LOR GEOTECHNICAL GROUP, INC.
Soil Engineering ▲ Geology ▲ Environmental

PRELIMINARY GEOTECHNICAL AND INFILTRATION FEASIBILITY INVESTIGATION PROPOSED FITWELL CAMPUS APN 360-350-014 MENIFEE, CALIFORNIA

PROJECT NO. 13906.1
APRIL 4, 2023

Prepared For:

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Attention: Mr. Nick Thomas, LEED, AP

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Subject: Preliminary Geotechnical and Infiltration Feasibility Investigation, Proposed Fitwell Campus, APN 360-350-014, Menifee, California.

LOR Geotechnical Group, Inc., is pleased to present this report of our geotechnical investigation for the subject project. In summary, it is our opinion that the proposed development is feasible from a geotechnical perspective, provided the recommendations presented in the attached report are incorporated into design and construction. However, the contents of this summary should not be solely relied upon.

To provide adequate support for the proposed structures and structural improvements, we recommend that a compacted fill mat be constructed beneath footings and slabs. The compacted fill mat will provide a dense, high-strength soil layer to uniformly distribute the anticipated foundation loads over the underlying soils. Any undocumented fill material and any loose, compressible alluvial materials should be removed from structural areas and areas to receive engineered compacted fills. The data developed during this investigation indicates that removals ranging from approximately 2 to 7 feet will be required from currently planned development areas. The given removal depths are preliminary and the actual depths of the removals should be determined during the grading operation by observation and/or in-place density testing.

Low expansion potential and poor R-value quality content generally characterize the upper onsite materials tested. Near completion and/or at the completion of site grading, additional foundation and subgrade soils should be tested, as necessary, to verify their expansion potential, soluble sulfate content, and R-value quality.

Non-conducive infiltration rates were obtained for the earth materials tested.

LOR Geotechnical Group, Inc.

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INTRODUCTION

During March and April of 2023, a Preliminary Geotechnical and Infiltration Feasibility Investigation was performed by LOR Geotechnical Group, Inc., for the proposed Fitwell Campus project, Assessor's Parcel Number (APN) 360-350-014, in Menifee, California. The purpose of this investigation was to provide a technical evaluation of the geologic setting of the site and to provide geotechnical design recommendations for the proposed development. The scope of our services included:

- Review of available geotechnical literature, reports, maps, and agency information pertinent to the study area;
- Interpretation of aerial photographs of the site and surrounding regions dated 1938 through 2022;
- Geologic field reconnaissance mapping to verify the areal distribution of earth units and significance of surficial features as compiled from documents, literature, and reports reviewed;
- A subsurface field investigation to determine the physical soil conditions pertinent to the proposed development;
- Percolation testing via the borehole test method to determine Infiltration characteristics;
- Laboratory testing of selected soil samples obtained during the field investigation;
- Development of geotechnical recommendations for site grading and foundation design; and
- Preparation of this report summarizing our findings, and providing conclusions and recommendations for site development.

The approximate location of the site is shown on the attached Index Map, Enclosure A-1, within Appendix A.

PROJECT CONSIDERATIONS

To orient our investigation at the site, a Conceptual Plan prepared by AO Architecture, dated September 15, 2022, and an Ortho Photo with Boundary map, prepared by Advanced Civil Group, Inc., and dated February 28. 2023, were furnished for our use. The current site conditions and elevations were reflected in the topographic map while the

proposed building configuration and associated driveway, parking, and landscape areas were indicated on the Conceptual Plan. A composite of these two drawings was utilized as a base map for our field investigation and is presented as Enclosure A-2, within Appendix A.

As noted on the conceptual site development plan, proposed improvements to the 8.38 acre parcel include a 65,200 square foot (sf) gym, an 80,000 sf event center, a 5,000 sf museum, a 22,000 sf health and wellness office building, asphalt concrete/Portland cement concrete paved parking including 475 spaces, and landscaping. Although no site grading or construction drawings are currently available, we understand that the buildings will likely be one to two stories in height and of masonry, steel, and/or wood frame construction. In addition, infiltration of onsite runoff waters for WQMP purposes is proposed for within the northeast portion of the site.

AERIAL PHOTO ANALYSIS

The aerial photographs reviewed consisted of vertical aerial photograph images of varying scales. We reviewed imagery available from Google Earth Pro (2023) computer software and from online Historic Aerials (2023).

To summarize briefly, the site remained vacant land from prior to 1938 through today. The site was utilized for the majority of this time for farming (mostly dry land farming) purposes and evidence for minor disturbances to the property due to plowing and removal of surface rocks is apparent on some of the photographs reviewed. No evidence for the presence of faults traversing the site area or mass movement features was noted during our review of the photographs covering the site and nearby vicinity.

EXISTING SITE CONDITIONS

The approximately10-acre site is located east of Haun Road and south of Garbani Road in the Menifee area of Riverside County, Riverside. The property consists of the southeast portion of a large area of vacant, dry-farmed land that currently extends north to Garbani Road and west Haun Road. Other than a few piles of soils and rocks in the central-northeastern portion, the site is absent of apparent man-made features. A remnant drainage course traverses the site from the southeast corner, toward the central portion, and then in a northeast direction before exiting the property. Near the center of the site, a lone tree is present in this drainage area. Otherwise, the site is covered by a recently planted, dry-farmed crop. Topographically, the property consists of gently rolling terrain with local highs in the southwest and central-eastern portions and low lying areas generally

present west of the onsite drainage. The site is bordered on the south by a self-storage facility and on the east by the 215 freeway.

SUBSURFACE FIELD INVESTIGATION

Our subsurface field exploration program was conducted on March 7, 2023. The work consisted of advancing a total of 12 exploratory borings using a truck-mounted drill rig equipped with 8-inch diameter hollow stem augers. In addition, two borehole percolation tests were conducted in general accordance with the Shallow Percolation Test procedure as outlined in the Technical Guidance Document for Water Quality Management Plans (CDM Smith, 2013). The approximate locations of our exploratory borings and percolation tests are presented on Enclosure A-2, within Appendix A.

The subsurface conditions encountered in the exploratory borings were logged by a State licensed geologist from this firm. The borings were drilled to depths ranging from 6.5 and 26.5 feet below the existing ground surface. Relatively undisturbed and bulk samples were obtained at a maximum depth interval of 5 feet, and returned to our geotechnical laboratory in sealed containers for further testing and evaluation.

Percolation test borings were drilled to the requested depth of approximately 3 feet below the existing ground surface at the requested locations on March 8, 2023.

A detailed description of the subsurface field exploration program and the boring logs is presented in Appendix B, while a detailed description of our borehole percolation testing program and the test results are presented in Appendix C.

LABORATORY TESTING PROGRAM

Selected soil samples obtained during the field investigation were subjected to geotechnical laboratory testing to evaluate their physical and engineering properties. Laboratory testing included in-place moisture content and dry density, laboratory compaction characteristics, direct shear, sieve analysis, sand equivalent, R-value, expansion index, Atterberg limits, consolidation, and corrosion. Physical testing was conducted in our geotechnical laboratory and chemical testing was conducted by our subconsultant, Project X Corrosion Engineering. A detailed description of the geotechnical laboratory testing program and the test results are presented in Appendix D.

GEOLOGIC CONDITIONS

Regional Geologic Setting

The subject site is located upon the Perris block within the Peninsular Ranges Geomorphic Province of southern California. The Peninsular Ranges Geomorphic Province is a very large mass of crystalline igneous rocks of Cretaceous age and pre-batholithic metasedimentary and metavolcanic rocks of older ages, and is characterized by northwest-southeast trending fault zones which separate elongated structural blocks. These active fault zones typically consist of high angle, right-lateral, strike slip faults. The Perris block has a series of erosional surfaces, marked by low topographic relief and capped with unconsolidated alluvial sediments that have been eroded from the surrounding highlands. The subject site is situated in Menifee Valley, one of many alluviated valley within the Perris Block. While the Perris block is considered to be a relatively stable structural block, it is bounded by active faults. These include the Elsinore fault zone on the southwest, the San Jacinto fault zone on the northeast, and the Cucamonga fault zone on the north. The southeast boundary of the Perris Block is vague, but is believed to coincide with a complex group of faults extending southeast from Murrieta. The nearest is the Elsinore fault zone located approximately 11 kilometers (6.8 miles) to the southwest. The San Jacinto fault zone is located approximately 22 kilometers (13.7 miles) to the northeast while the San Andreas fault is located approximately 47 kilometers (29.5 miles) to the northeast and the Cucamonga fault is located approximately 63 kilometers (39 miles) to the north.

The geology of the site and surrounding region as mapped by Morton (2003) is shown on the attached Regional Geologic Map, Enclosure A-3 within Appendix A. As shown, the site in underlain by young and old alluvial fan deposits as well as igneous bedrock.

Site Geologic Conditions

As noted during this investigation, the subject site contains minor, local fill soils overlying older alluvial materials, and granitic bedrock locally at shallow to moderate depths. These units are described in further detail in the following sections.

Fill: As observed during our investigation, minor fill soils are present locally within the central-eastern portion of the site. This mainly consists of a pile of soils and rocks on the northwest side of an elevated knob in the east-central area and there is evidence that fill soils have been placed within the drainage course that traverses the site roughly from south to north. The rocks range from gravel to boulder size (up to about 3 feet in diameter)

and are mixed within the soil materials. The soils appear to be mostly onsite derived, however, we noted that there are minor areas that include concrete and rock materials that were imported from offsite areas. The fill materials are loose and exist in an non-engineered manner.

Older Alluvium: Beneath the vast majority of the site, older alluvial materials were encountered. The older alluvium was noted to be composed primarily of silty sand, sandy silt with clay, and sandy lean clay of low plasticity. The older alluvial materials were mostly moist, generally brown to reddish-brown in color, and generally massive to poorly layered. Based on our field observations, in-situ density tests, and Standard Penetration Test (SPT) data, it was noted that the older alluvium is generally in a loose/soft to medium dense/stiff state. In addition, expansion index testing performed on a clayey sample of older alluvium showed that these units have a low expansion potential.

Granitic Bedrock

Granitic bedrock was encountered within all of our exploratory borings at depths ranging from 1.5 to 23 feet beneath the surface. The bedrock ranges from monzogranite to granodiorite in composition and is generally fine to coarse grained, yellowish-brown to grayish-brown in color, and typically had a 1 to 3 foot thick weathered and slightly decomposed surface that gradually became fresher with increasing depth. Bedrock was found to be the shallowest below the surficial fill and/or older alluvial soils within the eastern and southwestern-southern portions and deepest in the southwest-central portions.

A detailed description of the subsurface soil and bedrock conditions as encountered within our exploratory borings is presented on the Boring Logs within Appendix B.

Details and results of our laboratory testing program are presented within Appendix D of this report.

Groundwater Hydrology

Within the site area, groundwater was encountered within several of our borings as water locally perched upon the underlying bedrock. In our exploratory borings, bedrock ranged in depth from approximately 1 to 23 feet beneath the surface. In the lower portions of the property, the perched groundwater was encountered at depths ranging from approximately 14 to 19 feet. However, there is no true groundwater table present at the subject property. Groundwater flow direction is likely variable, but is likely to the northeast.

According to the Department of Water Resources online Water Data Library (2023), the closest groundwater well to the subject property is located approximately 1.1 miles to the south-southeast. This groundwater well, State Well No. 06S03W23E001S, has one groundwater level measurement from December 1993 at approximately 21 feet bgs. Online GeoTracker (2023) records for the GTE-Murrieta Plant Yard at 32477 Haun Road, a Leaking Underground Storage Tank site located approximately 0.25 mile southwest of the subject property, had four groundwater monitoring wells with groundwater levels ranging from approximately 13 to 17 feet bgs during the time period from June to December 1998. Groundwater flow direction at this GTE site was estimated from north-northeast to northeast. Bedrock (decomposed granite) encountered in the borings for these groundwater monitoring wells ranged from approximately 12 to 27.5 feet bgs.

Mass Movement

The site lies on a relatively flat surface with some areas of gently rolling topography. The occurrence of mass movement failures such as landslides, rockfalls, or debris flows within such areas is generally not considered common, and no evidence of mass movement was observed on the site.

Faulting

No active or potentially active faults are known to exist at the subject site. In addition, the subject site does not lie within a current State of California Earthquake Fault Zone (Hart and Bryant, 2003) nor does the site lie within a County of Riverside fault zone. No evidence of faulting projecting into or crossing the site was noted during our aerial photograph review or our review of published geologic maps.

As previously mentioned, the Elsinore fault zone is the closest active fault and it is located approximately 11 kilometers (6.8 miles) to the southwest. Two significant faults are located to the northeast and these are the San Jacinto and the San Andreas faults, located approximately 22 kilometers (13.7 miles) and approximately 47 kilometers (29.5 miles) to the northeast. In addition, the Cucamonga fault is located approximately 63 kilometers (39 miles) to the north.

The Elsinore fault zone is one of the largest in southern California. The primary sense of slip along the Elsinore fault is right lateral strike-slip. It is believed that the Elsinore fault zone is capable of producing an earthquake magnitude on the order of 6.5 to 7.5.

The San Jacinto fault is one of the major tectonic features in the region, second only to the San Andreas in terms of length, slip rate, and potential earthquakes. The fault extends from the east end of the San Gabriel Mountains southeast into Mexico. Within the Peninsular Ranges Province, this fault serves as the eastern boundary of the aforementioned Perris Block. It is one of the most active faults in California. It is believed that the San Jacinto fault is capable of producing an earthquake magnitude on the order of 6.7 or greater.

The San Andreas fault is considered to be the major tectonic feature of California, separating the Pacific plate from the North American plate. While estimates vary, the San Andreas fault is generally thought to have an average slip rate on the order of 24 mm/year and capable of generating large magnitude events on the order of 7.5 or greater.

The Cucamonga fault is considered to be part of the Sierra Madre fault system which marks the southern boundary of the San Gabriel Mountains. This is a north dipping thrust fault which is believed to be responsible for the uplift of the San Gabriel Mountains. It is believed that the Cucamonga fault is capable of producing an earthquake magnitude on the order of 7.0 or greater.

Current standards of practice often include a discussion of all potential earthquake sources within a 100 kilometer (62 mile) radius. However, while there are other earthquake faults within a 100 kilometer (62 mile) radius of the site, none of these are considered as relevant to the site as the faults described above, due to their greater distance and smaller anticipated magnitudes.

Historical Seismicity

In order to obtain a general perspective of the historical seismicity of the site and surrounding region a search was conducted for seismic events at and around the area within various radii. This search was conducted utilizing the historical seismic search website of the U.S.G.S. (2022). This website conducts a search of a user selected cataloged seismic events database, within a specified radius and selected magnitudes, and then plots the events onto a map. At the time of our search, the database contained data from January 1, 1932 through March 28, 2023.

In our first search, the general seismicity of the region was analyzed by selecting an epicenter map listing all events of magnitude 4.0 and greater, recorded since 1932, within a 100 kilometer (62 mile) radius of the site, in accordance with guidelines of the California Division of Mines and Geology. This map illustrates the regional seismic history of

moderate to large events. As depicted on Enclosure A-4, within Appendix A, the site lies within a relatively active region associated with the San Andreas fault and various Mojave Desert fault to the east.

