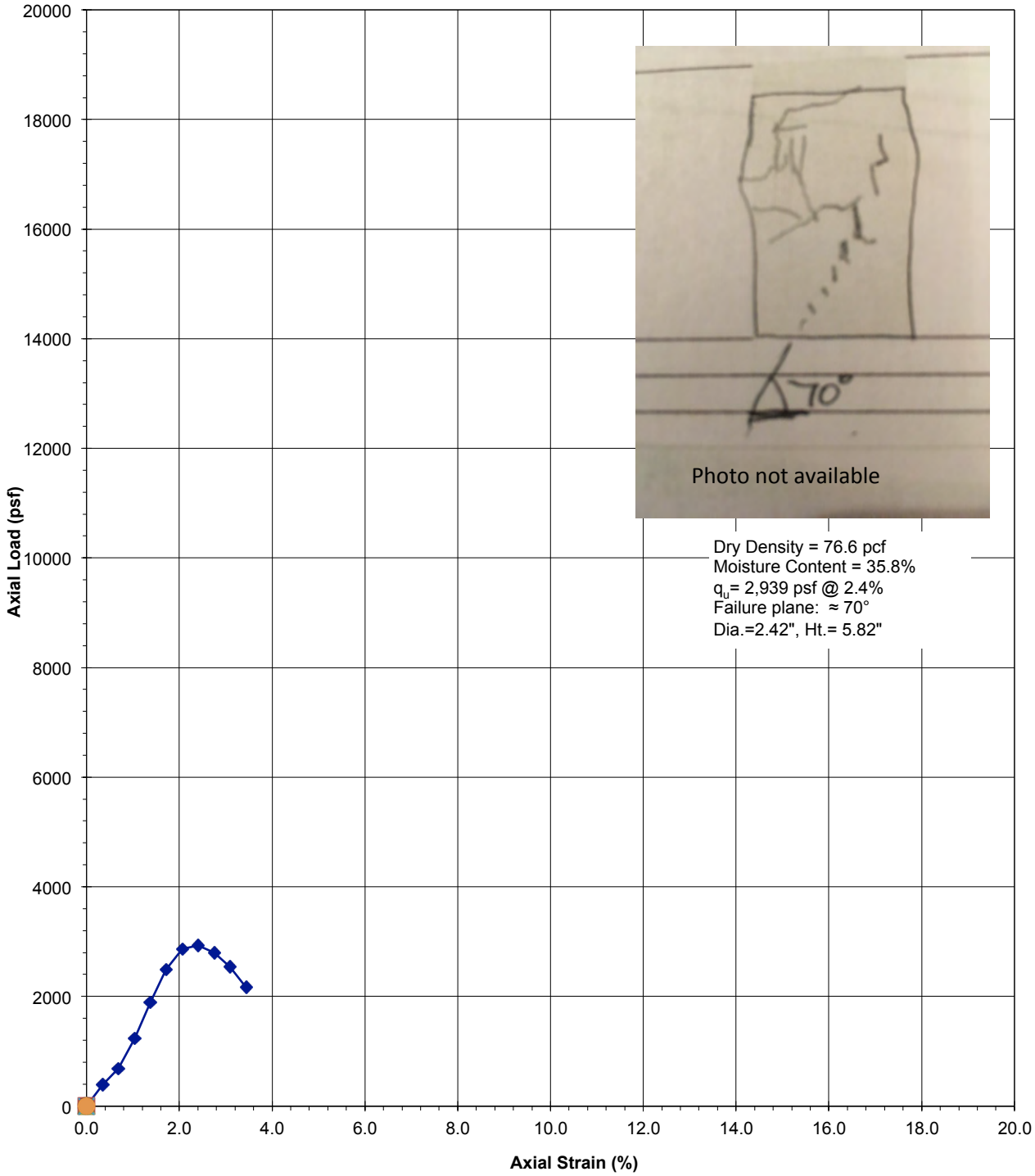
0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0

Axial Strain (%)

CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG5, T1 @ 2.0'
Sandy Lean Clay (CL/CH) dk brn w/~10%vfg-fg sand, ~10% mg-cg

