PRELIMINARY GEOLOGIC SITE CHARACTERIZATION AND FAULT RUPTURE HAZARD STUDY PROPOSED NURSING HOME FACILITY AND RESIDENTIAL BUILDINGS PROJECT ASSESSOR PARCEL NOS. 2664-022-018, 2664-022-008, AND 2664-022-009

15151 MISSION HILLS ROAD

LOS ANGELES, CA 91345

FOR

ARARAT HOME OF LOS ANGELES

PROJECT NO. 17-641-26

NOVEMBER 2, 2018

November 2, 2018

Project No. 17-641-26

Ararat Home of Los Angeles
15105 Mission Hill Road
Los Angeles, CA 91345

Subject: Report of Preliminary Geologic Characterization
And Earthquake Fault Rupture Hazard Study
Proposed Skilled Nursing Care Facility and Residential Buildings Project
APN Nos. 2664-022-018, 2664-022-008, and 2664-022-009
15151 Mission Hill Road
Los Angeles, CA 91345

Gentlemen:

We are pleased to submit our geologic report of preliminary site characterization and fault rupture hazard study, for the property at 15151 Mission Hills Road in Los Angeles, California.

The scope of this investigation was based in part on our workplan as delineated in our Scope of Work Proposals dated November 21, 2017, and based in part on our correspondence with city and state reviewers, as well as correspondence with the buyers of the property (Ararat Home). Summaries of data gathered during our investigation, our analysis of these data, and our conclusions and recommendations are presented in this attached report.

Thank you for the opportunity to be of continued service on this project. Please call the undersigned if you have any questions regarding this report.

Respectfully Submitted,

APPLIED EARTH SCIENCES

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Engineering Geologist 2607

CERTIFIED ENGINEERING GEOLOGIST
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Preliminary Geologic Site Characterization
And Earthquake Fault Rupture Hazard Study
Proposed Skilled Nursing Care Facility Project
15151 Mission Hills Road
Los Angeles, California

EXECUTIVE SUMMARY

Applied Earth Sciences conducted a multi-phase field exploration of the subject site as part of a preliminary geologic site characterization and fault rupture hazard assessment, for the subject client, Ararat Home of Los Angeles. The client owns and operates the property to the east as a nursing care facility and retirement home; this acquisition is the purpose of expanding their operations. As part of our effort, AES reviewed a significant volume of prior reports and literature; advanced 18 geotechnical boreholes across the study area in December 2017, commissioned a third-party geophysical survey in January 2018, advanced three seismic trenches from February through March 2018, and advanced two geologic large-diameter boreholes in the southern portion of the site in April 2018. No active faults were encountered in our study. One inactive fault was encountered in Trench 1 at around Station 215, with offset ranging from 2" to 10". The fault generally had larger offset deeper in the trench. Importantly, the fault did not rupture or disturb Pleistocene soils in the upper three feet of T-1 as seen on the east wall of the trench.

The northern portion of Trench 3 was in the vicinity of the axis of the Mission Hills Anticline. Our results were in general agreement with other geologic literature for this area. The Mission Hills fault zone is thought to extend roughly east-west within close proximity to the southern portion of the site. Based on our findings, we have presented a No-Build Zone which is 50' wide, from the southernmost point of exploration (Boring B) in which no faulting was encountered. The proposed skilled nursing facility, as presented in the Geologic Map and Site Plan, is situated outside of the 50' wide No-Build-Zone.

Further geotechnical engineering recommendations will be forthcoming in future reports once the site grading concept and design documents are prepared in more detail.

INTRODUCTION

State law requires skilled nursing care facilities to be located on sites that are free of earthquake fault rupture hazard, particularly in active fault zone areas and in close proximity to mapped or postulated faults. The subject site is located south of the established Alquist-Priolo Earthquake Fault Zone (Figure No. 5) for this area. However, due to the property's close proximity to an AP zone, and the proposed use of the property as a skilled nursing care (hospital-type) facility, and after verbal correspondence between the undersigned geologist and Mr. Brian Olson of the California Geologic Survey, we performed a fault rupture hazard study of the site as described below.

In December 2017, Ararat Home contacted AES regarding the subject sites, for which it was in escrow to purchase. All of the field investigation of these sites took place while the property was in escrow, with written authorization provided to AES by the then-owner to perform said work. Results of our field investigation were communicated verbally and in writing to the buyers during the course of the investigation. At the time of this writing, escrow has closed and Ararat Home is the owner of the subject property.

This report is intended to in part satisfy Office of Statewide Health Planning and Development (OSHPD) requirements for geologic studies as part of development of new skilled nursing care facilities, and in accordance with Note 48 of the California Geologic Survey and related state guidelines. We understand that OSHPD is the lead agency and that the California Geologic Survey (CGS) will review these reports on OSHPD's behalf.

It should be noted that this report is intended to satisfy the Note 48 guidelines for Engineering Geology and Site Characterization only, with particular attention on earthquake fault rupture hazard. Future reports will need to be prepared to address

Seismology and Calculation of Earthquake Ground Motion, Liquefaction and Seismic Settlement Analysis, Slope Stability Analyses, and other Geologic and Geotechnical Hazards.

SITE DESCRIPTION

The proposed development involves three adjacent and contiguous parcels on the north side of Mission Hills Road, west of the Ararat Home of Los Angeles, and east of the Eden Memorial Park, in the Mission Hills neighborhood of the city of Los Angeles. The site is located near the intersection of three major freeways, south of the confluence of the I-405 and I-5 freeways, and north of the CA 118 freeway. The total surface area of the combined three parcels is 11.79 acres. For ease of reference, the southern two smaller parcels have been denoted by the project civil engineer KPFF as Parcels 1 and 2, while the larger parcel to the north has been denoted at Parcel 3; please see the Geologic Map and Site Plan attached. The western extension of the public right-of-way Mission Hills Road actually extends through the southern portion of the subject properties (Parcels 1 and 2), and hence is a private street, part of the subject property. The private portion of this street through the subject property is currently a one-way street with eastbound traffic only and parking along the north side of the private street. Also, there is a private easement of approximately 30' wide, for roadway access along the entire east side of the parcels. This private roadway provides access to the residences at 15151, 15155, and 15149 Mission Hills Road.

The approximate site Coordinates are as follows:

34d, 16'50.66" N, 118d, 27'53.26" W at southwest corner;

34d, 16'53.00" N, 118d, 27'44.44" W at southeast corner;

34d, 16'57.49" N, 118d, 27'53.8" W at northwest corner;

34d, 17'1.18" N, 118d, 27'49.79" W at northeast corner.

From private Mission Hills Road at the southern end of the property, the elevation of the subject parcels rises from a base of approximately 1035' MSL at the lowest point at the southwest corner of Parcel 1, to a maximum elevation of 1160' MSL near the northwest corner of Parcel 3. Please see the Geologic Map and Site Plan, which uses a

topographic survey prepared by KPFF as the base map, and which presents detailed contours and spot elevations throughout the entire subject property.

PROPOSED PROJECT CONSIDERATIONS

The proposed project will involve a planned multilevel nursing care facility situated in an approximately east-west orientation primarily on Parcels 1 and 2 at the southern portion of the combined properties. Parcel 3 to the north will house residential buildings only and no nursing care or hospital facilities.

We are in receipt of a preliminary site plan drawings for the proposed nursing care facility on Parcels 1 and 2 from the project architect Zakian Woo Architects, as well as a topographic survey by KPFF dated 10/18/2017. Trench locations were surveyed by KPFF and presented on their topographic map on 3/4/2018. We have depicted the approximate outline of the proposed nursing care facility for reference purpose. The proposed residential buildings and associated structures on Parcel 3 are also shown; however, it should be noted that those buildings do not require an earthquake fault rupture hazard study, and are not within the OSHPD jurisdiction of buildings. Detailed geotechnical recommendations for all the proposed buildings (nursing care facilities as well as non-OSHPD buildings) will be presented in a future geotechnical engineering and engineering-geologic comprehensive report by this office for submittal to LADBS and OSHPD for review and eventual approval, which will be issued under separate cover at a later date.

It should be noted that the approximate outline of the proposed nursing care facility as shown on our attached site plan drawing is approximate only and based on conceptual drawings from the project architect, for the purpose of providing required setbacks from our southernmost exploratory point where we rule out active faulting. The scale, scope and location of the proposed skilled nursing building may change from the current depiction, at which time an addendum report may be prepared by AES for additional review by CGS/OSHPD.

REVIEW OF PRIOR GEOLOGIC/FAULT STUDY REPORTS IN THE VICINITY

Applied Earth Sciences previously prepared limited fault hazard study reports for the proposed additions at the main Ararat Home facility at 15105 Mission Hills Road, for the same client (Ararat Home of Los Angeles), in 2009 and 2011. (This property is adjacent and east of the current subject properties.) As part of our work, AES advanced a series of hollow-stem auger borings across the study area in a north-south transect for cross-correlation of geologic units and groundwater levels, and found no fault in the area of the proposed skilled nursing care additions. It should be noted that this study was investigated in the vicinity of the Mission Wells or Verdugo fault zones. The results were presented in AES reports dated 5/22/2009 and 9/10/2009. AMEC GeoMatrix also provided a supplemental report of Site Specific Ground Motion Hazard Evaluation, dated 7/21/2011. These reports were eventually approved by CGS and OSHPD in their 8/25/2011 and 9/2/2011 reports, respectively.

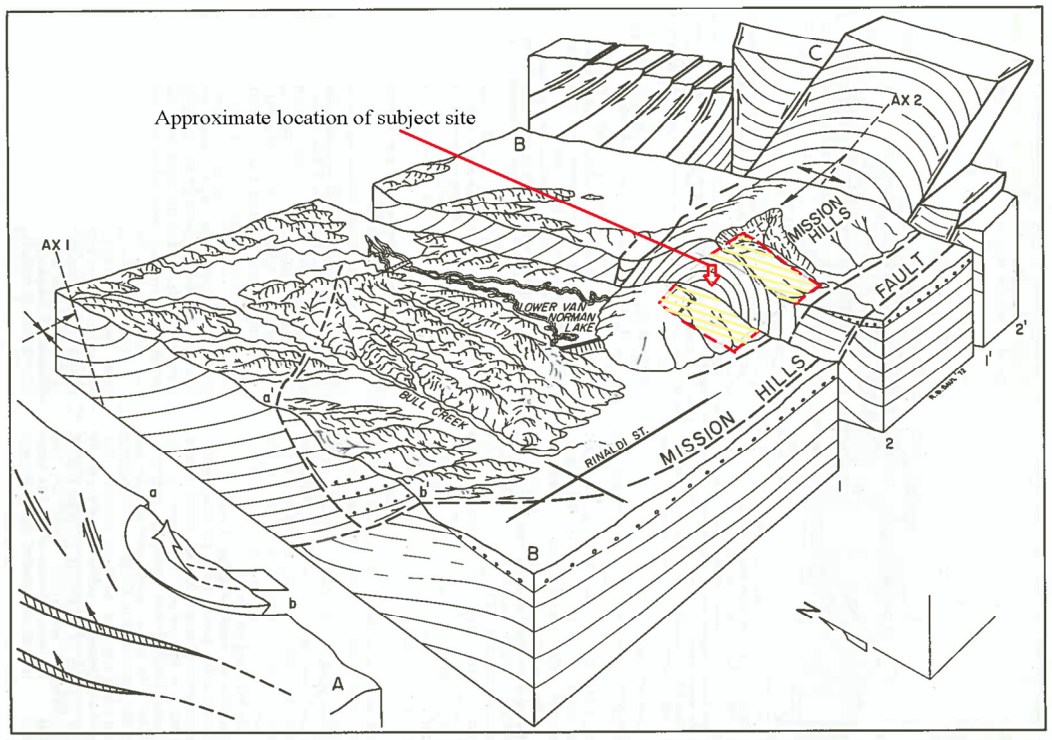
We are also in receipt of geological/seismic reports by Robert Stone and Associates and Michael Scullin that accompanied the original construction of the existing main nursing care facilities at 15105 Mission Hills Road. These reports are dated 2/21/1984 and 8/4/1987. As part of their effort, RSA advanced several trenches and boreholes in the vicinity of a splay of the Verdugo or Mission Wells faults. A 50' structural setback was established at the northeast portion of that property on the south side of the projected northwest-trending splay fault. Soil engineering reports were provided by Hakimian Engineering.

More recently, Allen E. Seward Engineering Geology, Inc. prepared a brief geologic report dated 4/27/2017 for the owner of the adjacent north property at 15155 Mission Hills Road, which involved a limited investigation of the private driveway that accesses the dwellings at 15151 and 15155 Mission Hills Road. In their shallow trench excavations they encountered shallow perched groundwater at the fill/older alluvium contact that appears to follow an existing east/southeast trending drainage through the northern portion of the said properties. The drainage has been altered by grading and placement of fill for the roadway, and the perched water in this area has recently caused some distress to the private roadway. This will be discussed further in the groundwater section of this report.

We have compiled and presented the available geologic data in our attached Area Geology Map – Drawing No. 1, which also includes geologic data from regional published maps and other sources. We have also included a PDF copy of these referenced reports with this submittal. Hard copies can be provided upon request.

REGIONAL GEOLOGY

The project site is located in the north-central San Fernando Valley, in the area of Los Angeles known as the Mission Hills, which is part of the Transverse Ranges Geomorphic Province of southern California. The Mission Hills are a compressional geomorphic feature and fold system wedged between two related faults: the Mission Hills fault to the south, and the Mission Wells fault to the north. These faults are thought to converge in the subsurface, at approximately 10,000 feet depth (Davis, Namson and Gordon, 1996). The Mission Hills fault is considered to be a thrust fault which thrusts and displaces the older Mission Wells fault to the north. The Mission Wells fault is considered to be a normal fault that rides in the hanging wall of the Mission Hills fault. For a graphical depiction, please see the generalized block diagram below, taken from Saul, 1975, Chapter 5 of Bulletin 196, showing the Mission Wells normal fault, Mission Hills thrust fault, Mission Hills anticline, and the approximate location of the subject property.



1974 SAN FERNANDO EARTHQUAKE—GEOLOGY AND GEOPHYSICS 63

Figure 2. A generalized block diagram of the eastern province. Block A is simplified to show the possible distribution and relative direction of Late Quaternary fault displacement at the west end of the province. The eastward tilt of the west end of the province (figure 3) may be explained by the rotation of the boat-shaped block lying north of the Mission Hills fault. This is illustrated by its truncated (a — b = a'— b') western tip in block A. Displacement at point a is right-lateral oblique. At point b, it is left-lateral oblique. Block B is a rough physiographic portrayal of the Mission Hills-Van Norman Reservoirs area including most of the south flank of the Mission Hills syncline (axial plane ax 1) and the Mission Hills anticline (axial plane ax 2). The Mission Hills are slightly exaggerated, and most urban features were deleted for emphasis and simplicity. Block C represents the section cut out of block B (1 — 2 = 1'— 2'). It is drawn as a hypothetical block diagram. The relative displacements between the various fault-bounded rock bodies is suggested. The "folded deck of cards" effect is illustrated at the north end of block C by the arrows on the west side.

We have also depicted the approximate location of the site with respect to a generalized cross section through the northern margin of the San Fernando subbasin, shown at a smaller scale, taken from a professional paper by Davis, Namson and Gordon, 1996.

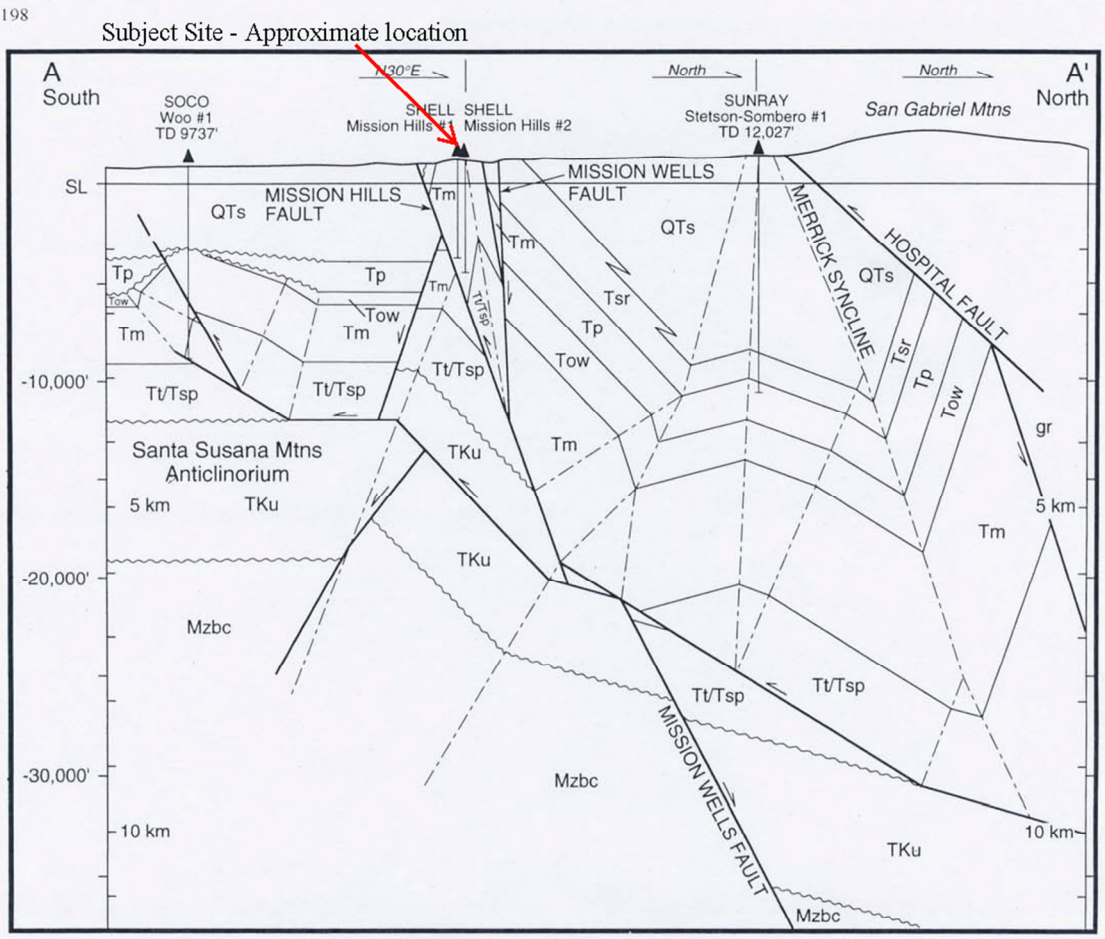


Figure 7. Cross section across the northern margin of the San Fernando subbasin showing basin inversion during the Quaternary. Abbreviations: Mzbc=Mesozoic-age plutonic rocks, TKu=undifferentiated upper Cretaceous and lower Tertiary strata, Tt/Tsp=undifferentiated Topanga and Espe Formations; Tm=Modelo Formation; Tow=Towsley Formation; Tp=Pico Formation; Tsr=Sunshine Ranch Member Saugus Formation; QTs=Saugus Formation.

The Mission Hills and Mission Wells faults are part of the Sierra Madre thrust system that uplifts the nearby San Gabriel and Santa Susana Mountains. The project site is located approximately along the axis of the Mission Hills Anticline, as it is presented on regional geologic maps (Figures Nos. 3 and 4) and in the diagram above. The area south of the Mission Wells fault (location of subject site) is underlain by recent colluvial and alluvial soils, Pleistocene older alluvial terrace deposits, middle Pleistocene Pacoima Formation alluvial gravels, and Miocene-age Modelo Formation shale. North of the Mission Wells fault, lower Pleistocene Saugus Formation conglomerate and Pliocene Towsley Formation sedimentary rocks are also exposed (Figure No. 3).

The 1971 San Fernando earthquake was a seminal geologic event in southern California which resulted in widespread geologic study and mapping of surface faults in southern California. This activity eventually led to the development and passing of the Alquist Priolo Act of 1972, which requires fault studies for sites in established fault zones. The 1971 earthquake ruptured portions of the Mission Wells fault zone, Reservoir fault segment, and possibly the westward extension of the Verdugo fault, as well as numerous smaller faults which are considered part of the general thrust fault system that actively uplifts the San Gabriel Mountains (see Figures Nos. 4 and 5). These surface ruptures along the Mission Wells, Reservoir, and Verdugo fault zones from the 1971 earthquake are concentrated north of the subject site, approximately ¼ mile north from the location of the planned nursing facility. Incidentally, while the project site is within close proximity to documented surface fault rupture from the 1971 earthquake, there were no documented surface ruptures along the Mission Hills fault zone. Moreover, currently, the Mission Hills fault zone is not in the Alquist Priolo special studies zones requiring fault studies, nor is the site within the zone of required investigation for earthquake-induced liquefaction or landslide hazard (Figure No. 6). However, because the planned project involves a critical facility, at the request of the property buyers (Ararat Home), and after verbal discussion between Mr. Minas of AES and Mr. Olson of the CGS, it was agreed to perform an earthquake fault investigation as part of an overall geologic site characterization for the planned skilled nursing facility.

FIELD EXPLORATION

Our investigation, as it was carried out, involved three phases of exploration and one limited geophysical survey performed by Southwest Geophysics, Inc. (outside consultant) prior to the trench excavation (discussed below). All field exploration was conducted on private property only.

Phase I- Geotechnical Borings. The first phase of exploration involved advancing a total of eighteen hollow stem auger borings over the course of two workdays December 20 and 21, 2017. The borings were advanced by Choice Drilling of Sylmar with a CME-75 rig. The borings were scattered throughout the three parcels to provide a broad

preliminary understanding of subsurface soils and geologic conditions, and in order to organize the next phase of exploration specifically to address the surface fault rupture hazard. Geotechnical boring depths ranged from a minimum of 8' total depth (in B-5) to 36' total depth (in B-1, B-15, and B-16). These borings were also sampled at regular intervals to be used later for geotechnical engineering recommendations. The geotechnical borings were surface logged by Ted Zeidan, staff geologist, under supervision and periodic observation by Shant Minas, engineering geologist. Logs and samples were later reviewed in detail and revised by Shant Minas. Steve Miller of Miller Geosciences also periodically visited the site during the first phase of drilling. Please see the Boring Logs in the Appendix I attached.

After review of initial boring logs, it was determined that the most suitable approach for the fault rupture hazard study was to excavate a series of trenches in an approximate north-south orientation, roughly perpendicular to the roughly east-west orientations of the Mission Wells and Mission Hills fault zones. Prior to the trench exploration, we commissioned a geophysical survey to assist in trench alignment and/or location.

Geophysical Survey. During the course of our field exploration planning, after the geotechnical borings and prior to advancing of the fault trenches, Southwest Geophysics, Inc. (SGI) of San Diego was brought on by AES as an outside consultant to perform a geophysical survey in an approximate north-south orientation, along the paved private roadway in the east portion of the Site, to assist AES in its field exploration for earthquake fault rupture hazard. SGI initially attempted a seismic P-wave refraction survey on January 9, 2018, but this was not possible due to overhead power lines along the LADWP easement directly east of the subject site. SGI then proceeded to conduct one multichannel analysis of surface waves (MASW) along the same private roadway on January 29, 2018. SGI prepared a draft report dated 2/26/2018 indicating some anomalous subsurface strata that could be attributed to folding or faulting. However, because the geophysical survey is a surface assessment only, it was of limited use. AES proceeded to plan a series of fault trenches for the fault rupture hazard study to cover the entire proposed area of the skilled nursing facility as well as northward into Parcel 3. The geophysical report is attached in the Appendix.

Phase II – Trenches Excavation. Prior to trench excavation, a ground-penetrating radar assessment was commissioned to detect any buried utilities or other historical structures along the alignment of the proposed trenches. No such structures were encountered in our GPR survey. Trench excavation commenced on February 19 and concluded on February 26, 2018, by Universal Demolition, Inc. of Sylmar, using a Case 225 Excavator.

Trench 1 was excavated on Parcel 1 in an approximate north-south direction. The trench depth ranged from 8' to 16.5' depth, and was approximately 285 feet long. The northern half of T-1 was situated on a level cut pad (station 150-220) and into a cut ascending slope (station 220-290) ranging from 5:1 to 1.8:1 H:V at its steepest. The southern half of T-1 is situated along a fill slope (between station 50 and station 150) and the lower valley floor in the southernmost part of T-1 (station 0 to 50).

Trench 2 was excavated as the northward continuation of Trench 1, at the south-central margin of Parcel 3 and extended slightly into Parcel 2. The southern end of Trench 2 was situated approximately 10 feet east of the north end of Trench 1. Trenches 1 and 2 had a minimum of five feet of overlap of Pleistocene older alluvium for cross correlation. Trench 2 was a total of ~90' in length, ranged from 7'-9' depth, and was situated along an approximately 3:1 H:V natural ascending slope.

Next, Trench 3 was excavated along the east side of the elevated terrace where the existing dwellings at 15151 and 15155 Mission Hills Road are situated. Trench 3 was approximately 430 feet long and ranged from 5' to 20' at its deepest near Station 315, which is at the approximate axis of the Mission Hills Anticline. The northern terminus of Trench 2 had a minimum of five feet of overlap with the southern terminus of Trench 3 of Pleistocene older alluvial terrace deposits for cross-correlation.

The west walls of all three trenches were scraped and cleaned by various AES personnel over the course of trench excavation activities to facilitate accurate logging of subsurface strata. The trenches were preliminarily logged by the project engineering geologist Shant Minas and senior geologist Steve Miller during the week of excavation. Senior geologist and soil stratigraphy specialist Thomas Rockwell arrived to the site on

February 26 through 27 for detailed logging of notable features. An onsite meeting was arranged for Tuesday, February 27 to review the trench excavation and preliminary findings, with the following individuals present:

AES- Shant Minas, Thomas Rockwell, Steve Miller, and support staff

CGS- Messrs. Brian Olson and Erik Frost

LADBS- Mr. Casey Jensen

Completed trench logs were then prepared after further detailed study and are discussed further below.

Phase III- Large Diameter Borings. Lastly, and in order to expand the explored area of the site in the southerly direction south of the southern terminus of T-1, two large-diameter borings were advanced by Roy Bros. Drilling of Malibu on April 5 and April 6, 2018 and downhole logged by Shant Minas.

See Drawing No. 2 – Geologic Map and Site Plan for the locations of the HSA borings, geophysical survey, trenches T-1, T-2 and T-3, and large-diameter borings Boring A and Boring B, with respect to existing and proposed structures. KPFF's trench location/topographic survey was used as a base map.

SITE SURFACE CONDITIONS

The subject site lies in an area of the elevated Mission Hills dissected by numerous low-lying valley areas and drainage channels. The site of the proposed skilled nursing care facility is located along an elevated terrace north of a prominent topographic rise coincident with the approximate alignment of the Mission Hills fault zone (Oakeshott, 1958; Namson, 1996).

To the north of the subject sites are the following: a large ranch-style property, similar to the subject property, at 15149 Mission Hills Road; a one-acre ranch property at 15151 Mission Hills Road directly north/northwest of the site; a cemetery/memorial park to the west; and the Ararat Home of Los Angeles main campus to the east. To the south of the site is a sports field belonging to Bishop Alemany High School. There is a

30’ wide LADWP utility easement along a natural south-flowing drainage located just east of the subject property, on the west side of the main Ararat Home property, along which there are overhead power transmission towers and electrical cables.

The subject property was originally developed in the 1950s with low rise residential buildings, which are currently onsite. The ground surface topography has been altered from its original pre-development condition in certain areas of the site. Prior grading records are not available for any of this grading work. Some grading has taken place on the site, consisting of the following:

1. Creation of flat building pads for each separate residential structure;

2. Creation of the cut pad in Parcels 2 and 3 where the skilled nursing facility is planned;

3. Placement of undocumented fill in the southern portion of Parcels 2 and 3 derived from the cutting of the existing level pad just to the north;

4. Placement of significant quantities of undocumented fill for the development of the dirt roadway that surrounds the existing dwelling on parcel 1. Based on our conversation with the former owner Mr. Klinger, it is our understanding that the fill placed on the south and east sides of the dirt roadway that surrounds the dwelling on the east, south and west was accomplished in the 1960s to 1970s using imported fill soils. No grading records are available for this work, therefore the fill is undocumented. Our observation of the fill slope, as well as the many borings drilled in this area, indicate that the fill placed here ranges from loose to moderately compact and is moderately compressible. Portions of this fill appear to be sloughing or failure prone, and have resulted in a nonconforming slope condition that will need to be mitigated as part of future site development. This condition will be discussed more in future geotechnical reports by AES. Please see a graphical depiction of the areas of undocumented fill on the subject property in our Drawing No. 2 – Geologic Map and Site Plan.

GEOLOGIC AND SOIL CONDITIONS

Our geologic investigation consisted of the excavation, inspection, sampling and geologic logging of three fault trenches, surface logging and sampling of 18 geotechnical borings, and surface sampling and downhole logging of two large-diameter borings; a thorough review of published geologic maps, professional papers, and prior reports, and site reconnaissance and mapping. This activity indicates that the site is underlain by Artificial Fill (Af), Colluvium (Qc), Recent Alluvium (Qa), Older Alluvium (Qoa), Pacoima formation breccia/conglomerate (Qp), Residual Soil (Rs) of Modelo formation, and Modelo formation sedimentary bedrock (Tm). A Regional Geology Map is presented in Drawing No. 1 which shows the site location with respect to mapped faults and geologic features from other studies in the area. A Geologic Map and Site Plan is provided in Drawing 2, and geologic cross-sections through the site in Drawings 3. Trench logs for T-1, T-2, and T-3 are presented in Drawings 4, 5 and 6, respectively. Fault Detail Log as encountered in Trench 1 is presented in Drawing 7. Boring logs are provided in Appendix I. A description of the units and their distribution are as follows:

Artificial Fill (Af): Artificial fill was encountered in several of the borings and in the trenches, placed from prior grading or man-made disturbance. Fill was found to be thickest in Borings B-14, B-15, B-16, and B-17, where, as discussed above, imported fill materials were placed directly on the natural descending slope so as to create a dirt path around the dwelling. In this area, fill was found to be between 10’ and 20’ thick and may locally be thicker.

Also, in the southern part of Trench T-1, south of the cut pad, there is up to 6’ of surficial fill from prior grading as seen in the trench log – Geologic Cross Section A. The soil composition of the fill is mostly silty gravelly sand (SM), loose to moderately compact and/or consolidated (typically at greater depths in the borings), damp to moist, with scattered to abundant gravel-size inclusions of lithic fragments.

The fill slopes between the dwelling pad and lower cut pad are over-steepened due to the placement of undocumented fill, and prone to sloughing, settlement and erosion. We understand that, as part of the site grading for the proposed projects, all of

the artificial fill will be removed from the site and the site slopes will be regraded to a condition similar to the pre-graded condition.

Recent Colluvium (Qc): Colluvial soils mantle the sloped areas on the site, particularly in the northeast and east portion of the site. Some colluvial clayey soil mantles the sedimentary bedrock and older alluvial fan deposits, as noted in Trench T-3 in the northern portion of the site. In the southern portion of the site, colluvial soils are likely mixed with alluvial soils, particularly near the private roadway along the southern property boundary. Colluvial soils generally consist of clayey sand (SC) to sandy clayey silt (ML) to silty clay (CL) and are generally porous to firm, to slightly dense, and range from slightly moist to very moist.

Recent Alluvium (Qa): Recent alluvial deposits are concentrated in the southern portion of the site, where they are typically mixed with colluvial hillslope soils. We encountered native alluvial soils in the southern part of Trench T-1, and also in geotechnical borings along the private roadway on the east side of the site, and in Borings B-A and B-B. Generally speaking, flatter areas in the southern and southeast part of the site typically have some recent alluvial deposits with limited thickness. These soils typically consist of silty to clayey sand (SM-SC) with scattered gravel.

Older alluvial fan deposits (Qoa, Qos, Qvoa-1): This unit is the uppermost middle to late Pleistocene deposit found on the site, and is distributed widely across the study area. It generally consists of massive to crudely stratified breccia or gravel (GM-GW) deposits, with various types and sources of lithic fragments derived from the San Gabriel Mountains. This unit is typically slightly indurated, dense to very dense, hard, and very coarse grained. Various workers have identified this material with similar symbols Qos, Qoal, Qvoa-1, and Qoa. This unit is widespread across the study area and ranges from a few to several feet in thickness. This unit unconformably overlies older Pacoima formation deposits. Some crude folding/stratification, as well as some folding/tilting, was identified in this unit (generally very shallow south dips), but generally was found to be massive.

Pacoima formation (Qp): Pacoima formation conglomerate and breccia was encountered primarily in the southern portion of the site, most easily identified in Trench 1, where it is exposed at the ground surface in the northern portion of T-1. It is generally stratified folded with shallow to moderate southerly dips up to 32 degrees. In the Pacoima Formation, there are easily recognizable beds with iron and manganese staining, ranging from gravelly conglomeratic beds to poorly graded clean sand beds (GW to SP). The Pacoima Formation at this site was found to be unconsolidated to weakly indurated, and is moderately hard and dense to very dense.

It is differentiated from the capping Qoa unit mainly by its generally stratified appearance, stronger cementation, and recognizable and differentiated beds, notably with iron and manganese staining.