In the second search, the micro seismicity of the area lying within a 15 kilometer (9.2 mile) radius of the site was examined by selecting an epicenter map listing events on the order of 1.0 and greater since 1978. The results of this search is a map that presents the seismic history around the area of the site with much greater detail, not permitted on the larger map. The reason for limiting the time period for the events on the detail map is to enhance the accuracy of the map. Events recorded prior to the mid to late1970's are generally considered to be less accurate due to advancements in technology. As depicted on this map, Enclosure A-5, a few events are present in the area, none appear to be associated with any known faults.

In summary, the historical seismicity of the site entails numerous small to medium magnitude earthquake events occurring in the region around the subject site. Any future developments at the subject site should anticipate that moderate to large seismic events could occur very near the site.

Secondary Seismic Hazards

Other secondary seismic hazards generally associated with severe ground shaking during an earthquake include liquefaction, seismic-induced settlement, seiches and tsunamis, earthquake induced flooding, landsliding, and rockfalls.

Liquefaction: The potential for liquefaction generally occurs during strong ground shaking within granular loose sediments where the depth to groundwater is usually less than 50 feet below the ground surface. Although shallow groundwater in the form of water perched upon the underlying bedrock is known to exist at the site, hard bedrock is present at shallow depth. In addition, the remedial grading recommendations outlined in subsequent portions of this report are anticipated to mitigate any near surface loose (soft) soil conditions. Therefore, the possibility for liquefaction to be a potential hazard at the site is considered nil.

Seiches/Tsunamis: The potential for the site to be affected by a seiche or tsunami (earthquake generated wave) is considered nil due to absence of any large bodies of water near the site.

Flooding (Water Storage Facility Failure): There are no large water storage facilities located on or near the site which could possibly rupture during in earthquake and affect the site by flooding.

Seismically-Induced Landsliding: Due to the low relief of the site and surrounding region, the potential for landslides to occur at the site is considered nil.

Rockfalls: No large, exposed, loose or unrooted boulders are present above the site that could affect the integrity of the site.

Seismically-Induced Settlement: Settlement generally occurs within areas of loose, granular soils with relatively low density. Since the site is underlain by relatively dense to alluvial materials, the potential for settlement is considered very low. In addition, the recommended earthwork operations to be conducted during the development of the site should mitigate any near surface loose (soft) soil conditions.

SOILS AND SEISMIC DESIGN CRITERIA (California Building Code 2022)

Design requirements for structures can be found within Chapter 16 of the 2022 California Building Code (CBC) based on building type, use, and/or occupancy. The classification of use and occupancy of all proposed structures at the site, shall be the responsibility of the building official.

Site Classification

Chapter 20 of the ASCE 7-16 defines six possible site classes for earth materials that underlie any given site. Bedrock is assigned one of three of these six site classes and these are: A, B, or C. Soil is assigned as C, D, E, or F. Per ASCE 7-16, Site Class A and Site Class B shall be measured on-site or estimated by a geotechnical engineer, engineering geologist or seismologist for competent rock with moderate fracturing and weathering. Site Class A and Site Class B shall not be used if more than 10 feet of soil is between the rock surface and bottom of the spread footing or mat foundation. Site Class C can be used for very dense soil and soft rock with Ñ values greater than 50 blows per foot. Site Class D can be used for stiff soil with Ñ values ranging from 15 to 50 blows per foot. Site Class E is for soft clay soils with Ñ values less than 15 blows per foot. Our investigation, mapping by others, and our experience in the site region indicates that the materials beneath the site are considered Site Class C, very dense soil and soft rock.

CBC Earthquake Design Summary

Earthquake design criteria have been formulated in accordance with the 2022 CBC and ASCE 7-16 for the site based on the results of our investigation to determine the Site Class and an assumed Risk Category II. However, these values should be reviewed and the final design should be performed by a qualified structural engineer familiar with the region. In addition, the building official should confirm the Risk Category utilized in our design (Risk Category II). Our design values are provided below:

CBC 2022 SEISMIC DESIGN SUMMARY* Site Location (USGS WGS84) 33.6533, -117.1726, Risk Category II	
Site Class Definition Chapter 20 ASCE 7	C
$\mathbf{S_s}$ Mapped Spectral Response Acceleration at 0.2s Period	1.389
$\mathbf{S_1}$ Mapped Spectral Response Acceleration at 1s Period	0.514
$\mathbf{S_{MS}}$ Adjusted Spectral Response Acceleration at 0.2s Period	1.667
$\mathbf{S_{M1}}$Adjusted Spectral Response Acceleration at 1s Period	0.764
$\mathbf{S_{DS}}$ Design Spectral Response Acceleration at 0.2s Period	1.111
$\mathbf{S_{D1}}$ Design Spectral Response Acceleration at 1s Period	0.510
$\mathbf{F_a}$ Short Period Site Coefficient at 0.2s Period	1.200
$\mathbf{F_v}$ Long Period Site Coefficient at 1s Period	1.486
$\mathbf{PGA_M}$ Site Modified Peak Ground Acceleration	0.71
Seismic Design Category	D
*values obtained from OSHPD Seismic Design Maps	

CONCLUSIONS

This investigation provides a broad overview of the geotechnical and geologic factors which are expected to influence future site planning and development. On the basis of our field investigation and testing program, it is the opinion of LOR Geotechnical Group, Inc., that the proposed development of the site for the proposed use is feasible from a geotechnical standpoint, provided the recommendations presented in this report are incorporated into design and implemented during grading and construction.

It should be noted that the subsurface conditions encountered in our exploratory borings are indicative of the locations explored and the subsurface conditions may vary. If conditions are encountered during the construction of the project that differ significantly from those presented in this report, this firm should be notified immediately so we may assess the impact to the recommendations provided.

Foundation Support

To provide adequate support for the proposed structures, we recommend that a compacted fill mat be constructed beneath footings and slabs. The compacted fill mat will provide a dense, high-strength soil layer to uniformly distribute the anticipated foundation loads over the underlying soils. The construction of this compacted fill mat will allow for the removal of any existing fill material that is present locally.

Conventional foundation systems utilizing either individual spread footings and/or continuous wall footings will provide adequate support for the anticipated downward and lateral loads when utilized in conjunction with the recommended fill mat.

Soil Expansiveness

Our expansion index testing of a representative sample of the on-site soils indicates a low expansion potential. For low expansive soils, specialized construction procedures to resist expansive soil activity are considered necessary and are provided within the following sections of this report.

Careful evaluation of onsite soils and any import fill for their expansion potential should be conducted during the grading operation.

Corrosion Screening

Select representative samples from our borings were taken to Project X Corrosion Engineering for full corrosion series testing. Results from soil corrosivity testing completed by Project X Corrosion Engineering are presented within Appendix D.

The corrosivity test results indicate that soluble sulfate concentrations in the samples was less than 0.10 percent by weight. These concentrations indicate an exposure class S0 for sulfate (ACI 318). No special mitigation methods are considered necessary.

The corrosivity test results indicate that chloride concentrations were below 500 ppm. This concentration indicates an exposure class C1 for chloride (ACI 318). Special mitigation measures are not considered necessary.

Soil pH for the samples was 8.0 to 8.1, slightly basic. Therefore, the need for specialized design is not anticipated.

Concentrations of ammonium and nitrate indicate the soil may be aggressive towards copper.

Resistivity results for the samples were in the mildly corrosive to corrosive range.

LOR Geotechnical does not practice corrosion engineering. If further information concerning the corrosion characteristics, or interpretation of the results submitted herein, is required, then a competent corrosion engineer could be consulted.

Infiltration

The results of our field investigation and percolation test data indicate that the site soils/bedrock materials at the depths and locations tested are not conducive to infiltration. Based on the results of this investigation, acceptable infiltration is also not anticipated to occur at other locations and depths due to the amount of silty/clayey fines present in much of the onsite soils, and/or the presence of hard, relatively impervious bedrock.

Geologic Mitigations

No special mitigation methods are deemed necessary at this time, other than the geotechnical recommendations provided in the following sections.

Seismicity

Seismic ground rupture is generally considered most likely to occur along pre-existing active faults. Since no known faults are known to exist at, or project into the site, the probability of ground surface rupture occurring at the site is considered nil.

Due to the site's close proximity to the faults described above, it is reasonable to expect a relatively strong ground motion seismic event to occur during the lifetime of the proposed development on the site. Large earthquakes could occur on other faults in the general area, but because of their lesser anticipated magnitude and/or greater distance, they are

considered less significant than the faults described above from a ground motion standpoint.

The effects of ground shaking anticipated at the subject site should be mitigated by the seismic design requirements and procedures outlined in Chapter 16 of the California Building Code. However, it should be noted that the current building code requires the minimum design to allow a structure to remain standing after a seismic event, in order to allow for safe evacuation. A structure built to code may still sustain damage which might ultimately result in the demolishing of the structure (Larson and Slosson, 1992).

No secondary seismic hazards are anticipated to impact the proposed development.

RECOMMENDATIONS

Geologic Recommendations

No special geologic recommendations are deemed necessary at this time, other than the geotechnical recommendations provided in the following sections.

General Site Grading

It is imperative that no clearing and/or grading operations be performed without the presence of a qualified geotechnical engineer. An onsite, pre-job meeting with the developer, the contractor, the jurisdictional agency, and the geotechnical engineer should occur prior to all grading related operations. Operations undertaken at the site without the geotechnical engineer present may result in exclusions of affected areas from the final compaction report for the project.

Grading of the subject site should be performed in accordance with the following recommendations as well as applicable portions of the California Building Code, and/or applicable local ordinances.

All areas to be graded should be stripped of significant vegetation and other deleterious materials.

Any undocumented fill encountered during grading should be completely removed, cleaned of significant deleterious materials, and may be reused as compacted fill. It is our recommendation that any existing fills under any proposed flatwork and paved areas be

removed and replaced with engineered compacted fill. If this is not done, premature structural distress (settlement) of the flatwork and pavement may occur.

Cavities created by removal of subsurface obstructions, which are anticipated in areas of the site which were previously developed, should be thoroughly cleaned of loose soil, organic matter and other deleterious materials, shaped to provide access for construction equipment, and backfilled as recommended in the following Engineered Compacted Fill section of this report.

Initial Site Preparation

The existing fill material and any loose, compressible alluvial soils should be removed from all proposed structural and/or fill areas. The data developed during this investigation indicates that removals on the order of 2 to 7 feet deep will be required from proposed development areas in order to encounter competent alluvium or bedrock upon which engineered compacted fill can be placed. The given removal depths are preliminary. Deeper fills may be present locally. Removals should expose alluvial materials with an in-situ relative compaction of at least 85 percent (ASTM D 1557) or relatively fresh bedrock. The actual depths of the removals should be determined during the grading operation by observation and/or in-place density testing.

Preparation of Fill Areas

Prior to placing fill, the surfaces of all alluvial areas to receive fill should be scarified to a minimum depth of 12 inches. The scarified soil should be brought to near optimum moisture content and compacted to a relative compaction of at least 90 percent (ASTM D 1557).

Engineered Compacted Fill

The onsite soils and bedrock materials should provide adequate quality fill material, provided they are free from oversized and/or organic matter and other deleterious materials. Unless approved by the geotechnical engineer, rock or similar irreducible material with a maximum dimension greater than 6 inches should not be buried or placed in fills.

If required, import fill should be inorganic, non-expansive granular soils free from rocks or lumps greater than 6 inches in maximum dimension. Sources for import fill should be approved by the geotechnical engineer prior to their use. Fill should be spread in maximum

8-inch uniform, loose lifts, each lift brought to near optimum moisture content, and compacted to a relative compaction of at least 90 percent in accordance with ASTM D 1557.

Preparation of Foundation Areas

All footings should rest upon at least 24 inches of properly compacted fill material placed over competent alluvium or bedrock. In areas where the required fill thickness is not accomplished by the recommended removals or by site rough grading, the footing areas should be further subexcavated to a depth of at least 24 inches below the proposed footing base grade, with the subexcavation extending at least 5 feet beyond the footing lines. The bottom of all excavations should be scarified to a depth of 12 inches, brought to near optimum moisture content, and recompacted to at least 90 percent relative compaction (ASTM D 1557) prior to the placement of compacted fill.

Concrete floor slabs should bear on a minimum of 24 inches of compacted soil. This should be accomplished by the recommendations provided above. The final pad surfaces should be rolled to provide smooth, dense surfaces upon which to place the concrete.

Short-Term Excavations

Following the California Occupational and Safety Health Act (CAL-OSHA) requirements, excavations 5 feet deep and greater should be sloped or shored. All excavations and shoring should conform to CAL-OSHA requirements. Short-term excavations of 5 feet deep and greater shall conform to Title 8 of the California Code of Regulations, Construction Safety Orders, Section 1504 and 1539 through 1547. Based on our exploratory borings, it appears that Type C soils and stable rock are the predominant type of soil on the project and all short-term excavations should be based on this type of soil.

Deviation from the standard short-term slopes are permitted using option 4, Design by a Registered Professional Engineer (Section 1541.1).

Short-term excavation construction and maintenance are the responsibility of the contractor and should be a consideration of his methods of operation and the actual soil and/or bedrock conditions encountered.

Slope Construction

Preliminary data indicates that cut and fill slopes should be constructed no steeper than two horizontal to one vertical. Fill slopes should be overfilled during construction and then cut back to expose fully compacted soil. A suitable alternative would be to compact the slopes during construction, then roll the final slopes to provide dense, erosion-resistant surfaces.

Slope Protection

Since the site soil materials are susceptible to erosion by running water, measures should be provided to prevent surface water from flowing over slope faces. Slopes at the project should be planted with a deep rooted ground cover as soon as possible after completion. The use of succulent ground covers such as iceplant or sedum is not recommended. If watering is necessary to sustain plant growth on slopes, then the watering operation should be monitored to assure proper operation of the irrigation system and to prevent over watering.

Soil Expansiveness

Some of the alluvial materials encountered during this investigation were tested and found to have a low expansion potential. Therefore, specialized construction procedures to specifically resist expansive soil activity are anticipated at this time and are provided within the following sections of this report.

Additional evaluation of on-site and any imported soils for their expansion potential should be conducted following completion of the grading operation.

Foundation Design (Expansion Index 20-50)

If the site is prepared as recommended, the proposed buildings may be safely supported on conventional shallow foundations, either individual spread footings and/or continuous wall footings, bearing entirely on a minimum of 24 inches of engineered compacted fill placed over competent alluvial materials. All foundations should have a minimum width of 12 inches. Footings placed upon very low and low expansive soils should be established a minimum of 12 inches below lowest adjacent grade.

For the minimum width and depth, spread foundations may be designed using an allowable bearing pressure of 2,000 psf. This bearing pressure may be increased by 200 psf for each

additional foot of width, and by 500 psf for each additional foot of depth, up to a maximum of 4,000 psf. For example, a footing 2 feet wide and embedded 2 feet will have an allowable bearing pressure of 2,700 psf.

The above values are net pressures; therefore, the weight of the foundations and the backfill over the foundations may be neglected when computing dead loads. The values apply to the maximum edge pressure for foundations subjected to eccentric loads or overturning. The recommended pressures apply for the total of dead plus frequently applied live loads, and incorporate a factor of safety of at least 3.0. The allowable bearing pressures may be increased by one-third for temporary wind or seismic loading.