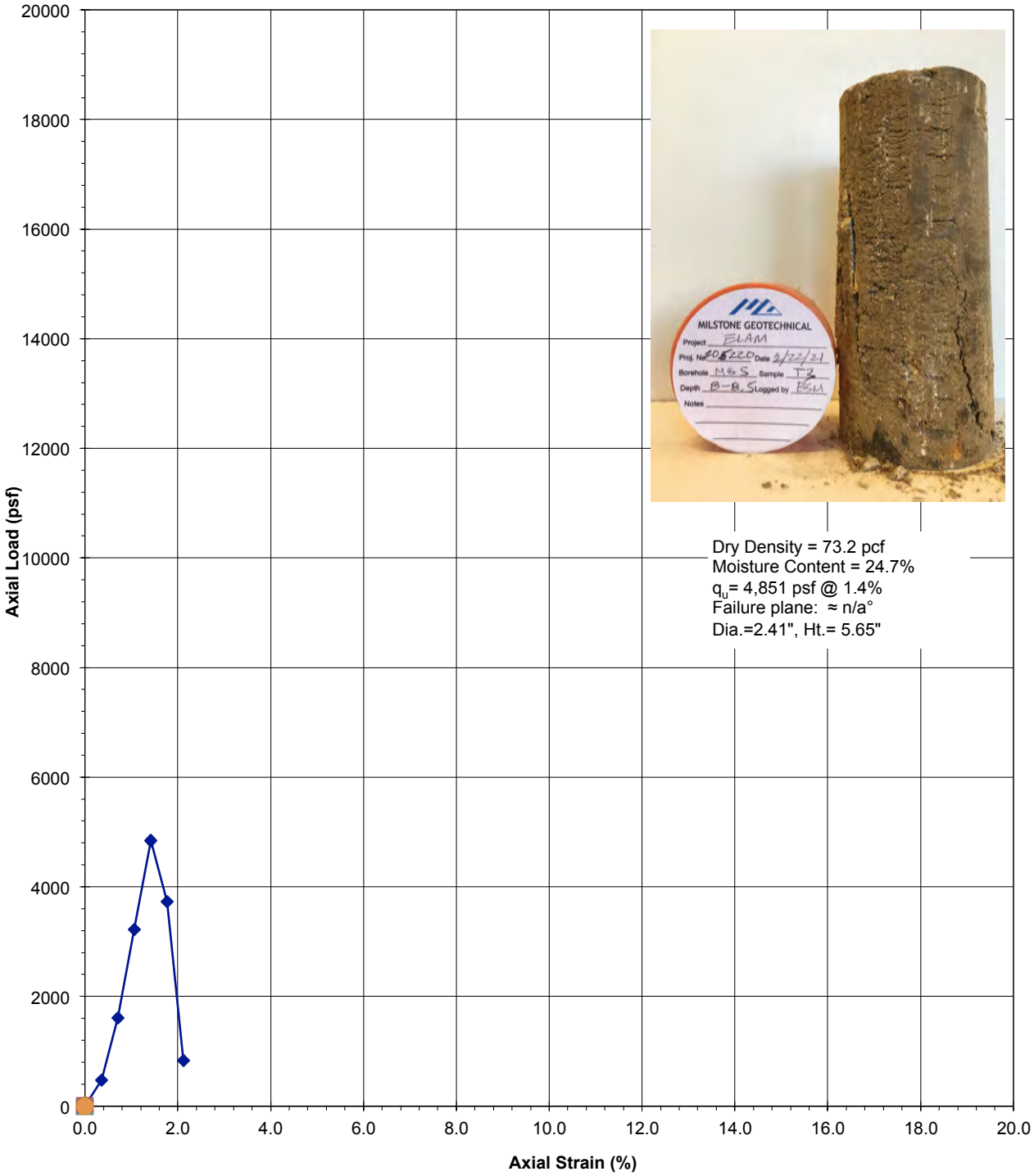


CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG5, T3 @ 8.0'
Sandy Lean Clay (CL/CH) dk brn w/~10%vfg-fg sand, ~10% mg-cg

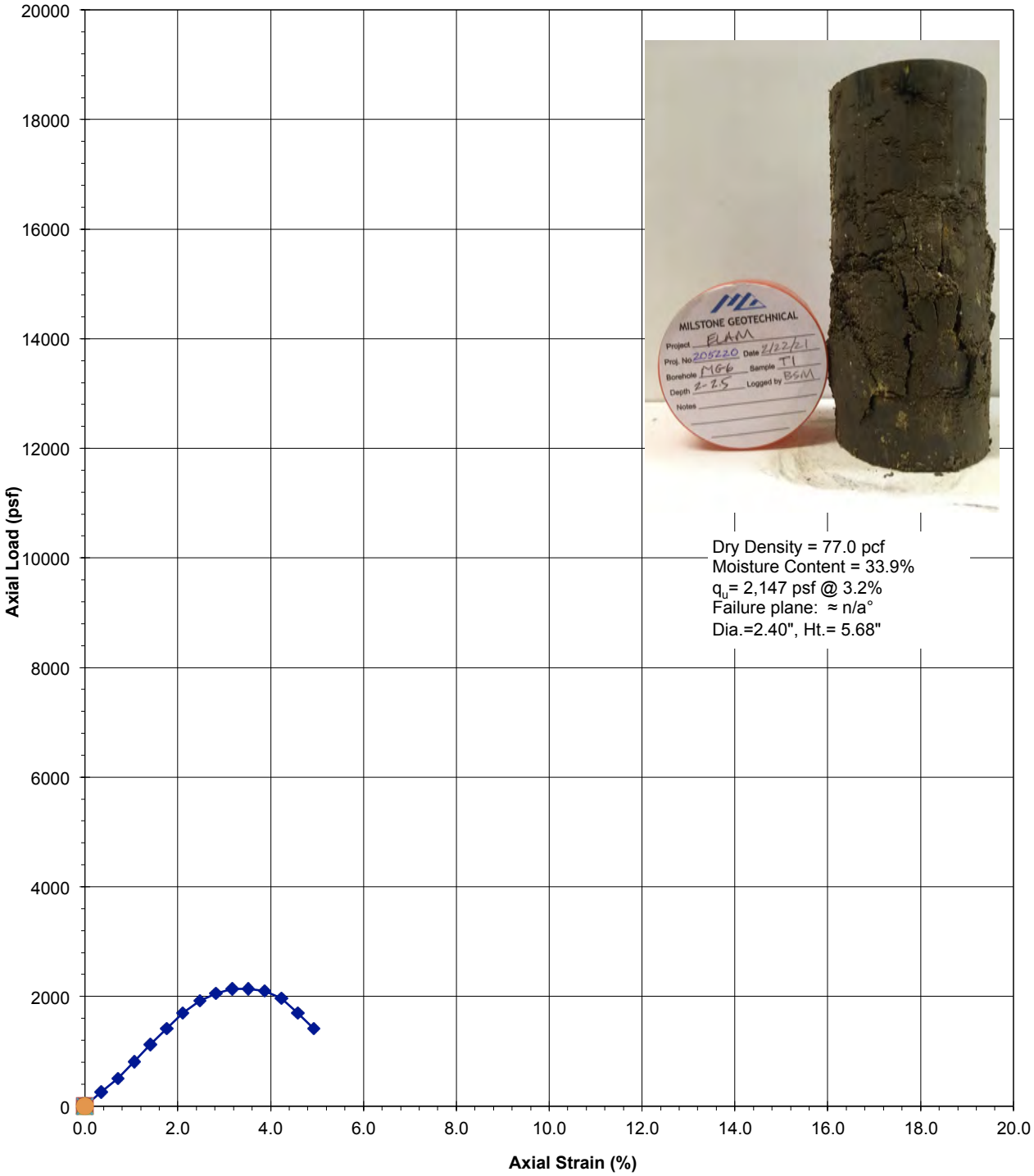
Dry Density = 73.2 pcf
Moisture Content = 24.7%
q_u= 4,851 psf @ 1.4%
Failure plane: ≈ n/a°
Dia.=2.41", Ht.= 5.65"



CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG6, T1 @ 2.0'
Sandy Fat Clay (CH/CL) olv brn to brn, 15% vfg-cg sand

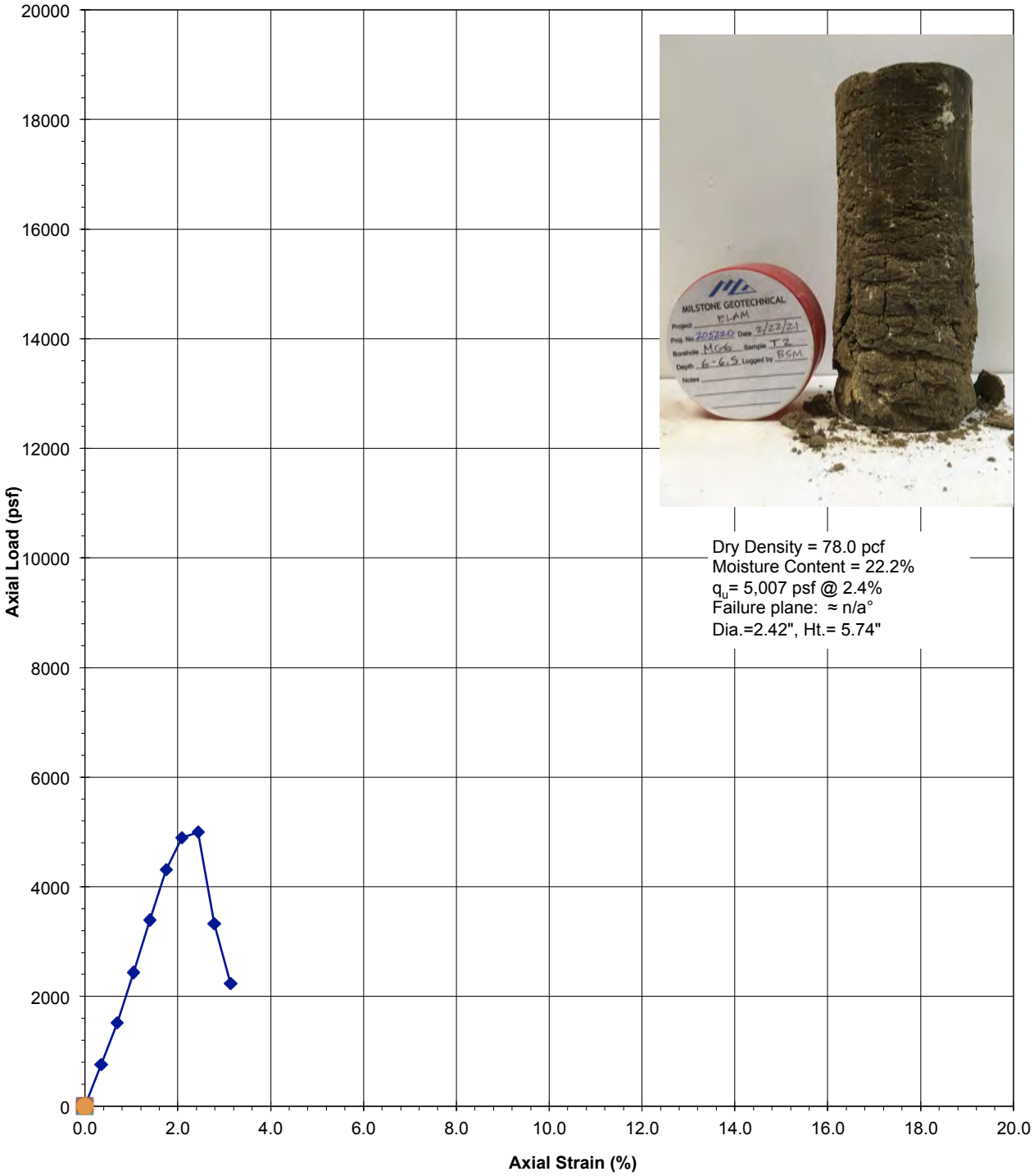


CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG6, T2 @ 6.0'
Sandy Fat Clay (CH/CL) brn w/wt, vfg-cg sand, moist/sl. moist