Residual Soil (Rs): In areas where Modelo formation bedrock was observed to have been degraded/weathered into a soil-like material, we have differentiated it from more intact bedrock with this unit. Residual soil of the Modelo formation was only locally found in Trench 3.

Modelo formation (Tm): Modelo formation shale and diatomaceous shale and sandstone was found in Trench 3, where it is shallow beneath the surface with local outcrops. It was also encountered at depth in many of the geotechnical borings and both of the large-diameter borings. It is generally grey to brown, white-weathering, thin-bedded to laminated, parts easily along beds, weathered, punky to slightly dense.

Nomenclature Discussion.

As part of our work, we reviewed several publications regarding the appropriate nomenclature and naming of units for this study. In the 1974 CDMG Bulletin 196 of the San Fernando Earthquake, Glenn A. Brown called “Qoal” as poorly consolidated continental gravels and included more folded Pacoima formation in this unit, based on previous unit descriptions by Oakeshott, 1958. The 1975 CDMG Bulletin 196 Plate 2

Geologic Map identifies the older alluvium at the surface of this site as Qos, for older flood plain deposits.

Furthermore, Brown identified what we have called Pacoima formation in this report, mainly gently folded conglomerates, as the older Saugus formation. Other reports indicate the folded conglomerates that were encountered in our study to be part of the Pacoima formation. The 2014 Preliminary Geologic Map of the Los Angeles Quadrangle by CGS, 2014, indicates the Pacoima formation to be a fanglomerate-breccia with a reddish-brown matrix, which matches with our observations of the lowermost Pleistocene alluvial unit encountered in the trenches. After some consideration and discussion with CGS geologists, we have called the lower folded breccia-conglomerate beds that contain iron and manganese-stained beds, as (**Qp**) **Pacoima formation** in our study, and the older alluvial unit above it, as **Qoa** for simplicity, which corresponds to the **Qvoa-1** unit assigned by CGS in their 2014 Preliminary Geologic Map of the Los Angeles 30' x 60' Quadrangle. For the purpose of this fault rupture hazard study, the actual names used do not matter much as all three of the formations, older alluvium, Pacoima, and Saugus, are late to older Pleistocene formations.

Geologic Structure

Our trench excavations allowed us to observe the in-situ geologic structure and stratigraphy of a portion of the Mission Hills area of the San Fernando Valley. The area of Trenches 1 and 2 are located on the south flank of the Mission Hills anticline and north of the Mission Hills fault. In trench 1, Pacoima formation conglomerate was found to be dipping consistently south with shallow dips, whereas the older alluvial deposits (Qoa), where stratification was discernable, was found to be dipping very shallowly to the south.

The older alluvium (Qoa) exposed in Trench 3 follows the slope contour and dips south on the south side of the anticlinal axis, and is relatively flat-lying to the north of it. The Modelo Formation bedrock exposed in T-3 is much more steeply dipping than the

overlying older alluvium, demonstrating that significant folding preceded the strathing of the older alluvial terrace across the Mission Hills Anticline, with subsequent continued folding in the late Quaternary.

In Borings B-A and B-B at the southernmost explored area of the site, Modelo bedrock was encountered at similar elevations and was found in samples to be dipping steeply. In the southern part of Trench 3, it was also found to be dipping steeply toward the south; however, in the northern reaches of T-3, the bedding orientation became markedly shallower. At Station 315 in T-3, we lost the upper contact between the Modelo bedrock and Qoa gravel conglomerate that unconformably overlies the bedrock. At this point, Modelo formation bedrock had a southerly dip of only 12 degrees, suggesting that the axis of the Mission Hills anticline is just north of there, probably around Station 330 in T-3. Therefore the northern part of T-3 north of approximately Station 330 is north of the Mission Hills anticline. This is in general agreement with and closely matches published maps and prior reports regarding the approximate location of the Mission Hills anticline.

Groundwater

Groundwater was encountered in several of geotechnical borings across the site. Groundwater was encountered in Borings B-7, B-8, and B-9 at depth of 12 feet in each in the east side of the subject site, along the private roadway and adjacent to the drainage that underlies the LADWP easement. Shallowest groundwater in our borings was at 7 feet depth in Boring B-10, where grading for the private roadway access has covered a natural east-trending drainage which converges with the south-trending drainage immediately east offsite. Boring 10 was in the same vicinity as Allen Seward's test holes in which groundwater was encountered as shallow as 2-3 feet depth in their backhoe test holes, at the colluvium/older alluvium contact. Please see our Geologic Map and Site Plan Drawing No. 2 for the locations of these holes and groundwater depth as encountered in the field by AES and Allen Seward.

In AES's large-diameter Borings B-A and B-B south of Trench T-1, groundwater was encountered at depths of 36' and 30'-32', respectively. It should be noted that Boring B was advanced at an elevation of roughly 6 feet below the ground surface elevation of Boring A such that the true groundwater levels are at approximately the same elevations. This is an important point in ruling out active faulting through the studied area, because the Mission Hills fault zone is thought to be a groundwater barrier.

Age of Alluvial Deposits

This part of the report primarily addresses the ages of alluvial deposits that are present beneath the proposed project site at Mission Hills area of Los Angeles, CA. A detailed soil description was completed by Dr. Rockwell to characterize the age of the soil capping the fluvial terrace (older alluvium) that is cut across the Mission Hills anticline at the site, as described in the trench wall near the fold crest, and it is this soil description that forms the basis for our interpretation of the ages of stratigraphic units that underlie the site in the shallow subsurface. The primary purpose of this section is to make assessments on the age of alluvium at the site to resolve whether the site is impacted by active faulting. We will discuss the soil characteristics that form the basis of our age assessments.

Age of terrace deposits exposed in trench **T3** – The alluvium exposed in the three trenches at the site fall into one of three broad categories: terrace deposits associated with a strath surface cut across the growing Mission Hills anticline; Pleistocene alluvial fill (Qoa and Qp) that thickens in the southern forelimb of the fold near the base of slope (including Pacoima Formation); and young Holocene (Qa/Qc) deposits at the south side of the project site that represent recent colluvial and mixed alluvial deposition on the south limb of the fold. The soil description in Table 1 was described near the crest of the fold (T-3 around Station 315) where deposits are thickest, and characterizes the minimum age of the terrace alluvium and the uppermost part of the thickened alluvial deposits on the forelimb, but not the young colluvial deposits at the south side of the project area, which are considered Holocene in age. The soil age estimate is considered a minimum because the trench was excavated near the top of

slope but on a sloping surface, which implies some erosion from the site of the trench. Hence, the soil characteristics are considered minimum values in comparison to what they would have been on a completely stable surface. The deformed thickened alluvium in the forelimb is mapped as the Pacoima Formation, a Pleistocene alluvial deposit derived from Pacoima Wash that drains the San Gabriel Mountains.

Soil, in this context, is the weathering profile that develops at Earth's surface over time. The expression of a weathering profile is affected by many parameters, including the characteristics of the parent material, the climatic conditions that prevailed during the period of development along with the associated vegetation that was dominant, the amount of surface slope and aspect that may affect surface stability, and the length of time that a stable surface has been exposed to weathering.

In this study, the parent material for the terrace alluvium is mostly derived from the San Gabriel Mountains and likely began as a sandy gravel based on its clast-supported character; this is expected for a fluvial terrace environment. The thickened older alluvium on the forelimb contains clasts from the San Gabriel Mountains along with some clasts derived from the Monterey Formation and is likely derived principally from Pacoima Wash drainage system as it is mapped as Pacoima Formation. The young colluvium fronting the forelimb is a silty clay loam interpreted to have been derived from erosion off of the forelimb face.

Variations in the climate in the Mission Hills / Los Angeles basin region are well documented: climate was substantially cooler and wetter in the late Pleistocene than today, with conifer forests growing throughout the coastal and inland region until early Holocene time, whereas the climate during the last interglacial was warm and probably drier than today (Huesser, 1978; 2000; and many other studies by the same author). These changes in climate over time are important in understanding and correctly assessing the ages of the alluvial units beneath the project site.

Assessment of time is a critical component of this study: the strength of a soil profile increases with time such that the characteristics of a soil profile change in a predictable fashion over time with strongly-developed soils requiring a longer period of formation than weakly-developed soils, assuming surface stability and little to no erosion. In the case of the terrace

soil, based on the surface slope at the location of the trench, some erosion likely occurred so the soil age estimate is a minimum.

The soil profile described for this study is presented in Table 1. The trench excavated into the terrace deposits that cross the anticline (trench 3) varied in depth from about 5 feet to over 15 feet, depending on the depth to Monterey Formation bedrock. The described pedon is in the deepest part of the trench near the anticlinal crest where the alluvium extended to the bottom of the trench; the alluvium was probably thicker to the east, which is now eroded out by the modern channel and adjoining hillslope, so the variations in alluvial thickness are interpreted to result primarily from distance to the paleo-channel wall.

The terrace surface preserves a 30-40 cm-thick A horizon (37 cm at the description locale) overlying a 1.2-2 m thick, moderately well-developed argillic horizon exhibiting 7.5YR hues and a sandy clay loam texture. There is moderately well developed angular blocky structure, extremely hard dry consistence, and plastic and very sticky wet consistence. Clay film development is strongly expressed with continuous thick clay films on ped faces and in pores, and many moderately thick clay films bridging grains in the matrix. These are common characteristics of gravel-rich late Pleistocene soils in non-arid regions of southern California, as discuss further below.

The argillic horizon grades downward into a transitional horizon, the BC horizon, which grades downward into the Cox horizon below about 3 m depth. The BC horizon exhibits typical 10YR hues, which is likely the initial color of the parent material, and massive to weak subangular blocky structure. This is consistent with the loamy sand texture, soft dry consistence and weakly developed clay film frequency and thickness.

The Soil Development Index (SDI)(Harden, 1982) was applied to the soil description, and the SDI value was compared to dated gravelly, coarse-grained soils in southern California. The SDI compares the current characteristics of the soil to that of the parent material, which in this case is inferred loose gravelly sand with an initial color of 10YR x/2. The parent material for the A Horizon is assumed to be a loamy silt, as there appears to be a significant aeolian component to that horizon.

To calculate an SDI, the current soil characteristics are assigned numeric values that represent the transition from the parent material to a maximally developed soil in southern California, which is a red (2.5YR) highly plastic clay with continuous thick clay films that is extremely hard when dry and exhibits strong prismatic structure. Such soils are typically early to middle Pleistocene in age.

Based on this, the SDI calculated for this profile is 123 at 380 cm depth, which is the depth used for comparison to the dated Ventura soil chronosequence because the SDI calculation is depth dependent. The contacts between the Bt2 and BC horizons, and between the BC and Cox horizons were obscured in the bench, so for the sake of the calculations, the contact was assumed to be midway within the bench. The Maximum Horizon Index (MHI) (Ponti, 1985; Rockwell, 2000) can also be used for comparison to dated soils, and for this profile, a maximum value of 0.76 was calculated.

The Mission Hills soil is most similar to the Q6 soils of Rockwell (1983), which suggests that the age falls in the 40,000 to 90,000 year range. Recalculated SDI values (Rockwell, 1983) for the Merced soil chronosequence of Harden (1982) suggest an older age that is comparable to the Riverbank series, which is correlated to the last interglacial period at about 120,000 years. For comparison, the oldest dated soil in the Cajon Pass chronosequence (McFadden and Weldon, 1985) yielded SDI values around 70-75 for the 55,000 year old terrace, supporting the older age range.

However, one factor that supports a late Pleistocene age of the terrace alluvium, rather than a last interglacial age, is the absence of a calcic horizon associated with the surface soil. In our experience throughout the Los Angeles Basin region and especially in the San Fernando Valley, soil profiles that experienced the extended dry period of the last interglacial period from about 130 to 115 ka, and perhaps as late as 80 ka, typically exhibit a stage II to Stage II+ calcic horizon below or superposed on the Bt and BC horizons. The absence of such a calcic horizon suggests that this soil is younger than 115-130 ka in age. It is possible that such a calcic horizon was leached out during the wetter late Pleistocene, but as calcic horizons are preserved elsewhere in the Los Angeles basin, this is not a satisfactory explanation. Consequently, we infer the likely age to be in the 60,000 to 80,000 year range, based on the

profile characteristics. Considering that the upper part of the soil may be eroded or deflated, this soil age estimate should be considered a minimum, but again, there is no indication that the soil experienced the last interglacial dry period based on the lack of a calcic horizon.

Trench Summary. In summary, the surface soil exposed in trench 3 near the anticlinal crest expresses characteristics that are consistent with a late Pleistocene age of 60,000 to 80,000 years. This is surprising in that there is a substantial amount of folding of the terrace surface which argues for significant shortening of the fold, and consequent slip at depth on the causative blind thrust in the subsurface. The terrace is cut across Miocene Modelo Formation bedrock, which exhibits bedding dips up to 65-70 degrees to the south. The maximum terrace gradient is about 12 degrees, based on observations in trench T2. This implies that much of the folding occurred prior to formation of the strath terrace, and that there has been 12 degrees of additional tilting in the past 60-80 thousand years. The underlying fault that is causing the folding and tilting is the Mission Hills fault, which is likely the southward propagation of the Santa Susana fault. The Santa Susana fault has an inferred long-term slip rate of 5-7 mm/y (SCEC Data Center: http://scedc.caltech.edu/significant/santasusana.html), although evidence of young activity is lacking except for minor cracking from the 1971 San Fernando earthquake. If the entire slip rate of the Susana Fault has propagated south onto the Mission Hills fault, then the recurrence interval for large (M7) earthquakes is likely on the order of a thousand years. If correct, then the 12 degrees of tilting occurred in 60-80 earthquakes, implying an average tilt per event of about 0.2 degrees. If the terrace deposits are older, than this is a maximum amount of tilting per event.

Dr. Rockwell has provided a detailed description of the terrace soils near the crest of the Mission Hills Anticline, at Station 315 in Trench T-3, where soil deposition is thickest across the explored area, as an attachment to this report. The approximate location of this soil description is indicated on both the Geologic Map Drawing No.2 as well as in the Trench T-3 Log, Drawing No. 5.

Assessment of Faulting - There is no evidence of active faulting in any of the trench exposures. A small fault in trench T1 offset a marker bed by 20-30 cm, but displacement died upward in the Pacoima Fm deposits, indicating that this fault slipped during growth of the fold

and is no longer active. Please see our Drawing No. 3 – Geologic Cross Section A and Trench T-1 Log, as well as Drawing No. 7 – T-1 Fault Detail, for a graphical depiction. This fault was observed in detail during our onsite meeting with regulatory agency reviewers on February 27, and was proved to be inactive since the small fault did not displace the upper Pleistocene Pacoima formation on the east trench wall.

Most of the trench exposed either Miocene Modelo Formation as the bedrock, Pleistocene Pacoima Formation (Qp), or Pleistocene older alluvium (Qoa), and other than the aforementioned small inactive fault, these observations argue that there is no evidence for faulting having occurred in the late Pleistocene or Holocene at the project site. **As there is evidence of continued folding, any high-rise structures should consider whether minor tilting (0.2 degrees or less) may affect the stability and functionality of the building.**

ENGINEERING-GEOLOGIC CONCLUSION

It is the conclusion of the undersigned Engineering Geologists that an active or potentially active strand of the Mission Hills or Santa Susana fault does not lie within the subject site in the explored areas.

South of the southern terminus of Trench 1, our Borings B-A and B-B have effectively extended the explored area south beyond the trench. In these borings, we encountered groundwater and bedrock at approximately the same elevations, which indicates that Mission Hills fault was not intercepted in either of the borings or the trenches. The location of the Mission Hills fault is likely toward the immediate south of the explored area, extending in a roughly east-west orientation under the northern part of the Bishop Alemany sports field. In the referenced 1985 Ziony and Yerkes paper, the orientation published for the Mission Hills fault is between N80E to E-W, with a north dip of 80 degrees. These orientations and dip correspond to other published sources for the Mission Hills fault.

In our Geologic Map, we have depicted this range of orientations of the Mission Hills fault just beyond the southernmost explored area of the site (Boring 2), north of which we indicate a 50’ no-build zone. The proposed skilled nursing facility will need to

be situated north of this zone in order to avoid any structural mitigation in the form of mat foundations. If any portion of the proposed skilled nursing facility is situated within this zone, the undersigned engineering geologists recommend that a thickened mat foundation of minimum 24" thickness be utilized for the proposed structures within this zone. We have indicated the area of the site on Drawing 2.

In the northern part of the site, our exploration extended well beyond the northern limit of the skilled nursing facility, and therefore no further exploration is required and no engineered mitigation is recommended for the proposed structures in this area. It should be noted that a fault rupture hazard study is not required for the proposed residential buildings on Parcel 3, as the site is not located in an Alquist Priolo fault zone.

This report is intended to present the results of our preliminary geologic characterization of the subsurface materials found across the site, as well as the results of our fault rupture hazard study. It should be noted that several future reports by AES will address other geologic hazards and mitigation measures, and provide detailed geotechnical recommendations for the proposed buildings, skilled nursing facility as well as future residential buildings. These reports will be issued when the proposed buildings and site grading concept are more clearly identified by the design professionals and property owners.

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The findings and recommendations presented in this geologic fault study report are based on the results of our site visit and field explorations combined with professional engineering-geologic experience and judgment. The report was prepared in accordance with generally accepted scientific and engineering principles and practice. We make no other warranty, either express or implied.

The following plates and appendices are attached and complete this report:

References
Drawing No. 1 – Area Geology Map
Drawing No. 2 - Geologic Map and Site Plan
Drawing No. 3- Geologic Cross Sections A – A', B-B' and C-C'
Drawing No. 4 - Trench Log T-1
Drawing No. 5 - Trench Log T-2
Drawing No. 6 - Trench Log T-3
Drawing No. 7 – T-1 Fault Detail

Figure No. 1 – Site Vicinity Map
Figure No. 2 – Regional Topographic Map – Navigate LA
Figure No. 3 – Regional Geologic Map (Dibblee)
Figure No. 4 – Geologic Map of the San Fernando Area, CDMG Bulletin 196
Figure No. 5 – Surface Effects Map of the San Fernando Earthquake Area, 1974
Figure No. 6– Earthquake Zones of Required Investigation, CGS 1999
Figure No. 7 – Historically Highest Groundwater Contour Map
Figure No. 8 – Preliminary Geologic Map of the LA Quadrangle, CGS 2014

Appendix I- Figure Nos. I-1 through I-20—Boring 1-18, Boring A, B Logs
Figure No. I-21
M/D Test Results from Samples taken in Fault Trenches
Table 1- Dr. Rockwell Soil Description, Mission Hills Anticline
Appendix II – Aerial Photographs of Site Vicinity, 1928-1930
Appendix III- Report of Geophysical Survey, Southwest Geophysics
February 26, 2018
Appendix IV- Selected Photographs of Site Taken During Study
Appendix V- Prior Reports by AES, Allen Seward, Hakimian and RSA (PDF Only)
Appendix VI- Trench Location Survey, Preliminary Conceptual Plans (PDF Only)

Respectfully Submitted,

APPLIED EARTH SCIENCES

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Distribution (4)

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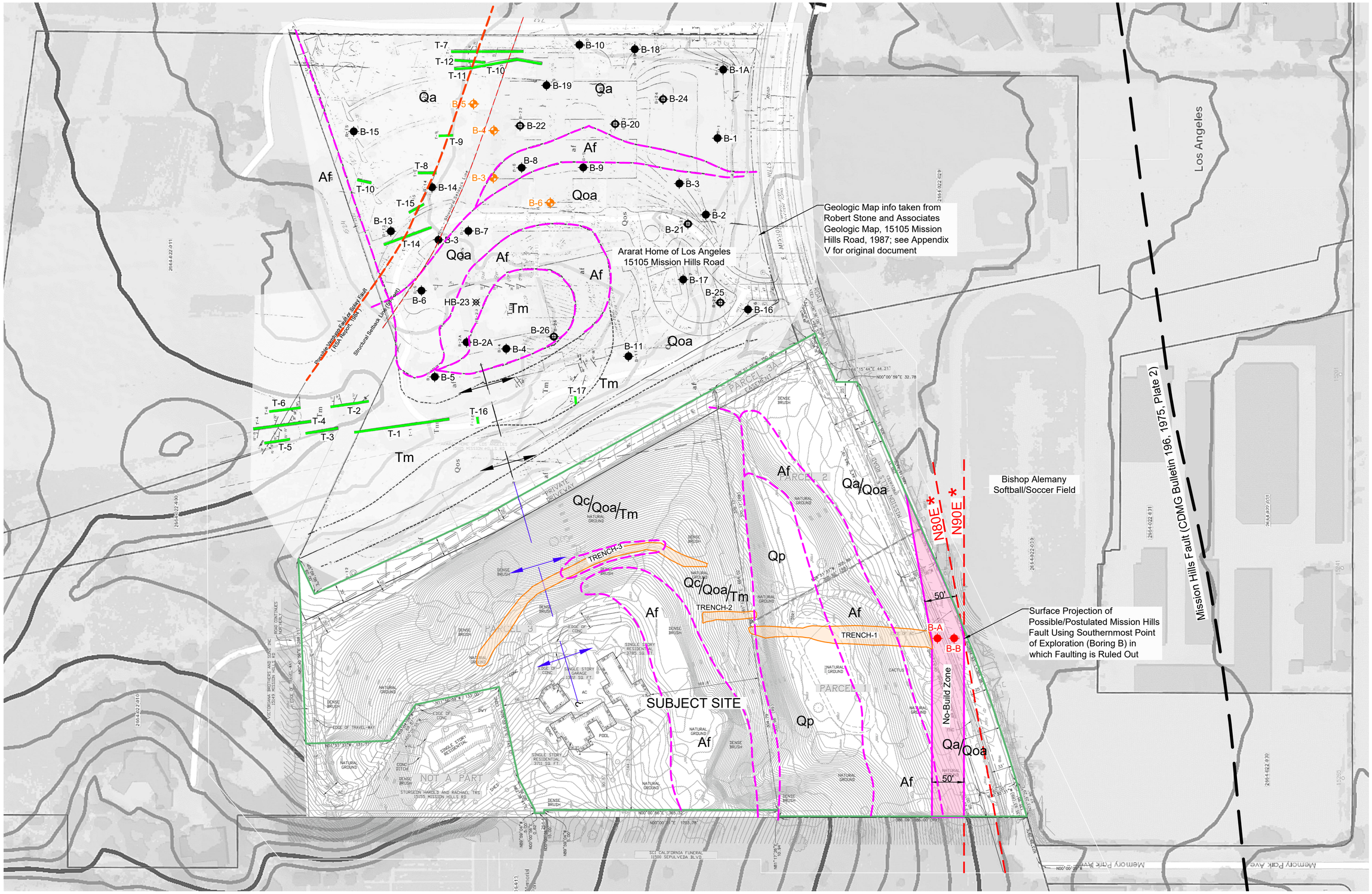
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LEGEND:

HOLOCENE
- Af = Artificial Fill
- Qa/Qc = Alluvium/ Colluvium

PLEISTOCENE
- Qoa = Older Terrace Alluvium
- Qp = Pacoima Formation Sand & Gravel

MIOCENE
- Rs = Residual Soil, Modelo Formation
- Tm = Sedimentary Bedrock, Modelo Formation

= Location of Mission Hills Anticline (AES)

= Location of Mission Hills Anticline (RSA Geologic Map, 1988)

B-4 = Location & Number of Boring (AES, 2009)

B-26 = Location of Boring (Hakimian & Associates, 1987)

B-2 = Location of Boring (Hakimian & Associates, 1983)

HB-23 = Location of Boring (Robert Stone & Associates, 1987)

B-A & B-B = Location & Number of Bucket Auger Borings (AES, 2018)

= Trenches Locations Based on Actual Field Condition & Kpff Survey (AES, 2018)

= Geological Contact Approximately Located

= Location of Trench (Robert Stone & Associates, 1988)

= Location of Mission Hills Fault (CDMG Bulletin 196, 1975, Plate 2)

* = Prevailing Fault Orientation for Mission Hills Fault Zone in Literature (N80E & N90E)

Note:
Area Geology Map prepared by using LA County GIS Map as a basemap.

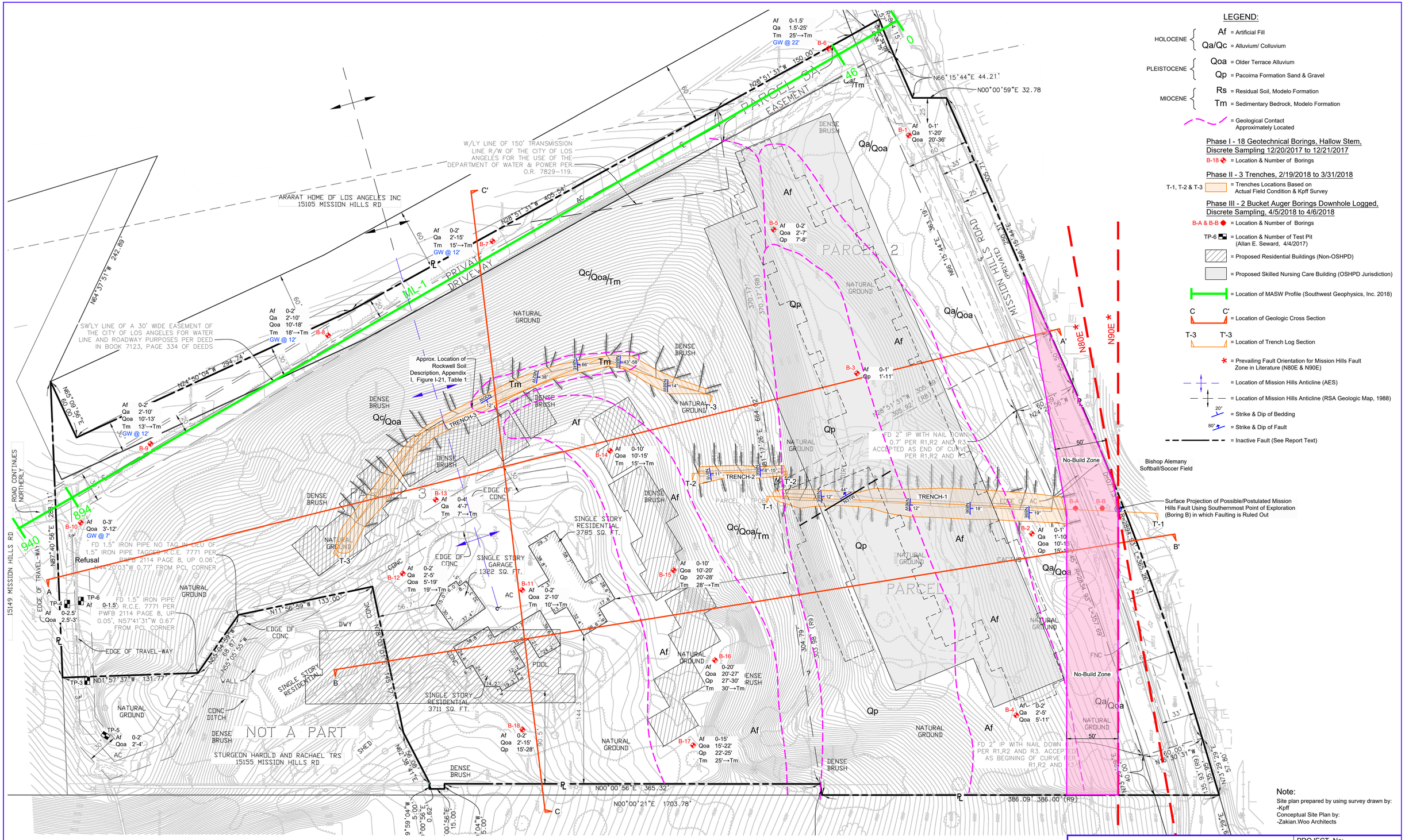
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Scale: 1" = 100'

AREA GEOLOGY MAP

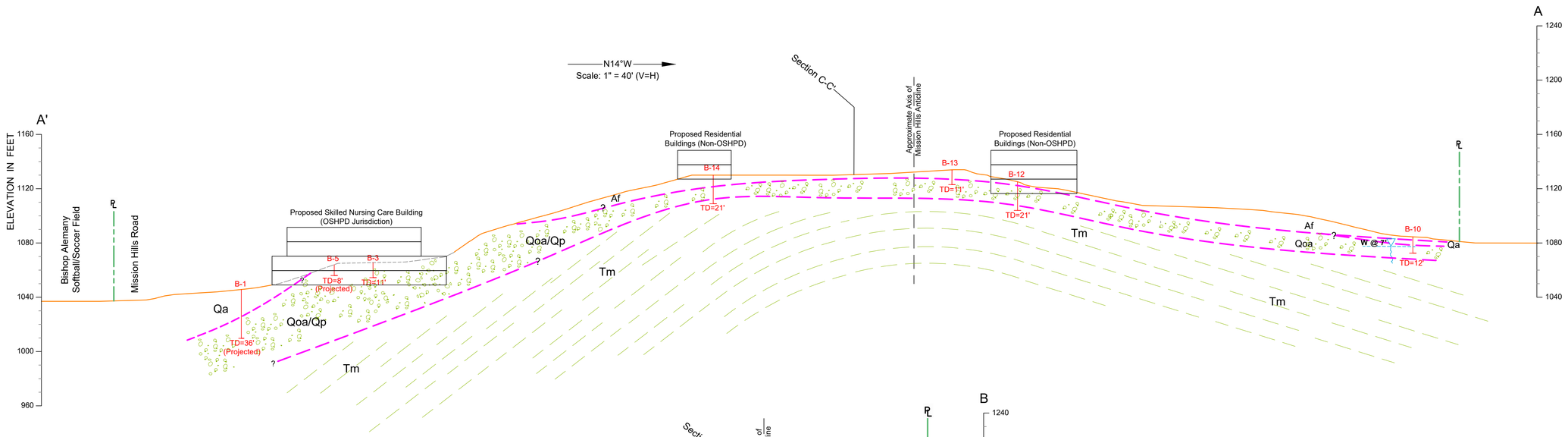
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		CHECKED BY:	SM
		DRAWING No:	1

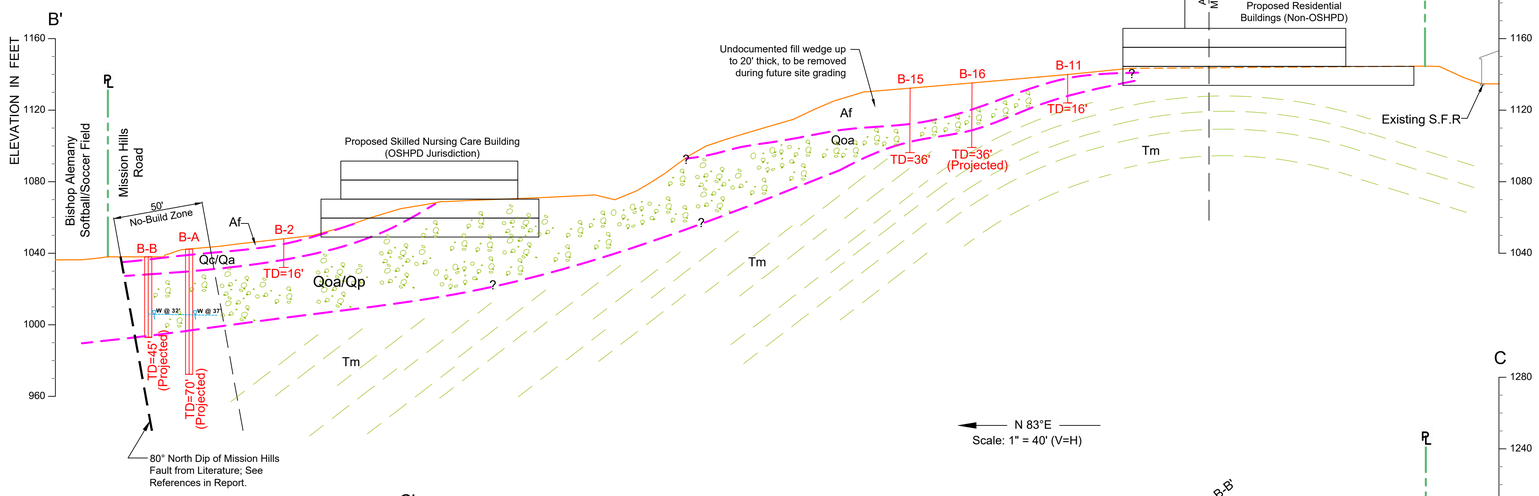
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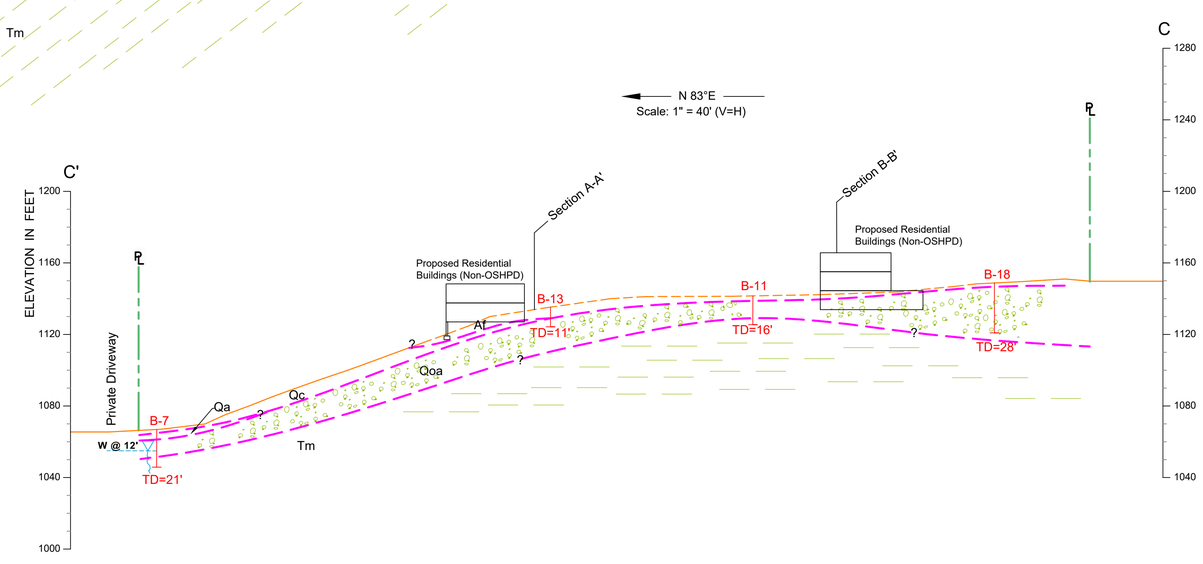


Note:
Site plan prepared by using survey drawn by:
-Kpff
Conceptual Site Plan by:
-Zakian.Woo Architects

GEOLOGIC MAP & SITE PLAN		PROJECT No:	17-641-26
DESCRIPTION:	Proposed Nursing Home Facility & Residential Building Project	DATE:	11 / 02 / 2018
FOR:	Ararat Home of Los Angeles	DRAWN BY:	VM
ADDRESS:	15151 Mission Hills Road, Los Angeles, CA 91345	CHECKED BY:	SM
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LEGEND:

- Af = Artificial Fill
- Qc = Colluvium
- Qa = Alluvium
- Qoa = Older Terrace Alluvium
- Qp = Pacoima Formation Sand & Gravel
- Tm = Sedimentary Bedrock
- = Geological Contact Approximately Located
- W @ 15' = Ground Water Depth
- B-18 / TD=10' (Projected) = Location & Number of Boring
- B-B / TD=10' (Projected) = Location & Number of Bucket Auger Boring

Note:

All proposed buildings presented in these drawings are schematically shown only, based on preliminary conceptual plans by Zakian Woo Architects. More details regarding site grading and proposed buildings will be presented in future Geotechnical reports by AES.