The resultant of the combined vertical and lateral seismic loads should act within the middle one-third of the footing width. The maximum calculated edge pressure under the toe of foundations subjected to eccentric loads or overturning should not exceed the increased allowable pressure.

Resistance to lateral loads will be provided by passive earth pressure and base friction. For footings bearing against compacted fill, passive earth pressure may be considered to be developed at a rate of 300 pounds per square foot per foot of depth. Base friction may be computed at 0.30 times the normal load. Base friction and passive earth pressure may be combined without reduction. These values are for dead load plus live load and may be increased by one-third for wind or seismic loading.

Footings on low expansive soils should be reinforced with a minimum of four # 4 rebars, two near the top and two near the bottom of the footings.

The preceding recommendations to counteract low expansive soil activity should be considered preliminary and should be revised upon the completion of the site grading. More stringent parameters for design of foundations on expansive soils can be specified by a structural engineer experienced in these matters.

Settlement

Total settlement of individual foundations will vary depending on the width of the foundation and the actual load supported. Maximum settlement of shallow foundations designed and constructed in accordance with the preceding recommendations are estimated to be on the order of 0.5 inch. Differential settlements between adjacent footings should be about one-half of the total settlement. Settlement of all foundations is expected to occur rapidly,

primarily as a result of elastic compression of supporting soils as the loads are applied, and should be essentially completed shortly after initial application of the loads.

Building Area Slab-on-Grade

To provide adequate support, concrete floor slabs-on-grade should bear on a minimum of 24 inches of engineered fill compacted soil. The final pad surfaces should be rolled to provide smooth, dense surfaces.

Prior to placing concrete, the upper 12-inches of the subgrade soil should be pre-saturated to 2 to 4 percent over optimum moisture content.

Slabs to receive moisture-sensitive coverings should be provided with a moisture vapor retarder/barrier. We recommend that a vapor retarder/barrier be designed and constructed according to the American Concrete Institute 302.1R, Concrete Floor and Slab Construction, which addresses moisture vapor retarder/barrier construction. At a minimum, the vapor retarder/barrier should comply with ASTM E1745 and have a nominal thickness of at least 10 mils. The vapor retarder/barrier should be properly sealed, per the manufacturer's recommendations, and protected from punctures and other damage. Per the Portland Cement Association, for slabs with vapor-sensitive coverings, a layer of dry, granular material (sand) should be placed under the vapor retarder/barrier.

For slabs in humidity-controlled areas, a layer of dry, granular material (sand) should be placed above the vapor retarder/barrier.

The slabs should be protected from rapid and excessive moisture loss which could result in slab curling. Careful attention should be given to slab curing procedures, as the site area is subject to large temperature extremes, humidity, and strong winds.

Exterior Flatwork

To provide adequate support, exterior flatwork improvements should rest on a minimum of 12 inches of soil compacted to at least 90 percent (ASTM D 1557).

To resist expansive soil forces, flatwork supported by low expansive soils should be reinforced with a minimum of # 3 rebar at 18 inches each way. Flatwork areas should be pre-saturated to 2 to 4 percent over optimum prior to placing concrete.

Flatwork surface should be sloped a minimum of 1 percent away from buildings and slopes, to approved drainage structures.

Wall Pressures

The design of footings for retaining walls should be performed in accordance with the recommendations described earlier under Preparation of Foundation Areas and Foundation Design. For design of retaining wall footings, the resultant of the applied loads should act in the middle one-third of the footing, and the maximum edge pressure should not exceed the basic allowable value without increase.

For design of retaining walls unrestrained against movement at the top, we recommend an active pressure of 55 pounds per square foot (psf) per foot of depth be used. This assumes level backfill consisting of compacted, non-expansive, soils placed against the structures and within the back cut slope extending upward from the base of the stem at 35 degrees from the vertical or flatter.

Retaining structures subject to uniform surcharge loads within a horizontal distance behind the structures equal to the structural height should be designed to resist additional lateral loads equal to 0.50 times the surcharge load. Any isolated or line loads from adjacent foundations or vehicular loading will impose additional wall loads and should be considered individually.

To avoid over stressing or excessive tilting during placement of backfill behind walls, heavy compaction equipment should not be allowed within the zone delineated by a 45 degree line extending from the base of the wall to the fill surface. The backfill directly behind the walls should be compacted using light equipment such as hand operated vibrating plates and rollers. No material larger than three inches in diameter should be placed in direct contact with the wall.

Wall pressures should be verified prior to construction, when the actual backfill materials and conditions have been determined. Recommended pressures are applicable only to level, non-expansive, properly drained backfill with no additional surcharge loadings. If inclined backfills are proposed, this firm should be contacted to develop appropriate active earth pressure parameters.

Preliminary Pavement Design

Testing and design for preliminary onsite pavement was conducted in accordance with the California Highway Design Manual and the Guild for the Design and Construction of Concrete Parking Lot (ACI33OR).

Based upon our preliminary sampling and testing, and upon an assumed Traffic Index generally used for similar projects, it appears that the structural sections tabulated below should provide satisfactory pavements for the subject on-site pavement improvements:

AREA	T.I.	DESIGN R-VALUE	PRELIMINARY SECTION
On site vehicular parking with occasional truck traffic (ADTT=10)	6.0	15	0.25' AC / 0.85' AB or 5" JPCP / 4" AB
Light to moderate truck traffic (ADTT=25)	7.0	15	0.30'AC / 1.05'AB or 6" JPCP / 4" AB
Moderate to Heavy Truck Traffic (ADTT=100)	--	15	6.5"JPCP/4"AB
AC - Asphalt Concrete AB - Class 2 Aggregate Base JPCP - Jointed Plain Concrete Pavement with MR ≥ 550 psi			

The above structural sections are predicated upon 90 percent relative compaction (ASTM D 1557) of all utility trench backfills and 95 percent relative compaction (ASTM D 1557) of the upper 12 inches of pavement subgrade soils and of any aggregate base utilized. In addition, the aggregate base should meet Caltrans specifications for Class 2 Aggregate Base.

The recommended concrete pavement sections should have a minimum modulus of rupture (MR) of 550 pounds per square inch (psi). Transverse joints should be sawcut in the pavement at approximately 12 to 15-foot intervals within 4 to 6 hours of concrete placement, or preferably sooner. Sawcut depth should be equal to approximately one quarter of slab thickness. Construction joints should be constructed such that adjacent sections butt directly against each other and are keyed into each other. Parallel pavement sections should also be keyed into each other.

It should be noted that all of the above pavement design was based upon the results of preliminary sampling and testing, and should be verified by additional sampling and testing during construction when the actual subgrade soils are exposed.

Infiltration

The results of our field investigation and percolation test data indicates the site earth materials at the depths and locations tested are not conducive to acceptable infiltration. Therefore, water quality storm water systems should not incorporate on-site infiltration when determining storm water treatment capacity.

Corrosion Protection

Based on the test results, this soil is classified as mildly corrosive to corrosive to ferrous metals and potentially aggressive towards copper. The laboratory data above should be reviewed and corrosion design should be completed by a qualified corrosion engineer.

In lieu of corrosion design for metal piping, ABS/PVC may be used. Soil corrosion is not considered a factor with ABS/PVC materials. ABS/PVC is considered suitable for use due to the corrosion potential of the on-site soils with respect to metals.

LOR Geotechnical does not practice corrosion engineering. If further information concerning the corrosion characteristics, or interpretation of the results submitted herein, is required, then a competent corrosion engineer could be consulted.

Construction Monitoring

Post investigative services are an important and necessary continuation of this investigation. Project plans and specifications should be reviewed by the project geotechnical consultant prior to construction to confirm that the intent of the recommendations presented in this report have been incorporated into the design.

Additional R-value, expansion, and soluble sulfate content testing may be needed after/during site rough grading.

During construction, sufficient and timely geotechnical observation and testing should be provided to correlate the findings of this investigation with the actual subsurface conditions exposed during construction. Items requiring observation and testing include, but are not necessarily limited to, the following:

1. Site preparation-stripping and removals.

2. Excavations, including approval of the bottom of excavations prior to the processing and preparation of the bottom areas for fill placement.

3. Scarifying and compacting prior to fill placement.

4. Foundation excavations.

5. Subgrade preparation for pavements and slabs-on-grade.

6. Placement of engineered compacted fill and backfill, including approval of fill materials and the performance of sufficient density tests to evaluate the degree of compaction being achieved.

LIMITATIONS

This report contains geotechnical conclusions and recommendations developed solely for use by N.T. Thomas Construction, Inc., and their design consultants for the purposes described earlier. It may not contain sufficient information for other uses or the purposes of other parties. The contents should not be extrapolated to other areas or used for other facilities without consulting LOR Geotechnical Group, Inc.

The recommendations are based on interpretations of the subsurface conditions concluded from information gained from subsurface explorations and a surficial site reconnaissance.

The interpretations may differ from actual subsurface conditions, which can vary horizontally and vertically across the site. If conditions are encountered during the construction of the project, which differ significantly from those presented in this report, this firm should be notified immediately so we may assess the impact to the recommendations provided. Due to possible subsurface variations, all aspects of field construction addressed in this report should be observed and tested by the project geotechnical consultant.

If parties other than LOR Geotechnical Group, Inc., provide construction monitoring services, they must be notified that they will be required to assume responsibility for the geotechnical phase of the project being completed by concurring with the recommendations provided in this report or by providing alternative recommendations.

The report was prepared using generally accepted geotechnical engineering practices under the direction of a state licensed geotechnical engineer. No warranty, expressed or implied, is made as to conclusions and professional advice included in this report. Any persons using this report for bidding or construction purposes should perform such independent investigations as deemed necessary to satisfy themselves as to the surface and subsurface conditions to be encountered and the procedures to be used in the performance of work on this project.

TIME LIMITATIONS

The findings of this report are valid as of this date. Changes in the condition of a property can, however, occur with the passage of time, whether they be due to natural processes or the work of man on this or adjacent properties. In addition, changes in the Standards-of-Practice and/or Governmental Codes may occur. Due to such changes, the findings of this report may be invalidated wholly or in part by changes beyond our control. Therefore, this report should not be relied upon after a significant amount of time without a review by LOR Geotechnical Group, Inc., verifying the suitability of the conclusions and recommendations.

CLOSURE

It has been a pleasure to assist you with this project. We look forward to being of further assistance to you as construction begins. Should conditions be encountered during construction that appear to be different than indicated by this report, please contact this office immediately in order that we might evaluate their effect.

Should you have any questions regarding this report, please do not hesitate to contact our office at your convenience.

Respectfully submitted,
LOR Geotechnical Group, Inc.



Robert M. Markoff, CEG
Engineering Geologist



John P. Leuer, GE 2030
President

RMM:JPL:ss

Distribution: Addressee (2) and via email nick@ntthomas.com

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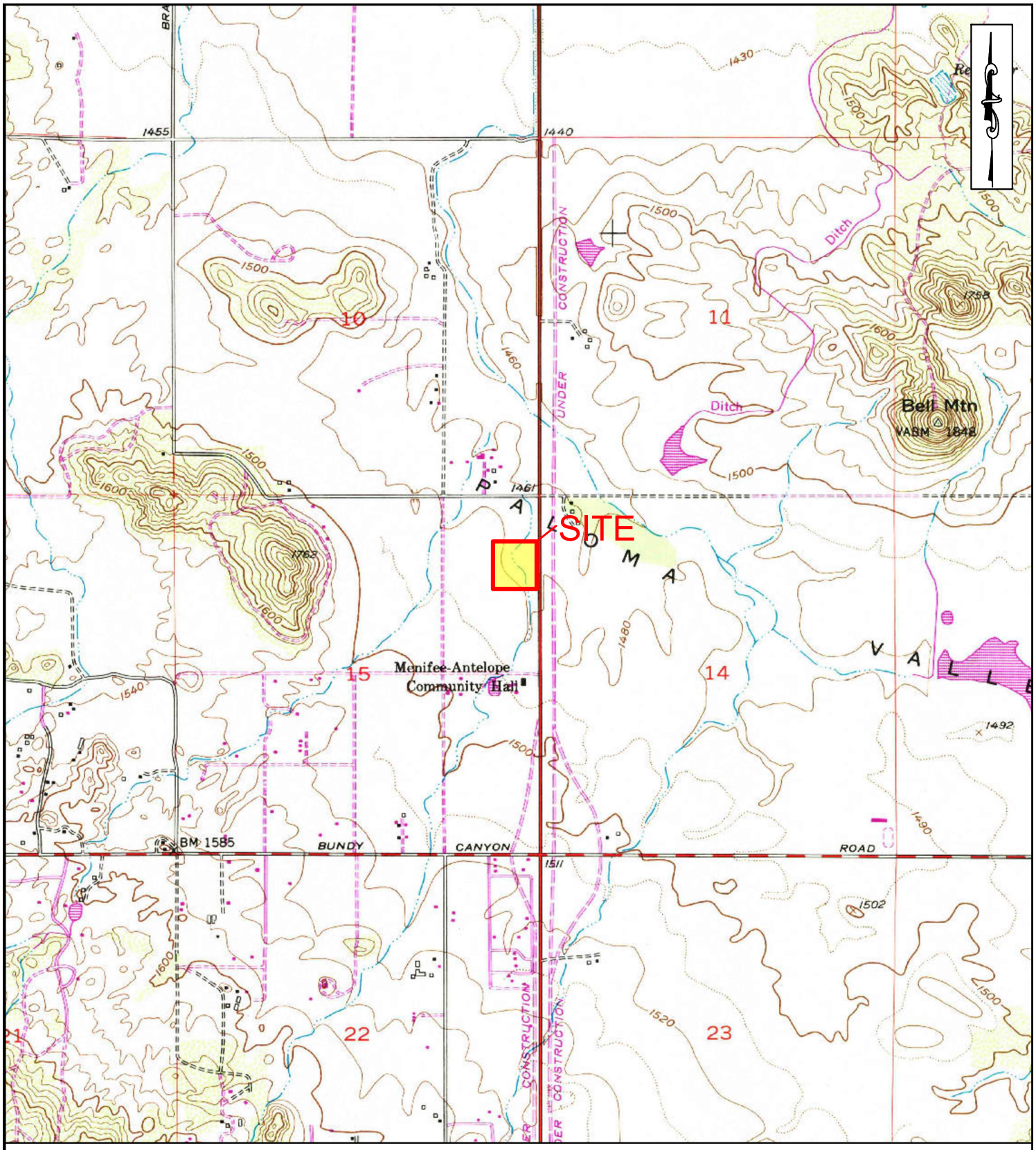
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APPENDIX A

Index Map, Site Plan, Regional Geologic Map, and Historical Seismicity Maps



INDEX MAP

PROJECT:	Proposed Fitwell Campus	**PROJECT NO.:**	13906.1
CLIENT:	N.T. Thomas Construction, Inc.	**ENCLOSURE:**	A-1
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	April 2023
		SCALE:	1" ≈ 2,000'

Legend

(Locations Approximate)

Map Symbols

- **B-12** - Exploratory Boring
- **Qoa** - Older Alluvium
- **Kpvg** - Granitic Bedrock
- - Approximate Geologic Contact