Dry Density = 78.0 pcf
Moisture Content = 22.2%
q_u= 5,007 psf @ 2.4%
Failure plane: ≈ n/a°
Dia.=2.42", Ht.= 5.74"

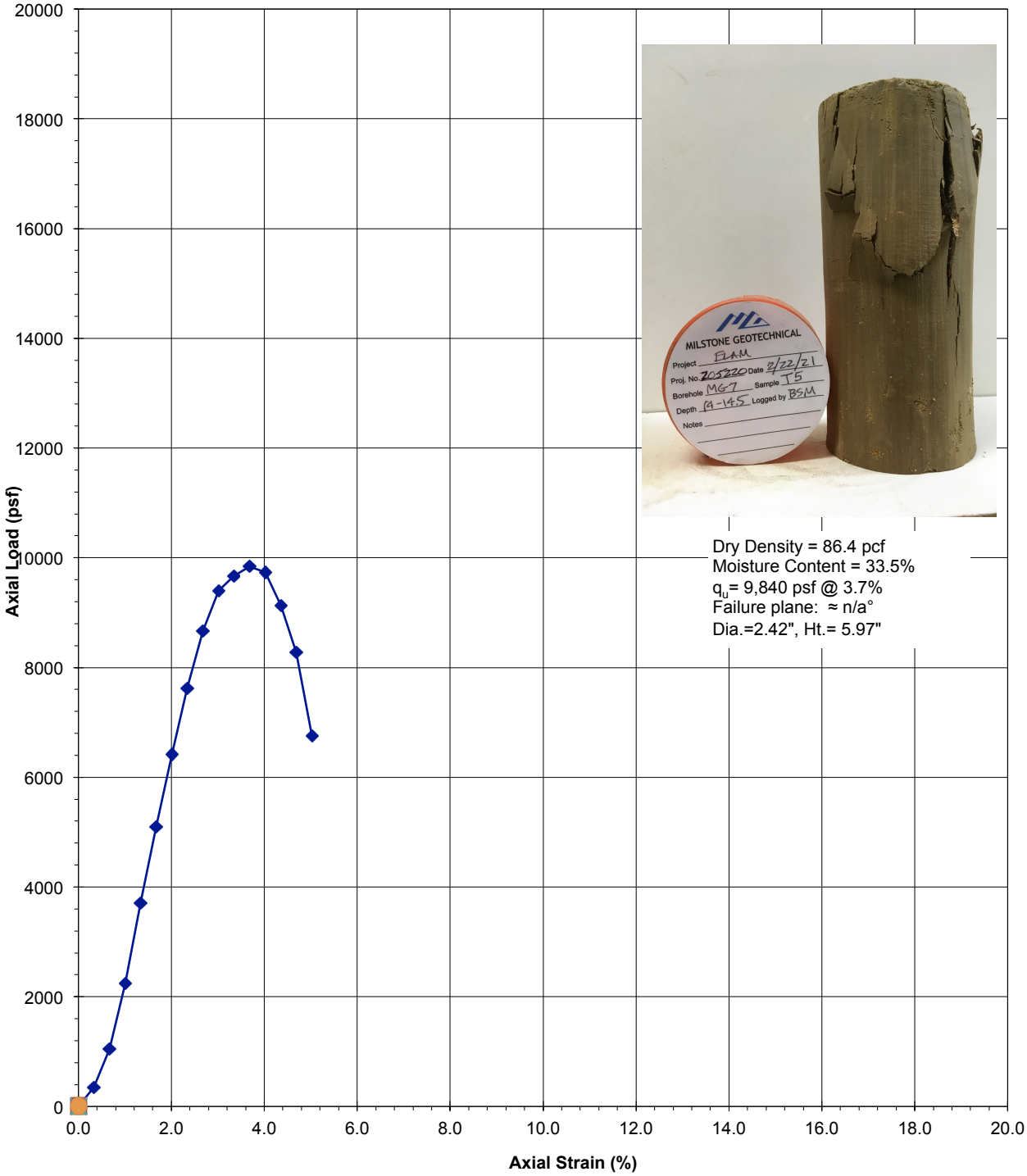


CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG7, T5 @ 14.0'
Siltstone/Shale, brn w dk yel brn, very severely weathered, soft

Dry Density = 86.4 pcf
Moisture Content = 33.5%
q_u= 9,840 psf @ 3.7%
Failure plane: ≈ n/a°
Dia.=2.42", Ht.= 5.97"