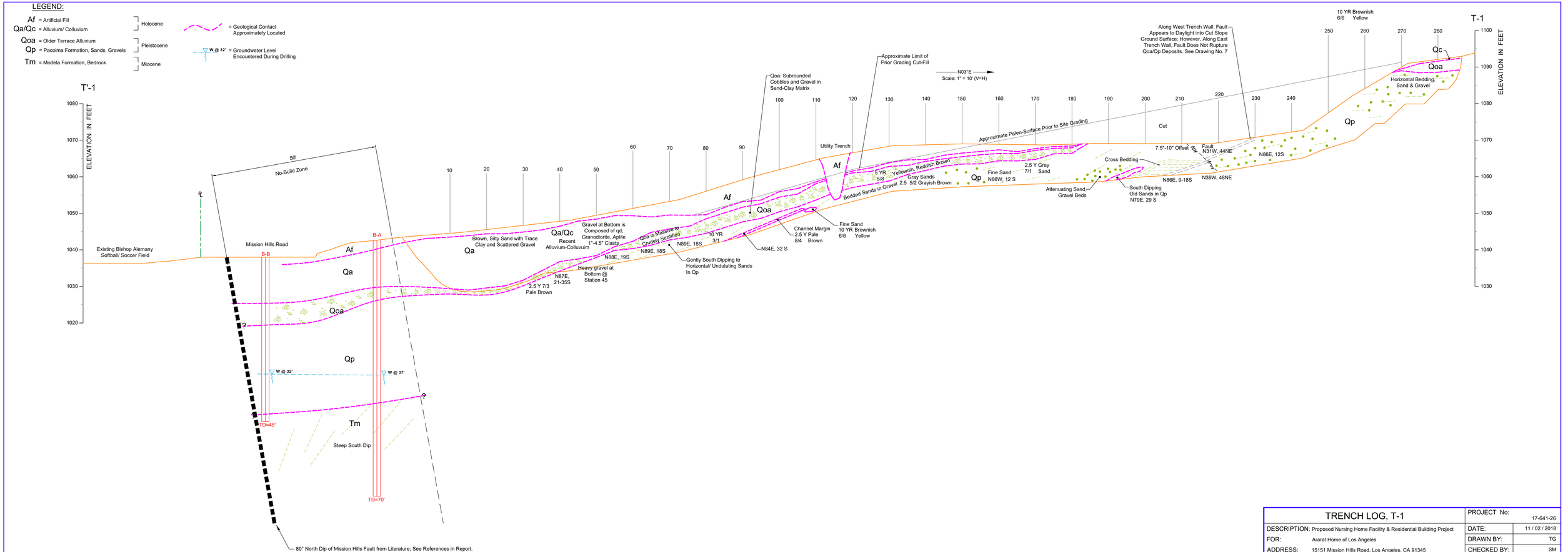
GEOLOGIC CROSS SECTIONS A-A', B-B' & C-C'

DESCRIPTION:	Proposed Nursing Home Facility & Residential Building Project	DATE:	11 / 02 / 2018
FOR:	Ararat Home of Los Angeles	DRAWN BY:	VM
ADDRESS:	15151 Mission Hills Road, Los Angeles, CA 91345	CHECKED BY:	SM

PROJECT No: 17-641-26

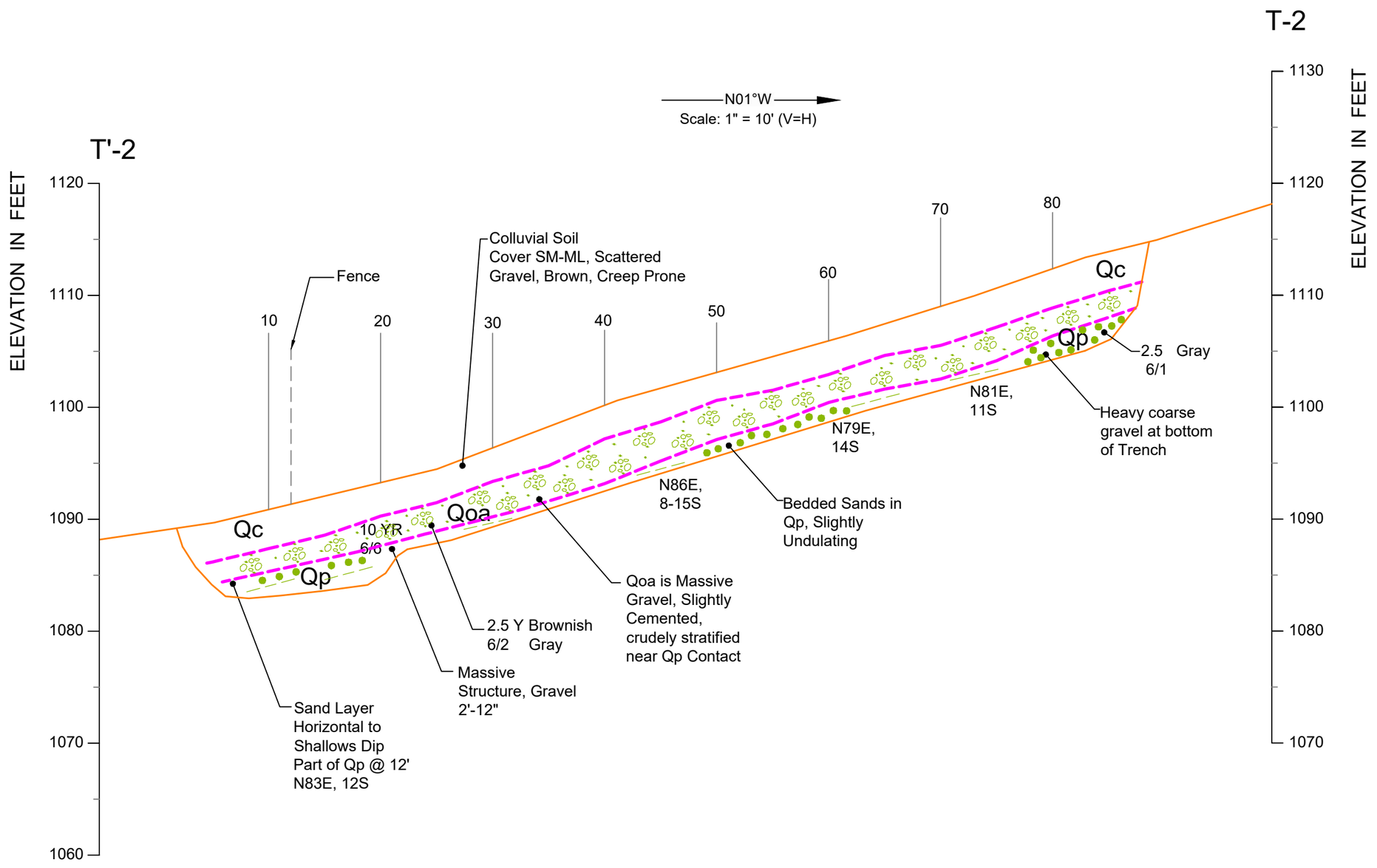
DRAWING No: 3

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TRENCH LOG, T-1		PROJECT No:	17-641-26
DESCRIPTION: Proposed Nursing Home Facility & Residential Building Project		DATE:	11 / 02 / 2018
FOR: Ararat Home of Los Angeles		DRAWN BY:	TG
ADDRESS: 15151 Mission Hills Road, Los Angeles, CA 91345		CHECKED BY:	SM
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LEGEND:

Qc = Colluvium

Qoa = Older Terrace Alluvium

Qp = Pacoima Formation, Sands, Gravel

= Geological Contact Approximately Located

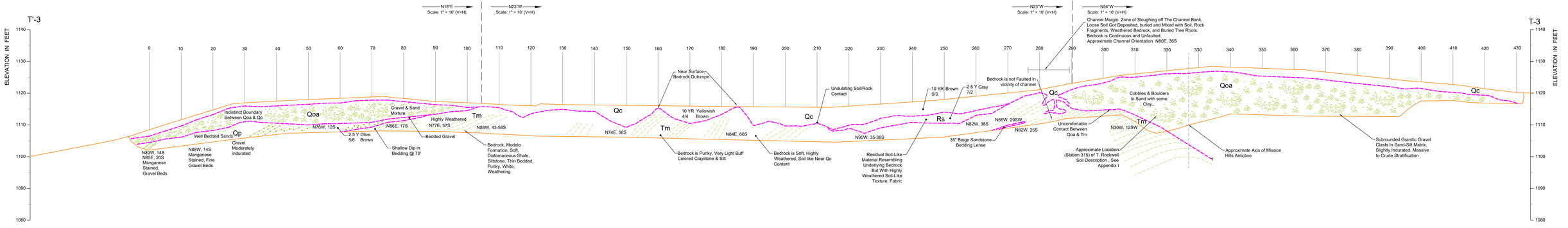
TRENCH LOG, T-2

DESCRIPTION:	Proposed Nursing Home Facility & Residential Building Project	DATE:	11 / 02 / 2018
FOR:	Ararat Home of Los Angeles	DRAWN BY:	TG
ADDRESS:	15151 Mission Hills Road, Los Angeles, CA 91345	CHECKED BY:	SM

PROJECT No: 17-641-26

DRAWING No: 5

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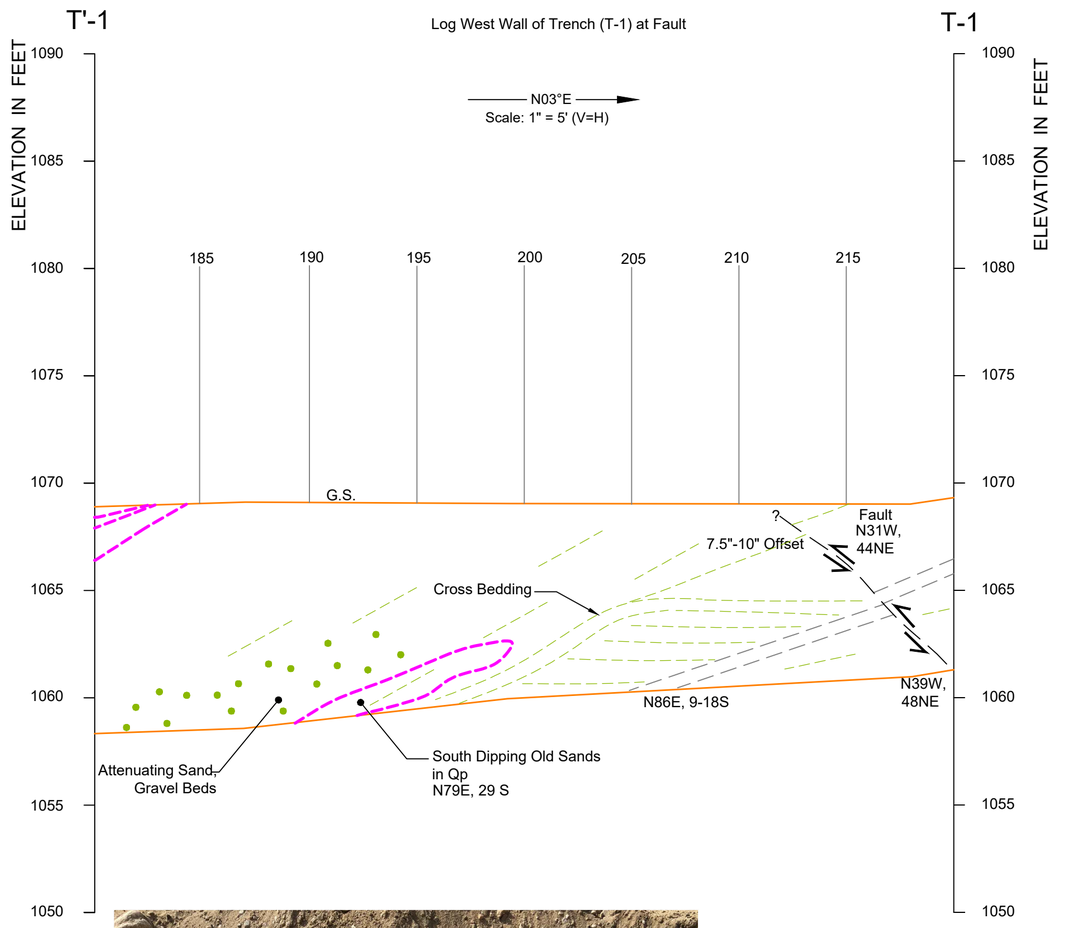


LEGEND:

- Qc = Colluvium
- Qoa = Older Terrace Alluvium
- Qp = Pacoima Formation, Sands, Gravel
- Rs = Residual Soil
- Tm = Sedimentary Bedrock

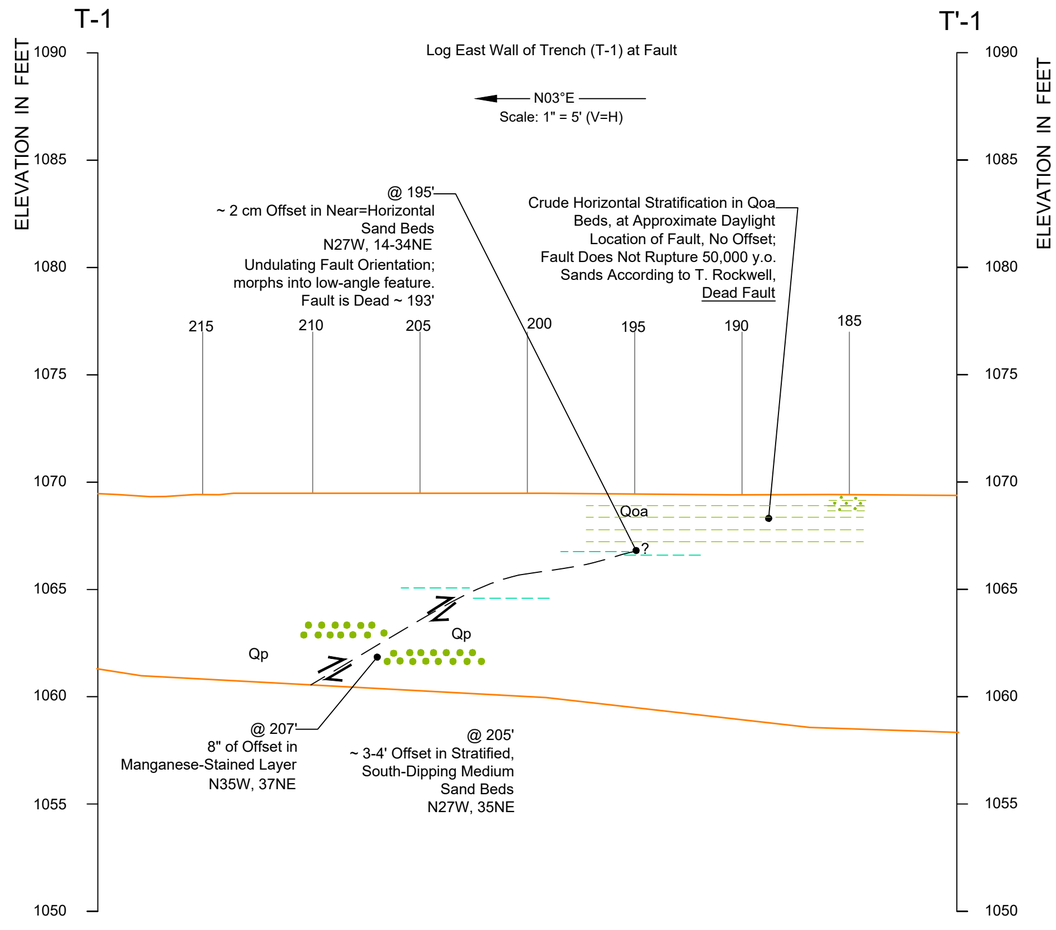
= Geological Contact Approximately Located

TRENCH LOG, T-3	PROJECT No:	17-641-26
DESCRIPTION: Proposed Nursing Home Facility & Residential Building Project	DATE:	11 / 02 / 2018
FOR: Ararat Home of Los Angeles	DRAWN BY:	TG
ADDRESS: 15151 Mission Hills Road, Los Angeles, CA 91345	CHECKED BY:	SM
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Fault on West Wall as Seen From Ground Surface,
Station ~213 Showing 7.5"-10" Offset; North is to the Right



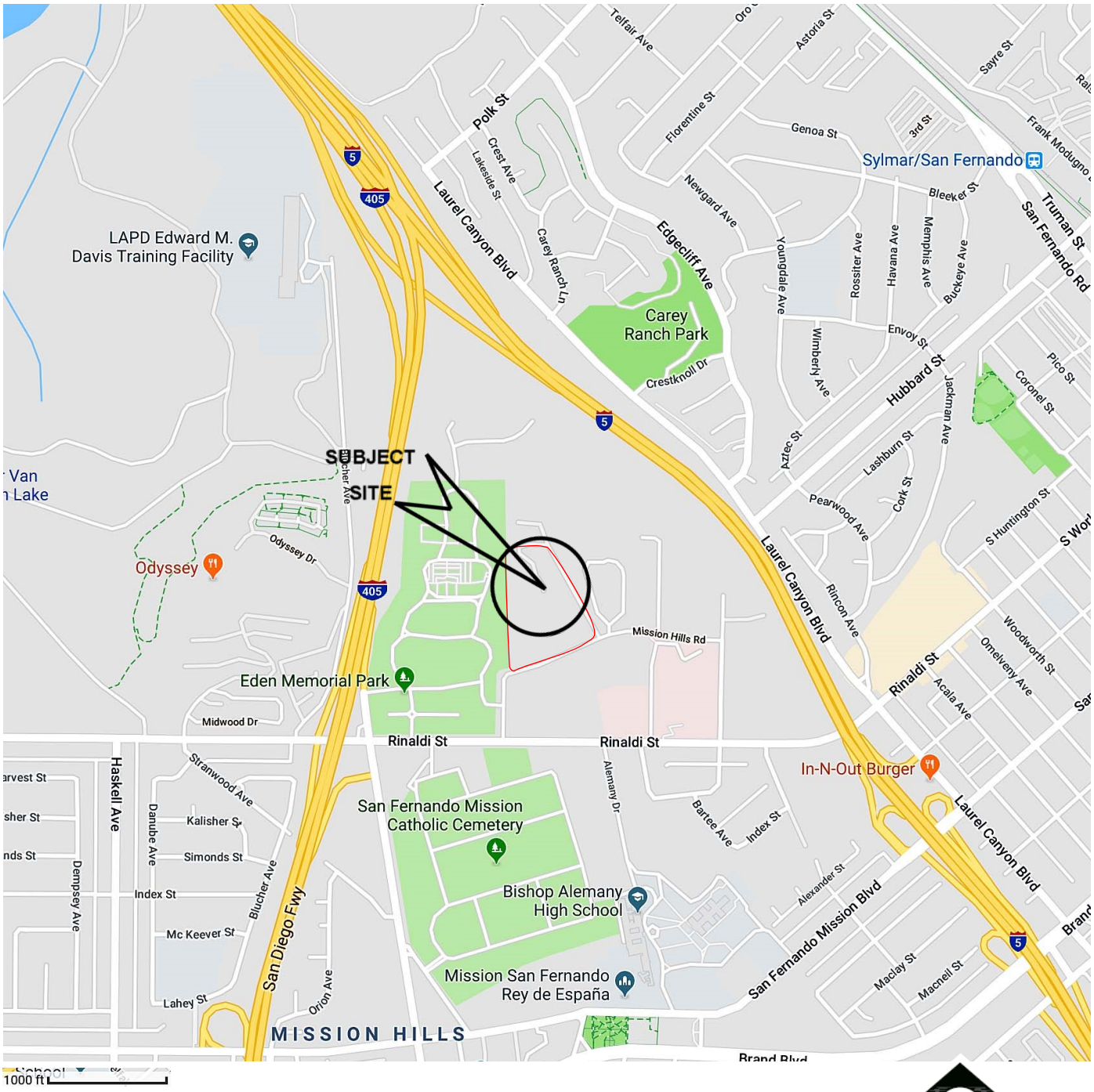


Fault Detail at Bottom of Trench East
Wall, Station 213 Showing 6" Offset



Fault Detail at Top of Trench, East Wall; Fault
Does Not Rupture Upper Qoa/Qp Deposits

T-1 FAULT DETAIL		PROJECT No: 17-641-26
DESCRIPTION: Proposed Nursing Home Facility & Residential Building Project		DATE: 11 / 02 / 2018
FOR: Ararat Home of Los Angeles		DRAWN BY: TG
ADDRESS: 15151 Mission Hills Road, Los Angeles, CA 91345		CHECKED BY: SM
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		DRAWING No: 7



Reference: Portion of Google Maps

SITE VICINITY MAP

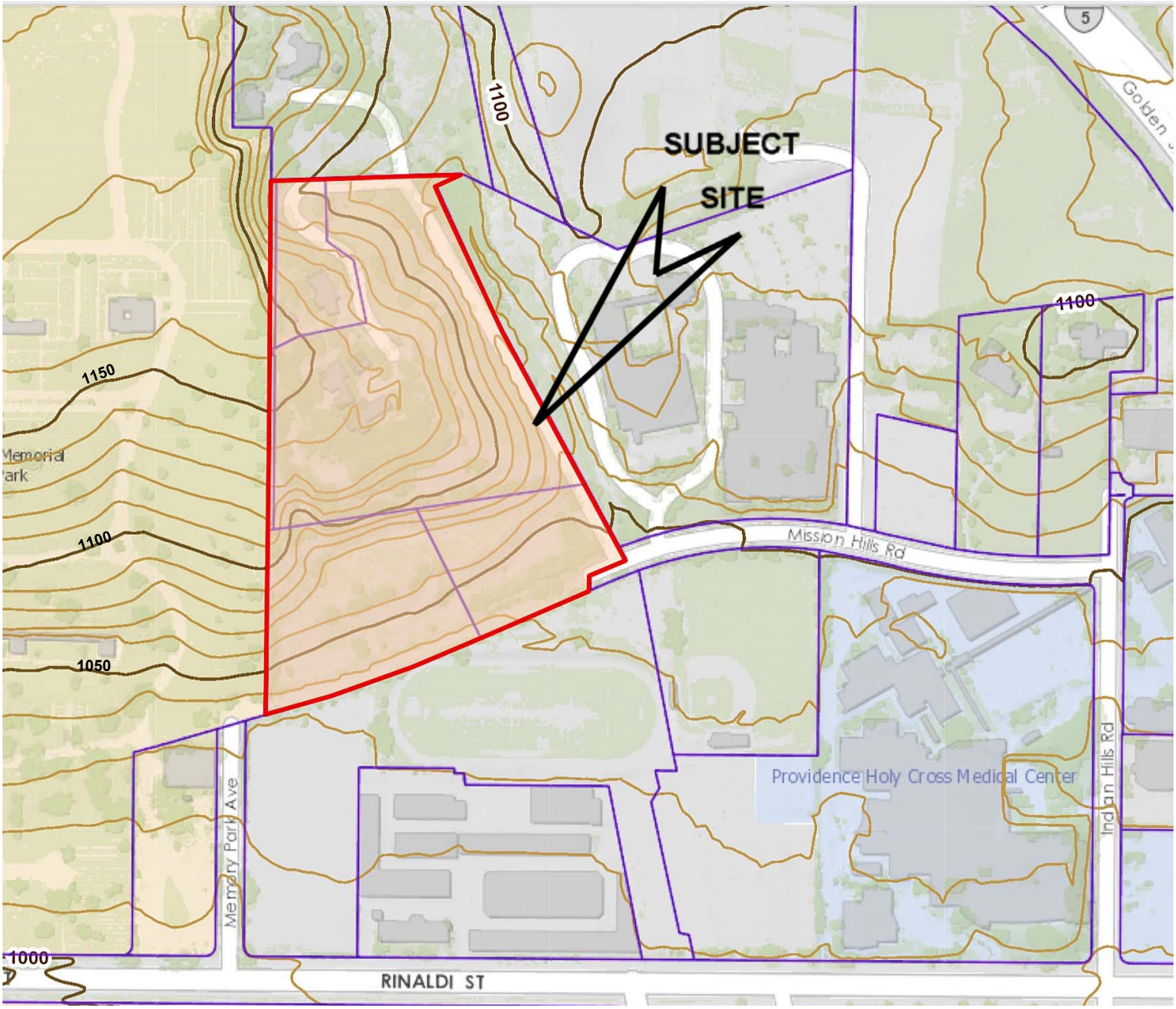
Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

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FIGURE No. 1



Reference: Los Angeles County GIS Map

REGIONAL TOPOGRAPHIC MAP

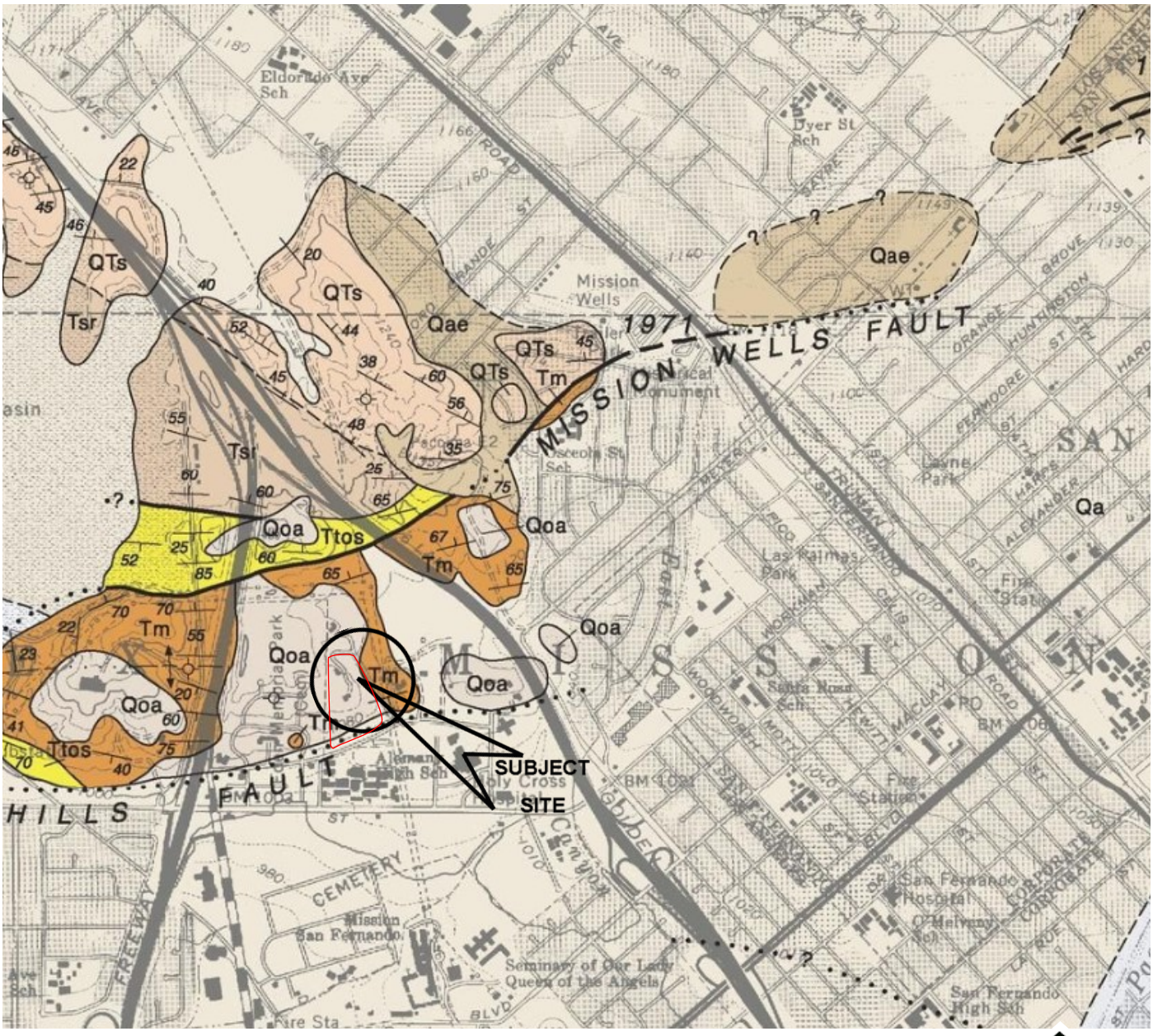
Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

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FIGURE No. 2



Reference: Dibblee Geologic Map of the San Fernando Quadrangle

REGIONAL GEOLOGIC MAP

Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

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FIGURE No. 3



Reference: San Fernando Earthquake Bulletin 196

GEOLOGIC MAP OF THE SAN FERNANDO AREA, CDMG BULLETIN 196

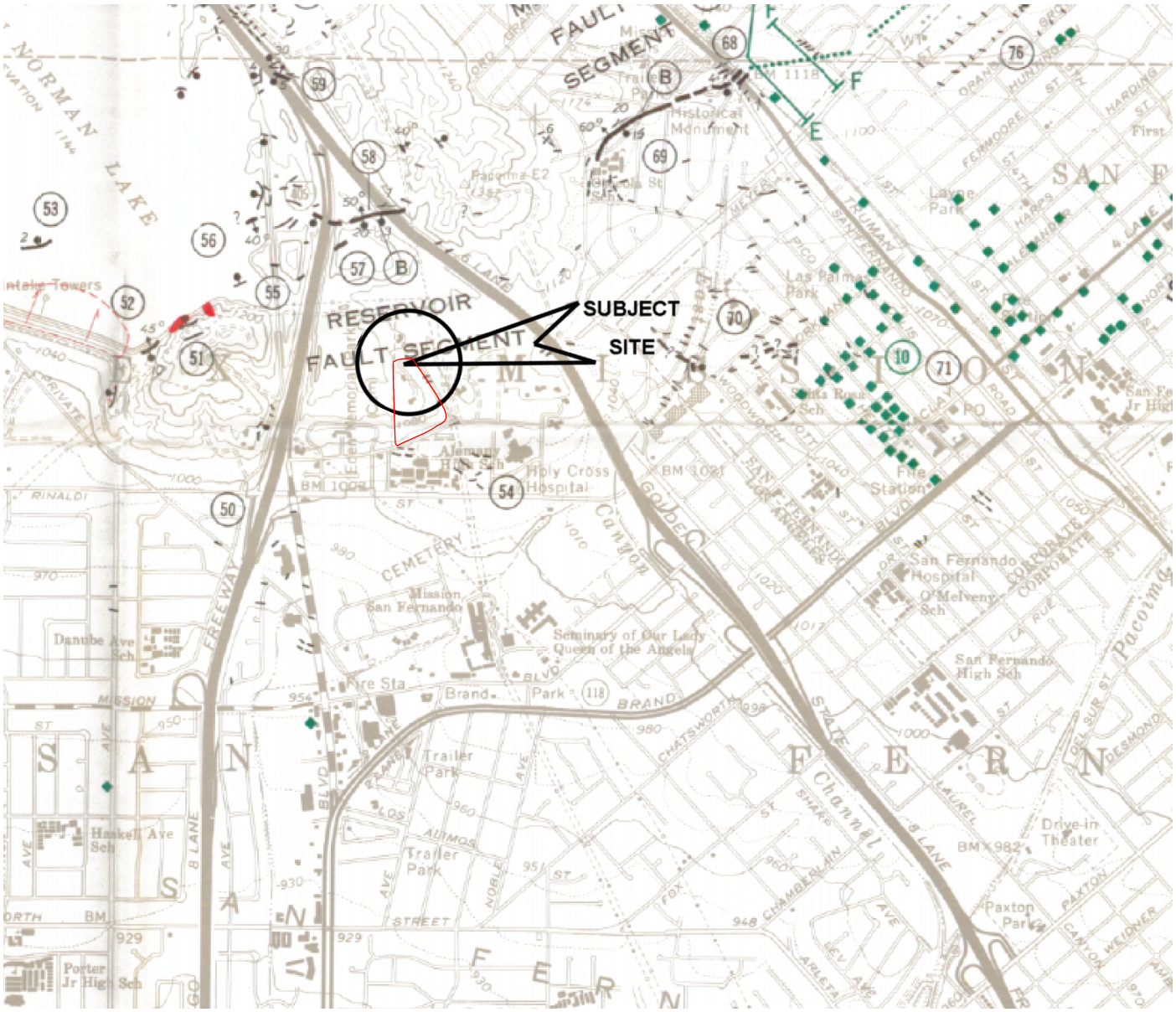
Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