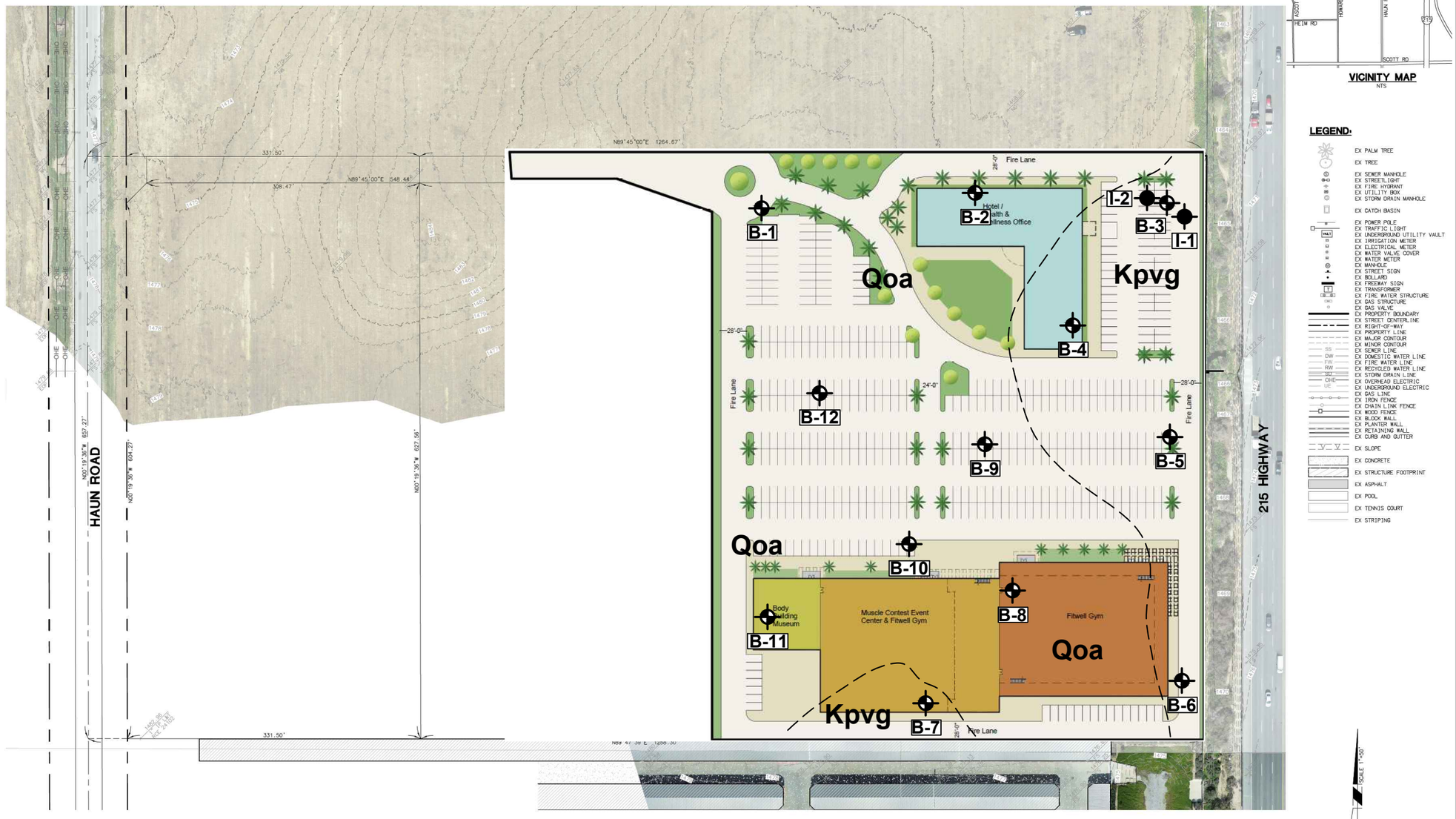
BASIS OF BEARINGS:

CENTERLINE OF HAUN ROAD N00°19'36"W PER PARCEL MAP NO. 18039 RECORDED IN THE COUNTY OF RIVERSIDE, BOOK 83 PAGES 75 AND 76.

BENCHMARK:

DESCRIBED BY RIVERSIDE COUNTY CALIFORNIA 1968
7.5 MI N FROM MURRIETA. 0.2 MILES SOUTH ON WASHINGTON AVE. FROM THE POST OFFICE IN MURRIETA, 2.4 MILES EAST ON LOS ALAMOS RD., 4.8 MILES NORTH ON HWY. 395, 0.1 MILE WEST ON SCOTT RD., 78 FT. SOUTH-EAST OF POWER POLE 31209B-5, 60 FT. SOUTH OF SCOTT RD., 4 FT. NORTH-WEST OF THE NORTH-EAST CORNER OF A PUMP HOUSE, 2 FT. WEST OF A MARKER POST. SET A BRASS DISK IN THE TOP OF A CONCRETE POST.

ELEV: 1520.00'



VICINITY MAP
NTS

LEGEND:

- EX PALM TREE
- EX TREE
- EX SEWER MANHOLE
- EX STREETLIGHT
- EX FIRE HYDRANT
- EX UTILITY BOX
- EX STORM DRAIN MANHOLE
- EX CATCH BASIN
- EX POWER POLE
- EX TRAFFIC LIGHT
- EX UNDERGROUND UTILITY VAULT
- EX IRRIGATION METER
- EX ELECTRICAL METER
- EX WATER VALVE COVER
- EX WATER METER
- EX MANHOLE
- EX STREET SIGN
- EX BOLLARD
- EX FREEWAY SIGN
- EX TRANSFORMER
- EX FIRE WATER STRUCTURE
- EX GAS STRUCTURE
- EX GAS VALVE
- EX PROPERTY BOUNDARY
- EX STREET CENTERLINE
- EX RIGHT-OF-WAY
- EX PROPERTY LINE
- EX MAJOR CONTOUR
- EX MINOR CONTOUR
- EX SEWER LINE
- EX DOMESTIC WATER LINE
- EX FIRE WATER LINE
- EX RECYCLED WATER LINE
- EX STORM DRAIN LINE
- EX OVERHEAD ELECTRIC
- EX UNDERGROUND ELECTRIC
- EX GAS LINE
- EX IRON FENCE
- EX CHAIN LINK FENCE
- EX WOOD FENCE
- EX BLOCK WALL
- EX PLANTER WALL
- EX RETAINING WALL
- EX CURB AND GUTTER
- EX SLOPE
- EX CONCRETE
- EX STRUCTURE FOOTPRINT
- EX ASPHALT
- EX POOL
- EX TENNIS COURT
- EX STRIPING

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SEAL—ENGINEER

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R. STEVEN AUSTIN
No. 68795
CIVIL
STATE OF CALIFORNIA

DRAWN BY: JRW
DESIGNED BY: JRW
CHECKED BY: RSA
APPROVED BY: RSA
DATE: 2/28/2023
REVISIONS:

PROJECT NUMBER: 1010602

SHEET NO.
C-2
2 OF 2

SCALE VERIFICATION
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET ADJUST SCALES ACCORDINGLY

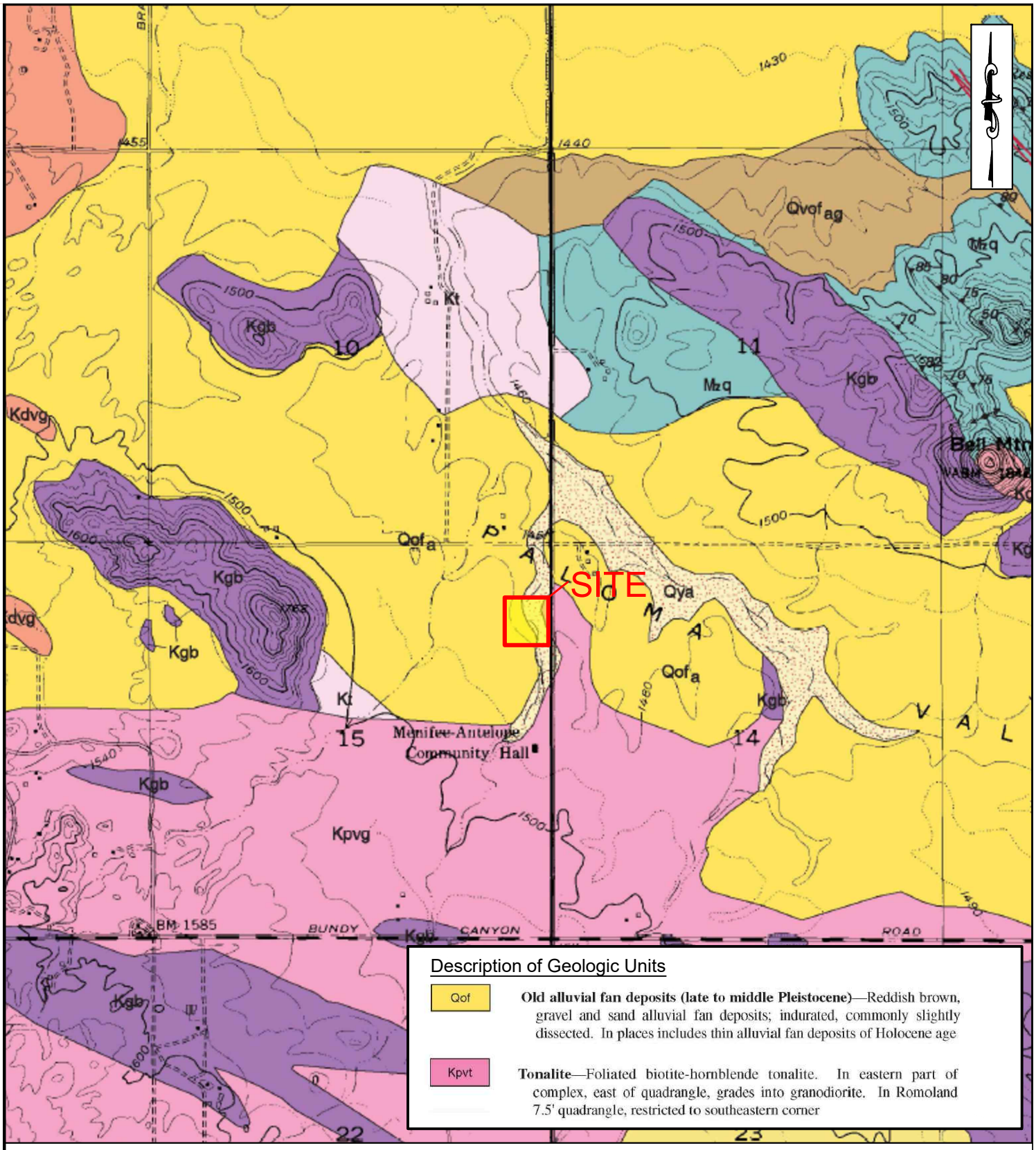
BORING LOCATION MAP

ORTHO PHOTO W/ BOUNDARY
360-350-014
MENIFEE, CA

PROJECT: Proposed Fitwell Campus
CLIENT: N.T. Thomas Construction, Inc.

LOR GEOTECHNICAL GROUP, INC.

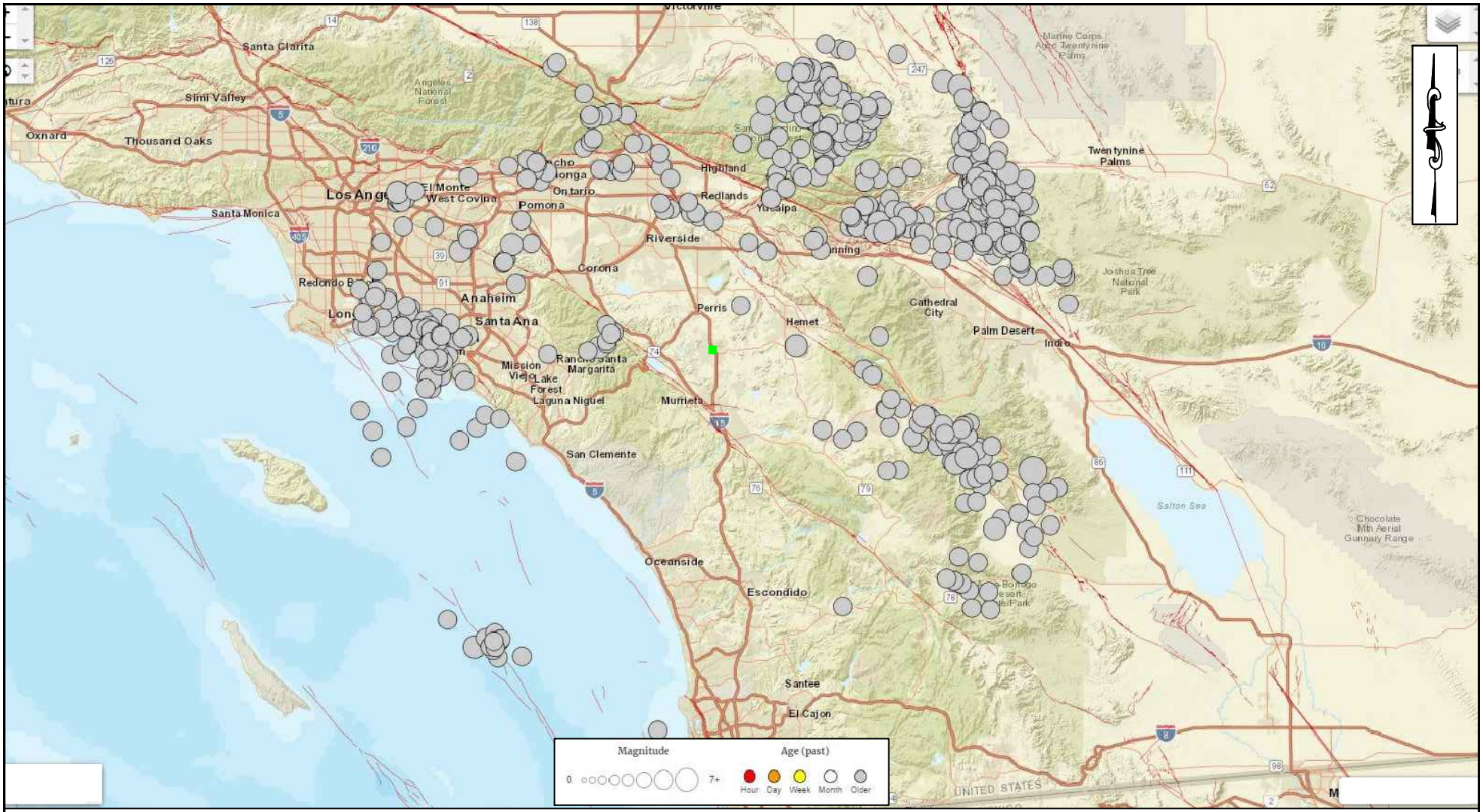
PROJECT NO.: 13906.1
ENCLOSURE: A-2
DATE: April 2023
SCALE: 1" ≈ 125'



REGIONAL GEOLOGIC MAP

(Morton, 2003)