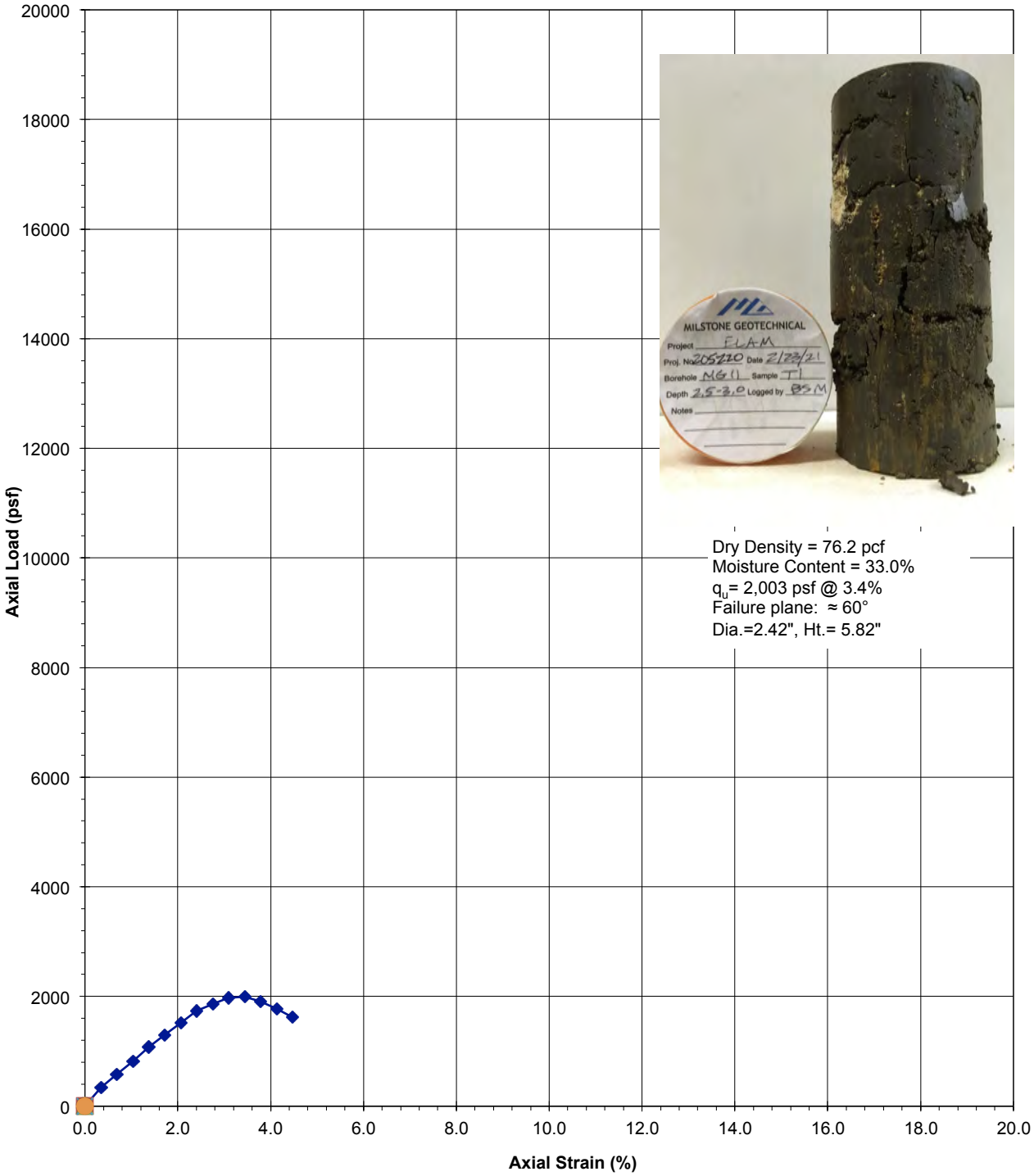


CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG11, T1 @ 2.5'
Sandy Fat Clay (CH) v dk gry, w/~15% fg-cg sand, trace CO_3

Dry Density = 76.2 pcf
Moisture Content = 33.0%
q_u= 2,003 psf @ 3.4%
Failure plane: ≈ 60°
Dia.=2.42", Ht.= 5.82"



CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG13, T3 @ 9.0'
Sandy Lean Clay w/Gravel (CL) v dk gry, ~30% vfg-cg + grav<1/2"

Dry Density = 68.5 pcf
Moisture Content = 27.3%
q_u= 2,460 psf @ 1.4%
Failure plane: ≈ n/a°
Dia.=2.42", Ht.= 5.76"

Axial Load (psf)