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FIGURE No. 4



REFRENCE: SAN FERNANDO EARTHQUAKE AREA,1974

SURFACE EFFECTS MAP OF THE SAN FERNANDO EARTHQUAKE AREA,1974

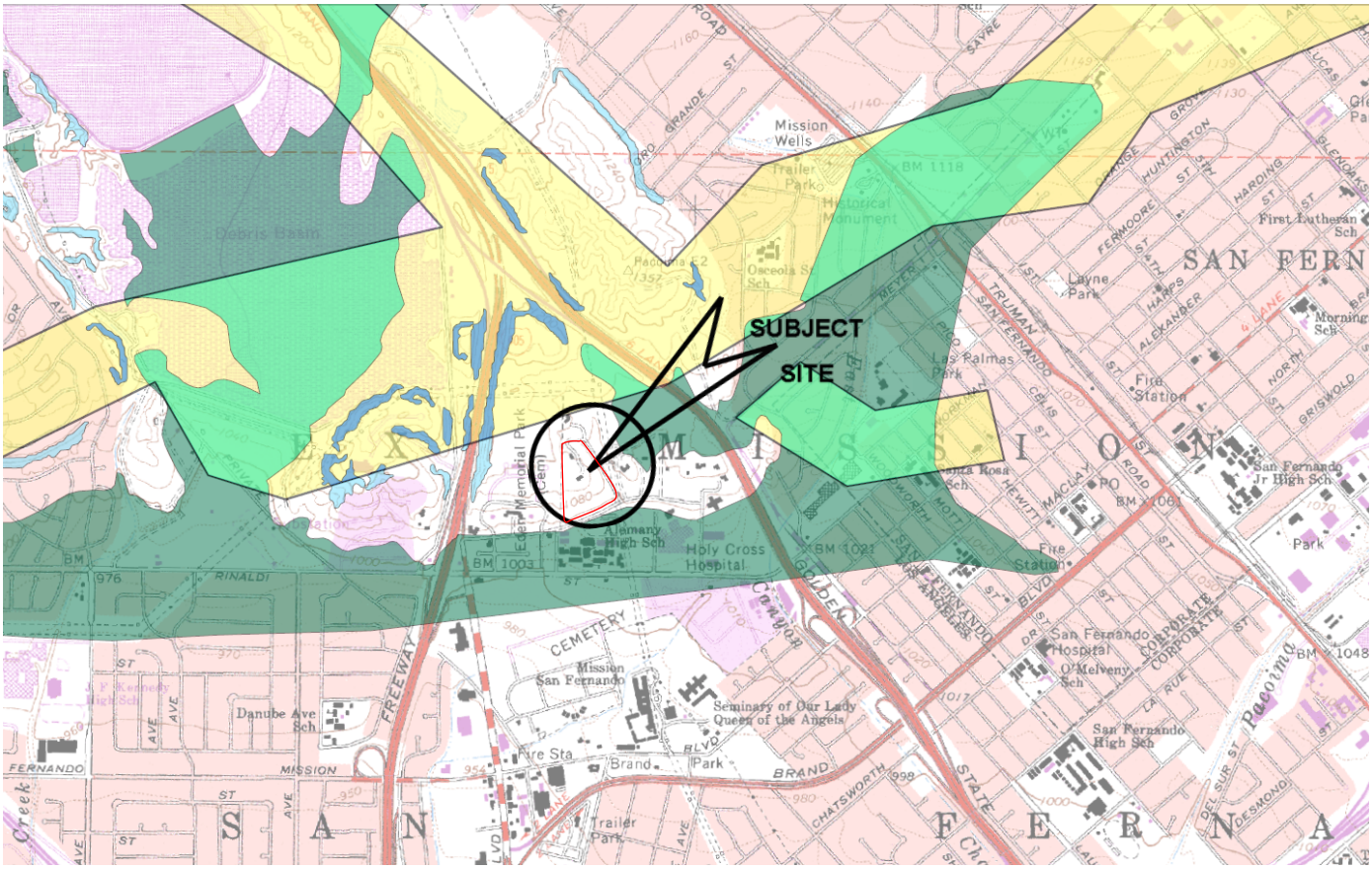
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FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

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FIGURE No. 5



Earthquake Fault Zones
Zone boundaries are delineated by straight-line segments; the boundaries define the zone encompassing active faults that constitute a potential hazard to structures from surface faulting or fault creep such that avoidance as described in Public Resources Code Section 2621.5(a) would be required.

Liquefaction Zones
Areas where historical occurrence of liquefaction, or local geological, geotechnical and ground water conditions indicate a potential for permanent ground displacements such that mitigation as defined in Public Resources Code Section 2693(c) would be required.

N

1 0.5 0 1 2 Miles

1,000 500 0 1,000 2,000 3,000 4,000 5,000 6,000 7,000 8,000 9,000 10,000 Feet

Reference: San Fernando 7.5 Minute Quadrangle

EARTHQUAKE ZONES OF REQUIRED INVESTIGATION, CGS 1999

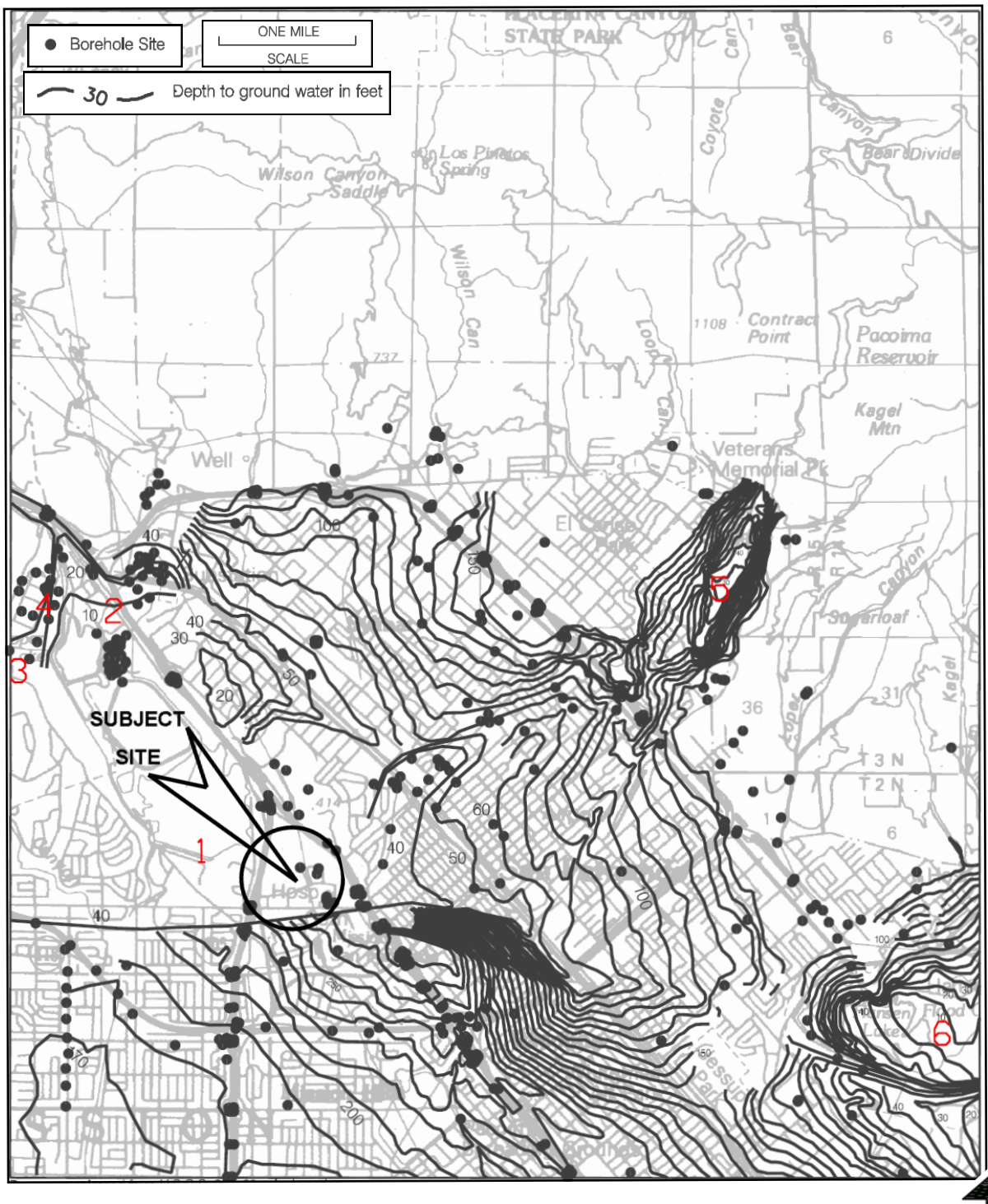
Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

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FIGURE No. 6



Reference: San Fernando 7.5 Minute Quadrangle

HISTORICALLY HIGHEST GROUNDWATER (Contour Map)

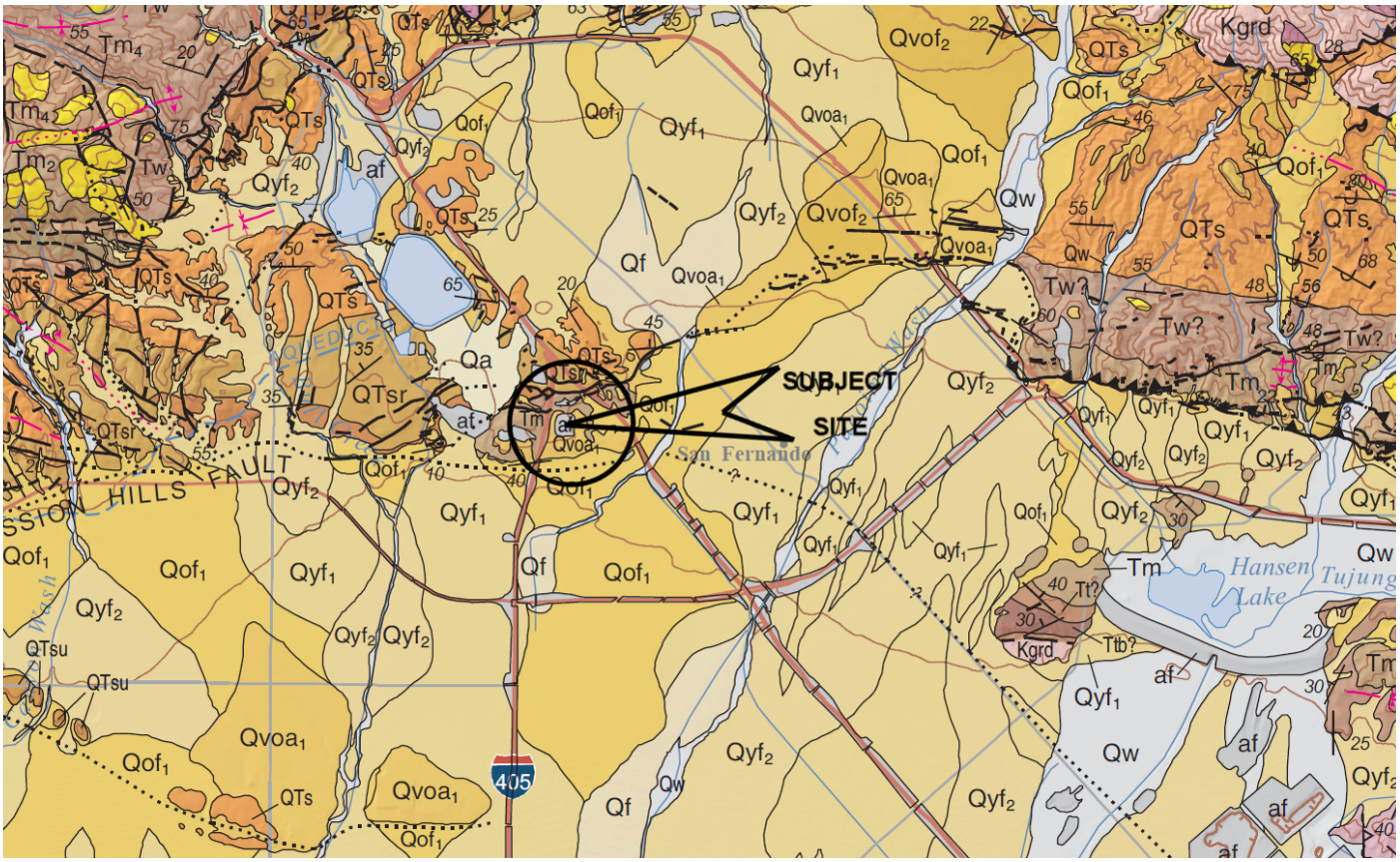
Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

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FIGURE No. 7



Reference: Preliminary Geologic Map Of The LA 30'x 60' Minute Quadrangle

PRELIMINARY GEOLOGIC MAP OF THE LA QUADRANGLE, CGS 2014

Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

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FIGURE No. 8

APPENDIX I

FIGURE NOS. I-1 THROUGH I-20—BORING 1-18, BORING A, B LOGS

FIGURE NO. I-21

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LOG OF BORING NO. 1

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200
0			(SM) FILL: Moderately compact, slightly moist, medium brown, fine grained sand, silty, little gravel.		22	7	111	62
			(Qa) Recent Alluvium:					
5			(ML) SILT: Stiff, slightly moist, medium brown, sandy silt with fine gravel.		41	7	106	58
			(ML) Grades to very stiff, fragments of rounded granite.					
10			(SM) SAND: Very dense, slightly moist, brown, silty fine grained sand with fine gravel.		45	5	115	46
			(SM) Grades to medium grained sand, more gravel.					
15			(ML) SILT: Very stiff, slightly moist, brown, sandy silt, gravelly.		58	9	105	60
			*Tough Drilling 20 min for 4'. Possible contact with Qoa					
20			(Qoa) Older Alluvium:		100/6"	3	94	30
			(SM) SAND: Very dense, slightly moist, light brown, silty, fine to medium grained sand, gravelly.					
25			(GM) GRAVEL: Old alluvial terrace, rounded cobbles in SP-SM matrix.		100/6"	6	109	16
30			(GM) Grades to crushed cobbles in SM matrix, moist, more silt, possibly Pacoima Formation (Qp).	50/3"		20	99	42
35			(GM) Grades to slightly moist, less silt.	50/5"		9	104	21
			End of Boring @ 36 Feet No Groundwater Encountered Hole Backfilled					

% -200 - △
% Moisture - ●
20 40 60 80

COMPLETION DEPTH: 36'
DATE: December 20, 2017

DEPTH TO WATER> INITIAL:
FINAL:

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LOG OF BORING NO. 2

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Moderately compacted, slightly moist, medium to light brown, fine grained sand with silt and little gravel.		34	5	115		
5			(Qa) Recent Alluvium: (SM) SAND: Dense, slightly moist, medium brown, silty fine grained sand with fine weathered granite fragments, slightly to medium consolidated. (SM) Grades to very dense, large granitic rock fragment.		45	7	129		
10			(Qoa) Older Alluvium: light yellowish brown, coarse sand & gravel, dense, damp, subrounded gravel clasts. *Very loud drilling, more vibrations.		100/11"	5	122		
15			(Qp) Possible Pacoima Formation: (SP-SM) Sand, Grades to less silt, fine gravel.		100/5"	9	96		
20			End of Boring @ 16 Feet No Groundwater Encountered Hole Backfilled						
25									
30									
35									

COMPLETION DEPTH: 16'
DATE: December 20, 2017

DEPTH TO WATER> INITIAL:
FINAL:

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LOG OF BORING NO. 3

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Loose to unconsolidated, slightly moist, brown, sand with gravel.		89	1	134		
			(Qp) Pacoima Formation: (SM/GM) SAND: Very dense, slightly moist, yellowish brown, fine to coarse grained gravelly sand, highly weathered granite.						
5					46	3	109		
			(SP/GP) Grades to fine to medium grained sand and gravel.						
10			(SP/GP) Grades to more gravel.		100/11"	5	117		
			End of Boring @ 11 Feet No Groundwater Encountered Hole Backfilled						
15									
20									
25									
30									
35									

COMPLETION DEPTH: 11'
DATE: December 20, 2017

DEPTH TO WATER> INITIAL:
FINAL:

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LOG OF BORING NO. 4

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Moderately compact, slightly moist, brown, silty sand.						
		■	(Qa) Recent Alluvium: (SM) SAND: Dense, slightly moist, yellowish brown, silty fine to medium grained sand, gravelly, weathered granitic fragments.		28	3	110		
5		■			26	3	111		
			(Qoa) Older Alluvium. (SM/GM) Grades to gravelly sand, fine grained gravel of weathered granite.						
10		■	(GM) GRAVEL: Very dense, slightly moist, brown to reddish brown, fine to medium grained sand matrix with fine to coarse weathered granite.		80	3	133		
15			End of Boring @ 11 Feet No Groundwater Encountered Hole Backfilled						
20									
25									
30									
35									

COMPLETION DEPTH: 11'
DATE: December 20, 2017

DEPTH TO WATER> INITIAL:
FINAL:

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LOG OF BORING NO. 5

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Loose, slightly moist, brown, sand with gravel.						
			(Qoa) Older Alluvium:		70	2	113		
5			(SM/GM) SAND: Very dense, slightly moist, yellowish brown, slightly silty, fine to coarse grained gravelly sand.		75	5	108		
			(SM/GM) Grades to more coarse weathered granite.		100/10"	3	119		
10			*(Qp) Possible Pacoima Formation: (SM/GM) Grades to more gravel,						
			End of Boring @ 8 Feet No Groundwater Encountered Hole Backfilled						
15									
20									
25									
30									
35									

COMPLETION DEPTH: 8'
DATE: December 20, 2017

DEPTH TO WATER> INITIAL:
FINAL:

Applied Earth Sciences

LOG OF BORING NO. 6

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Moderately compact, slightly moist, brown, silty sand.						
			(Qa) Recent Alluvium: (SM-ML) SAND: Dense, slightly moist, brown, silty fine grained sand with little gravel.		32	7	111		
5			(SM) Grades to less silt.		25	7	108		
10			(SM) Grades to moist, slightly clayey.		28	13	121		
15			(SM) Grades to wet, slightly clayey.		15	26	95		
20			(SM) Grades to very moist.		18	17	114		
25			(Tm) Modelo Formation: Sandstone with shale, silty, dense to very dense, moist, orange and gray layering, vertical bedding.		52	36	69		
30					80	30	95		
			End of Boring @ 31 Feet First Groundwater at 15' Groundwater stabalized at 22' after drilling Hole Backfilled						
35									

COMPLETION DEPTH: 31'
DATE: December 20, 2017

DEPTH TO WATER> INITIAL: 15'
FINAL: 22'

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LOG OF BORING NO. 7

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Slightly to moderately compact, slightly moist, brown, silty fine grained sand with little gravel, fragments of sandstone.		16	15	88		
5			(Qa) Recent Alluvium: (SM) SAND: Medium dense, moist, brown, silty fine grained sand, slightly gravelly. (ML) SILT: Stiff, moist, medium brown to brown, sandy silt.		23	23	90		
10			(SM) SAND: Medium dense, moist, brown, silty fine grained sand with some gravel. *Perched Groundwater Layer*		14	16	102		
15			(Tm) Modelo Formation: Sandstone, white weathered silty shale, thin bedding.		25	22	81		
20			(Tm) Grades to very dense.		92	30	82		
25			End of Boring @ 21 Feet Perched Groundwater @ 12 Feet Hole Backfilled						
30									
35									

COMPLETION DEPTH: 21'
DATE: December 20, 2017

DEPTH TO WATER> INITIAL: 12'
FINAL: 12'

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LOG OF BORING NO. 8

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Slightly to moderately compact, slightly moist, brown, silty fine grained sand with trace of fine gravel.		29	8	99		
5			(Qa/Qc) Mixture of Alluvium & Colluvium: (SM) SAND: Dense, slightly moist, brown, silty, fine grained sand, slightly gravelly. (SM) Grades to moist, very dense.		46	12	102		
10			(Qoa) Older Alluvium: (CL) CLAY: Stiff, slightly moist, brown, silty clay with fine sand and fine gravel.		16	11	108		
15			(CL) Grades to moist, gravelly clay, fragments of shale.		18	27	97		
20			(Tm) Modelo Formation: Sandstone, dense, moist, olive to dark brown, silty shale, thin bedded.		35	28	87		
25			(Tm) Grades to very hard.		100/10"	17	102		
30			End of Boring @ 26 Feet Perched Groundwater @ 12 Feet Hole Backfilled						
35									

COMPLETION DEPTH: 26'
DATE: December 20, 2017

DEPTH TO WATER> INITIAL: 12'
FINAL: 12'

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LOG OF BORING NO. 9

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Slightly to moderately compact, sligthly moist, brown, silty sand.						
			(Qa/Qc) Mixture of Alluvium & Colluvium *No Recovery*		6				
5			(SM/SC) SAND: Dense, moist, dark brown, gravelly, clayey sand.		22	14	116		
10			Grades to very dense, hard drilling, excessive vibrations.		100/11"	17	121		
			(Qoa) Older Alluvium: (GC-GM) GRAVEL: Clayey gravel with fine to medium sand matrix to gravelly clay. *Perched water at 12'						
15			(Tm) Modelo Formation: Siltstone, olive brown to dark olive brown, thin layered, clayey.		87	29	72		
20						17	82		
25			End of Boring @ 21 Feet Perched Groundwater @ 12 Feet Hole Backfilled						
30									
35									

COMPLETION DEPTH: 21'
DATE: December 20, 2017

DEPTH TO WATER> INITIAL: 12'
FINAL: 12'

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LOG OF BORING NO. 10

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Loose to slightly cmopact, moist, brown, silty sand with gravel.		12	19	110		
			(SM) Grades to slightly compact, silty sand with gravel.						
5			(Qoa) Older Alluvium: (SC/GC) CLAYEY SAND & GRAVEL: Very dense, moist, brown, silty ,granitic cobbles.		55	11	130		
10			(GM) No Sampling *too much time taken to advance boring *						
			Refusal @ 12 Feet Perched Groundwater @ 7 Feet Hole Backfilled						
15									
20									
25									
30									
35									

COMPLETION DEPTH: 12'
DATE: December 21, 2017

DEPTH TO WATER> INITIAL: 7'
FINAL: 7'

Applied Earth Sciences

LOG OF BORING NO. 11

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Loose to moderately compact, slightly moist, brown to light brown, silty sand, gravelly.		100/10"	4	125		
5			(Qoa) Older Alluvium: (GM) GRAVEL: Very dense, slightly moist, rusty to brown, weathered fragments of granite in sand matrix, densly consolidated. (GM) Grades to reddish brown.		100/10"	6	119		
10			(Tm) Modelo Formation: Silty shale, olive to grayish brown, thin bedded, clayey, Topanga formation.		47	57	59		
15			(Tm) Grades to light to tan gray, silicous, hard.		60	63	54		
20			End of Boring @ 16 Feet No Groundwater Encountered Hole Backfilled						
25									
30									
35									

COMPLETION DEPTH: 16'
DATE: December 21, 2017

DEPTH TO WATER> INITIAL:
FINAL:

Applied Earth Sciences

LOG OF BORING NO. 12

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Loose to densly compacted, slightly moist, brown, silty fine grained sand with gravel.		45	4	117		
5			(Qc) Colluvium: (SM) SAND: Dense, slightly moist, brown, silty, fine grained sand with fine gravel of granite.		100/7"	3	111		
10			(Qoa) Older Alluvium: (SM/GM) Grades to very dense, light brown to gray, gravelly sand, fragmented granite. (SM/GM) Similar as above.		100/6"	3	118		
20			(Tm) Modelo Formation: Silty shale, soft to hard, clayey, porcelanous, very thin bedded.		60	48	81		
25			End of Boring @ 21 Feet No Groundwater Encountered Hole Backfilled						
30									
35									

COMPLETION DEPTH: 21'
DATE: December 21, 2017

DEPTH TO WATER> INITIAL:
FINAL:

Applied Earth Sciences

LOG OF BORING NO. 13

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Loose to densely compacted, slightly moist, brown, silty fine grained sand with gravel.						
5		■	(Qc) Colluvium: (SM) SAND: Dense, slightly moist, brown, silty, fine grained sand with gravel, slightly to moderately consolidated.		47	4	112	●	
10		■	(TM) Modelo Formation: Silty, white weathering shale, thin bedded, soft to hard.		100/7"	19	64	●	
			End of Boring @ 11 Feet No Groundwater Encountered Hole Backfilled						
15									
20									
25									
30									
35									

COMPLETION DEPTH: 11'
DATE: December 21, 2017

DEPTH TO WATER> INITIAL:
FINAL:

Applied Earth Sciences

LOG OF BORING NO. 14

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Slightly to densly compacted, slightly moist, medium brown, silty, fine to coarse grained sand with fine gravel.		62	7	124		
			(SM) Grades to compact.						
5			(SM) Grades to more gravelly.						
10			(Qoa) Older Alluvium: (SM) SAND: Very dense, slightly moist, brown, silty, fine to coarse grained sand, gravelly.		100/9"	3	117		
15			(Tm) Modelo Formation: Silty, white weathering shale, soft to hard, slightly moist, fine grained, thin bedded.		70	26	93		
20			(TM) Grades to alternating gray and porcelain colored silty shale.		100/11"	32	98		
			End of Boring @ 21 Feet No Groundwater Encountered Hole Backfilled						
25									
30									
35									

COMPLETION DEPTH: 21'
DATE: December 21, 2017

DEPTH TO WATER> INITIAL:
FINAL:

Applied Earth Sciences

LOG OF BORING NO. 15

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Moderately compact, slightly moist, brown, silty sand.						
5		■	(SM) SAND: Medium dense, slightly moist, brown, silty, fine to coarse grained sand with fragments of shale and granite.		18	11	98		
10		■	(Qoa) Older Alluvium: (SM) SAND: dense, gravelly, slightly moist.		45	6	118		
15									
20		■	(Qp) Possible Pacoima Formation: (SM/ GM) Grades to very dense, more gravel.		100/11"	2	128		
25		■	(SM) Grades to light brown, silty fine grained sand with fine grained gravel, slightly consolidated.		100/7"	4	115		
30		■	(Tm) Modelo Formation: Hard, white weathering silty shale, thin bedded.		100/10"	21	86		
35		■			100/11"	40	68		
			End of Boring @ 36 Feet No Groundwater Encountered Hole Backfilled						

COMPLETION DEPTH: 36'
DATE: December 21, 2017

DEPTH TO WATER> INITIAL:
FINAL:

Applied Earth Sciences

LOG OF BORING NO. 16

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Moderately compacted to compacted, slightly moist, brown, silty fine grained sand with gravel and little clay.		85	7	125		
5			(SM) Grades to densly consolidated, some red fragments. (SM) Grades to less gravel.						
10			(SM) SAND: Medium dense, slightly moist, silty fine grained sand, weathered fine gravel, uniform.		20	6	87		
15									
20			(Qoa) Older Alluvium: (GM) GRAVEL: Medium dense, slightly moist, brown, highly weathered granitic cobbles and boulders in silty sand matrix.		28	1	111		
25									
			(Qp) Possible Pacoima Formation Hard drilling, excessive vibrations.						
30			(Tm) Modelo Formation: Silty white weathered shale composed of silt and clay stone with olive brown to gray coloring.		70	16	93		
					52	45	77		
35			End of Boring @ 36 Feet No Groundwater Encountered Hole Backfilled						

COMPLETION DEPTH: 35'
DATE: December 21, 2017

DEPTH TO WATER> INITIAL:
FINAL:

Applied Earth Sciences

LOG OF BORING NO. 17

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Loose to moderately compact, slightly moist, brown, gravelly, silty fine grained sand.						
5		■	(SM) SAND: Medium dense, slightly moist, brown, silty sand.		20	5	109	●	
			(SM) Grades to slightly clayey.						
10			(SM) Grades to more weathered fragments of granite.						
15		■	(Qoa) Older Alluvium: (GM) GRAVEL: Very dense, slightly moist, gray, fine weathered gravel in sand matrix.		61	6	131	●	
20									
			(Qp) Possible Pacoima Formation Very Hard Drilling						
25			(Tm) Modelo Formation: Clayey siltstone, light brown to tan, moist to very moist.						
		■	(Tm) Grades to moist, siltstone.		50	67	62	●	
30			End of Boring @ 29 Feet No Groundwater Encountered Hole Backfilled						
35									

COMPLETION DEPTH: 29'
DATE: December 21, 2017

DEPTH TO WATER> INITIAL:
FINAL:

Applied Earth Sciences

LOG OF BORING NO. 18

17-641-22 & 26
15151 Mission Hills Blvd, Los Angeles, CA 91345

Type: Hollow Stem Auger with 140lb Hammer Logged by: Ted
Location: *See Site Plan*

DEPTH, FT	SYMBOL	SAMPLES	DESCRIPTION OF MATERIAL	SPT BLOWS/FT	BLOWS PER FT	% Moisture	UNIT DRY WT LB/CU FT	% -200 - △ % Moisture - ● 20 40 60 80	% -200
0			(SM) FILL: Loose to moderately compact, slightly moist, brown, silty fine grained sand with gravel.		100/7"	5	132		
5			(Qoa) Older Alluvium: (SM) SAND: Very dense, slightly moist, brown, silty fine grained sand with gravel.						
10			(SM) Grades to slightly moist to moist, light brown to brown, silty, fine grained sand with gravel, fragments of rock.		80	10	98		
15			(Qp) Pacoima Formation: (SC/GC) Grades to moist, brown, clayey, gravelly sand, slightly to moderately compacted.		100/6"	13	104		
20			(GM) GRAVEL: Very dense, moist, brown, sandy gravel.						
25			(GM) Very hard to drill, water added to hole.						
30			Refusal @ 28 Feet No Groundwater Encountered Hole Backfilled						
35									

COMPLETION DEPTH: 28'
DATE: December 21, 2017

DEPTH TO WATER> INITIAL:
FINAL:

BORING No. A

DATE EXCAVATED: 4/5/2018 **LOGGED BY: Shant Minas, EG**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	ATTITUDE	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					Fill		**Earth cover, disturbed surficial soils (SM-ML)**
					SM-ML		@ 0-2.5' fill, disturbed surficial soils, sandy silt to silty sand
					(Qa)		@3' natural **recent alluvium (Qa),**
					Alluvium		
5	118	4		1	(SM)		sand (SM), medium brown, medium dense to dense, silty medium sand, rootlets
10	121	4		3	(SM)		@10' continued silty medium sand, increased white speckled fine gravel, medium dense to dense, damp to slightly moist, medium to yellowish brown
					(GP)		@12.5' change to **Older Alluvium (Qoa/Qog)**: gravel and gravelly coarse sand. Orange to yellow brown, granitic cobble clasts in sand matrix, no discernable orientation, unstratified/massive, dense
					(Qoa)		
15	114	3		4	(Qp)		**@15.5' Pacoima formation (Qp**), bedded sands and gravels, subrounded cobbles in a fine to medium sand matrix, bedding taken in Bedded sands
			N86W	(10")	GP		
			22S		SP		
			N84E				@20' continued gravel, more cobbly, slightly caving prone
			32S		GP		Bedding attitudes taken @19' in gravel and @20' in sand
20	127	3	N88W	4	SP		@21' loose cobbles, caving prone, downhole logged to 21' (cannot downhole log further; workman hazard. Remainder of log is surface log)
			21S	(6")			
					GP		Some difficulty drilling, heavy cobbles and boulders in sand matrix , some broken teeth in bucket need replacing.
25	NS				SP-GP		@25' no sample recovery, core through boulders
					GP		Moderately cemented below 25'
							Slower drilling, heavy gravel and cobbles
30	129	5		14	GP-GM		Very dense, mixed brown to light grey color, slightly more moist, more silty