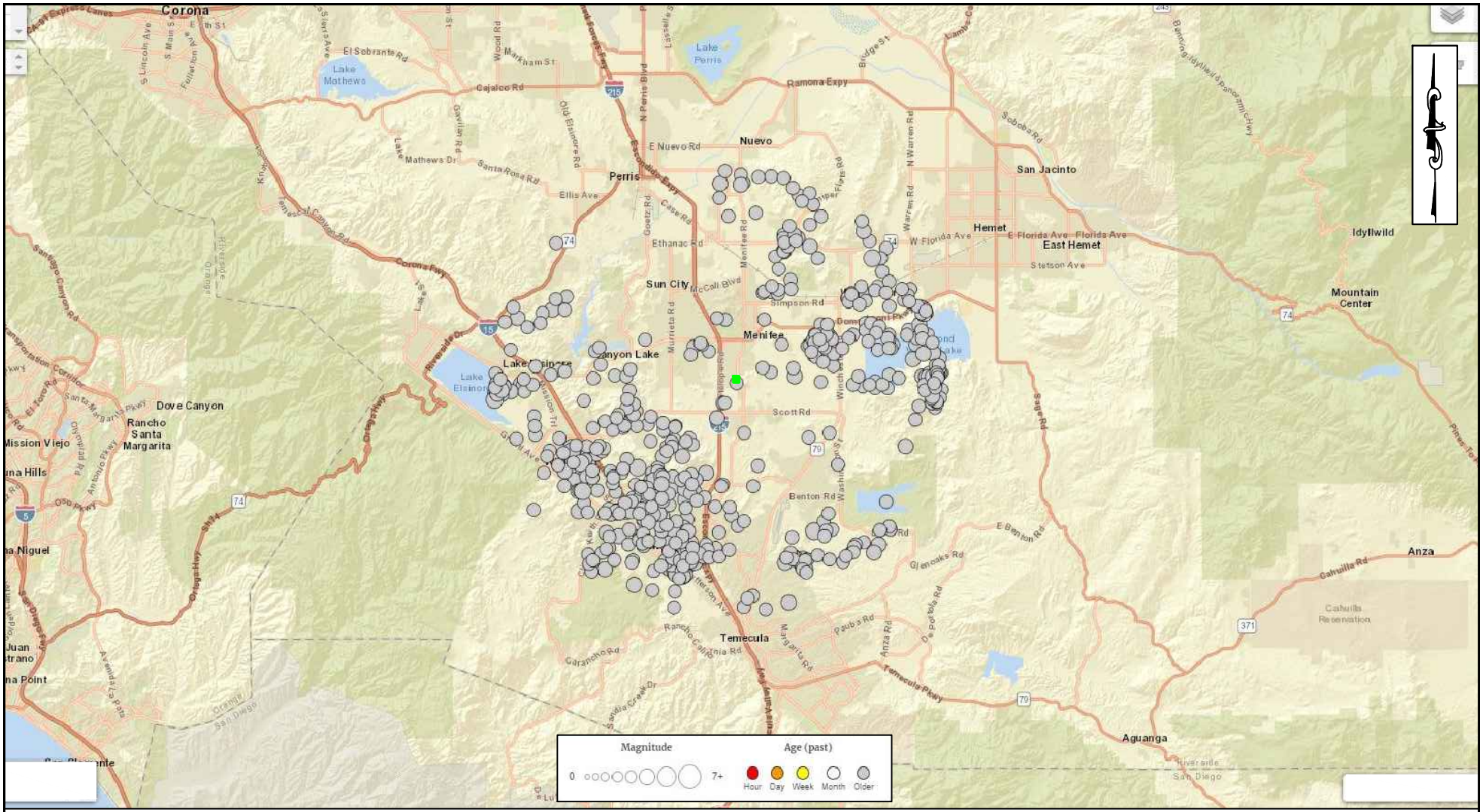
PROJECT:	Proposed Fitwell Campus	**PROJECT NO.:**	13906.1
CLIENT:	N.T. Thomas Construction, Inc.	**ENCLOSURE:**	A-3
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	April 2023
		SCALE:	1" ≈ 2,000'



U.S. Geologic Survey (2023) real-time earthquake epicenter map. Plotted are 527 epicenters of instrument-recorded events from 01/01/32 to present (03/29/23) of local magnitude 4+ within a radius of ~62 miles (100 kilometers) of the site. Location accuracy varies. The site is indicated by the green square (■). The selected magnitude corresponds to a threshold intensity value where very light damage potential begins. These events are also generally widely felt by persons. Red lines mark the surface traces of known Quaternary-age faults.

HISTORICAL SEISMICITY MAP - 100km Radius

PROJECT:	Proposed Fitwell Campus	**PROJECT NO.:**	13906.1
CLIENT:	N.T. Thomas Construction, Inc.	**ENCLOSURE:**	A-4
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	April 2023
		SCALE:	1" ≈ 40km



U.S. Geologic Survey (2023) real-time earthquake epicenter map. Plotted are 623 epicenters of instrument-recorded events from 01/01/78 to present (03/29/23) of local magnitude 2+ within a radius of ~9.2 miles (15 kilometers) of the site. Location accuracy varies. The site is indicated by the green square (■). The selected magnitude corresponds to a threshold intensity value where very light damage potential begins. These events are also generally widely felt by persons. Red lines mark the surface traces of known Quaternary-age faults.

HISTORICAL SEISMICITY MAP - 10km Radius

PROJECT:	Proposed Fitwell Campus	**PROJECT NO.:**	13906.1
CLIENT:	N.T. Thomas Construction, Inc.	**ENCLOSURE:**	A-5
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	April 2023
		SCALE:	1" ≈ 10km

APPENDIX B

Field Investigation Program and Boring Logs

APPENDIX B
FIELD INVESTIGATION

Subsurface Exploration

Our subsurface exploration of the site consisted of drilling 12 exploratory borings to depths of approximately 6.5 and 26.5 feet below the existing ground surface using a Mobile B-61 drill rig on March 7, 2023. The approximate locations of the borings are shown on Enclosure A-2 within Appendix A.

The drilling exploration was conducted using a Mobile B-61 drill rig equipped with 8-inch diameter hollow stem augers. The soils were continuously logged by a geologist from this firm who inspected the site, created detailed logs of the borings, obtained undisturbed, as well as disturbed, soil samples for evaluation and testing, and classified the soils by visual examination in accordance with the Unified Soil Classification System.

Relatively undisturbed samples of the subsoils were obtained at a maximum interval of 5 feet. The samples were recovered by using a California split barrel sampler of 2.50 inch inside diameter and 3.25 inch outside diameter or a Standard Penetration Sampler (SPT) from the ground surface to the total depth explored. The samplers were driven by a 140 pound automatic trip hammer dropped from a height of 30 inches. The number of hammer blows required to drive the sampler into the ground the final 12 inches were recorded and further converted to an equivalent SPT N-value. Factors such as efficiency of the automatic trip hammer used during this investigation (80%), borehole diameter (8"), and rod length at the test depth were considered for further computing of equivalent SPT N-values corrected for field procedures (N60) which are included in the boring logs, Enclosures B-1 through B-12.

The undisturbed soil samples were retained in brass sample rings of 2.42 inches in diameter and 1.00 inch in height, and placed in sealed plastic containers. Disturbed soil samples were obtained at selected levels within the borings and placed in sealed containers for transport to our geotechnical laboratory.

All samples obtained were taken to our geotechnical laboratory for storage and testing. Detailed logs of the borings are presented on the enclosed Boring Logs, Enclosures B-1 through B-12. A Boring Log Legend is presented on Enclosure B-i. A Soil Classification Chart is presented as Enclosure B-ii.

CONSISTENCY OF SOIL

SANDS

SPT BLOWS	CONSISTENCY
0-4	Very Loose
4-10	Loose
10-30	Medium Dense
30-50	Dense
Over 50	Very Dense

COHESIVE SOILS

SPT BLOWS	CONSISTENCY
0-2	Very Soft
2-4	Soft
4-8	Medium
8-15	Stiff
15-30	Very Stiff
30-60	Hard
Over 60	Very Hard

SAMPLE KEY

Symbol	Description
	INDICATES CALIFORNIA SPLIT SPOON SOIL SAMPLE INDICATES BULK SAMPLE INDICATES SAND CONE OR NUCLEAR DENSITY TEST INDICATES STANDARD PENETRATION TEST (SPT) SOIL SAMPLE

TYPES OF LABORATORY TESTS

1	Atterberg Limits
2	Consolidation
3	Direct Shear (undisturbed or remolded)
4	Expansion Index
5	Hydrometer
6	Organic Content
7	Proctor (4", 6", or Cal216)
8	R-value
9	Sand Equivalent
10	Sieve Analysis
11	Soluble Sulfate Content
12	Swell
13	Wash 200 Sieve

BORING LOG LEGEND

PROJECT:	Proposed Fitwell Health Campus, Menifee, California	**PROJECT NO.:**	13906.1
CLIENT:	N.T. Thomas Construction, Inc.	**ENCLOSURE:**	B-i
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	April 2023

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS	GRAVEL AND GRAVELLY SOILS	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
				GP	POORLY-GRADED GRAVELS, GRAVEL - SAND MIXTURES, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	SILTY GRAVELS, GRAVEL - SAND - SILT MIXTURES
				GC	CLAYEY GRAVELS, GRAVEL - SAND - CLAY MIXTURES
MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE	SAND AND SANDY SOILS	CLEAN SANDS (LITTLE OR NO FINES)		SW	WELL-GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES
				SP	POORLY-GRADED SANDS, GRAVELLY SAND, LITTLE OR NO FINES
	MORE THAN 50% OF COARSE FRACTION PASSING NO. 4 SIEVE	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	SILTY SANDS, SAND - SILT MIXTURES
				SC	CLAYEY SANDS, SAND - CLAY MIXTURES
FINE GRAINED SOILS	SILTS AND CLAYS	LIQUID LIMIT LESS THAN 50		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY
				CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS
				OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
MORE THAN 50% OF MATERIAL IS SMALLER THAN NO.200 SIEVE SIZE	SILTS AND CLAYS	LIQUID LIMIT GREATER THAN 50		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SAND OR SILTY SOILS
				CH	INORGANIC CLAYS OF HIGH PLASTICITY
				OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS
HIGHLY ORGANIC SOILS				PT	PEAT, HUMUS, SWAMP SOILS WITH HIGH ORGANIC CONTENTS

NOTE: DUAL SYMBOLS ARE USED TO INDICATE BORDERLINE SOIL CLASSIFICATIONS

PARTICLE SIZE LIMITS

BOULDERS	COBBLES	GRAVEL		SAND			SILT OR CLAY
		COARSE	FINE	COARSE	MEDIUM	FINE	
12"	3"	3/4"	No . 4	No. 10	No. 40	200	

(U.S. STANDARD SIEVE SIZE)

SOIL CLASSIFICATION CHART

PROJECT:	Proposed Fitwell Health Campus, Menifee, California	**PROJECT NO.:**	13906.1
CLIENT:	N.T. Thomas Construction, Inc.	**ENCLOSURE:**	B-ii
LOR GEOTECHNICAL GROUP, INC.		**DATE:**	April 2023

LOG OF BORING B-1

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0		10						SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 5% fine gravel, 15% coarse grained sand, 30% medium grained sand, 30% fine grained sand, and 20% silty fines, brown, moist, loose to medium dense.
	6		10.1		110.7				
5	14		4.3		110.4				@ 6 feet, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown, damp, upper 1± moderately weathered and decomposed; gradually becomes harder with increase in depth.
	43 for 6"		4.3		112.6				
10	113 for 10"		3.5						Below 12', slower drilling; hard.
15	109 for 10"		4.1						Below 15±', becomes more grayish-brown.
20	73 for 6"		4.6						END OF BORING @ 20.5' No fill No groundwater Bedrock @ 6'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,473'
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	March 7, 2023
		EQUIPMENT:	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-1

LOG OF BORING B-2

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	51		10.4		119.4			SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 10% fine gravel, 15% coarse grained sand, 25% medium grained sand, 30% fine grained sand, and 20% silty fines, dark brown, moist, medium dense.
									@ 3 feet, large rock encountered; boring repositioned.
5	56		4.9		105.7				@ 6 feet, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown, damp, hard at this location, surface of bedrock appears to be buried, fresh, angular, and hard material; refusal with two attempts to advance boring.

END OF BORING @ 6.5' (due to refusal)

No fill
No groundwater
Bedrock @ 6'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,470'
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	March 7, 2023
		EQUIPMENT:	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-2

LOG OF BORING B-3

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0	60		6.3		132.8			SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 5% fine gravel, 15% coarse grained sand, 25% medium grained sand, 30% fine grained sand, and 25% silty fines, brown, damp, loose to medium dense.
									@ 2.5 feet, GRANITIC BEDROCK: fine to coarse grained, grayish-brown, damp, weathered in upper 6-12"; gradually becomes fresher with increase in depth.
5	63 for 11"		4.8		119.4				
10	111		4.0						@ 10 feet, relatively fresh bedrock.
15	106 for 11"		4.6						@ 15 feet, unweathered, fresh bedrock; micaceous.
									END OF BORING @ 15.92'
									No fill No groundwater Bedrock @ 2.5'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,469'
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	March 7, 2023
		EQUIPMENT:	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-3

LOG OF BORING B-4

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0								SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 5% gravel, 10% coarse grained sand, 30% medium grained sand, 35% fine grained sand, and 20% silty fines, brown, moist, loose.
		9, 10						SC	@ 1 foot, CLAYEY SAND, trace fine gravel, approximately 10% coarse grained sand, 20% medium grained sand, 30% fine grained sand, and 40% clayey fines, yellowish-brown, moist, medium dense.
	25		11.4		115.8				
									@ 4± feet, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown and grayish-brown, moist, weathered with minor secondary clay in upper 2±'; becomes fresher with increase in depth.
5	40 for 6"		8.7		107.7				
10	95		5.6						@ 10 feet, no secondary clay; mostly grayish-brown granite.
									END OF BORING @ 11'
									No fill No groundwater Bedrock @ 4±'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,471'
		DATE DRILLED:	March 7, 2023
LOR GEOTECHNICAL GROUP, INC.		**EQUIPMENT:**	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-4

LOG OF BORING B-5

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0								SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 5% gravel, 15% coarse grained sand, 30% medium grained sand, 35% fine grained sand, and 15% silty fines, brown, moist, loose.
	40 for 4"		3.0		99.2				@ 1± foot, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown, damp, excavated as fine to coarse grained SILTY SAND.
5	89		4.2						@ 5 feet, less weathered.
10	107 for 11"		3.9						@ 10 feet, micaceous.
									END OF BORING @ 10.92'
									No fill
									No groundwater
									Bedrock @ 1±'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,476'
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	March 7, 2023
		EQUIPMENT:	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-5

LOG OF BORING B-6

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0	50		7.1		130.2			SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 5% gravel, 10% coarse grained sand, 30% medium grained sand, 35% fine grained sand, and 20% silty fines, brown, moist, loose.
									@ 1.5± feet, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown, damp, highly weathered in upper 2±', includes minor secondary clay, locally fractured and varying in color to grayish-brown.
5	43		7.5		105.8				@ 5 feet, fractured and weathered bedrock produces gravelly cuttings with sand and clay.
10	69		6.0						@ 10 feet, finer grained; still weathered and contains some minor secondary clay (fault gouge).
15	38		25.9						@ 15 feet, clay lining fractures apparent; lighter in color - gouge.
20	109		6.8						@ 20 feet, out of fault gouge and into fine to coarse grained granitic bedrock.
									END OF BORING @ 21.5'
									No fill No groundwater Bedrock @ 1.5±'