20000
18000
16000
14000
12000
10000
8000
6000
4000
2000
0

0.0 2.0 4.0 6.0 8.0 10.0 12.0 14.0 16.0 18.0 20.0

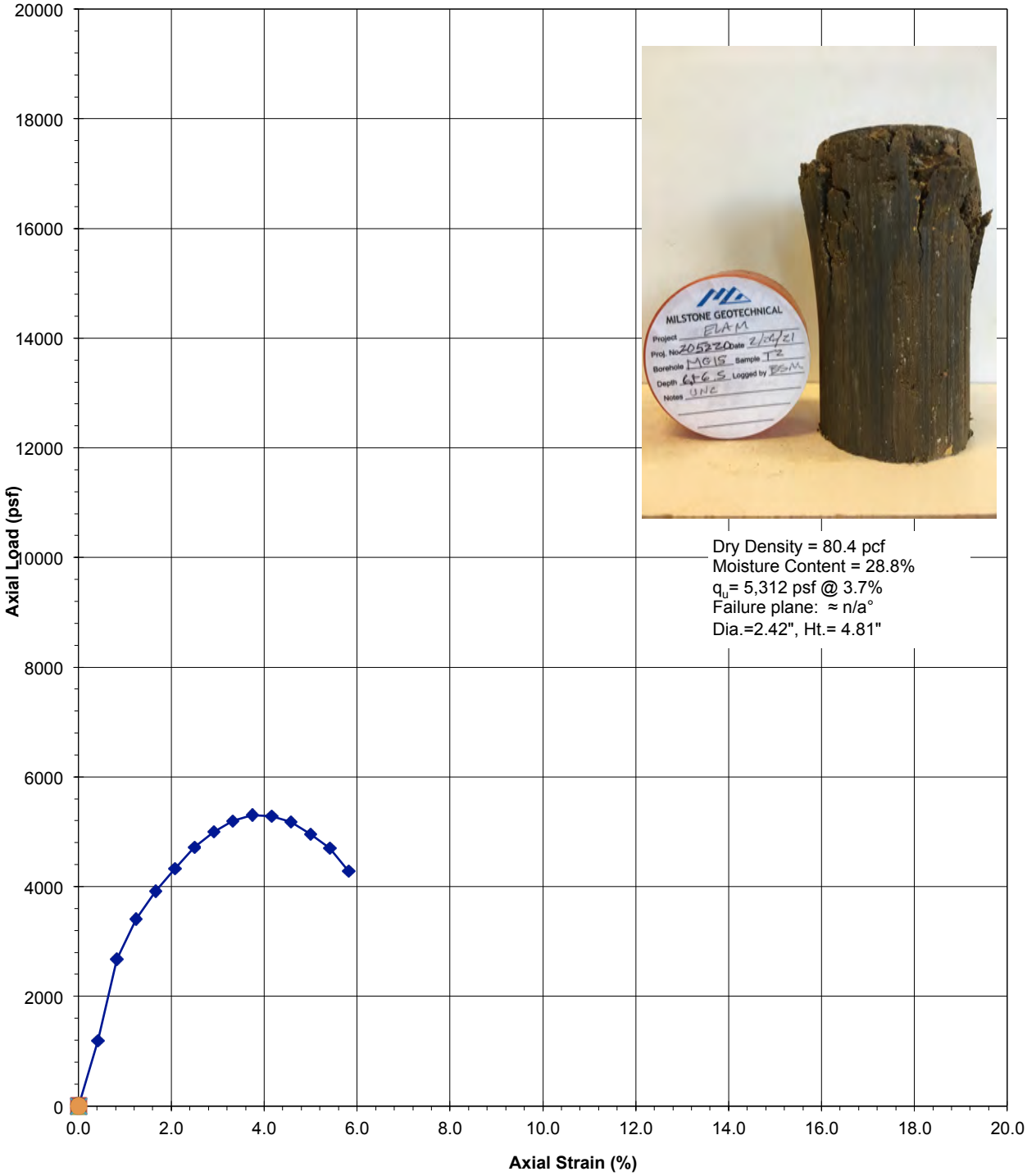
Axial Strain (%)

CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

Unconfined Compression Test Results
Elam, Project 205220
Boring MG15, T2 @ 6.1'
Sandy Lean Clay w/Gravel (CL) v dk gry, ~20% fg-cg, tr grav<1/4"

Dry Density = 80.4 pcf
Moisture Content = 28.8%
q_u= 5,312 psf @ 3.7%
Failure plane: ≈ n/a°
Dia.=2.42", Ht.= 4.81"



CLIENT: Milstone Geotechnical

FISHER GEOTECHNICAL
SOIL TESTING LABORATORY

FISHER GEOTECHNICAL

Client Name:	Milstone Geotechnical	Project Name/No.:	Elam, MG205220
Client Address:	17020 Melody Lane Los Gatos, CA 95033	Sample ID:	TP2, 3.5'
		Visual Description:	Sandy Elastic Silt (MH), v dk gry brn (10yr3/2), ~20% vfg-fg, ~5% mg-cg+grav<3/8", v clayey
Client Contact:	Barry Milstone		
Report Date:	5/15/21	Reference:	Passing No. 40 portion tested
Date Received:	5/14/21	Test Classification:	MH