LOG OF BORING

JOB NAME: 15151 Mission Hills Road, LA, CA JOB No. 17-641-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-19.1

BORING No. A (continued)

DATE EXCAVATED: 4/5/2018 **LOGGED BY: Shant Minas, EG**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	ATTITUDE	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					Qp		**Continued from previous page** Continued Pacoima formation bedded gravel and sand
35	128	10		15	GW		Very moist to saturated sample, well-rounded coarse sand and gravel of the Pacoima formation Perched Groundwater @36'
40	NS			8	GM-SM		Wet gravel-sand mixture, sample lost during recovery. Large Boulders impeding downward drilling progress. Gravel and cobbles in sand-silt mixture, stiff, dense, wet, dark grey. Cuttings are all wet
					GC-CL Rs?		@43.5' clayey gravel to gravelly clay, appears to be residual soil of underlying bedrock, some remnant bedrock structure. wet
45	89	31	75d		Tm		@44.5' **Bedrock** of the Monterey/Modelo formation, Highly weathered near Pacoima formation contact
50	88	34		14	Tm		Modelo formation. laminated to thin-bedded siltstone, dark grey to black with light grey laminations, orange brown, wet, steep 75 degree dip in sample
55	84	30		15			Continued bedrock, thin-bedded to laminated, siltstone and shale, wet, dark grey
60	77	41	70d	15	Tm		70-75 dips seen in laminated shale samples, dark grey with light grey bands

LOG OF BORING

JOB NAME: 15151 Mission Hills Drive, LA, CA JOB No. 17-641-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-19.2

BORING No. A (continued-2)

DATE EXCAVATED: 4/5/2018 **LOGGED BY: Shant Minas, EG**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	ATTITUDE	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					Tm		**Continued from previous page** Continued Modelo formation siltstone and shale
65	91	30	68d	15			Slightly to moderately weathered, wet, dark grey, siltstone and shale and mudstone, thin bdd to laminated, 68-74 degree dip Well-indurated, slightly weathered
70	87	31	69d	15			69 degree dip seen in sample shoe from 70'.
							End of Boring @ 70' Groundwater initially encountered @ 36' depth Downhole Logged to 21'; unable to advance due to caving around 21-22'
45							
50							
55							
60							

LOG OF BORING

JOB NAME: 15151 Mission Hills Drive, LA, CA JOB No. 17-641-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-19.3

BORING No. B

DATE EXCAVATED: 4/6/2018 **LOGGED BY: Shant Minas, EG**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	ATTITUDE	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					Fill (Af)		**4" asphalt cover, disturbed surficial soils (SM)** @ 0-1.5' fill, disturbed surficial soils, sandy silt to silty sand
					(Qa-Qc) Alluv.		@2' natural **recent alluvium and colluvium mixture (Qa-Qc),**
5	NS				(SM)		Medium grained, silty sand, medium brown, scattered fine gravel, colluvial and alluvial mixture, recent deposits.
10	101	7		1	(SM)		Sand, slightly dense, slightly porous, silty, medium grained, medium brown w speckled white gravel
					SM-GM Qoa		@11' grades to yellowish brown to orange brown, sand gravel mixture, slightly silty
					SP		@13.5' change to **Older Alluvium,** fine poorly graded sand, slightly caving prone, faintly stratified with shallow south dip
15	100	5	N82W 6S	3	SM-GM		Medium dense, slightly moist, light grey, yellow brown, mostly sand, silty with scattered subrounded gravel, massive, brown
20	117	3	N79W 20S	8	Qp GP-SP		@20' **Pacoima formation (Qp)** coarse gravel, crude stratification, shallow to moderate south dip, bedding in gravel-cobble lens
					GP		@23'-24' well bedded gravels and sands, clean, consistent around hole.
25	114	6	N79E 21S N84E 28S	15	SP GP		Very moist at 25.5' Red Modelo Fmn. Clasts @ 27' Nearly wet @28'
30	126	12	N90E 18S	14	SP		**Perched groundwater @29.5'**, downhole logged to 29' Well bedded medium sand, Pacoima formation

LOG OF BORING

JOB NAME: 15151 Mission Hills Road, LA, CA JOB No. 17-641-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-20.1

BORING No. B (continued)

DATE EXCAVATED: 4/6/2018 **LOGGED BY: Shant Minas, EG**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	ATTITUDE	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					Qp		**Continued from previous page** Continued Pacoima formation bedded gravel and sand
35	128	11		18	SP-SM		Wet, dense to very dense, mixed grey, orange to brown,
					GM-GP		Wet gravels and sand beds
					SM-GM		
40	NS						Unable to sample @ 40' due to abundance of cobbles, caving, wet conditions
	112	12			Qp		Sample @ 44' is at bottom of Qp unit.
45	61	63			Tm		@44.5' **change to Modelo formation shale**, grey to olive brown, wet, clayey, laminated, steep dip seen in sample shoe.
							End of Boring @ 45'. First Groundwater encountered @29.5', stabilized to 32' after drilling completed. Caving in sandy sections, caved to 40' after drilling.
50							NS- No sample recovered
55							
60							

LOG OF BORING

JOB NAME: 15151 Mission Hills Drive, LA, CA JOB No. 17-641-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-20.2

MISSION HILLS FAULT STUDY, AES PROJECT NO. 17-641-22

SAMPLES TAKEN FROM FAULT TRENCHES FOR SOILS ENGINEERING PURPOSES

STATION	DEPTH	DENSITY	MOISTURE	USCS	GEOLOGIC UNIT	FIELD ID
TRENCH 1						
28	6.5	125	8	SM-GM	Qa	T1-1
32	15	115	7	GM-SM	Qoa	T1-1
140	6	115	7	SP-SM	Qoa	T1-2
140	12	114	10	SP	Qp	T1-2
140	15	116	10	SP	Qp	T1-2
245	8	120	4	GP	Qp	T1-3
280	2	121	6	GM	Qoa	T1-3
TRENCH 2						
40	2	114	14	SM-GM	Qc	T2-4
40	5	124	9	GP-GM	Qoa	T2-4
40	8	112	11	SM-GM	Qp	T2-4
TRENCH 3						
40	4	118	9	SP-GP	Qoa	T3-5
45	10	119	7	GP	Qp	T3-5
57	1	119	14	SM-GM	Qc	T3-5
135	1.5	92	9	SM-ML	Qc	T3-6
135	5	46	62		Tm	T3-6
135	10	47	49		Tm	T3-6
325	4	130	5	GM-GP	Qoa	T3-7
315	18	60	42		Tm	T3-7
317	20	66	49		Tm	T3-7
390	10	122	12	GM-SM	Qoa	T3-8

M/D Test Results from Samples taken in Fault Trenches

FOR: 15151 Mission Hills Road	DATE: 10//25/18	**PROJECT NO.:** 18-327-22
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS		**Figure No. I-21**

Table 1- Dr. Rockwell Soil Description, Mission Hills Anticline

Table 1. Soil Description, Mission Hills anticline terrace soil

Horizon	Depth (cm)	Description
A	0-37	10YR3/3m, 4.5/3d; slightly gravelly Loam texture; moderate, coarse subangular blocky structure; soft to slightly hard dry consistence, slightly sticky and slightly plastic wet consistence; no clay films observed; abrupt, irregular boundary to:
Bt1	37-80	7.5-10YR4/4m, 7.5YR4/6d; very gravelly Sandy Clay Loam texture; strong, coarse angular block structure; extremely hard dry consistence, very sticky and plastic wet consistence; continuous thick clay films on ped faces and within pores, many moderately thick to thick clay films bridging grains (clay film colors range from 7.5YR 4/3 to 5/6m); clear, wavy boundary to:
Bt2	80-160	7.5-10YR4/4m, 4/6d; very gravelly Sandy Loam texture; weak to moderately developed coarse subangular blocky structure; slightly hard dry consistence, slightly sticky and non-plastic wet consistence; continuous, thick clay films lining pores, many thin to thick clay films bridging grains, few thick clay films on ped faces (clay film colors 7.5YR4/4 & 4/6m, 10YR 4/4m), boundary in bench:
Bench	160-230	Bt2 material exposed in the bench, so the Bt2 is inferred to extend to about 230 cm depth.
BC	230-280+	10YR4/6m, 5/6d; very gravelly Loamy Sand texture; massive breaking to weak, coarse subangular blocky structure; soft dry consistence, non-sticky and non-plastic wet consistence; common thin clay films bridging grains in lams, few thin to moderately thick clay films on clast-matric interfaces; boundary in bench;
Bench	280-335	BC in lower bench; gradual, irregular boundary to:
Cox	335-500+	10YR5/3m, 5/4d; very gravelly Sand texture; massive breaking to weak, medium subangular blocky and single grain structure; soft to loose dry consistence, non-sticky and non-plastic wet consistence; Fe_2O_3 and Mn_2O_3 banding (indicating a fluctuating groundwater level); boundary not exposed but expected to be abrupt and smooth over Tm bedrock.

Notes: Field conditions: soil is moist from previous nights' rain. Soil exposure is in a benched trench with 4-5 foot risers. Soil was described over a deep "pit" into Tm, where deposits are thickest. Alluvium is cobbly to boulder alluvium interpreted as fluvial deposits over a strath surface. Capping alluvium may be a debris flow deposit as it is more poorly sorted but contains well-rounded clasts. Clasts are rotted in Bt horizon: Most clasts are easily cut with a scrapper although some show resistance but are cut with difficulty. Most clasts are of granitic composition, with some mafic-rich clasts (basalt? Or dark, fine-grained amphibolite) – interpreted as sourced out of the San Gabriel Mountains.

A`	0.33	37	12.2
Bt1	0.76	43	32.7
Bt2	0.39	135	52.6
BC	0.19	118	22.4
Cox	0.07	47+	3.3

SDI @ 380 = 123.2

APPENDIX II

AERIAL PHOTOGRAPHS OF SITE VICINITY, 1928-1930



FI : C-1001 A
FR : Z-22
1-18-1930
1: 18,000

AERIAL PHOTOGRAPHS OF SITE VICINITY, 1928-1930

Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

APPLIED EARTH SCIENCES
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS

FIGURE No. II-1



FI : C-300
FR: F-25
1-1-1928
1: 18,000

AERIAL PHOTOGRAPHS OF SITE VICINITY, 1928-1930

Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

APPLIED EARTH SCIENCES
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS

FIGURE No. II-2



FI : C-1001 A
FR : Z-23
1-18-1930
1: 18,000

AERIAL PHOTOGRAPHS OF SITE VICINITY, 1928-1930

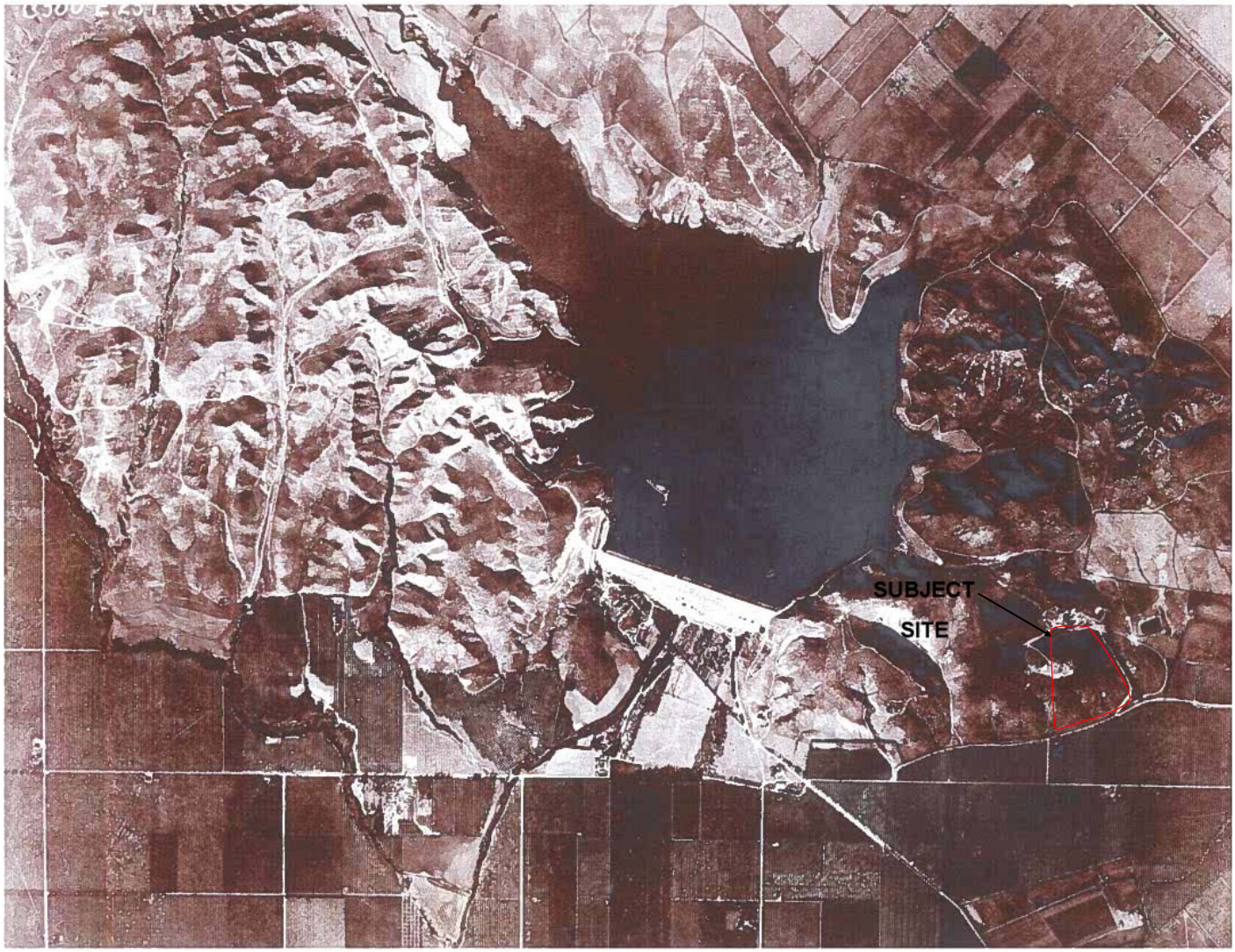
Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

APPLIED EARTH SCIENCES
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS

FIGURE No. II-3



FI : C-300
FR: E-257
1-1-1928
1: 18,000

AERIAL PHOTOGRAPHS OF SITE VICINITY, 1928-1930

Proposed Nursing Home Facility & Residential Building Project

15151 Mission Hills Road, Los Angeles, CA 91345

FOR	DATE	PROJECT No.
Ararat Home of Los Angeles	11 / 02 / 2018	17-641-26

APPLIED EARTH SCIENCES
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS

FIGURE No. II-4

Appendix III- Report of Geophysical Survey, Southwest Geophysics

February 26, 2018

APPENDIX IV

SELECTED PHOTOGRAPHS OF SITE TAKEN DURING STUDY



Photo 1: February 21, T-1. View is to north. Cleaning west wall



Photo 2: Steve Miller cleaning south dipping iron-stained beds in Pacoima Fmn. in T-1

2-21-2018



Photo 3: View of T-2 from south to north, exposing Qoa and Qp in west wall



Photo 4: Begin excavation of T-3 with Case 225 Excavator, 2-21-2018



Photo 5: steep south-dipping Modelo formation bedrock in T-3 with colluvial soil cover, 2-26-2018



Photo 6: Onsite Meeting with Geologists B. Olson and E. Frost from CGS along with other CGS personnel; C. Jensen of LADBS, T. Rockwell representing AES, 2-27-2018



Photo 7: south end of T-2 with T-1 below, view to south, 2-27-2018



Photo 8: View of T-3 toward southeast with Ararat Home Main Campus in background (adjacent property). Worker in Trench is near deepest part of trench near Station 315,

2-27-2018



Photo 9: Fault in T-3, west wall, photo taken from ground surface



Photo 10: Rockwell cleaning east wall along easterly fault trajectory, 2-21-2018



Photo 11: Discussion near fault, Rockwell and Minas, with CGS personnel in background, 2-21-2018



Photo 12: Fault in east wall, minor 2-3” offset in lower layers, but does not rupture capping Pleistocene alluvial soils, in range of ~50 ka (Rockwell), 2-27-2018



Photo 13: T-1 cleaned, gridded, logged, view from South to North



Photo 14: Boring A drilling just south of south terminus of T-1. Roy Bros. Bucket Auger 4-5-2018. Note fence on left side



Photo 15: Modelo Fmn, steeply dipping Bedrock in Boring A @50', 4-5-2018



Photo 16: Boring B in private roadway, southernmost exploratory data point, 4-6-2018

APPENDIX V- PRIOR REPORTS BY AES, ALLEN SEWARD, HAKIMIAN AND RSA (PDF ONLY)

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological And Geotechnical Consultants

April 27, 2017

Job No: 17-2468-9

Mr. Harold P. Sturgeon
15155 Mission Hills Road
Mission Hills, CA 91345

Subject: **GEOLOGIC AND GEOTECHNICAL REPORT**
Investigation of Existing Ground Water Conditions and Distressed Access Road to Residence

Project: 15155 Mission Hills Road
Mission Hills, California

Dear Mr. Sturgeon:

This report presents the results of our geologic and geotechnical evaluation of the existing ground water conditions at the project site and associated distress to the residence access road, and provides conclusions and remedial recommendations relative to site drainage and access road improvements. Our conclusions and recommendations are based on observations, measurements, and pertinent data collected by this firm during the current phase of work.

1.0 SCOPE OF WORK

Our scope of work included the following tasks:

1. Review of published maps and reports in the general area of the subject site.
2. Review of available Geologic/Geotechnical reports and data in our files prepared by this firm and others for projects within the vicinity of the subject site.
3. Review of the County of Los Angeles Assessor's Map of the project site (APN 2664-022-019) to determine the approximate location of property boundaries.
4. On-site geologic/geotechnical reconnaissance on April 5, 2017, including observation and documentation of observed ground water conditions and reported distress to the access road.
5. Coordination with Underground Service Alert to obtain clearance from potentially impacted utilities prior to the subsurface exploration.

6. Preparation of a Geologic/Geotechnical Map utilizing property lines from the assessor's parcel map as a base to document observed geologic and geotechnical conditions.
7. Geologic logging of six (6) exploratory trenches excavated using a rubber-tire backhoe in the areas of the distressed access road to document the existing subsurface conditions and assess direction of water flow.
8. Collection of samples from the trench excavations and laboratory testing to document the density, moisture content and classification of in-situ soils.
9. Preparation of this report and associated figures.

2.0 SITE DESCRIPTION

The subject access road to the residence is off of a main access road to the east of the property that connects with Mission Hills Road to the south. Review of the assessor's map indicates that the access road crosses the adjacent property, 15151 Mission Hills Road, prior to entering your property. The access road low point is at the "T" intersection with the main access road and ascends to the west. The access road is approximately 10 feet wide and generally consists of asphalt. It is distressed on the adjacent property where it has been infilled with gravel material. It is destressed on a portion of your property where the road curves towards your residence.

A roughly east-west trending drainage swale/draw is located south of the eastern portion of the access road, within the adjacent property. The western extension of the drainage swale onto your property is indiscernible due to prior grading activities that have modified the topography. The original drainage swale is concealed by fill material and was likely located at the vicinity where the existing drain pipe/culvert crosses beneath the access road. This natural drainage swale likely extends offsite into Eden Memorial Park to the west, however grading has also modified the topography. Overall, site drainage is generally towards the east and southeast.

3.0 FIELD EXPLORATION AND LABORATORY TESTING

3.1 Surface Mapping and Preparation of a Base Map

Surface geologic mapping and aerial photo interpretations were undertaken by personnel from Allan E. Seward Engineering Geology Inc. (AESEGI). This data was used in conjunction with property line locations obtained from the assessor's parcel map to prepare the appended Geologic/Geotechnical Map. This map does not constitute a survey of the property but was prepared to illustrate the access road alignment, existing geologic and

geotechnical conditions, existing slopes, locations of subsurface explorations relative to distressed portions of the access road and remedial recommendations.

3.2 Subsurface Investigation

Our subsurface investigation consisted of the excavation, logging and sampling of six trenches (T-1 through T-6) to a maximum depth of 5.5 feet on 4/14/2017. The trenches were excavated by Barkley Engineering using a rubber-tire backhoe and were logged and sampled by a Certified Engineering Geologist from this firm. Following completion of logging, the trenches were backfilled with the excavated materials. The locations of the trenches are shown on the Geologic/Geotechnical Map **(Plate I)**.

The Trench Logs included in **Appendix A** represent our interpretation of field data encountered at each location by our geologic/engineering staff at the time of excavation, along with refinements based on observations and laboratory test results. The distribution and engineering characteristics of materials in adjacent areas may vary from those observed in the explorations.

3.3 Sampling Procedures

Modified California Drive ring samples were obtained in the trenches at various depths (see logs in **Appendix A**). Recovered soil samples were sealed in plastic containers and brought to our laboratory for further classification and testing. Bulk (disturbed) samples of soils were obtained from cuttings developed during excavation of the exploratory trenches. The bulk samples were collected for classification and testing purposes and represent a mixture of soils within the noted depths.

3.4 Laboratory Program

Soil samples were visually classified in the field. Thereafter, the samples were brought to our laboratory, the visual soil classifications were checked using visual-manual procedures (ASTM Standard Practice D2488), and the trench logs were reviewed in order to select soil samples for testing.

The laboratory testing program included the following tests on selected samples of on-site soils: moisture content (ASTM Test Method D2216), dry density (ASTM Test Method D7263), and particle-size distribution of soils using sieve analysis (ASTM Test Method D6913).

Based on laboratory test results the soil sample classifications were further refined per the Unified Soil Classification System (ASTM Standard Practice D2487). The results of the field investigation and the laboratory tests were used as the basis for our analyses and

recommendations presented in this report. Laboratory test results are presented on the trench logs and in **Appendix A.**

4.0 GENERALIZED GEOLOGIC/GEOTECHNICAL SUBSURFACE CONDITIONS AND SOIL PROPERTIES

4.1 Geologic Units

A general description of geologic units, including older alluvium and artificial fill are presented below. Distribution of these units is shown on the Geologic/Geotechnical Map **(Plate I).**

4.1.1 Older Alluvium (Qoa)

The older alluvium consists of medium to dense yellowish-brown to yellowish-to rusty brown sand, silty sand and pebbly sand with scattered cobbles and boulders. The older alluvium was observed in Trenches T-2, T-4 and T-5 beneath the artificial fill.

4.1.2 Artificial Fill (af)

Non-compacted artificial fill is present in the vicinity and beneath the access road (see Geologic/Geotechnical Map). The fill material consists of light to medium yellowish-brown, dark-brown, and dark-gray to black silty, clayey sands. Through personal communication with Mr. Howard Sturgeon, the artificial fill was imported from various off-site locations. The thickness of fill encountered in our explorations ranged from 2 ft to 4.75 ft. The measured in-situ dry densities are 109 and 111 pcf with moisture contents of 18.8 and 17.1 percent, respectively. Based on an estimated laboratory maximum dry density of 130 pcf, which is considered representative for the material type (SC-SM) when compacted in accordance with ASTM Test Method D1557, the relative compaction of the artificial fills do not meet the industry standard of 90 percent.

4.2 Ground Water

Ground water was encountered within each trench excavation at depths ranging from the ground surface (Trench T-6) to 2.5' below ground surface. Strong flows of water were observed flowing out of the excavation sidewalls in Trenches T-1, T-2 and T-3.

5.0 FINDINGS AND CONCLUSIONS

1. Undocumented artificial fill was previously placed beneath and adjacent to the access road. The outlet and inlet of an existing culvert that extends beneath the westerly portion of the access road, presumably to collect and direct surface water within the natural drainage area beneath the access road, was buried by the artificial fill, rendering it non-

functional. Both ends of this culvert drain were located during our investigation and left open to allow water to drain.

2. The direction of flow of surface water and groundwater is within and toward the natural drainage swale. The natural drainage swale has been modified by prior grading activities, which are restricting the flow of water along its original course.
3. Field observation during the excavation of Trenches T-2, T-4 and T-5 indicate that ground water was ponding on top of the older alluvium deposits.
4. The artificial fill, where encountered in the vicinity of the access road, is wet to saturated and is opined to have a relative compaction that is less than the industry standard of 90 percent of the laboratory maximum dry density.
5. Eden Memorial Park is located to the west of the property. It is likely that surface runoff and infiltration of landscape water from Eden Memorial is contributing to the flow of groundwater observed to be following the natural drainage swale at the project site.
6. Based on site observations, it is our professional opinion that the access road is yielding under soft, wet subgrade soils that are seasonally impacted by surface and subsurface water associated with the natural drainage course. This water is considered to be the causative factor of the distress to the access road.

6.0 RECOMMENDATIONS

The following recommendations are based on observations made during our subsurface investigation and results of our evaluation.

6.1 Grading and Drainage

- Grades should be modified, as needed, to achieve positive surface drainage away from the access road and prevent ponding of water and minimize water infiltration adjacent to the road. Surface runoff water should be conducted beneath the access road and directed to the natural drainage course to the south and east of the access road via non-erodible drainage devices. Surface grades at the vicinity of the existing culvert inlet should be modified to direct drainage towards the culvert.
- Water migrating toward the access road from the north and west may be cut off to reduce the amount of water flowing over and through distressed portions of the access road. This may be accomplished by constructing a gravel cutoff drain (see appended Construction Detail, **Figure 2)** along the north and west sides of the access road adjacent to the distressed areas. The cutoff drain should extend at least three feet beneath the soil subgrade and covered with 12 inches of compacted fill. A 4-inch

diameter perforated PVC pipe located at the base of the gravel should be used to collect water and direct the water to a non-perforated PVC pipe extending beneath the access road to a suitable discharge location per the recommendation of a civil engineer.

- A Civil Engineer should be consulted prior to altering the site grading and drainage. Remedial measures to improve site drainage, including modification to site grades, restoring functionality of the existing culvert, or construction of new drainage devices, should be designed and constructed in compliance with current City of Los Angeles Codes.

6.2 Access Road Improvements

It is our professional opinion that the most cost-effective remedial recommendations to repair the distressed access road and provide long-term performance is to remove the existing subgrade soils to a depth of 20 inches, stabilize the exposed subgrade with geotextile reinforcement, and replace the excavated soils with 8 inches of compacted aggregate subbase to facilitate drainage, and an additional 12 inches of base course to support traffic loads. The access road section is illustrated on **Figure 2.**

The following recommendations for design and construction of the improvements are based on the assumption that the access road will remain unpaved with no permanent surfacing such as concrete or asphalt concrete.

6.2.1 Subgrade Preparation

All surfaces shall be prepared by removing organics (vegetation), topsoil, debris, existing artificial fills, and other unsuitable material shall be removed, and excavating to the planned subgrade elevation (i.e. 20 inches below existing grade). If very soft or saturated subgrade soils are exposed, light equipment with low ground contact pressure may be required to minimize subgrade disturbance. Spreading and compacting of ¾-inch crushed rock (per SSPWC Section 200-1.2) into unstable subgrades may also be performed to facilitate temporary stabilization for construction purposes. The prepared subgrade surface should be relatively level and smooth, with no significant humps or depressions. Prior to placement of geotextiles the prepared subgrade should be observed by the Geotechnical Engineer.

6.2.2 Geotextile Reinforcement

A geotextile (TenCate® Mirafi RS280i, or equivalent) that is engineered to provide subgrade reinforcement and base course confinement, while also maintaining separation, filtration and drainage, should be selected for the subject application. The geotextile shall be placed directly on the prepared subgrade and unrolled so that the long axis is in

the direction of construction traffic patterns. Adjacent rolls (typically 15 to 17 feet in width), if needed, should be overlapped at least 24 inches, but no more than 36 inches. The geotextile should be flat and tight with no folds or wrinkles. Soil mounds or landscaping staples may be used to hold the geotextile in place.

6.2.3 Aggregate Subbase

An 8-inch thick layer of open-graded aggregate subbase should be placed and spread directly over the geotextile to facilitate drainage. The subbase material should be a washed crushed rock with no more than 1 percent passing the No. 200 sieve size and in conformance with the gradation requirements of ASTM No. 2 base, as specified in ASTM Test Method D448 (or approved equivalent). The subbase should then be densified using lightweight compaction equipment, such as a steel-drum roller weighing less than 5,000 pounds. The roller should be operated in static mode only to minimize potentially destabilizing pore water pressures from developing in saturated subgrade soils. Following densification, a second layer of geotextile reinforcement shall be placed on the level aggregate subbase.

6.2.4 Base Course

A base course shall be placed and spread in one horizontal lift over the second layer of geotextile reinforcement. The base course should comply with specifications for untreated crushed aggregate base (CAB), crushed miscellaneous base (CMB), or processed miscellaneous base (PMB), as defined Section 200-2 of the current Standard Specifications for Public Works Construction "Greenbook", or aggregate base (AB-Class 2) as defined in Section 605.3 of the current Caltrans Highway Design Manual.

The base material shall be watered as required to facilitate compaction, then spread and compacted to at least 95 percent of Maximum Dry Density, per ASTM Test Method D1557. The compacted thickness of the base course shall be at least 12 inches.

7.0 LIMITATIONS

This report has been prepared for the exclusive use of Mr. Harold Sturgeon and his design consultants for the specific site discussed herein. This report should not be considered transferable. Prior to use by others, we should be notified, as additional work may be required to update this report.

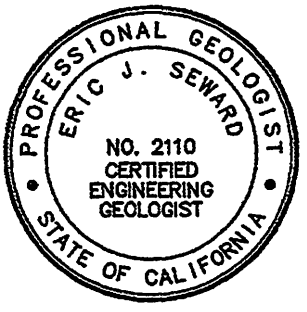
In performing these professional services, this firm has used the degree of care and skill ordinarily exercised, under similar circumstances, by reputable engineering geologists and geotechnical engineers practicing in this or similar localities. The analyses and interpretations presented in this report have been based on the results of pertinent field and

laboratory testing. It should be recognized that subsurface conditions can vary in time and laterally and with depth at a given site and that the conclusions and recommendations presented in this report are based on the data available and our interpretation of the data based on our experience and background. Therefore, our **conclusions** and **recommendations** are **professional opinions** and are **not meant** to be a control of nature. We make other **no warranty**, either **expressed** or **implied.**

This opportunity to be of service is appreciated. If you have any questions regarding this report, please give us a call.

Respectfully submitted,

Eric J. Seward, CEG 2110
Principal Engineering Geologist
Vice President



Kevin P. Callahan, MS, GE 2989
Principal Geotechnical Engineer



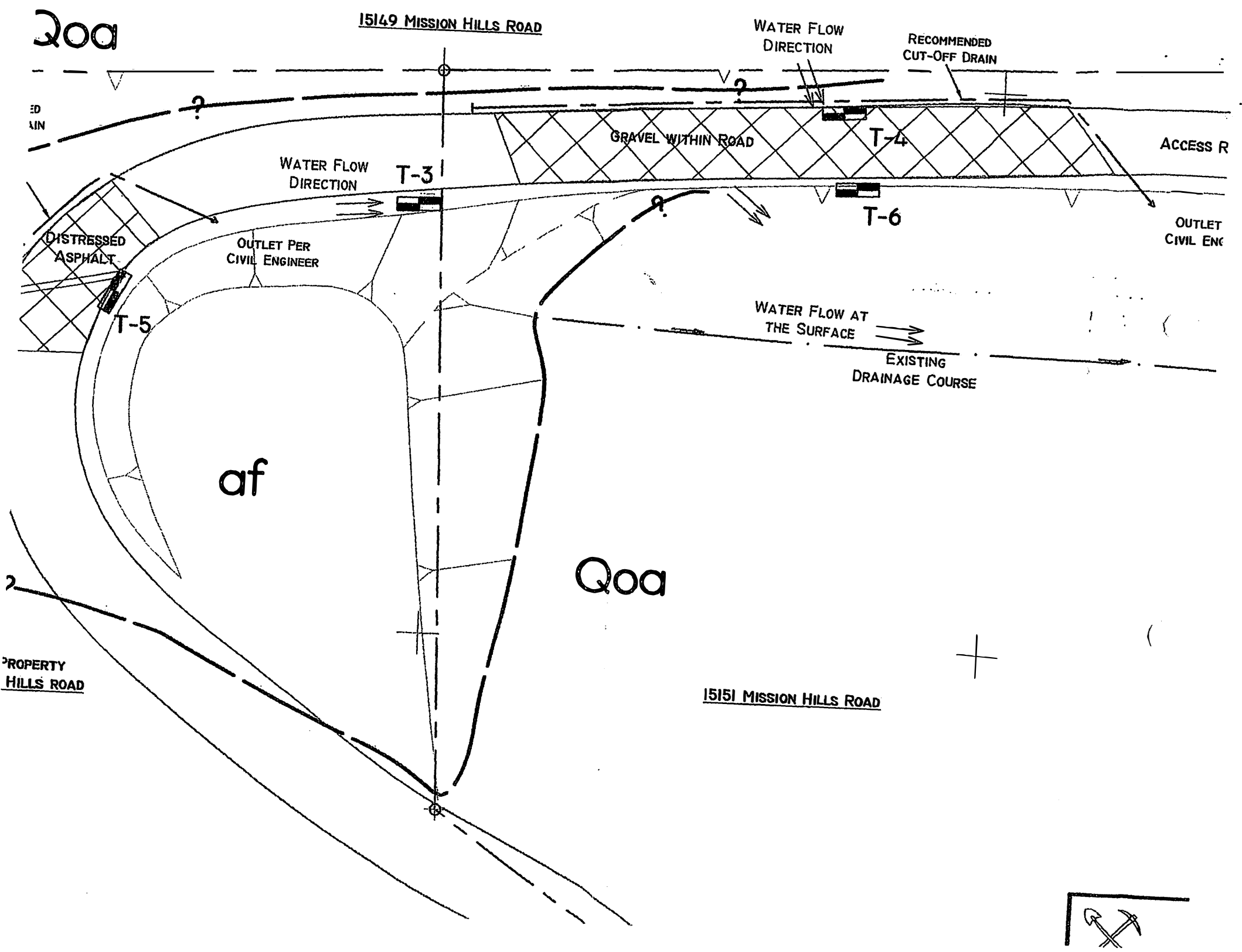
The following attachments and appendix completes this report.