TEST DATA

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,474'
		DATE DRILLED:	March 7, 2023
LOR GEOTECHNICAL GROUP, INC.		**EQUIPMENT:**	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-6

LOG OF BORING B-7

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
0								SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 5% gravel, 10% coarse grained sand, 25% medium grained sand, 35% fine grained sand, and 25% silty fines, brown, moist, loose.
	20		9.3		120.4				@ 2± feet, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown, damp, highly weathered and moderately decomposed in upper 2±'.
5	60 for 11"		7.2		124.2				
10	116 for 10"		3.3						END OF BORING @ 10.83' No fill No groundwater Bedrock @ 2±'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,477'
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	March 7, 2023
		EQUIPMENT:	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-7

LOG OF BORING B-8

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0								SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 5% gravel, 10% coarse grained sand, 20% medium grained sand, 30% fine grained sand, and 35% silty fines.
	14	1, 3, 4, 7, 8, 9, 10	13.6		114.0			CL	@ 1 foot, LEAN CLAY with SAND, approximately 5% medium grained sand, 25% fine grained sand, and 70% clayey fines, dark brown, moist, soft to stiff.
5	23		12.4		120.5				@ 5 feet, slight decrease in clay content.
	18		14.5		114.6			ML	@ 7± feet, SANDY SILT, approximately 5% medium grained sand, 40% fine grained sand, and 55% silty and clayey fines, brown, moist, very stiff.
10	16	2	13.1		115.8				@ 10 feet, slight increase in sand content.
	19		12.1		119.4			SM	@ 11.5± feet, SILTY SAND, approximately 5% coarse grained sand, 15% medium grained sand, 50% fine grained sand, and 30% silty fines, brown, moist, medium dense.
15	11		24.2		102.1			SC	@ 15± feet, CLAYEY SAND, approximately 5% coarse grained sand, 20% medium grained sand, 45% fine grained sand, and 30% clayey fines, brown, wet, loose to medium dense; groundwater.
								SM	@ 19 feet, SILTY SAND, approximately 5% coarse grained sand, 25% medium grained sand, 40% fine grained sand, and 30% silty fines, brown, wet, medium dense.
20	29		21.8		106.0				
									@ 23 feet, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown, wet, moderately weathered and slightly decomposed, hard.
25	51 for 5"		16.0		114.0				END OF BORING @ 25.42'
									No fill Groundwater @ 15±' Bedrock @ 23'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,472'
		DATE DRILLED:	March 7, 2023
LOR GEOTECHNICAL GROUP, INC.		**EQUIPMENT:**	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-8

LOG OF BORING B-9

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
									TEST DATA
0								SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 15% fine gravel and coarse grained sand, 20% medium grained sand, 30% fine grained sand, and 35% silty fines, brown, moist, loose to medium dense.
	9		15.6		114.9			CL	@ 2 feet, SANDY LEAN CLAY, approximately 5% coarse grained sand, 20% medium grained sand, 20% fine grained sand, and 55% clayey and silty fines, dark brown, moist, stiff.
								SM	@ 4 feet, SILTY SAND, approximately 5% coarse grained sand, 20% medium grained sand, 35% fine grained sand, and 40% silty fines, brown, moist, medium dense to dense.
5	28		5.0		126.1				
10	18		4.1		105.4				@ 10 feet, coarser grained sand; less silt.
						▽			@ 14 feet, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown, moist to wet, hard; groundwater.
15	79		7.0		134.4				END OF BORING @ 16.5'
									No fill Groundwater @ 14' Bedrock @ 14'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,471'
		DATE DRILLED:	March 7, 2023
LOR GEOTECHNICAL GROUP, INC.		**EQUIPMENT:**	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-9

LOG OF BORING B-10

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0	16	3, 7, 9, 10	10.3		125.5			SM ML SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 5% fine gravel, 10% coarse grained sand, 25% medium grained sand, 30% fine grained sand, and 30% silty fines, dark brown, moist, medium dense. @ 1 foot, grades to SANDY SILT/SILTY SAND, trace fine gravel, approximately 5% coarse grained sand, 10% medium grained sand, 35% fine grained sand, and 50% silty fines.
5	14		7.1		118.9			CL	@ 4.5 feet, SANDY LEAN CLAY, approximately 5% medium grained sand, 25% fine grained sand, and 70% clayey and silty fines, dark brown, moist, soft to stiff.
10	13	2	14.5		113.3			ML	@ 8.5± feet, SANDY SILT, approximately 5% medium grained sand, 35% fine grained sand, and 60% silty fines, brown, moist, soft to stiff.
15	9		22.7		104.2			SM	@ 13± feet, SILTY SAND, approximately 5% coarse grained sand, 20% medium grained sand, 45% fine grained sand, and 30% silty fines, brown, very moist, loose to medium dense. @ 16.5 feet, groundwater.
20	29		15.8		109.7				@ 20 feet, coarser grained sand and less silt.
									@ 22 feet, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown, wet, slightly to moderately weathered and decomposed, hard.
25	51 for 5"		12.9		124.2				END OF BORING @ 25.42' No fill Groundwater @ 16.5' Bedrock @ 22'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,473'
		DATE DRILLED:	March 7, 2023
LOR GEOTECHNICAL GROUP, INC.		**EQUIPMENT:**	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-10

LOG OF BORING B-11

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0	7		12.0		111.4			SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 15% fine gravel and coarse grained sand, 20% medium grained sand, 35% fine grained sand, and 30% silty fines, dark brown, moist.
5	9	2	7.7		105.8			ML	@ 4.5± feet, SANDY SILT, approximately 5% coarse grained sand, 15% medium grained sand, 25% fine grained sand, and 55% silty fines, brown, moist, soft to stiff.
10	16		6.4		125.5				
15	80 for 11"		3.5		122.3				@ 12.5 feet, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown, damp, slightly weathered and slightly decomposed, hard.
									END OF BORING @ 15.92'

No fill
No groundwater
Bedrock @ 12.5'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,475'
LOR GEOTECHNICAL GROUP, INC.		**DATE DRILLED:**	March 7, 2023
		EQUIPMENT:	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-11

LOG OF BORING B-12

DEPTH IN FEET	SPT BLOW COUNTS	LABORATORY TESTS	MOISTURE CONTENT (%)		DRY DENSITY (PCF)	SAMPLE TYPE	LITHOLOGY	U.S.C.S.	DESCRIPTION
	TEST DATA								
0	10		6.8		114.0			SM	@ 0 feet, OLDER ALLUVIUM: SILTY SAND, approximately 5% fine gravel, 10% coarse grained sand, 25% medium grained sand, 30% fine grained sand, and 30% silty fines, brown, moist, loose to medium dense.
5	31		4.9		115.8				
								ML	@ 8± feet, SANDY SILT, approximately 5% coarse grained sand, 15% medium grained sand, 20% fine grained sand, and 60% silty fines, brown, moist, soft to stiff.
10	15		9.4		114.0				
								SC	@ 14 feet, CLAYEY SAND, approximately 10% medium grained sand, 60% fine grained sand, and 30% clayey and silty fines, brown, moist, medium dense.
15	18		12.9		120.5				
						▽			@ 19 feet, groundwater.
20	25		21.9						@ 20 feet, GRANITIC BEDROCK: fine to coarse grained, yellowish-brown to grayish-brown, moist, highly weathered in upper 1-2' with abundant secondary clay from decomposition.
25	124		10.1						END OF BORING @ 26.5'
									No fill Groundwater @ 19' Bedrock @ 20'

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**ELEVATION:**	1,472'
		DATE DRILLED:	March 7, 2023
LOR GEOTECHNICAL GROUP, INC.		**EQUIPMENT:**	Mobile B-61
		HOLE DIA.: 8"	**ENCLOSURE:** B-12

APPENDIX C

Borehole Percolation Testing Program and Infiltration Rate Test Results

APPENDIX C
BOREHOLE PERCOLATION TESTING PROGRAM AND INFILTRATION RATE TEST RESULTS

Two borehole percolation tests were conducted in general accordance with the Shallow Percolation Test procedure as outlined in the Technical Guidance Document for Water Quality Management Plans (CDM Smith, 2013). The general locations of our tests are illustrated on Enclosure A-2 and were conducted at the requested locations and depth. Subsequent to drilling, a 3-inch diameter, perforated PVC pipe wrapped in filter fabric was placed within each test hole and 3/4-inch gravel was placed between the outside of the pipe and the hole wall. Test holes were pre-soaked the same day as drilling. Testing took place the next day, March 8, 2023, within 26 hours but not before 15 hours, of the pre-soak. The holes were filled using water from a 200 gallon water tank. Test periods consisted of allowing the water to drop in approximately 30-minute intervals. After each reading, the hole was refilled. Testing was terminated after a total of 12 readings were recorded. The percolation test data was converted to an infiltration rate using the Porchet Method as outlined by the Technical Guidance Document (CDM Smith, 2013).

Infiltration test results are summarized in the following table:

Test No.	Depth* (ft)	Infiltration Rate** (in/hr)
P-1	3.5	0.03
P-2	3.3	0.03

* depth measured below existing ground surface
** Porchet Method determined clear water rate

The results of this testing are presented as Enclosures C-1 and C-2.

BOREHOLE METHOD PERCOLATION TEST RESULTS

Project:	APN 360-350-014	Test Date:	March 9, 2023
Project No.:	13906.1	Test Hole No.:	P-1
Soil Classificaiton:	(SM) Silty sand	Effective Hole Dia.*:	4.8 in.
Depth of Test Hole:	3.5 ft.	Date Excavated:	March 8, 2023
Tested By:	A.L.		

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	PERCOLATION RATE
			min	hr.	hr.	in.	in.	in.	in.	in.	in.	(min/in)
1	9:13 AM	9:38 AM	25	0.42	0.42	17.25	17.75	42.00	42.00	0.50	24.50	50.0
2	9:38 AM	10:03 AM	25	0.42	0.83	17.75	18.50	42.00	42.00	0.75	23.88	33.3
3	10:03 AM	10:35 AM	32	0.53	1.37	18.50	19.00	42.00	42.00	0.50	23.25	64.0
4	10:35 AM	11:07 AM	32	0.53	1.90	19.00	19.50	42.00	42.00	0.50	22.75	64.0
5	11:07 AM	11:39 AM	32	0.53	2.43	19.50	19.75	42.00	42.00	0.25	22.38	128.0
6	11:39 AM	12:11 PM	32	0.53	2.97	19.75	20.25	42.00	42.00	0.50	22.00	64.0
7	12:11 PM	12:43 PM	32	0.53	3.50	20.25	20.75	42.00	42.00	0.50	21.50	64.0
8	12:43 PM	1:15 PM	32	0.53	4.03	20.75	21.00	42.00	42.00	0.25	21.13	128.0
9	1:15 PM	1:47 PM	32	0.53	4.57	21.00	21.25	42.00	42.00	0.25	20.88	128.0
10	1:47 PM	2:19 PM	32	0.53	5.10	21.25	21.75	42.00	42.00	0.50	20.50	64.0
11	2:19 PM	2:51 PM	32	0.53	5.63	21.75	22.25	42.00	42.00	0.50	20.00	64.0
12	2:51 PM	3:23 PM	32	0.53	6.17	22.25	22.50	42.00	42.00	0.25	19.63	128.0

PERCOLATION RATE CONVERSION (Porchet Method):

H_O	19.75	
H_f	19.50	
ΔH	0.25	
H_{avg}	19.63	
I_t	**0.03**	in/hr (clear water rate)

* diameter adjusted to an effective diameter due to the loss in volume of water because of gravel packing

BOREHOLE METHOD PERCOLATION TEST RESULTS

Project:	APN 360-350-014	Test Date:	March 9, 2023
Project No.:	13906.1	Test Hole No.:	P-2
Soil Classificaiton:	(SM) Silty sand	Effective Hole Dia.*:	4.8 in.
Depth of Test Hole:	3.3 ft.	Date Excavated:	March 8, 2023
Tested By:	A.L.		

READING	TIME START	TIME STOP	TIME INTERVAL		TOTAL TIME	INITIAL WATER LEVEL	FINAL WATER LEVEL	INITIAL HOLE DEPTH	FINAL HOLE DEPTH	CHANGE IN WATER LEVEL	AVERAGE WETTED DEPTH	PERCOLATION RATE
			min	hr.	hr.	in.	in.	in.	in.	in.	in.	(min/in)
1	9:15 AM	9:40 AM	25	0.42	0.42	16.00	16.25	40.00	40.00	0.25	23.88	100.0
2	9:40 AM	10:05 AM	25	0.42	0.83	16.00	16.50	40.00	40.00	0.50	23.75	50.0
3	10:05 AM	10:37 AM	32	0.53	1.37	16.50	17.00	40.00	40.00	0.50	23.25	64.0
4	10:37 AM	11:09 AM	32	0.53	1.90	17.00	17.50	40.00	40.00	0.50	22.75	64.0
5	11:09 AM	11:41 AM	32	0.53	2.43	17.50	18.00	40.00	40.00	0.50	22.25	64.0
6	11:41 AM	12:13 PM	32	0.53	2.97	18.00	18.25	40.00	40.00	0.25	21.88	128.0
7	12:13 PM	12:45 PM	32	0.53	3.50	18.25	18.75	40.00	40.00	0.50	21.50	64.0
8	12:45 PM	1:17 PM	32	0.53	4.03	18.75	19.25	40.00	40.00	0.50	21.00	64.0
9	1:17 PM	1:49 PM	32	0.53	4.57	19.25	19.50	40.00	40.00	0.25	20.63	128.0
10	1:49 PM	2:21 PM	32	0.53	5.10	19.50	19.75	40.00	40.00	0.25	20.38	128.0
11	2:21 PM	2:53 PM	32	0.53	5.63	19.75	20.25	40.00	40.00	0.50	20.00	64.0
12	2:53 PM	3:25 PM	32	0.53	6.17	20.25	20.50	40.00	40.00	0.25	19.63	128.0

PERCOLATION RATE CONVERSION (Porchet Method):

H_O	19.75	
H_f	19.50	
ΔH	0.25	
H_{avg}	19.63	
I_t	**0.03**	in/hr (clear water rate)

* diameter adjusted to an effective diameter due to the loss in volume of water because of gravel packing

APPENDIX D

Laboratory Testing Program and Test Results

APPENDIX D
LABORATORY TESTING

General

Selected soil samples obtained from the borings were tested in our geotechnical laboratory to evaluate the physical properties of the soils affecting foundation design and construction procedures. The laboratory testing program performed in conjunction with our investigation included in-place moisture content and dry density, laboratory compaction characteristics, direct shear, sieve analysis, sand equivalent, R-value, expansion index, Atterberg limits, consolidation, and corrosion. Descriptions of the laboratory tests are presented in the following paragraphs:

Moisture Density Tests

The moisture content and dry density information provides an indirect measure of soil consistency for each stratum, and can also provide a correlation between soils on this site. The dry unit weight and field moisture content were determined for selected undisturbed samples, in accordance with ASTM D 2921 and ASTM D 2216, respectively, and the results are shown on the boring logs, Enclosures B-1 through B-12 for convenient correlation with the soil profile.