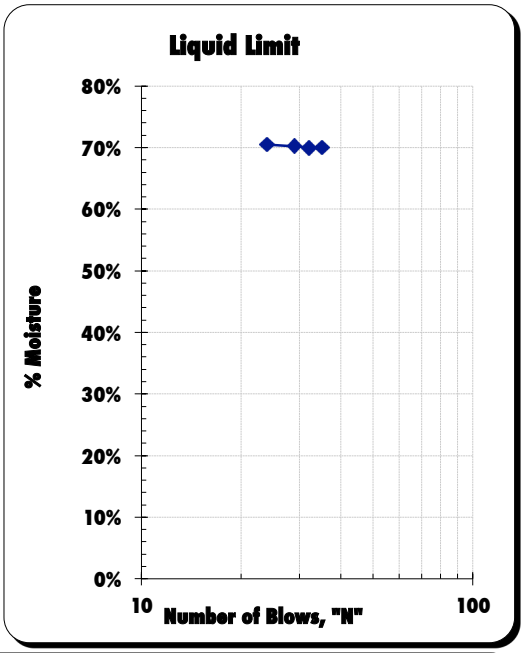
Liquid Limit Determination

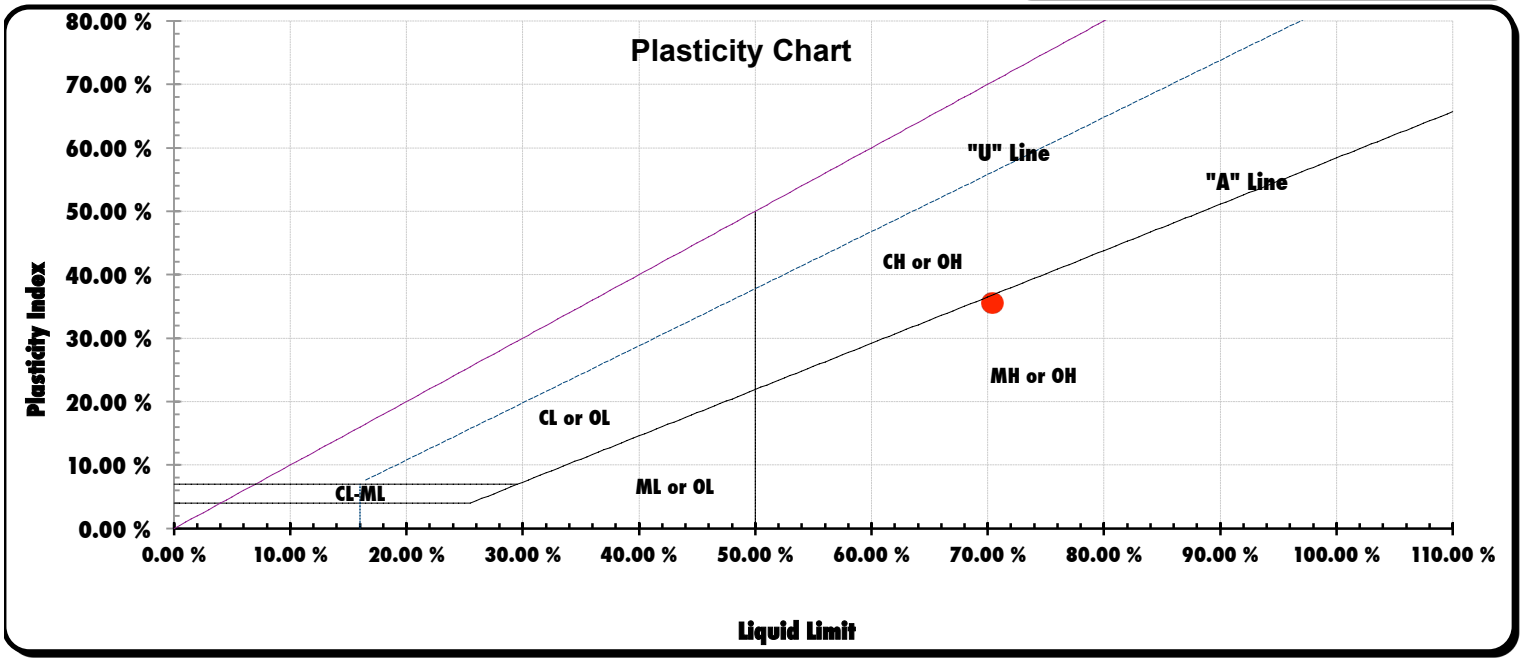
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	12.68	7.61	9.81	9.94		
Weight of Dry Soils + Pan:	8.93	5.68	7.25	7.03		
Weight of Pan:	3.57	2.92	3.61	2.90		
Weight of Dry Soils:	5.36	2.76	3.64	4.13		
Weight of Moisture:	3.75	1.93	2.56	2.91		
% Moisture:	70.0 %	69.9 %	70.3 %	70.5 %		
Number of Blows, N:	35	32	29	24		

Atterberg Limits		(whole no.)
Liquid Limit@ 25 Blows:	70.43 %	70
Plastic Limit Average:	34.88 %	35
Plasticity Index, I_P:	35.55 %	36

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	11.71	16.61				
Weight of Dry Soils + Pan:	9.65	13.24				
Weight of Pan:	3.68	3.68				
Weight of Dry Soils:	5.97	9.56				
Weight of Moisture:	2.06	3.37				
% Moisture:	34.5 %	35.3 %				





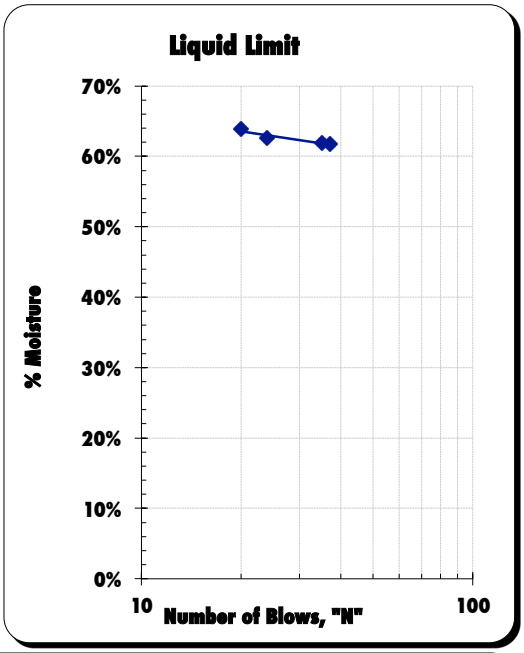
FISHER GEOTECHNICAL

Client Name:	Milstone Geotechnical	Project Name/No.:	Elam, MG205220
Client Address:	17020 Melody Lane Los Gatos, CA 95033	Sample ID:	TP4, 3.5'
		Visual Description:	Sandy Fat Clay (CH), v dk gry brn (10yr3/2), ~10%-20% vfg-fg, ~5% mg-cg+grav<3/4", v silty
Client Contact:	Barry Milstone		
Report Date:	5/15/21	Reference:	Passing No. 40 portion tested
Date Received:	5/14/21	Test Classification:	CH