References

APPENDIX A

- Test Pits (T-1 thru T-6) & Key to Symbols — Figure 1
- Particle-Size Analysis Test Report — Figure 2
- Construction Detail – Cut-off Drain
- Geologic/Geotechnical Map (1"=20'), Plate I — (in pocket)

Distribution: Mr. Harold Sturgeon (3 hardcopies and PDF format)


Qoa
15149 MISSION HILLS ROAD
WATER FLOW DIRECTION
RECOMMENDED CUT-OFF DRAIN
GRAVEL WITHIN ROAD
T-4
ACCESS R
WATER FLOW DIRECTION
T-3
T-6
OUTLET CIVIL ENG
DISTRESSED ASPHALT
OUTLET PER CIVIL ENGINEER
T-5
WATER FLOW AT THE SURFACE
EXISTING DRAINAGE COURSE
af
Qoa
PROPERTY
HILLS ROAD
15151 MISSION HILLS ROAD

REFERENCES

Published

Dibblee, T.W., Jr., 1991, Geologic Map of the San Fernando and Van Nuys (North ½) Quadrangles, Los Angeles County, California: Dibblee Geological Foundation, Map #DF-33.

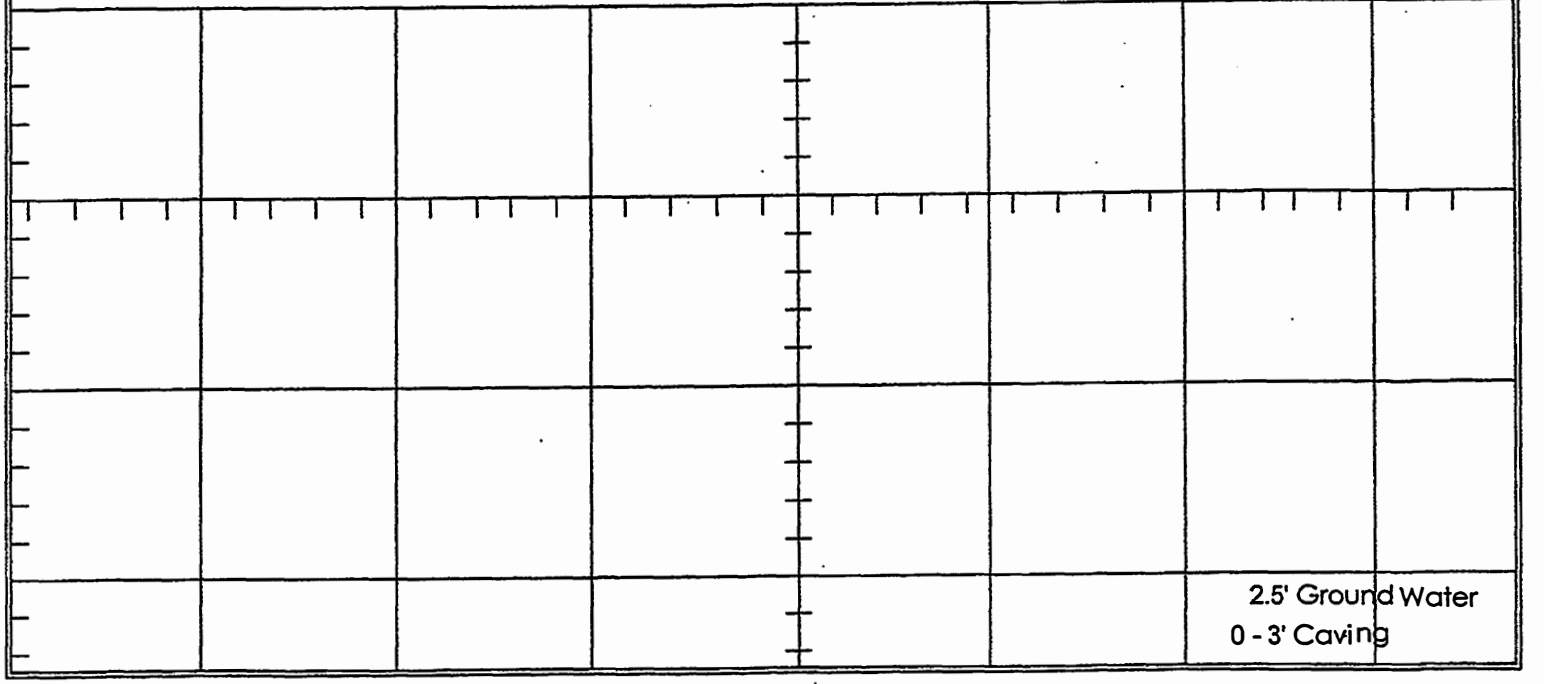
Hitchcock, C.S., and Willis, C. J., 2000, Quaternary Geology of the San Fernando Valley, Los Angeles County, California: California Department of Conservation Division of Mines and Geology Map Sheet 50.

CLIENT: Mr. Harold Sturgeon	JOB NO: 17-2468	**TRENCH LOG NO. T-1**
PROJECT: Distressed access road to residence 15155 Mission Hills Road Mission Hills, California	DATE: 4/27/2017	
	LOGGED BY: VCG	
	EXCAVATED: 4/14/17	
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0				SM-SC	**ARTIFICAL FILL;af (0 - 3')** @ 0' Silty, clayey SAND; loose; wet; dark brown to black to dark gray; roots to 3' (bottom of excavation); water flowing out of southwest excavation wall				
				SM	@ 1' Silty SAND; reddish brown; excavation caved immediately; water flow is strong, from west to southwest				
1.5									
					@ 2.5' - static water				
3					COMMENTS: Trench 5' from large wall at property line; trench turned to mud after caving Unable to collect ring sample due to caving				
4.5									
6									

TOTAL DEPTH: 3 feet

SCALE: 1 inch = 1.5 feet

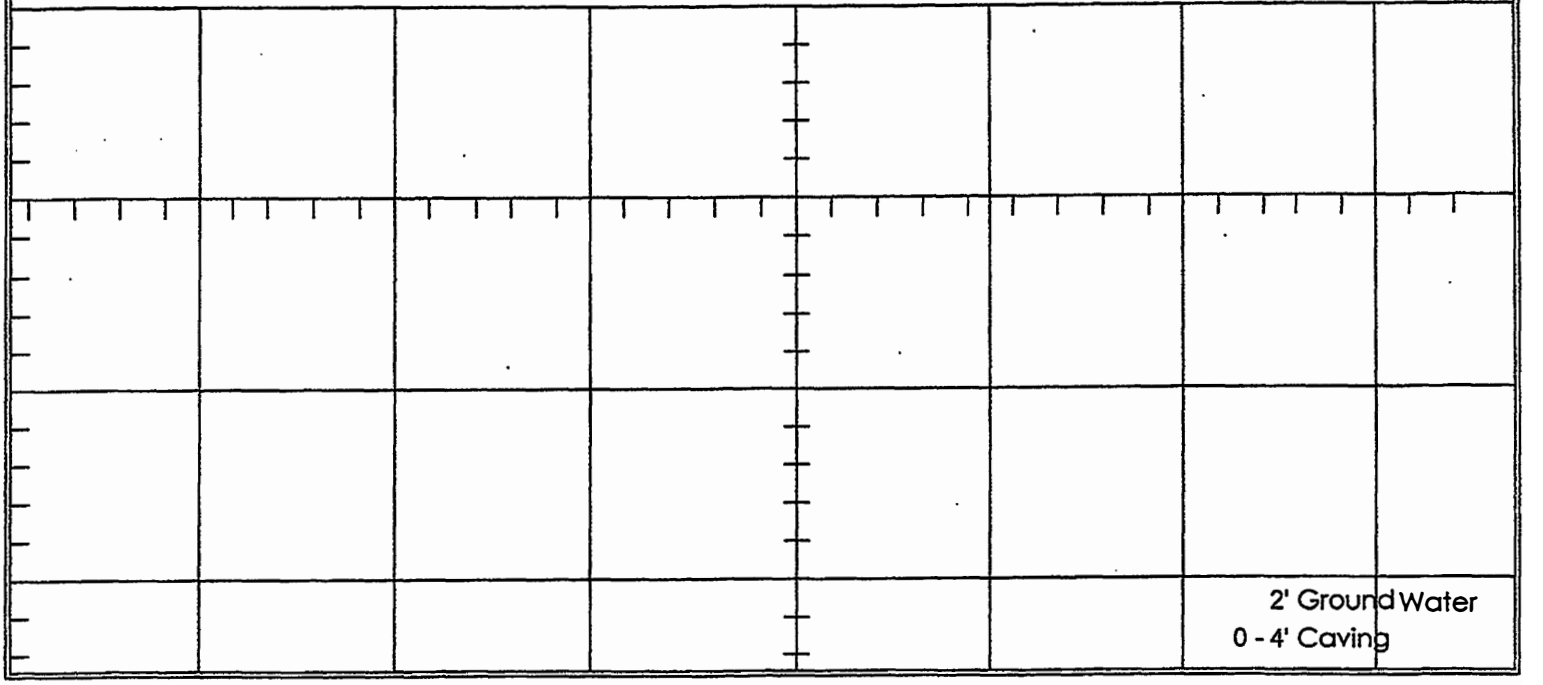


CLIENT: Mr. Harold Sturgeon	JOB NO: 17-2468	**TRENCH LOG NO. T-2**
PROJECT: Distressed access road to residence 15155 Mission Hills Road Mission Hills, California	DATE: 4/27/2017 LOGGED BY: VCG EXCAVATED: 4/14/17	
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0				SM-SC	**ARTIFICAL FILL; af (0 - 4.75')** @ 0' Silty, clayey SAND; loose; damp to wet; black to dark brown to dark gray				
1.5					@ 2' - saturated; strong water flow out of excavtion wall; caving immediately (0 - 4'); water ponding on contact with Qoa				
3									
4.5				SM	**OLDER ALLUVIUM; Qoa (4.75 - 5.5')** @ 4.75' Silty SAND with gravel and cobbles; dense; damp to wet; rusty brown COMMENTS: Unable to advance excavation due to caving and presence of mud				
6									

TOTAL DEPTH: 5.5 feet

SCALE: 1 inch = 1.5 feet



CLIENT: Mr. Harold Sturgeon		JOB NO: 17-2468	**TRENCH LOG NO. T-3**
PROJECT: Distressed access road to residence 15155 Mission Hills Road Mission Hills, California		DATE: 4/27/2017	
		LOGGED BY: VCG	
		EXCAVATED: 4/14/17	
EXCAVATION METHOD: Rubber Tire Backhoe		ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0				SC	**ARTIFICAL FILL; af (0 - 3.5')** @ 0' Clayey SAND with scattered gravel; loose to medium dense; damp to wet; light to medium yellowish brown				
1.5				SC					Gradation % fines=41.4
					@ 2' - saturated; strong water flow out of west excavation wall; started caving immediately after encountering the water		18.8	109	
3					@ 3' - no sample recovery				
					COMMENTS: Excavation turned to mud after caving				
4.5									
6									

TOTAL DEPTH: 3.5 feet

SCALE: 1 inch = 1.5 feet

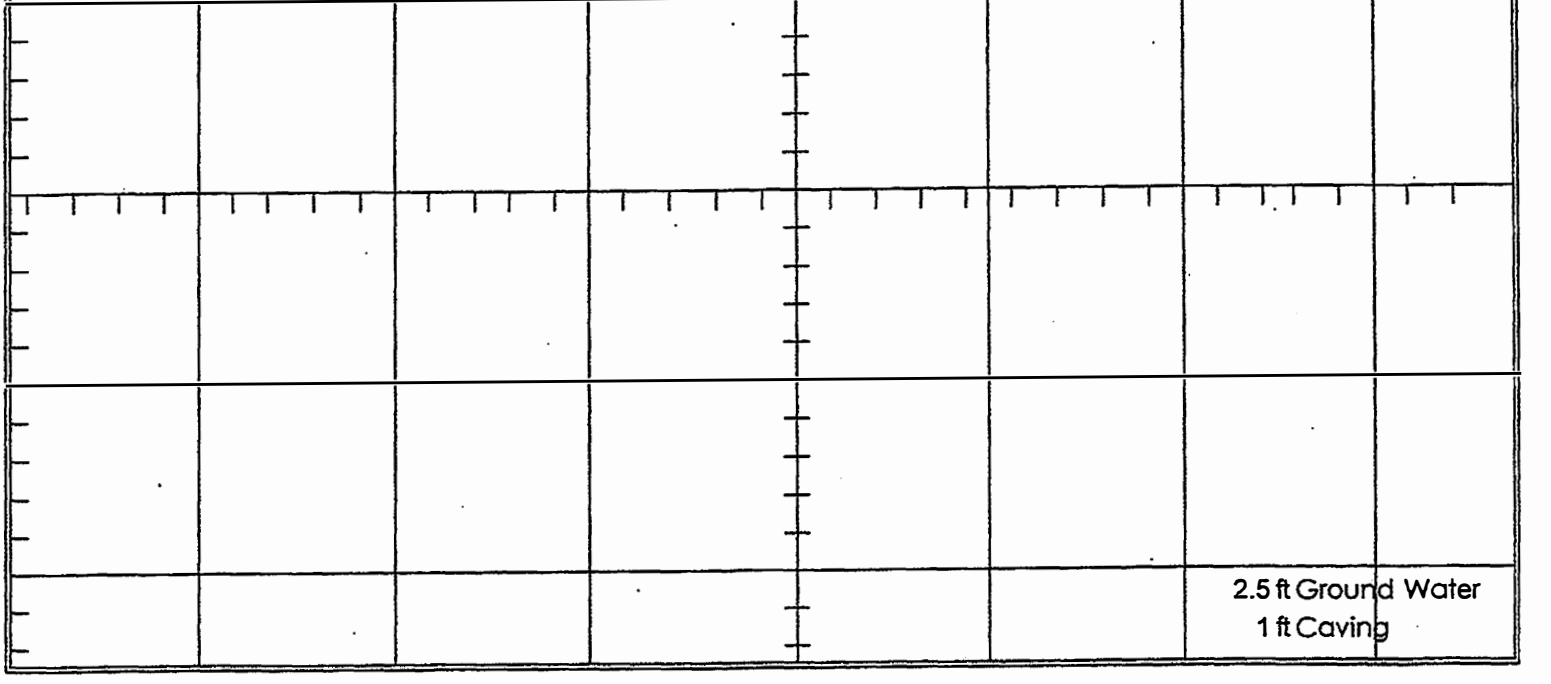
2' Ground Water
2' Caving

CLIENT: Mr. Harold Sturgeon	JOB NO: 17-2468	**TRENCH LOG NO. T-4**
PROJECT: Distressed access road to residence 15155 Mission Hills Road Mission Hills, California	DATE: 4/27/2017	
	LOGGED BY: VCG	
	EXCAVATED: 4/14/17	
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0				GP	**GRAVEL; (0 - 0.5')** @ 0' 1-inch crushed gravel				
				SM	**ARTIFICAL FILL; af (0.5 - 2.5')** @ 0.5' Silty SAND; loose; wet; gray to black @ 1' - caving				
1.5				SM	@ 2.5' water ponding on contact with Qoa; water flowing out of excavation wall on north side		17.1	111	Gradation % fines=33.9
				SM	**OLDER ALLUVIUM; Qoa (2.5 - 3')** @ 2.5' Silty SAND with granitic boulders; dense; damp to wet; yellowish brown to tan				
3									
4.5									
6									

TOTAL DEPTH: 3 feet

SCALE: 1 inch = 1.5 feet



CLIENT: Mr. Harold Sturgeon	JOB NO: 17-2468	**TRENCH LOG NO. T-5**
PROJECT: Distressed access road to residence 15155 Mission Hills Road Mission Hills, California	DATE: 4/27/2017	
	LOGGED BY: VCG	
	EXCAVATED: 4/14/17	
EXCAVATION METHOD: Rubber Tire Backhoe	ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0				SM	**ARTIFICAL FILL; af (0 - 2')** @ 0' Silty SAND with gravel; loose; damp to wet; black to dark gray; some organics; water appears to be ponded on contact with Qoa				
1.5				SM	**OLDER ALLUVIUM; Qoa (2 - 4')** @ 2' Silty SAND with gravel and cobbles; dense; wet; light yellowish brown to rusty brown; caving; no sample recovery				
3					COMMENTS: Excavated to find a pipe culvert on outlet side; left part of excavation open to allow culvert to drain; standing water at the end of the day; staked with flagging around excavation				
4.5									
6									

TOTAL DEPTH: 4 feet

SCALE: 1 inch = 1.5 feet

2' Ground Water
2' Caving

CLIENT: Mr. Harold Sturgeon		JOB NO: 17-2468	**TRENCH LOG NO. T-6**
PROJECT: Distressed access road to residence 15155 Mission Hills Road Mission Hills, California		DATE: 4/27/2017	
		LOGGED BY: VCG	
		EXCAVATED: 4/14/17	
EXCAVATION METHOD: Rubber Tire Backhoe		ELEVATION:	

DEPTH (feet)	SAMPLE TYPE	SAMPLE NUMBER	GRAPHIC LOG	USCS SYMBOL	DESCRIPTION	ATTITUDES	LABORATORY TESTS: Moisture Content (%)	LABORATORY TESTS: Dry Density (pcf)	LABORATORY TESTS: Other Tests
0				SM	**ARTIFICAL FILL; af (0 - 1.5')** @ 0' Silty SAND; loose; saturated; caving immediately upon excavation COMMENTS: Unable to advance excavation due to caving and presence of mud				
1.5									
3									
4.5									
6									

TOTAL DEPTH: 1.5 feet

SCALE: 1 inch = 1.5 feet

0' Ground Water
0' Caving

SOIL CLASSIFICATION CHART

MAJOR DIVISIONS			SYMBOLS GRAPH	SYMBOLS LETTER	TYPICAL DESCRIPTIONS
COARSE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS LARGER THAN NO. 200 SIEVE SIZE)	GRAVEL AND GRAVELLY SOILS (MORE THAN 50% OF COARSE FRACTION RETAINED ON NO. 4 SIEVE SIZE)	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
		GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		GM	Silty gravels, gravel-sand-silt mixtures
				GC	Clayey gravels, gravel-sand-clay mixtures
	SAND AND SANDY SOILS (MORE THAN 50% OF COARSE FRACTION PASSING ON NO. 4 SIEVE SIZE)	CLEAN SANDS (LITTLE OR NO FINES)		SW	Well-graded sands, gravelly sands, little or no fines
				SP	Poorly-graded sands, gravelly sands, little or no fines
		SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		SM	Silty sands, sand-silt mixtures
				SC	Clayey sands, sand-clay mixtures
FINE GRAINED SOILS (MORE THAN 50% OF MATERIAL IS SMALLER THAN NO. 200 SIEVE SIZE)	SILTS AND CLAYS (LIQUID LIMIT LESS THAN 50)			ML	Inorganic silts and very fine sands, clayey silts with slight plasticity
				CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, lean clays
				OL	Organic silts and organic silty clays of low plasticity
	SILTS AND CLAYS (LIQUID LIMIT GREATER THAN 50)			MH	Inorganic silts, micaceous or diatomaceous fine, sandy or silty soils, elastic silts
				CH	Inorganic clays of high plasticity, fat clays
				OH	Organic clays of medium to high plasticity, organic silts
HIGHLY ORGANIC SOILS				PT	Peat and other highly organic soils

Notes:
(1) Dual USCS symbols, such as SP-SM, denote 5 to 12% of minor constituent.
(2) Dual USCS symbols, such as SM/ML, denote borderline soil classifications.
(3) Subsurface information from boring and test pit logs depict conditions only at the specific locations, and dates indicated. Soil conditions and water levels at other locations may differ from conditions at these locations. Also, the conditions at these locations may change with time.
(4) Blow counts on logs are the number of blows to drive the sampler with the weight and drop height indicated on each log.
(5) Split-barrel sampler driving record applies only to hollow-stem-auger and rotary-wash borings.
(6) These logs are subject to the limitations, conclusions, and recommendations in this report.

HS: Hollow-stem-auger boring
RW: Rotary-wash boring
B: Bucket-auger boring

SAMPLE TYPE

- STANDARD PENETRATION TEST — Split barrel sampler in accordance with ASTM D-1586 Test Method
- CALIFORNIA DRIVE — Split-barrel sampler in accordance with ASTM D-3550 Test Method
- DISTURBED CALIFORNIA DRIVE
- SHELBY TUBE — Thin-walled sampler in accordance with ASTM D-1587 Test Method
- BULK SAMPLE
- NO RECOVERY

GROUND WATER DATA

- GROUND WATER WHILE DRILLING
- GROUND WATER AFTER DRILLING

DENSITY OF GRANULAR SOILS

DESCRIPTION	SPT BLOWS PER FOOT
Very Loose	< 4
Loose	4 - 10
Medium Dense	11 - 30
Dense	31 - 50
Very Dense	> 50

STRENGTH OF COHESIVE SOILS

CONSISTENCY	SPT BLOWS PER FOOT
Very Soft	< 2
Soft	2 - 4
Firm	5 - 8
Stiff	9 - 15
Very Stiff	16 - 30
Hard	> 30

SPLIT-BARREL SAMPLER DRIVING RECORD

BLOW COUNT	DESCRIPTION
25	25 blows drove the sampler 12 inches, after initial 6 inches of seating
50/7"	50 blows drove the sampler 7 inches, after initial 6 inches of seating
Ref/3"	50 blows drove the sampler 3 inches during initial 6-inch seating interval

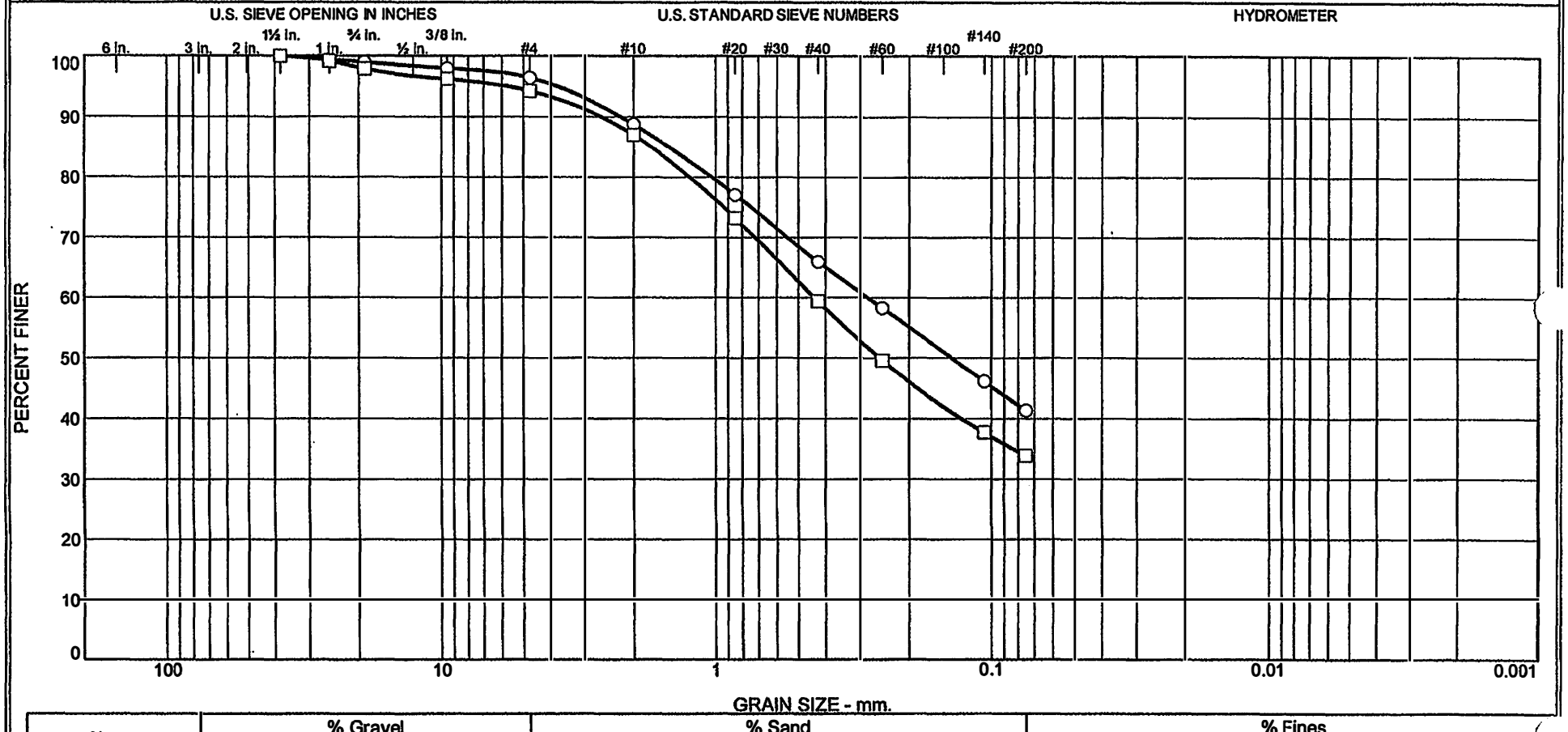
LABORATORY TESTING ABBREVIATIONS

Plasticity Index	PI	Compaction Curve	Curve=A
Liquid Limit	LL	Consolidation / Collapse	Consol
Hydrometer	%-5 micron	Direct Shear / Reshear / Remold	Shear Test
Expansion Index	EI		
Corrosivity Analysis	Cor		

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

USCS Soil Classification and Key to Boring Log Symbols

Particle Size Distribution Test Report



	% +3"	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	1.0	2.5	7.7	22.9	24.5	41.4	
□	0.0	2.1	3.6	7.3	27.6	25.5	33.9	

	Source	Sample #	Depth/Elev.	Date Sampled	USCS	Material Description	NM %	LL	PL
○	T-3		1.5	4/14/17	SC	Yellowish-brown, clayey SAND	18.8		
□	T-4		1.5	4/14/17	SM	Dark-brown, silty SAND	17.1		

Client Mr. Harold Sturgeon

Project Distressed access road to residence

15155 Mission Hills Road

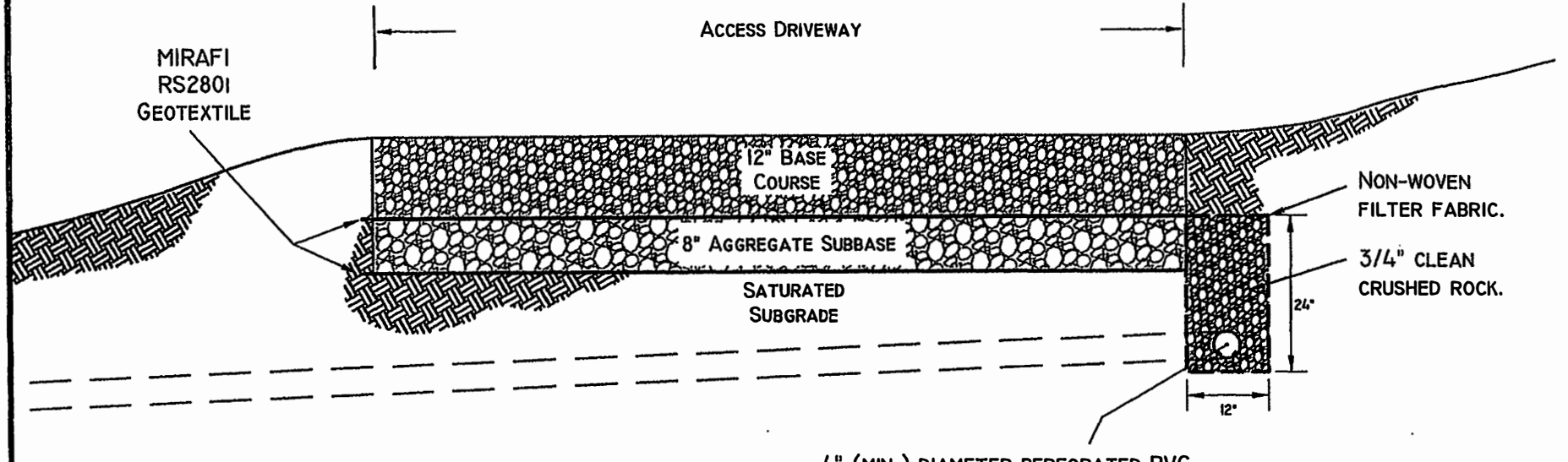
Project No. 17-2468 | Figure 1

ALLAN E. SEWARD

ENGINEERING GEOLOGY, INC.

Valencia, California

NOT TO SCALE



4" (MIN.) DIAMETER PERFORATED PVC PIPE (SCH 40 OR EQUIVALENT) WITH PERFORATIONS ORIENTED DOWN. AT LEAST 3" OF DRAINAGE ROCK AROUND PIPE. MIN. 1% GRADIENT TO SUITABLE OUTLET DETERMINED BY THE CIVIL ENGINEER.

ALLAN E. SEWARD
ENGINEERING GEOLOGY, INC.
Geological and Geotechnical Consultants

CUT-OFF DRAIN DETAIL

JOB NO.: 17-2468

DATE: 4/27/17 | FIGURE: 2

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

HELENA JUBANY
PRESIDENT

VAN AMBATIELOS
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VICTOR H. CUEVAS
SEPAND SAMZADEH

CITY OF LOS ANGELES
CALIFORNIA

ERIC GARCETTI
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

RAYMOND S. CHAN, C.E., S.E.
SUPERINTENDENT OF BUILDING
INTERIM GENERAL MANAGER

9-25-13

Log # 80975-1

Ararat Home of Los Angeles
c/o Sobin-Harte Architects/Bob Simonian
23147 Ventura Bl, # 200
Woodland Hills, CA 91364

TRACT: Rancho Ex-Mission de San Fernando
BLOCK:
LOT : Sec 4 T2NR15W
LOCATION: 15105 Mission Hills Rd

PERMIT NO. 10030-20000-10674
DISTRICT MAP: 213B145
COUNTY REF. DCC 1526 CF 896 RF 238

SUBJECT: **PRIMARY STRUCTURAL FILL**

FILL SOILS CLASSIFICATION, PER TABLE 18.1.A.
LOTS HAVING COMPACTED FILL: same

Soils Compaction Report No. 09-322-22, date 9-16-13, prepared by Applied Earth Sciences.

Approval is granted for compacted fill constructed on the above lots as described in the compaction report. Approval is limited to the area shown in the report and by the following conditions:

1. Compacted fill shall extend beyond the footings a minimum distance equal to the depth of fill below the footings.
2. Footing bearing pressure for all structures shall not exceed a value of 2000 psf at 24 inches minimum embedment into approved compacted fill.
3. Isolated footing bearing pressure for all structures shall not exceed a value of / psf at / inches minimum embedment into approved compacted fill.
4. The soil engineer shall inspect the footing excavations to determine that they are founded in the recommended strata before calling the Department for footing inspection.
5. Slope erosion control, planting, and irrigation of fill slopes, and run-off control are required as per Los Angeles City Building Code Sections 91.7012 and 91.7013.
6. Dwelling foundations located partially or wholly upon compacted fill ground shall meet the requirements of Section 91.1806.10 of the Los Angeles City Building Code.

GRADING INSPECTOR
David Captain
cc: Captain-VN Office
Applied Earth Sciences

NOTE: Grading oversized document is not attached. (Document Type 92)

Applied Earth Sciences
a division of Applied Soil Technology, Inc.
GEOTECHNICAL & ENVIRONMENTAL ENGINEERING CONSULTANTS

September 16, 2013 09-322-22

Ararat Home Of Los Angeles
c/o Sobin-Harte Architects
23147 Ventura Boulevard
Suite 200
Woodland Hills, California 91364

Attention: Mr. Bob Simonian

Subject: Addendum Report No. 2
Observation And Testing Of Compacted Fill
Proposed Addition To Skilled Nursing Facility
Within The Confines Of The Ararat Home Of Los Angeles
Lot. Sec 4 T2NR15W, Of
Tract. Rancho Ex-Mission de San Fernando
Permit No. 10030-20000-10674.
15105 Mission Hills Road
Mission Hills, California

Gentlemen:

This Addendum No. 2 Report presents response to the letter issued by the Department of Building and Safety of the City of Los Angeles on compaction report for the subject project issued by this office on June 4, 2013.