Laboratory Compaction

A selected soil sample was tested in the laboratory to determine compaction characteristics using the ASTM D 1557 compaction test method. The results are presented in the following table:

LABORATORY COMPACTION				
Boring Number	**Sample Depth (feet)**	**Soil Description (U.S.C.S.)**	**Maximum Dry Density (pcf)**	**Optimum Moisture Content (percent)**
B-8	1-4	(CL) Sandy Clay	122.5	12.0
B-10	1-4	(SM) Silty Sand	128.5	11.0

Direct Shear Test

Shear tests are performed in general accordance with ASTM D 3080 with a direct shear machine at a constant rate-of-strain (0.04 inches/minute). The machine is designed to test a sample partially extruded from a sample ring in single shear. Samples are tested at varying normal loads in order to evaluate the shear strength parameters, angle of internal friction and cohesion. Samples are tested in remolded condition (90 percent relative compaction per ASTM D 1557) and soaked, to represent the worse case conditions expected in the field.

The results of the shear test on a selected soil sample is presented in the following table:

DIRECT SHEAR TEST				
Boring Number	**Sample Depth (feet)**	**Soil Description (U.S.C.S.)**	**Apparent Cohesion (psf)**	**Angle of Internal Friction (degrees)**
B-8	1-4	(CL) Sandy Clay	380	25
B-10	1-4	(SM) Silty Sand	750	25

Sieve Analysis

A quantitative determination of the grain size distribution was performed for selected samples in accordance with the ASTM D 422 laboratory test procedure. The determination is performed by passing the soil through a series of sieves, and recording the weights of retained particles on each screen. The results of the grain size distribution analyses are presented graphically on Enclosure D-1.

Sand Equivalent

The sand equivalent of selected soils were evaluated using the California Sand Equivalent Test Method, Caltrans Number 217. The results of the sand equivalent tests are presented with the grain size distribution analyses on Enclosure D-1.

R-Value Test

Based on the indicator testing above, a soil sample was selected and tested to determine its R-value using the California R-Value Test Method, Caltrans Number 301. The results of the R-value test is presented on Enclosure D-1.

Consolidation Test

The apparatus used for the consolidation test (odometer) is designed to test a one-inch high portion of the undisturbed soil sample as contained in a sample ring. Porous stones and filler paper are placed in contact with the top and bottom of the specimen to permit the addition or release of water. Loads are applied to the test specimen in specified increments, and the resulting axial deformations are recorded. The results are plotted as log of axil pressure verses consolidation or compression, expressed as strain or sample height.

Samples are tested at field and greater-than field moisture contents. The results are shown on Enclosures D-2 through D-4.

Expansion Index Test

Remolded samples are tested to determine their expansion potential in accordance with the Expansion Index (EI) test. The test is performed in accordance with the Uniform Building Code Standard 18-2. The test result for a select soil sample is presented in the following table:

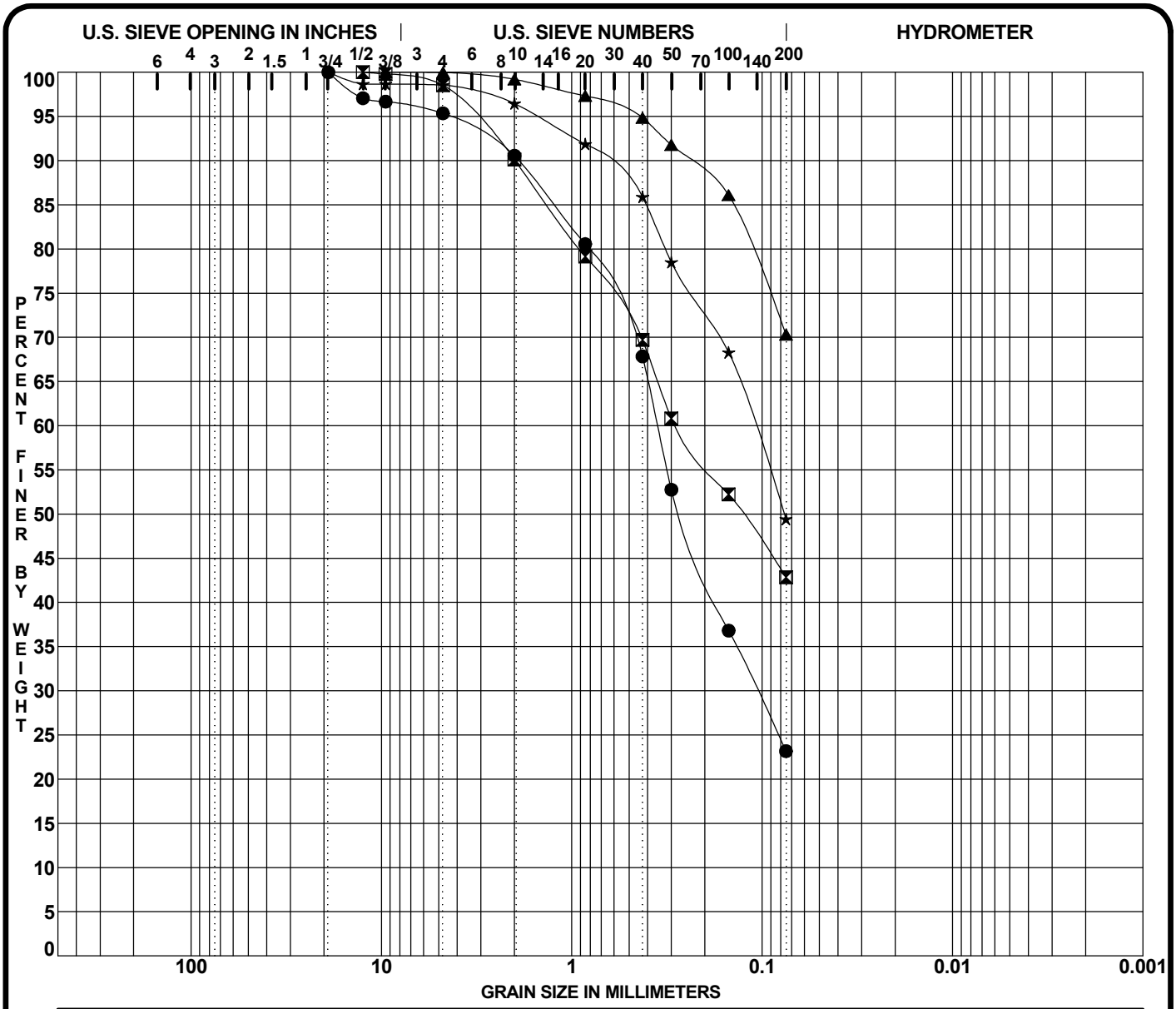
EXPANSION INDEX TEST				
Boring Number	**Sample Depth (feet)**	**Soil Description (U.S.C.S.)**	**Expansion Index (EI)**	**Expansion Potential**
B-8	1-4	(CL) Sandy Clay	43	Low
Expansion Index:	0-20 Very low	21-50 Low	51-90 Medium	91-130 High

Atterberg Limits

A selected sample of the on-site fine grained, low expansion potential soils were tested for their Atterberg limits in accordance with ASTM D 4318. The results of these tests are presented on Enclosure D-5.

Corrosion

Corrosion testing was conducted by our subconsultant, Project X Corrosion Engineering. Test results are enclosed.



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	Specimen Identification		Soil Classification	SE	RV	PL	PI	Cc	Cu
●	B-01	@ 0-3'	(SM) Silty Sand	--	--				
⊠	B-04	@ 1-4'	(SC) Clayey Sand	11	--				
▲	B-08	@ 1-4'	(CL) Lean Clay with Sand	5	15	18	10		
★	B-10	@ 1-4'	(ML/SM) Sandy Silt/Silty Sand	10	--				

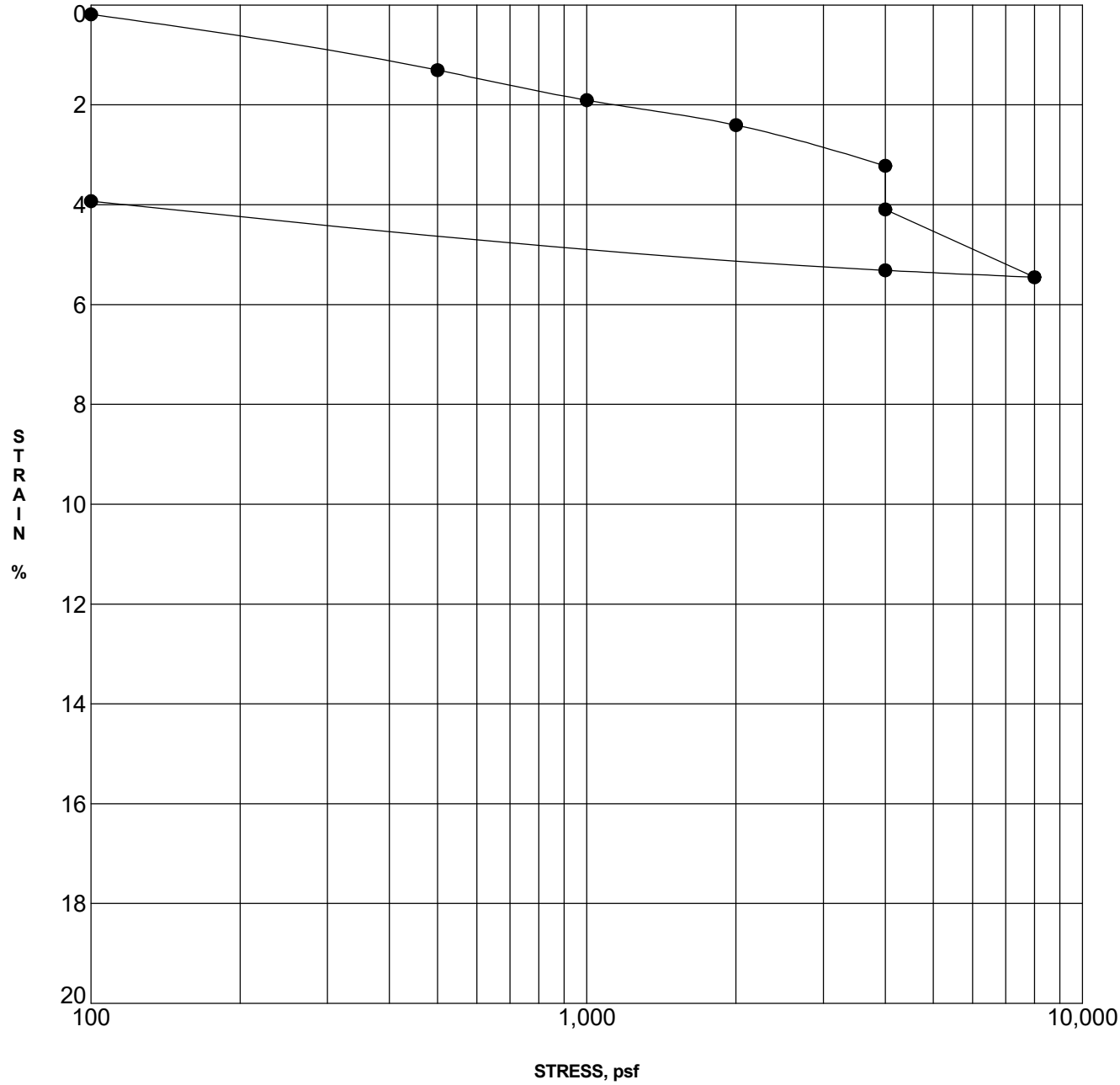
	Specimen Identification		D100	D60	D30	D10	%Gravel	%Sand	%Silt	%Clay
●	B-01	@ 0-3'	19.00	0.35	0.106		4.7	72.2	23.2	
⊠	B-04	@ 1-4'	12.50	0.28			1.5	55.7	42.9	
▲	B-08	@ 1-4'	9.50				0.0	29.7	70.3	
★	B-10	@ 1-4'	19.00	0.11			1.4	49.1	49.4	

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**DATE:**	March 2023

GRADATION CURVES

LOR GEOTECHNICAL GROUP, INC.

ENCLOSURE: D-1



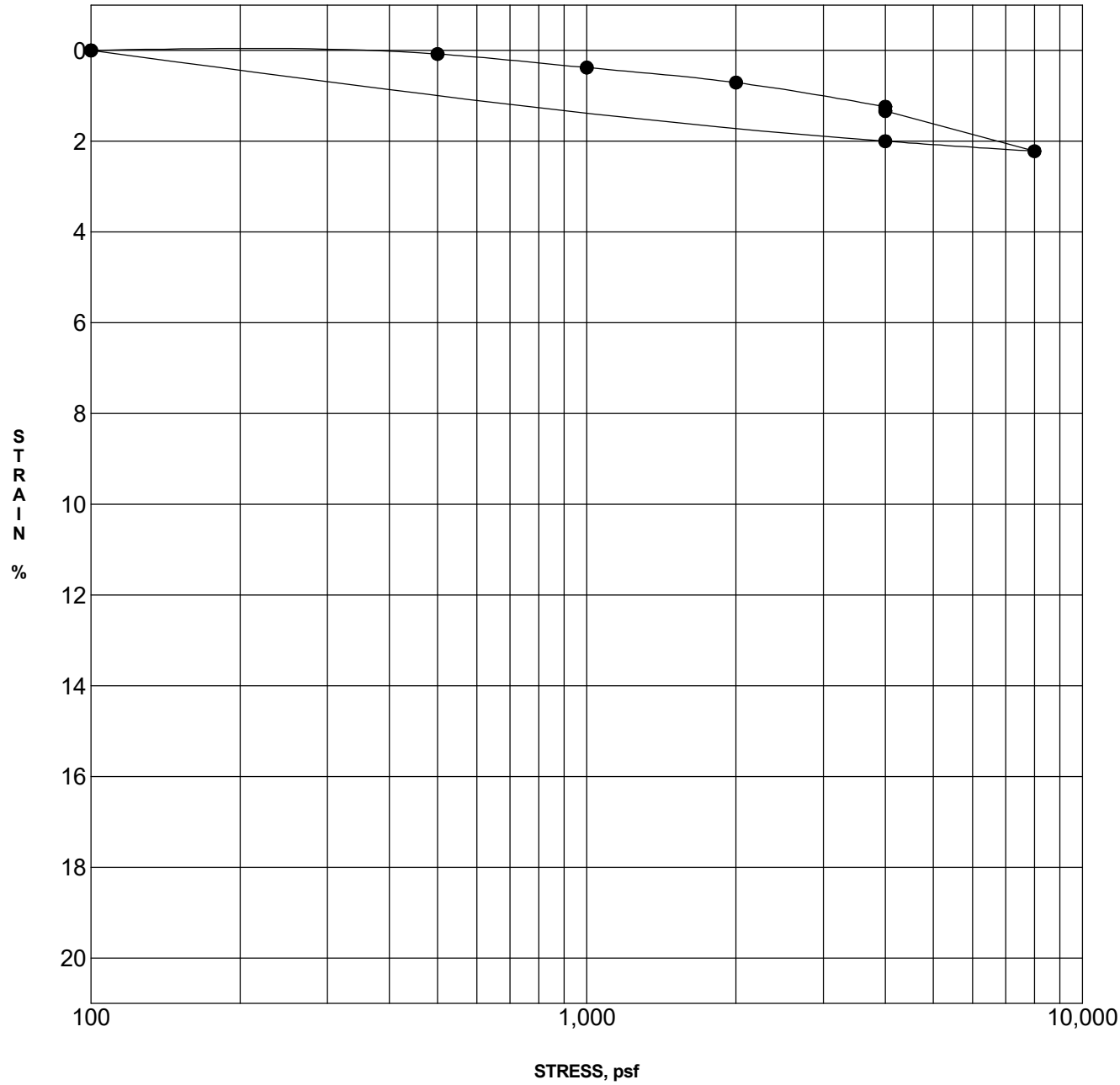
Specimen Identification		Classification	DD	MC%
● B-08 @ 10'		*(ML) Sandy Silt*	113	13

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**DATE:**	March 2023

CONSOLIDATION TEST

LOR GEOTECHNICAL GROUP, INC.