Liquid Limit Determination

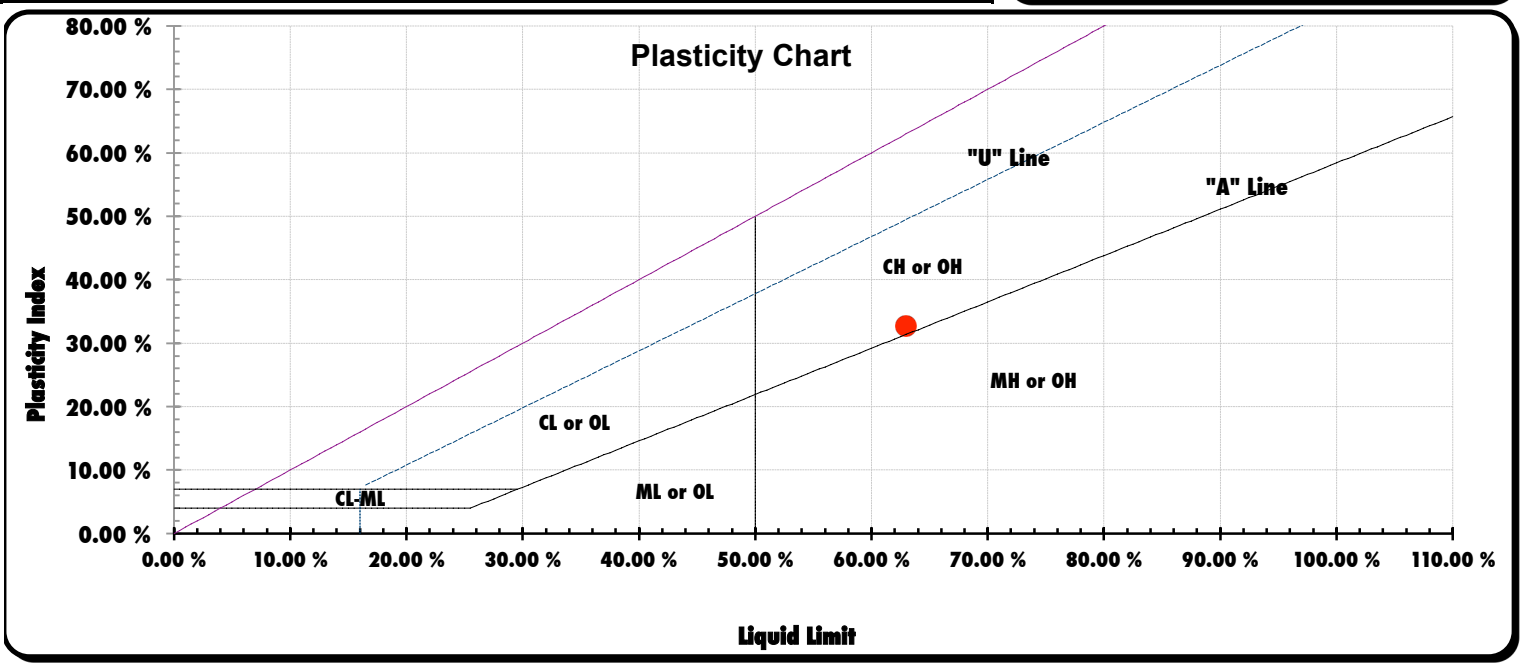
	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	14.56	10.20	11.30	11.61		
Weight of Dry Soils + Pan:	10.37	7.40	8.32	8.51		
Weight of Pan:	3.59	2.88	3.56	3.66		
Weight of Dry Soils:	6.78	4.52	4.76	4.85		
Weight of Moisture:	4.19	2.80	2.98	3.10		
% Moisture:	61.7 %	62.0 %	62.6 %	63.9 %		
Number of Blows, N:	37	35	24	20		

Atterberg Limits		(whole no.)
Liquid Limit@ 25 Blows:	63.00 %	63
Plastic Limit Average:	30.20 %	30
Plasticity Index, I_P:	32.80 %	33



Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	21.06	19.58				
Weight of Dry Soils + Pan:	17.03	15.72				
Weight of Pan:	3.71	2.91				
Weight of Dry Soils:	13.32	12.81				
Weight of Moisture:	4.03	3.86				
% Moisture:	30.3 %	30.1 %				



FISHER GEOTECHNICAL

Client Name:	Milstone Geotechnical	Project Name/No.:	Elam, MG205220
Client Address:	17020 Melody Lane Los Gatos, CA 95033	Sample ID:	MG11, T2, 6.0'
		Visual Description:	Sandy Fat Clay (CH), brn (10yr4/3), ~10% vfg-cg, tr ang/sub ang shale<3/8", w/CO3 fine veins, v silty
Client Contact:	Barry Milstone		
Report Date:	5/15/21	Reference:	Passing No. 40 portion tested
Date Received:	5/14/21	Test Classification:	CH

Liquid Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	21.67	25.29	19.27	22.29		
Weight of Dry Soils + Pan:	14.14	16.19	12.27	14.26		
Weight of Pan:	3.63	3.75	2.93	3.70		
Weight of Dry Soils:	10.51	12.44	9.34	10.56		
Weight of Moisture:	7.53	9.10	7.00	8.03		
% Moisture:	71.7 %	73.2 %	75.0 %	76.0 %		
Number of Blows, N:	42	29	26	22		

Atterberg Limits		(whole no.)
Liquid Limit@ 25 Blows:	74.95 %	75
Plastic Limit Average:	31.89 %	32
Plasticity Index, I_P:	43.07 %	43

Plastic Limit Determination

	#1	#2	#3	#4	#5	#6
Weight of Wet Soils + Pan:	22.86	19.77				
Weight of Dry Soils + Pan:	18.26	15.68				
Weight of Pan:	3.76	2.92				
Weight of Dry Soils:	14.50	12.76				
Weight of Moisture:	4.60	4.09				
% Moisture:	31.7 %	32.1 %