The Comment Sheets dated July 8, 2013 (Log No. 80975) contained the following:

1. Provide correct grading permit number and legal description (lot and tract number) on report and certificate of compliance.

Response:

1. Address and correct legal description of the site, 15105 Mission Hills Road, Mission Hills, Ca, Lot. Sec 4 T2NR15W, Of Tract. Rancho Ex-Mission de San Fernando, Permit No. 10030-20000-10674.

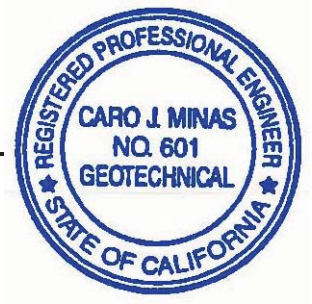
Should you have any questions regarding this addendum report No. 1 please do not hesitate to call this office.

Respectfully submitted,

Applied Earth Sciences

Reza Ghamsari
Staff Engineer

Caro J. Minas
Geotechnical Engineer
GE 601



Dist: (4) Addressee

CITY OF LOS ANGELES
DEPARTMENT OF BUILDING AND SAFETY
ENGINEER'S CERTIFICATE OF COMPLIANCE FOR CONSOLIDATED EARTH FILLS

LEGAL OR STREET ADDRESS: Lot. Sec 4 T2NR15W, Of
Tract. Rancho Ex-Mission de San Fernando
Permit No. 10030-20000-10674
15105 Mission Hills Road
Mission Hills, California

SOIL TESTING AGENCY: C.M. Applied Earth Sciences

PROPERTY OWNER'S NAME: Ararat Home Of Los Angeles
c/o Sobin-Harte Architects

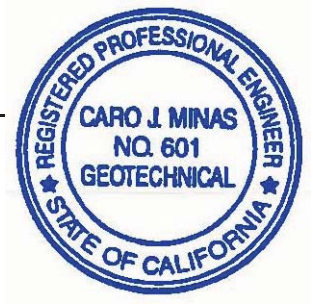
OWNER'S ADDRESS: 23147 Ventura Boulevard, Suite 200
Woodland Hills, California 91364

AREA TESTED: Proposed Building Area
(See Site Plan)

PER REPORTS ON THE PROJECT: October 10, 2007, April 9, 2013
DATE WORK STARTED ON PROJECT: August 29, 2011
DATE FILL WAS COMPLETED: April 19, 2013
DATE OF THIS CERTIFICATE: September 16, 2013

TO THE SUPERINTENDENT OF BUILDING:

** I HEREBY CERTIFY THAT I HAVE PERSONALLY INSPECTED AND TESTED THE PLACING OF COMPACTED EARTH FILLS ON THE ABOVE DESCRIBED PROPERTY, AND ON THE BASIS OF THESE INSPECTIONS AND TESTS, IT IS MY OPINION THAT THE SAME WAS PLACED IN CONFORMITY WITH REQUIREMENTS OF THE LOS ANGELES CITY BUILDING CODE.



CARO J. MINAS
Geotechnical Engineer
G.E. 601

MY ADDRESS IS: 4742 San Fernando Road
Glendale, CALIFORNIA 91204

* FOR THE PURPOSE OF THIS CERTIFICATE, TO "HAVE PERSONALLY INSPECTED AND TESTED" SHALL INCLUDE INSPECTION AND TESTING PERFORMED BY ANY PERSON RESPONSIBLE TO THE LICENSED ENGINEER SIGNING THIS CERTIFICATE. WHERE THE INSPECTION AND TESTING OF ALL OR PART OF THE WORK ABOVE ARE DELEGATED, FULL RESPONSIBILITY SHALL BE ASSUMED BY THE LICENSED ENGINEER WHOSE SIGNATURE IS AFFIXED THEREON.

BOARD OF
BUILDING AND SAFETY
COMMISSIONERS

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VAN AMBATIELOS
VICE-PRESIDENT

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VICTOR H. CUEVAS
SEPAND SAMZADEH

CITY OF LOS ANGELES
CALIFORNIA

DEPARTMENT OF
BUILDING AND SAFETY
201 NORTH FIGUEROA STREET
LOS ANGELES, CA 90012

RAYMOND S. CHAN, C.E.,S.E.
SUPERINTENDENT OF BUILDING
INTERIM GENERAL MANAGER

ERIC GARCETTI
MAYOR

7-8-13

LOG #: 80975

Applied Earth Sciences
4742 San Fernando Rd
Glendale, CA 91204

TRACT: Rancho Ex-Mission de San Fernando
BLOCK:
LOT: Sec 4 T2NR15W

PERMIT No. 10030-20000-10674
DISTRICT MAP: 213B145
COUNTY REF. DCC 1526 CF 896 RF 238

LOCATION: **15105 Mission Hills Rd**

LOTS HAVING COMPACTED FILL: Same

Soils Compaction Report No. 09-322-22, dated 6-4-13, prepared by Applied Earth Sciences.

The above compaction report has been reviewed by the Grading Division of the Department of Building & Safety. The report cannot be approved at this time. The review of the report will be continued upon submittal of an addendum report addressing, but need not be limited to:

1. Provide correct grading permit number and legal description (lot and tract number) on report and certificate of compliance.

2. An additional fee of $118.01 will be required when correction is submitted.

GRADING INSPECTOR
David Captain

cc: Captain-VN Office

NOTE: Grading oversized document is not attached. (Document Type 92)

June 4, 2013 09-322-22

Ararat Home Of Los Angeles
c/o Sobin-Harte Architects
23147 Ventura Boulevard
Suite 200
Woodland Hills, California 91364

Attention: Mr. Bob Simonian

Subject: Observation And Testing Of Compacted Fill
Proposed Addition To Skilled Nursing Facility
Within The Confines Of The Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California

Gentlemen:

INTRODUCTION

This report presents the results of our observation and testing of the compacted fill placed on the subject site between August 29, 2011 and April 19, 2013. The original reports of geotechnical investigation, Addendum No. 1, and compaction letter were issued by this office on May 22, 2009, March 22, and April 2, 2012 respectively.

The purpose of the site grading was to remove and recompact the existing fill which was detected during the course of our original investigation.

This office provided continuous observation and testing services during the course of site grading. The presence of our field representative was to provide source of professional advice, opinion, and recommendations based on our observation of the contractors work and did not include any superintending, supervision, or direction of the actual work of the contractor's workmen.

The grading work was performed in accordance with the recommendations presented in the original report. This report basically includes our conclusions and recommendations regarding the work accomplished and the intended use of the compacted fill placed on the site.

The enclosed Site Plan; Drawing No. 1, indicates the approximate location of the field density tests taken during the course of our field observation. This Site Plan also shows the approximate depths and limits of the placed fill.

The attached Appendix I, describes the method of field density testing. Table I presents a summary of field density test results. The attached Appendix II describes the laboratory testing procedures. Table II-1 presents the results of maximum Density-optimum moisture content of the materials used in the compacted fill.

PROPOSED GRADING

The purpose of site grading was to remove and recompact the existing fill detected during our original soils investigation.

The depth of removal and recompaction was approximately 2 to 5 feet. All fill was removed and recompacted. The zone of removal and recompaction were extended beyond the exterior walls of the proposed building a horizontal distance equal to at least 5 feet.

PROJECT SPECIFICATION

The compacted fill was placed in accordance with the recommendations of the original report. All fill soils were compacted to a relative compaction of at least 90 percent at optimum moisture content. The maximum density of the material used were determined in accordance with ASTM Designation D1557-09 laboratory compaction method. The in-place density test of the compacted fill soils were made using Sand Cone Method, as outlined under ASTM designation D 1556-09.

GRADING OBSERVATION

The grading operation was observed to be performed in the following general manner:

1. The surficial fill was excavated until competent native soils were exposed. The exposed bottom of excavations were observed and approved by a representative of this office before new fill was placed. A field memorandum to that effect were left on the subject site;

2. The exposed surfaces were scarified to a depth of 8 inches, watered to near optimum moisture content, and then compacted in-place to a relative compaction of at least 90 percent before new fill was placed;

3. Fill materials were placed in 8-inch loose layers on the prepared surface. Each layer was compacted to a relative compaction of at least 90 percent before the next layer was added. Soils were placed and compacted by a loader;

4. Placement of compacted fill was continued until the proposed finished grades were established;

5. The materials used to construct the compacted fill were on-site soils which consisted of silty sand. The site soils were found to be to be virtually non expansive.

Field density tests were made during the placement of the fill to determine the degree of compaction and moisture content. Where test results indicated insufficient density, additional compaction effort or adjustment of layer thickness, as necessary, were made until at least 90 percent compaction was attained.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of the tests, our observation of the construction procedure used in the field, and our experience, it is our opinion that the compacted fill shown on the enclosed Site Plan; Drawing No. 1, has been placed to at least 90 percent relative compaction. The compacted fill discussed in this report and in the area of the proposed building is primary structural fill intended to support structural foundations and grade slabs.

Based on the results of laboratory testing, it is our opinion that the recommended allowable maximum bearing pressure of 2000 pounds per square foot would be available for footings placed on compacted fill soils having a minimum width of 16 inches and be placed at depth of 24 inches below the lowest adjacent finished grade, This value is for the total of dead and frequently applied live loads and could be increased by 1/3 for short duration transient loading, such as wind or seismic forces, as discussed in the original report. It is anticipated that post construction total and differential settlements of the structure would be on the order of 5/8 and 1/4 of one inch, respectively.

-o0o-

The following Drawing and Appendices are attached and complete this report:

Site Plan - Drawing No. 1
Appendix I - Method of Field Density Testing
Table I - Summary of Field Density Testing
Appendix II - Method of Laboratory Testing
Table II-1
Certificate of Compliance

Respectfully submitted

Applied Earth sciences

Reviewed By:

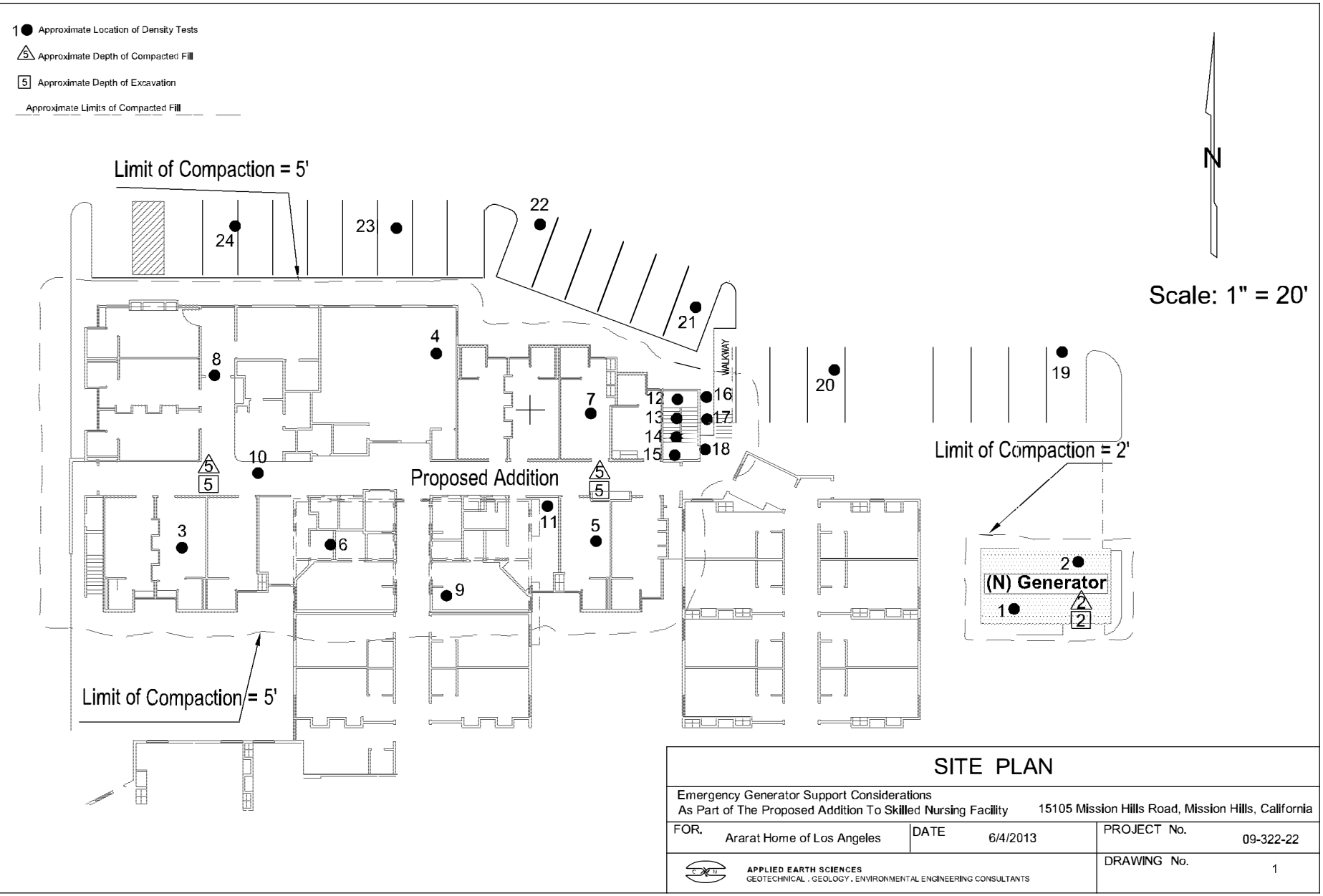
Reza Ghamsari
Staff Engineer

Caro J. Minas
Geotechnical Engineer

GE 601



Dist: (5) Addressee



SITE PLAN

Emergency Generator Support Considerations
As Part of The Proposed Addition To Skilled Nursing Facility — 15105 Mission Hills Road, Mission Hills, California

FOR.	DATE	PROJECT No.
Ararat Home of Los Angeles	6/4/2013	09-322-22

APPLIED EARTH SCIENCES
GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS

DRAWING No. 1

APPENDIX I

METHOD OF FIELD TESTING

The in-place density test of the compacted fill soils were made using Sand Cone Method, as outlined under ASTM designation D1556-09.

TABLE I

SUMMARY OF FIELD DENSITY TESTS

TEST NO.	DATE	ELEVATION IN FEET	FIELD DRY DENSITY (PCF)	FIELD MOISTURE CONTENT (%)	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT %	COMPACTION %
1	8/29/11	F.G. - 2	118	10	128	8	92
2	8/31/11	F.G.	119	10	128	8	93
3	6/20/12	F.G. - 3	119	10	128	8	93
4	6/20/12	F.G. - 3	120	11	128	8	94
5	6/20/12	F.G. - 3	119	11	128	8	93
6	6/21/12	F.G. - 1	119	11	128	8	93
7	6/21/12	F.G. - 1	118	10	128	8	92
8	6/21/12	F.G. - 1	118	11	128	8	92
9	6/23/12	F.G.	119	10	128	8	93
10	6/23/12	F.G.	120	10	128	8	94
11	6/23/12	F.G.	119	11	128	8	93
12	2/13/13	F.G. - 6	118	9	128	8	92
13	2/13/13	F.G. - 4	119	11	128	8	93
14	2/14/13	F.G. - 2	118	10	128	8	92
15	2/14/13	F.G.	119	10	128	8	93
16	2/15/13	F.G. - 6	119	9	128	8	93
17	2/15/13	F.G. - 4	120	11	128	8	94
18	2/15/13	F.G. - 2	118	10	128	8	92
19	2/15/13	F.G.	119	10	128	8	93
20	4/11/13	F.G.	119	11	128	8	93
21	4/11/13	F.G.	120	11	128	8	94
22	4/11/13	F.G.	119	10	128	8	93
23	4/11/13	F.G.	118	11	128	8	92
24	4/11/13	F.G.	120	9	128	8	94

NOTE: See the enclosed site plan Drawing No. 1 for the location of density tests

F. G. Is Finished Grade Elevation

PPENDIX II

LABORATORY TESTING PROCEDURES

Maximum Density-Optimum Moisture Tests

Bag samples of the fill material were tested in our the laboratory to determine maximum dry density and optimum moisture content of the soils. The tests were performed using ASTM D1557-09 Laboratory Compaction Test Method. The results of the test are presented below:

Table II-1

Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% of dry weight)
Brown Silty, slightly clayey sand (SM) On-Site	128	8

The Maximum Density was obtained on sample portion finer than No. 4 screen. Where required each field density test was adjusted to account for that fraction of gravel size larger than the No. 4 screen size openings.

CITY OF LOS ANGELES

DEPARTMENT OF BUILDING AND SAFETY
ENGINEER'S CERTIFICATE OF COMPLIANCE FOR CONSOLIDATED EARTH FILLS

LEGAL OR STREET ADDRESS: 15105 Mission Hills Road
Mission Hills, California
SOIL TESTING AGENCY: C.M. Applied Earth Sciences

PROPERTY OWNER'S NAME: Ararat Home For The Aged
OWNER'S ADDRESS: 15105 Mission Hills Road
Mission Hills, California

AREA TESTED: Proposed Basement Area
PER REPORTS ON THE PROJECT: May 22, 2009, March 22, 2012
DATE WORK STARTED ON PROJECT: August 29, 2011
DATE FILL WAS COMPLETED: April 19, 2013
DATE OF THIS CERTIFICATE: June 4, 2013

TO THE SUPERINTENDENT OF BUILDING:
** I HEREBY CERTIFY THAT I HAVE PERSONALLY INSPECTED AND TESTED THE PLACING OF COMPACTED EARTH FILLS ON THE ABOVE DESCRIBED PROPERTY, AND ON THE BASIS OF THESE INSPECTIONS AND TESTS, IT IS MY OPINION THAT THE SAME WAS PLACED IN CONFORMITY WITH REQUIREMENTS OF THE LOS ANGELES CITY BUILDING CODE.



CARO J. MINAS
Geotechnical Engineer
G.E. 601
MY ADDRESS IS: 4742 San Fernando Road
Glendale, CALIFORNIA 91204

* FOR THE PURPOSE OF THIS CERTIFICATE, TO "HAVE PERSONALLY INSPECTED AND TESTED" SHALL INCLUDE INSPECTION AND TESTING PERFORMED BY ANY PERSON RESPONSIBLE TO THE LICENSED ENGINEER SIGNING THIS CERTIFICATE. WHERE THE INSPECTION AND TESTING OF ALL OR PART OF THE WORK ABOVE ARE DELEGATED, FULL RESPONSIBILITY SHALL BE ASSUMED BY THE LICENSED ENGINEER WHOSE SIGNATURE IS AFFIXED THEREON.

XB&S G-16 5.66

Applied Earth Sciences
a division of Applied Soil Technology, Inc.

1742 San Fernando Rd., Glendale CA 91204
T: (818) 552-6000 F: (818) 552-6007
aessoil.com

DAILY FIELD REPORT

DAILY FIELD REPORT No.	4	CONTRACTOR	Simonian Development
PROJECT NAME	proposed parking	SUPERINTENDENT	ELio
PROJECT No.	09-322-02	PHONE No.	(818) 652 8935
LOCATION	15105 Mission Hills Rd.	DAY	Thursday
CITY	Mission Hills	DATE	4-11-13
CLIENT/OWNER	Ararat Home	FIELD CONDITION	Sunny
CLIENT REP.(S)	ELio		
AES REP. (S)	Rappi	TITLE	Soil technician
SUBJECT	Compaction tests - Subgrade for Base		
EQUIPMENT	Roller		

TIME	FIELD OBSERVATION
	Superintendent / Building Inspector Compaction tests on the Subgrade for Base on the parking lot by this office and the tests Results were found to be 90% Relative to Max density of Soil used.

HOURS	
REGULAR:	2.5
OVERTIME:	
TRAVEL:	1.5
TOTAL HRS:	4
MILEAGE:	34
MINIMUM CHARGE:	

WRITTEN BY: Rappi Calestanian (signature) (representing) DATE: 4-11-13

APPROVED BY: ELio SDI SUPER SDI (signature) (title) (representing) DATE: 4-11-13

COPIES TO: ELio

PAGE 1 of 1

APPLIED EARTH SCIENCES
4742 San Fernando Road
Glendale, California 91204
Tel.: (818) 552-6000 • Fax: (818) 552-6007

FIELD OBSERVATION CHARGES

Invoice # 24502

Date 9/17/12 Project #: 09-322-02

Contact Name: Eric Contact tel #: 818 729 3968

Project Address: 15105 Mission Hills Rd.

Field Engineer: S. Mines

Performed Task: Subgrade observation

Charges for this Performed Task will be made as follows:

_____ hours at 75.00 / hr. including _____ hr(s) travel time and

_____ Miles at 0.65 / mi.

Minimum Trip Charges $ 280.00

Overtime Rate:

_____ hours at 95.00 / hr. including _____ hr(s) travel time and

_____ Miles at 0.65 / mi.

Raymond Ronquillo - Director of Safety
Name Of Field Contact

Raymond Ronquillo CHC, CSST, QSP
Authorized Signature

APPLIED EARTH SCIENCES
4742 San Fernando Road
Glendale, California 91204
Tel.: (818) 552-6000 • Fax: (818) 552-6007

OBSERVATION MEMORANDUM

Date 9/17/12

To: Superintendent / Bldg Inspector

Undersigned inspector observed the pea gravel that has been placed in lieu of compacted engineered fill in various parts of the subgrade. This 3/8" pea gravel was previously approved for use as a backfill material around the elevator pits and in places where placement of backfill and compaction efforts were prohibitively difficult. This material is approved for use adjacent to compacted fill for the purpose of a temporary support embankment until concrete is poured. However, it is recommended that it be covered by the vapor barrier to reduce chance of disturbance during pour. This office to be called out during further landscaping and wall backfill activities.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 09-322-02 Report Date 5/2/05

Project Address 15105 Mission Hills Rd Observed By S. Mines

Signature

Brent Carter Deputy Grading Inspector
Title

Applied Earth Sciences

GEOTECHNICAL & ENVIRONMENTAL ENGINEERING CONSULTANTS

April 2, 2012 09-322-22

Ararat Home Of Los Angeles
c/o Sobin-Harte Architects
23147 Ventura Boulevard
Suite 200
Woodland Hills, California 91364

Attention: Mr. Bob Simonian

Subject: Observation And Testing Of Compacted Fill
Proposed Addition To Skilled Nursing Facility
Within The Confines Of The Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California

Gentlemen:

This report presents the results of our observation and testing of the compacted fill placed on the subject site on March 23, 2012. The original reports of geotechnical investigation and Addendum No. 1 were issued by this office on May 22, 2009 and March 22, 2012 respectively.

This office provided periodic observation and testing services during the course of site grading for this phase of the project, which included excavating a new footing for the southern limit of the proposed new addition, per approved plan. The presence of our field representative was to provide a source of professional advice, opinion, and recommendations based on our observation of the contractors work and did not include any superintending, supervision, or direction of the actual work of the contractor's workmen. This report essentially includes our conclusions and recommendations regarding the work accomplished and the intended use of the compacted fill placed in the site.

The enclosed Site Plan; Drawing No. 1, indicates the new footing along the southern limit of the new building, and the approximate location of the field density test taken during the course of our field observations, with respect to existing and proposed buildings.

The maximum density of the material used were determined in accordance with ASTM Designation D1557-09 laboratory compaction method. The in-place density tests of the compacted fill soils were made using Sand Cone Method, as outlined under ASTM designation D 1556-09.

The results of our field density testing indicated that the previously placed fill soils had a relative compaction of 93% near optimum moisture content. As such, the recommendation given in our March 22 letter to "mechanically compact the [previously placed] controlled fill to at least 92%" is not necessary, since our field compaction test indicates that without further mechanical compaction, the existing fill is already above the required 92% relative compaction.

-o0o-

Thank you for the opportunity to be of service in this project. If you have any questions regarding this submittal, or wish to discuss the project further, please do not hesitate to call us.

Respectfully submitted,

APPLIED EARTH SCIENCES

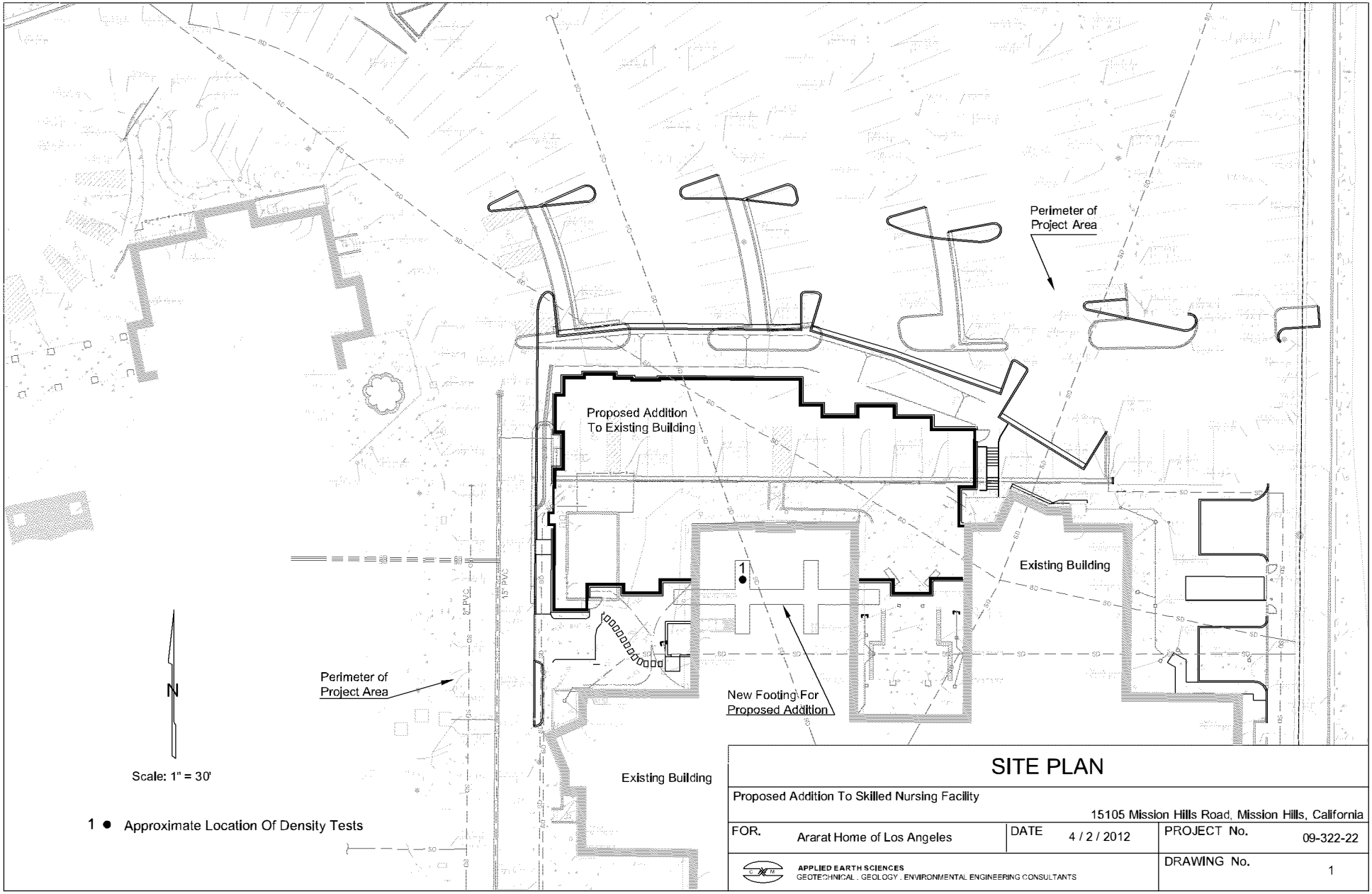
Reviewed By:

Shant Minas
Deputy Grading Inspector
License No. P029739

Caro J. Minas
Geotechnical Engineer
GE 601

PROFESSIONAL GEOLOGIST
SHANT MINAS
PG # 8859
Exp. 12/12
STATE OF CALIFORNIA

REGISTERED PROFESSIONAL ENGINEER
CARO J. MINAS
NO. 601
EXP. 12/12
GEOTECHNICAL
STATE OF CALIFORNIA



SITE PLAN

Proposed Addition To Skilled Nursing Facility

15105 Mission Hills Road, Mission Hills, California

FOR.	Ararat Home of Los Angeles	DATE	4 / 2 / 2012	PROJECT No.	09-322-22
	APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS			DRAWING No.	1

CITY OF LOS ANGELES

DEPARTMENT OF BUILDING AND SAFETY
ENGINEER'S CERTIFICATE OF COMPLIANCE FOR CONSOLIDATED EARTH FILLS

LEGAL OR STREET ADDRESS: 15105 Mission Hills Road
Mission Hills, California

SOIL TESTING AGENCY: C.M. Applied Earth Sciences

PROPERTY OWNER'S NAME: Ararat Home Of Los Angeles
OWNER'S ADDRESS: 15105 Mission Hills Road
Mission Hills, California

AREA TESTED: Proposed Basement Area
PER REPORTS ON THE PROJECT: May 22, 2009; March 22, 2012
DATE WORK STARTED ON PROJECT: March 23, 2012
DATE FILL WAS COMPLETED: March 23, 2012
DATE OF THIS CERTIFICATE: April 2, 2012

TO THE SUPERINTENDENT OF BUILDING:
** I HEREBY CERTIFY THAT I HAVE PERSONALLY INSPECTED AND TESTED THE PLACING OF COMPACTED EARTH FILLS ON THE ABOVE DESCRIBED PROPERTY, AND ON THE BASIS OF THESE INSPECTIONS AND TESTS, IT IS MY OPINION THAT THE SAME WAS PLACED IN CONFORMITY WITH REQUIREMENTS OF THE LOS ANGELES CITY BUILDING CODE.



CARO J. MINAS
Geotechnical Engineer
G.E. 601
MY ADDRESS IS: 4742 San Fernando Road
Glendale, CALIFORNIA 91204

* FOR THE PURPOSE OF THIS CERTIFICATE, TO "HAVE PERSONALLY INSPECTED AND TESTED" SHALL INCLUDE INSPECTION AND TESTING PERFORMED BY ANY PERSON RESPONSIBLE TO THE LICENSED ENGINEER SIGNING THIS CERTIFICATE. WHERE THE INSPECTION AND TESTING OF ALL OR PART OF THE WORK ABOVE ARE DELEGATED, FULL RESPONSIBILITY SHALL BE ASSUMED BY THE LICENSED ENGINEER WHOSE SIGNATURE IS AFFIXED THEREON.

XB&S G-16 5.66

APPLIED EARTH SCIENCES
09-322-22

Applied Earth Sciences
a division of Applied Soil Technology, Inc.
GEOTECHNICAL & ENVIRONMENTAL ENGINEERING CONSULTANTS

March 22, 2012 09-322-02

Ararat Home For The Aged
c/o Sorbin Hearte Architects
23147 Ventura Boulevard
Suite 200
Woodland Hills, California 91364

Attention: Mr. Bob Simonian

Subject: Addendum No. 1
Geotechnical Investigation
Fill Over-Excavation Zone Considerations
Proposed Addition To Skilled Nursing Facility
Within The Confines Of The Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California

Gentlemen:

INTRODUCTION

Following our site meeting on March 22, 2012, we are pleased to submit this Addendum No. 1, providing specific recommendations for over-excavation of the fill within the area of the proposed construction. The original report of geotechnical investigation for the proposed addition to the "Skilled Nursing Facility" was issued by this office on May 22, 2009. Our Supplement No. 1 was later issued on September 10, 2009, providing response to the comments of OSHPD (Office of Statewide Health Planning and Development.

Our original report and Supplement No. 1 were reviewed and approved " with conditions" by the Grading Section of the Department of Building and Safety of the City of Los Angeles. A Soils Report Approval Letter to that effect was issued on June 30, 2010 (Log # 70939).

PROJECT CONSIDERATIONS

In our original report, we had recommended that the top 2 feet of the existing controlled fill be removed and recompacted for support of grade slabs and foundations. We also had recommended that, where possible, the zone of removal and recompaction be extended beyond the footprint of the proposed addition a horizontal distance equal to the depth of excavation. This refers to the open area to the north of the existing building. Further, we had recommended that the vertical zone of removal be limited to the footing bottom of the existing building.

As part of the proposed addition, the northern portion of the existing building will be demolished. Within the footprint of the portion of the existing building that will be demolished, it will ***not*** be necessary to over-excavated the existing controlled fill horizontally. This is because the soils beneath the existing building has not been subject to weathering conditions. Our close examination and probing of the materials exposed within a footing excavation (some 4 feet deep) at the boundary between the existing and proposed addition indicated that the existing controlled fill was quite compact and tight in-place.