ENCLOSURE: D-2



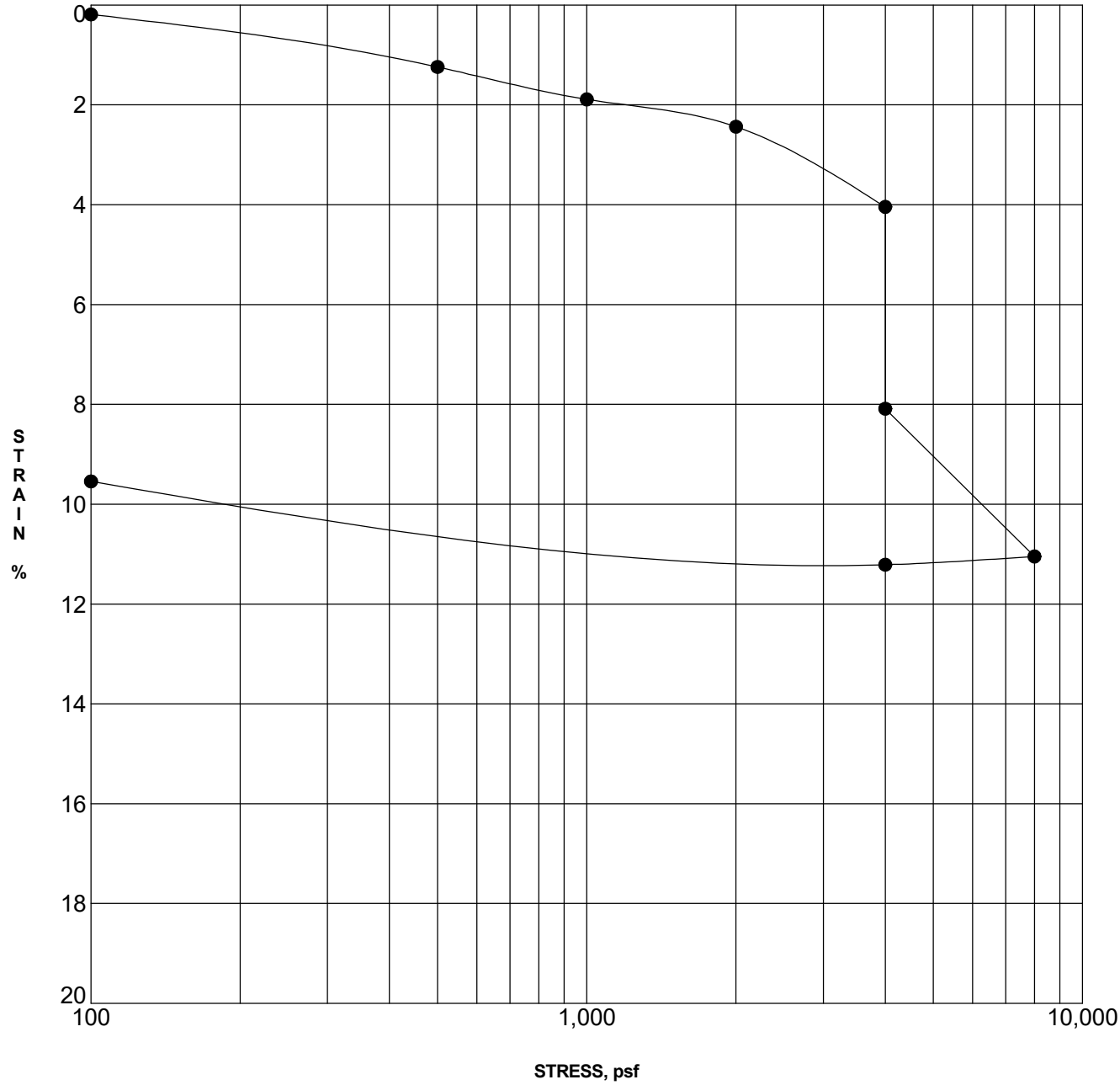
Specimen Identification		Classification	DD	MC%
● B-10 @ 10'		*(ML) Sandy Silt*	113	15

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**DATE:**	March 2023

CONSOLIDATION TEST

LOR GEOTECHNICAL GROUP, INC.

ENCLOSURE: D-3



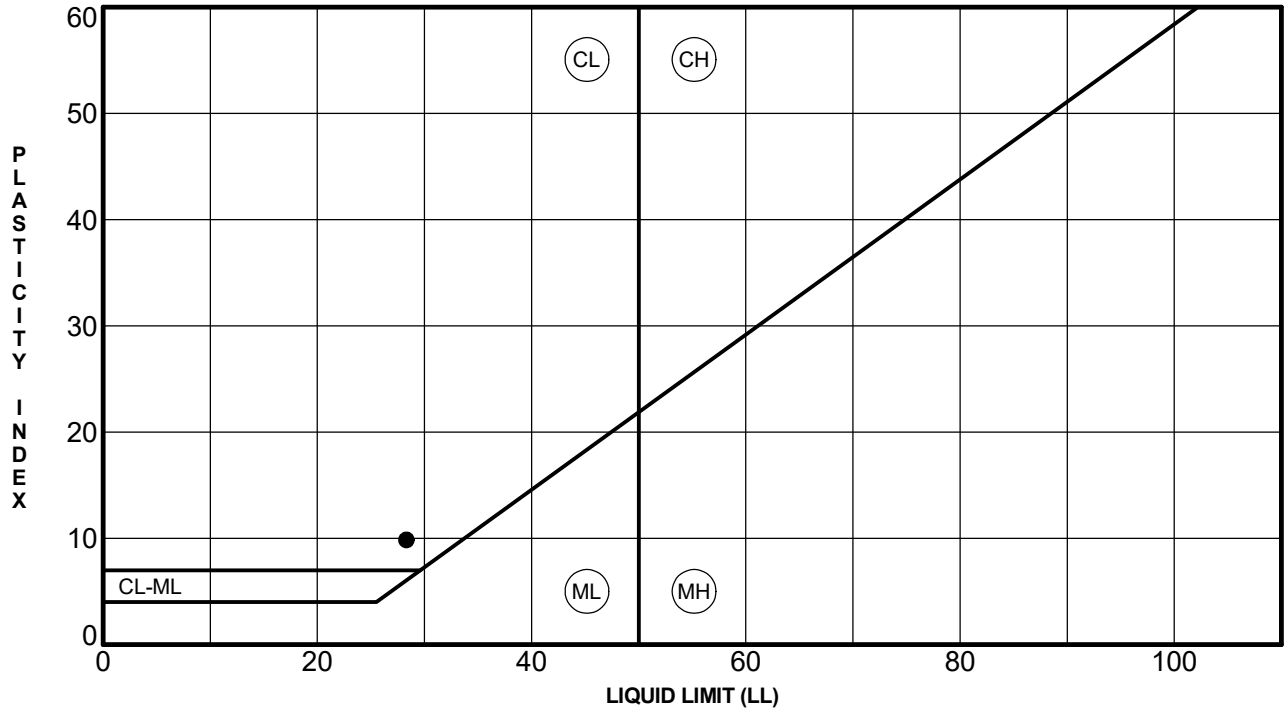
Specimen Identification		Classification	DD	MC%
● B-11 @ 5'		*(ML) Sandy Silt*	101	8

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**DATE:**	March 2023

CONSOLIDATION TEST

LOR GEOTECHNICAL GROUP, INC.

ENCLOSURE: D-4



Specimen Identification		LL	PL	PI	Fines	Classification
● B-08	@ 1-4'	28	18	10	70.3	(CL) Lean Clay with Sand

PROJECT:	Proposed Fitwell Health Campus	**PROJECT NO.:**	13906.1
CLIENT:	NT Thomas Construction, Inc.	**DATE:**	March 2023

ATTERBERG LIMITS RESULTS

LOR GEOTECHNICAL GROUP, INC.

ENCLOSURE: D-5

Results Only Soil Testing for N. T. Thomas Construction, Inc.

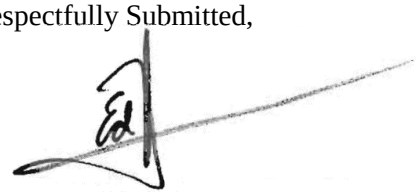
March 13, 2023

Prepared for:

Robb Markoff
LOR Geotechnical
6121 Quail Valley Ct
Riverside, CA
rmarkoff@lorgeo.com

Project X Job#: S230310A
Client Job or PO#: 13906.1

Respectfully Submitted,





Eduardo Hernandez, M.Sc., P.E.
Sr. Corrosion Consultant
NACE Corrosion Technologist #16592
Professional Engineer
California No. M37102
ehernandez@projectxcorrosion.com

Soil Analysis Lab Results

Client: LOR Geotechnical
Job Name: N. T. Thomas Construction, Inc.
Client Job Number: 13906.1
Project X Job Number: S230310A
March 13, 2023

	Method	ASTM D4327		ASTM D4327		ASTM G187		ASTM G51	ASTM G200	SM 4500-D	ASTM D4327	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D4327	ASTM D4327
Bore# / Description	**Depth**	**Sulfates** SO_4^{2-}		**Chlorides** Cl^-		**Resistivity** As Rec'd | Minimum		**pH**	**Redox**	**Sulfide** S^{2-}	**Nitrate** NO_3^-	**Ammonium** NH_4^+	**Lithium** Li^+	**Sodium** Na^+	**Potassium** K^+	**Magnesium** Mg^{2+}	**Calcium** Ca^{2+}	**Fluoride** F_2^{--}	**Phosphate** PO_4^{3-}
	(ft)	(mg/kg)	(wt%)	(mg/kg)	(wt%)	(Ohm-cm)	(Ohm-cm)		(mV)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)	(mg/kg)
BB-4, B-3 (SC) Clayey Sand	1-4	30.9	0.0031	30.6	0.0031	17,420	5,896	8.1	142	4.8	22.8	14.1	0.0	38.5	5.0	41.0	119.1	2.0	63.8
BB-7, B-10 (CL) Sandy Clay	5-8	70.2	0.0070	123.6	0.0124	5,829	1,072	8.0	119	0.1	89.7	11.1	0.0	138.0	4.0	40.4	110.0	4.4	1.7

Cations and Anions, except Sulfide and Bicarbonate, tested with Ion Chromatography
mg/kg = milligrams per kilogram (parts per million) of dry soil weight
ND = 0 = Not Detected | NT = Not Tested | Unk = Unknown
Chemical Analysis performed on 1:3 Soil-To-Water extract
PPM = mg/kg (soil) = mg/L (Liquid)

Note: Sometimes a bad sulfate hit is a contaminated spot. Typical fertilizers are Potassium chloride, ammonium sulfate or ammonium sulfate nitrate (ASN). So this is another reason why testing full corrosion series is good because we then have the data to see if those other ingredients are present meaning the soil sample is just fertilizer-contaminated soil. This can happen often when the soil samples collected are simply surface scoops which is why it's best to dig in a foot, throw away the top and test the deeper stuff. Dairy farms are also notorious for these items.

Project X
Corrosion Engineering
Corrosion Control - Soil, Water, and Metallurgy Lab

Lab Request Sheet Chain of Custody
Phone: (213) 928-7213 · Fax (951) 226-1720 · www.projectxcorrosion.com

Ship Samples To: 29990 Technology Dr, Suite 13, Murrieta, CA 92563

Project X Job Number: S230310A LOR 139906.1 N.T. THOMAS 2FULL

IMPORTANT: Please complete Project and Sample Identification Data as you would like it to appear in report & include this form with samples.

Company Name:	LOR Geotechnical Group, Inc.	**Contact Name:**	ROBB MARKOFF
Phone No:	951-653-1760		
Mailing Address:	6121 Quail Valley Court	**Contact Email:**	RMARKOFF@LORGEO.COM
Accounting Contact:	John Leuer	**Invoice Email:**	ATARDIE " "
Client Project No:	139906.1	**Project Name:**	N.T. THOMAS CONST., INC.
P.O. #:	--	**3-5 Day Standard:**	✓
3 Day Guarantee (50% mark-up)		**24 Hr RUSH** (100% mark-up)	
(Business Days) Turn Around Time:			

Results By: ☐ Phone ☐ Fax ☐ Email

Date & Received by :

Default Method

Special Instructions:

ANALYSIS REQUESTED (Please circle)

	SAMPLE ID - BORE #	DESCRIPTION	DEPTH (ft)	DATE COLLECTED
221	1	BB-4, B-3	(SC) CLAYEY SAND)	1-4'	3-7-23
222	2	BB-7, B-10	(CL) SANDY CLAY)	5-8'	3-7-23
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				

Soil Resistivity	pH	Sulfate	Chloride	Redox Potential	Sulfide	Ammonia	Nitrate	Flouride	Phosphate	Lithium	Sodium	Potassium	Magnesium	Calcium	BiCarbonate	Full Corrosion Series	Soil Corrosivity Evaluation Report	Water Corrosivity Mini Report	Moisture Content	Total Alkalinity	Thermal Resistivity	Metallurgical Analysis	Langelier Index	Puckorius Index	XRF Elemental Analysis	Water Hardness
																✓										
																✓										

Soil Resistivity	pH	Sulfate	Chloride	Redox Potential	Sulfide	Ammonia	Nitrate	Flouride	Phosphate	Lithium	Sodium	Potassium	Magnesium	Calcium	BiCarbonate
Caltrans CTM643	Caltrans CTM643	Caltrans CTM417	Caltrans CTM422												
AASHTO T288	AASHTO T 289	AASHTO T 290	AASHTO T 291	SM 2580B		SM 4500-NH3	SM 4500-NO3								
ASTM G187	ASTM G 51	ASTM D4327	ASTM D4327	ASTM G200	SM 4500-S2	ASTM D6919	ASTM D6919	ASTM D4327	ASTM D4327	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	ASTM D6919	SM 2320B

Full Corrosion Series

Geo Quad

Full Corrosion Series

Reports

*Req. Min. 3 Samples, site map, and groundwater info

Soil Corrosivity Evaluation Report	Water Corrosivity Mini Report	Moisture Content	Total Alkalinity	Thermal Resistivity	Metallurgical Analysis	Langelier Index	Puckorius Index	XRF Elemental Analysis	Water Hardness
		ASTM D2216	SM 2320B						