SUPPLEMENTAL EVALUATION AND RECOMMENDATIONS

For the purpose of this project, it is recommended that the bottom of the footing exposing the old controlled fill to be compacted in-place with mechanical equipment to attain a relative compaction of at least 92 percent at optimum moisture content. This should be verified by the Soil Engineer.

All geotechnical investigation findings and recommendations presented in our pervious report will remain unchanged.

-oOo-

Thank you for the opportunity to be of continued service on this project. Should you have any questions regarding this Supplement No. 2, or wish to discuss the project further, please do not hesitate to call us.

Respectfully Submitted,

APPLIED EARTH SCIENCES

Caro J. Minas, President.

Geotechnical Engineer
GE 601



CJM/ra

Distribution: (4)

AES Project No: 09-3

OFFICE OF STATEWIDE HEALTH PLANNING AND DEVELOPMENT
FACILITIES DEVELOPMENT DIVISION – www.oshpd.ca.gov/fdd
400 R Street, Suite 200 ~ Sacramento, California 95811 Phone (916) 440-8300 FAX (916) 324-9188
700 N Alameda Street, Suite 2 500 ~ Los Angeles, California 90012 Phone (213) 897-0166 FAX (213) 897-0168

Verified Compliance Report

If Final Report, Place "F" in Box → F

NOTE: Required at specific intervals or project milestones as indicated in the Testing, Inspection and observation Program approved by the Office (See CCR, Title 24, Part 1, Section 7-151)

VR

A Facility Information

Facility #:	Facility Name:	OSHPD #:
22413	Ararat Home of Los Angeles	HL 101812-19A

Street Address:	Phone:
15105 Mission Hills Road	Fax:

City:	County:	Zip:
Mission Hills	Los Angeles	91345

Record Name (Project Scope): Emergency Generator Relocation/Replacement

B

Interval/Milestone*: Final Ref. No.*:

This report includes construction work to the 6th day of January, 20 12

* As identified on the approved Testing, Inspection and Observation Program

C

Observed Elements of Construction this reporting interval or project milestone:

The soil has been tested and accepted as required by the OSHPD approved documents. Work is complete.

D

Area Under Observation Compliance Statement:

I hereby declare that, to the best of my personal knowledge*, the work performed and the materials used and installed covered by this report, are in compliance with the approved drawings and specifications and any approved Post Approval Documents/Amended Construction Documents. If applicable, a tentative list of items to be completed or corrected is given herein below or attached hereto. This list may not be all-inclusive. Failure to include an item in it does not alter the responsibility of the Contractor/Builder to complete all of the work in accordance with the approved drawings and specifications and all applicable building codes. (*As defined in CCR, Title 24, Part 1, Section 7-151)

E

Comments and/or Exception List: (attach additional sheets if necessary)

F

Print Name:	Registration #:
Shant Minas / Caro Minas	601

Firm Name: Applied Earth Sciences

Address:	City:	State:	Zip
4742 San Fernando Rd	Glendale	CA	91204

☐ AOR ☐ CIVIL ☐ Contractor/Owner-Builder ☐ EEOR ☑ GEOR

☐ IOR ☐ MEOR ☐ SEOR ☐ Special Inspector ☐ Other:

Signature: SL for | Date: 1/6/12

Facilities Development Division
400 R Street, Suite 200
Sacramento, CA 95811
(916) 440-8300 Fax (916) 324-9188
www.oshpd.ca.gov/fdd

Mr. Jeffrey L. Sobin C18249
Sobin-Harte Architects, Inc.
23147 Ventura Boulevard, Suite 200
Woodland Hills, CA 91364

DATE 9/2/2011
OSHPD NO. HL091126-19A

Facility Name: ARARAT HOME OF LOS ANGELES – 22413
15105 MISSION HILLS ROAD
MISSION HILLS, CA 91345

Project Scope: SKILLED NURSING FACILITY EXPANSION

Dear Mr. Sobin:

As requested, the Office of Statewide Health Planning and Development, Facilities Development Division (OSHPD) and/or the California Geological Survey (CGS) have reviewed the **Engineering Geology and Geotechnical Engineering Reports** submitted for the project noted above to determine conformance with the standards of the *California Code of Regulations, Title 24, Part 2 (CBC 2007)*.

This letter constitutes written approval of the following documents for OSHPD project HL091126-19A.

1. "Report of Geotechnical Investigation, Proposed Addition to Skilled Nursing Facility within the Confines of the Ararat Home of Los Angeles, Mission Hills, California." Report Prepared by Applied Earth Sciences, dated May 22, 2009.
2. "Supplement # 1, geotechnical Investigation, Proposed 62-Bed Addition to the Existing Skilled Nursing Facility within the Confines of the Ararat Home of Los Angeles, Mission Hills, California." Report Prepared by Applied Earth Sciences, dated September 10, 2009.
3. "Ground Motion Hazard Report, Skilled Nursing facility Expansion, Ararat Home, Mission Hills, California." Report Prepared by Applied Earth Sciences, dated July 21, 2011.

The approval does not authorize or approve any omission or deviation from applicable regulations. Should conditions develop, not covered by the stamped construction documents, a change order detailing and specifying the required work must be submitted to OSHPD for approval.

In addition, you are responsible to the local jurisdiction for local planning standards and these will be enforced by OSHPD at the request of the local jurisdiction.

Acceptance of the work is subject to field inspection and observation and determination that the work, as completed, complies with the applicable regulations.

If you have any questions, please contact me at (916) 440-8469 or cslater@oshpd.state.ca.us.

Sincerely,

M. R. Karim
Supervisor, Structural Support Unit

Enclosure: Review letter from CGS

cc: Ramin Sadr, Supervisor, OSHPD North Los Angeles Region
Sharon Wang, Sr. Architect, OSHPD North Los Angeles Region
Geotechnical File
Armen Hampar, Ararat Home of Los Angeles
Caro Minas – Applied Earth Sciences

DEPARTMENT OF CONSERVATION

CALIFORNIA GEOLOGICAL SURVEY

REVIEW UNIT • 801 K STREET, MS 12-32 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 324-7324 • FAX 916 / 322-4765 • TDD 916 / 324-2555 • WEB SITE conservation.ca.gov/cgs

M. R. Karim
Supervisor Structural Support Unit
Facilities Development Division
Office of Statewide Health Planning and Development
400 R Street, Suite No. 200
Sacramento, CA 95811

August 25, 2011

Subject: **Second Engineering Geology and Seismology Review**
Ararat Home of Los Angeles-SNF Expansion
15099 Mission Hills Road, Mission Hills, Los Angeles County
OSHPD No. HL-091126-19A Facility 22413

Dear Mr. Karim:

In accordance with your request and transmittal of documents on August 18, 2011, the California Geological Survey (CGS) performed a second engineering geology and seismology review for OSHPD of this hospital project in Mission Hills. It is our understanding that the project is the construction of a new sixty bed, two-story skilled nursing addition at the existing facility. This review was performed in accordance with Title 24, California Code of Regulations, Part 2: the 2007 California Building Code and followed CGS Note 48. The following new report was provided by OSHPD for our review:

> Wells, Donald L., Certified Engineering Geologist 2120, and Egan, John A. Registered Geotechnical Engineer 291 (2011), **Ground Motion Hazard Evaluation, Skilled Nursing Facility Expansion, Ararat Home, Mission Hills, California, OSHPD Facility ID no. 22413, OSHPD Project no. HL091126-19A**: AMEC Geomatrix, 2101 Webster Street, 12th Floor, Oakland, California, 94612-3066; **report dated July 21, 2011**, Project No. NB11161600, 15 pages, 5 tables, 8 figures.

CGS reviewed the following previously submitted reports and provided our findings to OSHPD in a letter dated September 28, 2010:

> Crook, Richard, Certified Engineering Geologist 924 and Minas, Caro J., Registered Geotechnical Engineer 601, (2009), **Supplement No. 1, Geotechnical Investigation, Proposed 62-Bed Addition To The Existing Skilled Nursing Facility Within The Confines Of The Ararat Home Of Los Angeles, 15105 Mission Hills Road, Mission Hills, California:** Applied Earth Sciences, 4742 San Fernando Road, Glendale, CA 91204, **report dated September 10, 2009**, Project No. 09-322-22, 6 pages.

Minas, Caro J., Registered Geotechnical Engineer 601, (2009), **Report of Geotechnical Investigation, Proposed Addition To Skilled Nursing Facility Within The Confines Of The "Ararat Home Of Los Angeles", 15105 Mission Hills Road, Mission Hills, California:** Applied Earth Sciences, 4742 San Fernando Road, Glendale, CA 91204, **report dated May 22, 2009**, Project No. 09-322-02, 6 pages.

Minas, Caro J., Registered Geotechnical Engineer 601, (1997), **Observation and Testing of Compacted Fill, Proposed Expansion of Skilled Nursing Facility Within The Confines Of Ararat Home Of Los Angeles, Lot 3 Tract 3660, 15105 Mission Hills Road, Mission Hills, California:** Applied Earth Sciences, 4742 San Fernando Road, Glendale, CA 91204, **report dated November 19, 1997**, Project No. 95-525-02, 15 pages.

Scullin, Michael, Certified Engineering Geologist 170, (1984), **Engineering Geologic/Seismic Investigation and Geotechnical Evaluation, Portion of Sec. #4, T2N, R15W and Lot 3, Tract 3660, M.B. 38, Pages 96-97, Armenian Ararat Institutions, 15103-15105 Mission Hilis Road, Mission Hills, CA:** Robert Stone & Associates, 8020 Deering Avenue, Canoga Park, CA 91304, **report dated February 21, 1984**, Job No. 2159-00, 34 pages.

Our September 28, 2010 review noted the consultants' report the results of a code-based ground motion analysis. Because the proposed building Seismic Design Category is F, the ground motion analysis must include a site–specific ground motion analysis as per 2007 CBC Section 1614A.1.2, ASCE 7-05 Ch. 21, and the OSHPD CAN 2-1802.A.6.2 and 2-1614A1.2. CGS recommended the consultants provide a site–specific ground motion analysis as described above.

In the numbered paragraphs below, this second review of outstanding issues is keyed to the paragraph numbers of California Geological Survey Note 48 (October, 2007 edition), *Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings.*

Seismology & Calculation of Earthquake Ground Motion

12. Evaluation of Historic Seismicity: Adequately addressed.
13. Mapped Spectral Acceleration Parameters: Adequately addressed. The consultants' July 21, 2011 report presents values of S_S = 2.422 and S_1 = 0.811, which are consistent with our independent findings.
14. Classify Geologic Subgrade: Adequately addressed. The consultants' July 21, 2011 report classifies the soil conditions as Site Class D as per 2007 CBC section 1613A.5.5 and Table 1613A.5.2. This appears to be reasonable.
15. Site Coefficients and Adjusted Maximum Considered Earthquake (MCE) parameters: Adequately addressed. The consultants' July 21, 2011 report provides site coefficients F_a = 1.0 and F_v = 1.5, and calculated MCE spectral acceleration parameters for Site Class D are S_{MS} = 2.422 and S_{M1} = 1.217. These values appear to be reasonable.
16. Design Spectral Acceleration Parameters S_{DS} and S_{D1}: Adequately addressed. The consultants' July 21, 2011 report does not provide code-based design spectral acceleration parameters but instead provides site-specific values, nee Number 19 below.

17. Seismic Design Category: Adequately addressed. The consultants' July 21, 2011 report states the Seismic Design Category is F.
18. Deaggregated Seismic Source Parameters: Adequately addressed.
19. Site-Specific Ground Motion Analysis: Adequately addressed. The consultants' July 21, 2011 report provides a Site-Specific Ground Motion Analysis using Next Generation Attenuation relationships and acceptable scaling factors for the maximum rotated component of motion, and in accordance with the 2010 CBC Chapter 16A, ASCE 7-05, Section 21.4, and the OSHPD CAN 2-1802.A.6.2 and 2-1614A1.2. The results of their Site-Specific Ground Motion Analysis are presented in Table 3, 4 and 5, and summarized in the table on page 14. Based on their Site-Specific Ground Motion Analysis in the table on page 14 the consultants provide **S_{DS} = 1.366g and S_{D1} = 1.328g**, and **S_{MS} = 2.049g and S_{M1} = 1.992**. These values appear reasonable based on comparison with the California Geological Survey State-Wide Model (from Peterson and others, 2008).
20. Time-Histories of Earthquake Ground Motion: Not applicable.

Report Documentation

35. Geology, Seismology, and Geotechnical References: Adequately addressed.
36. Certified Engineering Geologist: signature, valid license number: Adequately addressed. Donald L. Wells, Certified Engineering Geologist 2120.
37. Registered Geotechnical Engineer: signature, valid license number & seal: Adequately addressed. John A. Egan, Registered Geotechnical Engineer 291.

Conclusions and Recommendations

Based on our review, the consultants provide an adequate assessment of engineering geology and seismology issues with respect to the proposed improvements. The principal concerns identified by the consultants are: the potential for severe ground shaking from future earthquakes on active faults in the region; shallow loose and potentially compressible soil not suitable for shallow foundation support; shallow expansive soils; and potentially corrosive soils. Based on their Site-Specific Ground Motion Analysis, the consultants provide recommended seismic parameters **S_{DS} = 1.366g** and **S_{D1} = 1.328g**, and **S_{MS} = 2.049g** and **S_{M1} = 1.992**. These values appear reasonable based on comparison with the California Geological Survey State-Wide Model (from Peterson and others, 2008). Their evaluation indicates liquefaction, dynamic settlement, surface fault rupture, and deep-seated slope instability are not design concerns for the project.

In conclusion, ***the engineering geology and seismology issues at this site are adequately assessed in the referenced reports and no additional information is requested from the consultants at this time.*** If you have any further questions about this review letter, you may contact the California Geological Survey at (707) 576-2162.

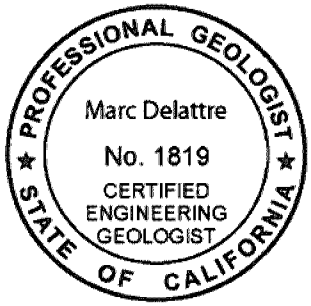
Respectfully submitted,

Wayne D. Haydon
Engineering Geologist
PG 4747, CEG 1740



Concur:

Marc Delattre
Senior Engineering Geologist
PG 5230, CEG 1819



Applied Earth Sciences

GEOTECHNICAL & ENVIRONMENTAL ENGINEERING CONSULTANTS

August 10, 2011

Project No. 09-322-22

Mr. Bob Simonian
Sobin-Harte Architects. Inc.
23147 Ventura Blvd., Suite 200
Woodland Hills, CA 91364

Subject: Qualifications of AES for Construction Observation and Testing
Ararat Home of Los Angeles
Proposed Skilled Nursing Facility Expansion
15105 Mission Hills Road
Mission Hills, CA 91345

Mr. Simonian:

This office previously performed a geotechnical investigation of the subject site in 2009 and produced reports dated 5/22/2009, 9/10/2009, 7/12/2010, and 2/4/2011. These reports were subsequently approved by the LADBS Grading Division in their Approval Letter Dated 6/30/2010; OSHPD approved our reports pending a site-specific ground motions study, which was later produced by AMEC and is currently under review.

It is our understanding that the first phase of construction of an auxiliary building is to commence the latter part of the week of August 15. As such, it has been requested from this office to produce some documentation regarding the qualifications of team members that will be performing inspections and observations during construction.

AES was founded in 1985 by the current principal Caro Minas, after working with a number of major national and international engineering firms for 12 years. He received his BS ('75) and MS ('76) degrees in civil and geotechnical engineering, respectively, from California State University. In addition to his extensive experience in California and Nevada, he has conducted major investigations for nuclear power plants, harbors, industrial complexes, and gas distribution projects in the Persian Gulf area. He is one of the most experienced geotechnical engineers in the LA area and oversees all engineering operations at AES. Qualifications pertinent to the current Missions Hills construction-phase project include active professional state licenses as a Civil Engineer (Lic. No. 31970) as well as Geotechnical Engineer (Lic. No. 601).

Shant Minas, a state licensed Professional Geologist (No. 8859), will serve as the project geologist, providing inspections when excavations are made into bedrock. Shant will also provide Deputy Inspection services as needed during construction. Shant holds the following licenses and/or designations pertinent to this project: Professional Geologist (CA), ICC Soils Special Inspector, and Deputy Grading Inspector (Lic. No. P029739).

Reza Ghamsari is our senior field engineer and has over twenty years experience in geotechnical engineer, especially construction-phase inspections and observations. Reza is also a licensed Deputy Grading Inspector in the City of Los Angeles. Reza will oversee most day-to-day engineering field observations and prepare the final compaction and as-built grading report.

Raffi Galestanian is a field technician with over 25 years experience in the geotechnical field as well as in the petroleum engineering field. Raffi will be performing routine grading, foundation and subdrain observations and will perform compaction testing under the supervision of Reza.

Lastly, AES has a Los Angeles City-approved soils engineering testing laboratory (Lic. No. 24715) at its premises in Glendale, which will provide materials testing support throughout construction.

Please do not hesitate to ask further questions. References and copies of licenses and certificates can be provided upon request.

Respectfully submitted,
Applied Earth Sciences



August 10, 2011

Shant Minas
Project Geologist
General Manager

Date

June 21, 2011
2011NB0055

Mr. Shant Minas
Applied Earth Sciences
4742 San Fernando Road
Glendale, CA 91204

Subject: **PROPOSAL FOR SITE-SPECIFIC GROUND MOTION HAZARD EVALUATION ARARAT HOME OF LOS ANGELES-SNF EXPANSION**
15099 Mission Hills Road, Mission Hills, Los Angeles County, California

Dear Mr. Minas:

As requested, AMEC Geomatrix, Inc., (AMEC) has prepared this proposal and scope of work to perform a site-specific ground motion hazard evaluation for the Skilled Nursing Facility (SNF) expansion at the Ararat Home of Los Angeles facility in Mission Hills, California. It is our understanding that the project involves the construction of a new sixty bed, two-story skilled nursing addition at the existing facility. It also is our understanding that Applied Earth Sciences (AES) submitted a set of reports to the Office of Statewide Health Planning and Development (OSHPD) and their reviewer, the California Geological Survey (CGS). CGS provided comments in a letter dated September 28, 2010, and they state that a site specific ground motion analysis is required for compliance with the 2007 California Building Code (CBC), because the proposed building Seismic Design Category is F.

SCOPE OF WORK

AMEC will complete a site-specific probabilistic ground motion hazard evaluation (commonly referred to as a probabilistic seismic hazard analysis or PSHA) for the project site, including consideration of near-field fault rupture effects, if necessary, as a basis for developing site-specific equal-hazard response spectra. The PSHA will be conducted using a seismic source model developed for the site region and attenuation relationships appropriate for the types of seismic sources included in the source model and for the site conditions. We also will evaluate the deterministic limit spectra and the site-specific deterministic maximum considered earthquake spectra (MCE) as a basis for selecting the site-specific MCE and design response spectra. The MCE and design spectra will be developed consistent with the 2010 CBC (it is our understanding that any new submissions in 2011 must comply the 2010 CBC), and in accordance with the requirements of the OSHPD and the 2010 CBC for design of skilled nursing facilities. However, we will need confirmation from AES and the owner regarding the nature of the facility (OSHPD Type 2 or other), and the code of record for the project as a basis for selecting the appropriate approach for the analysis.

AMEC will provide the results of the evaluation in a letter report for submission to the OSHPD and CGS. The report will be signed by registered professionals as required by the CBC. The report will be provided in electronic form for use by the Project Team.

AMEC Geomatrix, Inc.
510 Supeior Avenue, Suite 200
Newport Beach, CA
USA 92663-3627
Tel (949) 642-0245
Fax (949) 642-4474
www.amecgeomatrixinc.com

SCHEDULE

AMEC can complete the evaluation and prepare a draft letter report for AES' review within three (3) weeks from notice to proceed. The final report can be completed within one (1) week after we receive your comments.

FEE

We propose to perform and complete the proposed scope of work for a not-to-exceed fee of $6,800 on a time and materials basis. The fees will be billed in accordance with the hourly rates and charges outlined in the attached fee schedule.

If the proposal meets with your approval and you would like us to proceed with the work described herein, please sign and return the Professional Services Agreement attached; otherwise, please send us your contract for consulting services.

Thank you for the opportunity to present this proposal. If you have any questions regarding the scope, schedule or cost of the services described herein, please do not hesitate to call the undersigned at (949) 642-0245.

Sincerely,
AMEC GEOMATRIX, INC.

James J. Weaver, PE, GE
Vice President and
Principal Geotechnical Engineer

Enclosures: Professional Services Agreement
Schedule of Charges

Professional Services Agreement
Time-and-Materials

PARTIES

This Agreement made this _____ day of June 2011, between:

Client Name	**Applied Earth Sciences**	and	**AMEC Geomatrix Inc.**
Address	4742 San Fernando Road Glendale, CA 91204		510 Superior Ave, Suite 200 Newport Beach, California 92663
Attn:	Shant Minas		Attn: Jay Weaver
hereinafter called "Client"			hereinafter called "AMEC"

PROJECT

Client engages AMEC to provide services in connection with:

PROPOSAL FOR SITE-SPECIFIC GROUND MOTION HAZARD EVALUATION - ARARAT HOME OF LOS ANGELES-SNF EXPANSION

SCOPE OF SERVICES

AMEC agrees to perform services as follows:

Services are described on the attached letter proposal dated June 2011.

COMPENSATION

Client agrees to compensate AMEC for all hours worked and other costs incurred at the rates and terms set forth herein. Should the total cost of AMEC's performance be greater than the estimated amount shown below, AMEC will notify CLIENT and provide a revised estimate for Client's approval. In such event, continued performance is subject to additional funding as mutually agreed. In addition to the Agreement amount, CLIENT assumes full responsibility for the payment of any applicable sales, use, or value-added taxes under this Agreement, except as otherwise specified.

Labor Categories and Hourly Labor Rates:	Other Direct Costs (Reimbursed at cost plus 10 % mark-up):
See attached proposal	See attached proposal

Total Estimated Cost: $6,800

ATTACHMENTS

The listed attachments form part of this agreement:

1. This professional services agreement has been included as an attachment to the letter proposal (PROPOSAL FOR SITE-SPECIFIC GROUND MOTION HAZARD EVALUATION - ARARAT HOME OF LOS ANGELES-SNF EXPANSION) dated June 21, 2011.

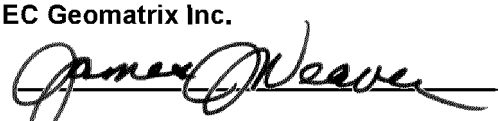
TERMS AND CONDITIONS

1. AUTHORIZATION TO PROCEED. The signing of this Agreement by the Client and AMEC will serve as written authorization for AMEC to proceed with the services called for in this Agreement.
2. EXTENT OF AGREEMENT. This Agreement, including attachments incorporated herein by reference, represents the entire agreement between AMEC and Client and supersedes all prior negotiations, representations, or agreements, either written or oral. This Agreement may be altered only by written instrument signed by authorized representatives of both Client and AMEC.
3. CHANGES. Work beyond the scope of services or redoing any part of the project through no fault of AMEC, shall constitute extra work and shall be paid for on a time-and-materials basis in addition to any other payment provided for in this Agreement. In the event AMEC's work is interrupted due to delays other than delays caused by AMEC, AMEC shall be compensated equitably (based on AMEC's current Fee Schedule) for the additional labor or other charges associated with maintaining its work force for Client's benefit during the delay, or at the option of the Client, for charges incurred by AMEC for demobilization and subsequent remobilization. If, during the course of performance of this Agreement, conditions or circumstances are discovered which were not contemplated by AMEC at the commencement of this Agreement, AMEC shall notify Client in writing of the newly discovered conditions or circumstances and the impact on the Agreement. Client and AMEC agree to negotiate in good faith any changes to the price, terms and conditions or schedule of this Agreement. All previous proposals, offers, and other communications relative to the provisions of these services are hereby superseded. CLIENT acknowledges and agrees that it's use of any purchase order or other form to procure services is solely for administrative purposes and in no event shall AMEC be bound to any terms and conditions on such form regardless of reference to or signature. CLIENT shall endeavor to reference this Agreement on any purchase order (or any other form), but CLIENT's failure to do so shall not operate to modify this Agreement.
4. PAYMENT. AMEC shall invoice Client periodically for the services performed under this Agreement. Client shall pay such invoice upon receipt. Invoices not paid within thirty (30) days of the invoice date shall be subject to a late fee of one and one-half percent (1.5%) per month computed at 31 days from the date of invoice. In addition, any collection fees, attorney's fees, court costs, and other related expenses

incurred by AMEC in the collection of delinquent invoice amounts shall be paid by CLIENT. The invoice amounts shall be presumed to be correct unless Client notifies AMEC in writing within fourteen (14) days of receipt. Progress billings, when paid, represent acceptances by Client of the invoiced services performed by AMEC. The Client agrees to pay attorney fees and costs necessary to collect on past due accounts. If client fails to pay an invoice when due, AMEC may suspend all services until such invoice is paid in full.

5. PERMITS, UTILITIES AND ACCESS. Unless otherwise stated in the Proposal, the Client shall apply for and obtain all required permits and licenses. The Client shall make all necessary arrangements for right of entry to provide AMEC access to the site for all equipment and personnel at no charge to AMEC. The Client shall also provide AMEC with the location of all underground utilities and structures in the exploration area, unless otherwise agreed in writing. While AMEC will take all reasonable precautions to minimize any damage to the property, the Client agrees to hold AMEC harmless for any damages to any subterranean structures or any damage required for right of entry.
6. PROBABLE COSTS. AMEC does not guarantee the accuracy of probable costs for providing services hereunder. Such probable costs represent only AMEC judgment as a Professional and are supplied only for the general guidance of the Client.
7. DISPUTES. Any dispute arising hereunder shall first be resolved by taking the following steps, where a successive step is taken if the issue is not resolved at the preceding step: 1) by the technical and contractual personnel for each party performing this Subcontract, 2) by executive management of each party, 3) by mediation, 4) by arbitration if both parties agree or 5) through the court system of the jurisdiction of the AMEC office that entered this Agreement. CLIENT hereby waives the right to trial by jury for any disputes arising out of this Agreement.
8. STANDARD OF CARE. AMEC shall perform its services in a manner consistent with the standard of care and skill ordinarily exercised by members of the profession practicing under similar conditions in the geographic vicinity and at the time the services are performed. This Agreement neither makes nor intends a warranty or guarantee, express or implied.
9. INDEMNITY. Client waives any claim against AMEC, its officers, employees and agents and agrees to defend, indemnify, protect and hold harmless AMEC and its officers, employees and agents from any and all claims, liabilities, damages or expenses, including but not limited to delay of the project, reduction of property value, fear of or actual exposure to or release of toxic or hazardous substances, and any consequential damages of whatever nature, which may arise directly or indirectly, to any party, as a result of the services provided by AMEC under this Agreement, unless such injury or loss is caused by the sole negligence of AMEC. All claims by Client shall be deemed relinquished unless filed within one (1) year after substantial completion of the services.
10. LIMITATION OF LIABILITY. Notwithstanding any other provision of this Agreement, Client agrees to limit AMEC's and its officers, directors, employees and agents liability due to professional negligence and to any liability arising out of or relating to this Agreement to the lesser of $50,000 or the stated value of this Agreement. This limit applies to all services on this project, whether provided under this or subsequent agreements, unless modified in writing, agreed to and signed by authorized representatives of the parties. In addition, AMEC shall not be liable for consequential, incidental or indirect damages as a result of the performance of this Agreement.
11. INSURANCE. AMEC will maintain insurance for this Agreement in the following types: 1) worker's compensation insurance at statutorily required levels, 2) comprehensive general liability insurance and 3) automotive insurance.
12. RESPONSIBILITY. AMEC is not responsible for the completion or quality of work that is dependent upon or performed by the Client or third parties not under the direct control of AMEC, nor is AMEC responsible for their acts or omissions or for any damages resulting therefrom.
13. EXCLUSIVE USE. Services provided under this Agreement, including all reports, information or recommendations prepared or issued by AMEC, are for the exclusive use of the Client for the project specified. No other use is authorized under this Agreement. Client will not distribute or convey AMEC's reports or recommendations to any person or organization other than those identified in the project description without AMEC's written authorization. Client releases AMEC from liability and agrees to defend, indemnify, protect and hold harmless AMEC from any and all claims, liabilities, damages or expenses arising, in whole or in part, from such unauthorized distribution.
14. FIELD REPRESENTATION. The presence of AMEC's or its subcontractors' field personnel, may be for the purpose of providing project administration, assessment, observation and/or field testing. Should a contractor(s) not retained by AMEC be involved in the project, Client will advise such contractor(s) that AMEC's services do not include supervision or direction of the means, methods or actual work of the contractor(s), his employees or agents. Client will also inform contractor that the presence of AMEC's field representative for project administration, assessment, observation or testing, will not relieve the contractor of its responsibilities for performing the work in accordance with applicable regulations, or in accordance with project plans and specifications. If a contractor is involved on the project, Client agrees AMEC shall not be responsible for working conditions on the job site including the safety and security of persons or property.
15. ENVIRONMENTAL LIABILITY. Client has and shall retain all responsibility and liability for the environmental conditions on the site. All non-consumed samples shall remain the property of the Client, and Client shall be responsible for and promptly pay for the removal and lawful disposal of samples, cuttings and hazardous materials, unless otherwise agreed in writing. If appropriate, AMEC shall preserve samples obtained for the project for not longer than 30 days after the issuance of any document that includes the data obtained from those samples.
16. TERMINATION. This Agreement may be terminated by either party upon ten (10) days written notice to the other. In the event of a termination, Client shall pay for all reasonable charges for work performed and demobilization by AMEC to date of notice of termination. The limitation of liability and indemnity obligations of this Agreement shall be binding notwithstanding any termination of this Agreement.
17. ASSIGNMENT. Neither client nor AMEC shall assign its interest in this Agreement without the written consent of the other.
18. GOVERNING LAW. This Agreement is governed by the law the judicial jurisdiction of the AMEC office that entered this Agreement.

Client and AMEC acknowledge that each has read and agrees to the Terms and Conditions, which are incorporated herein and made a part of this Agreement.

Client:	**AMEC Geomatrix Inc.**
By: _____	By: 
Title: _____	Title: Vice President
Date: _____	Date: June 21, 2011

AMEC GEOMATRIX, INC.
SCHEDULE OF CHARGES

Effective March 26, 2011

The Schedule of Charges applies to all services provided by and/or through AMEC Geomatrix, Inc. (AMEC). The schedule of charges may be revised periodically, as conditions require.

LABOR:

Labor charges are for technical work, including technical typing, editing, and graphics involved in the preparation of reports and correspondence and for the time associated with production of such documents. Direct charges are not made for secretarial service, office management, accounting, and maintenance, because these items are included in overhead. Labor category charge rates for AMEC are listed below. Regional and other factors may influence rates charged for certain individuals. Rates for individuals will be provided on request.

LABOR CATEGORY	HOURLY RATE
Principal	$225 - 350
Senior Consultant	225 - 350
Senior Decision Analyst	225 - 350
Senior II	195 - 220
Senior I	190
GIS Programmer/Web Designer	148
Project II	145
Project I	135
Field Engineer	122
Staff II	122
Staff I	112
Senior Technician	95
Field Technician	90
CAD/Graphic Designer	96
Technical Editor	95
Project Assistant	75
Support Staff	70

Time spent in travel in the interest of the client will be charged at hourly rates, except that no more than 8 hours of travel time will be charged in any day. When it is necessary for an employee to be away from the office ovemight, actual costs, or a negotiated rate, will be charged for living expenses. Employee expenses will be charged at cost plus 15%.

Charges for expert witness services will be at the hourly rates shown. However, for depositions and for court appearances, the rate is twice the amount shown. There will be a 4-hour minimum per-day charge for depositions and an 8-hour minimum per-day charge for court appearances. Special accounting services will be billed at the Support Staff rate.

COMMUNICATIONS CHARGE:

Four percent (4%) of Labor charges for routine photocopying, regular mail postage, and fax/telephone/cellular phone usage.

OUTSIDE SERVICES:

Outside services will be charged at cost plus 15%. Common outside items include: consultants, drilling services, laboratory testing, equipment and vehicle rental, printing and photographic work, postage and shipping, conference calls, travel and transportation.

REIMBURSABLES:

Non-routine Photocopies	$0.12/sheet
Specialized Computer Applications	$25.00/hour
Field equipment, vehicles, specialized reproduction	On request

INVOICES:

Invoices will be rendered at least monthly, either as a final or partial billing, and will be payable upon receipt. An additional late payment charge of 1 1/2% per month or the maximum charge allowed by law, whichever is less, will be payable on accounts not paid within 30 days from billing date.

AMEC is an Equal Opportunity/Affirmative Action Employer, and as such adheres to all applicable federal, state, and local laws and regulations in this regard.

AES Project #
09-322-02

SCHEDULE

First Draft by Friday, July 15th.

AMEC can complete the evaluation and prepare a draft letter report for AES' review ~~within three (3) weeks~~ from notice to proceed. The final report can be completed within ~~one (1) week~~ three days after we receive your comments.

FEE

$6000.00

We ~~propose~~ to perform and complete the proposed scope of work for a not-to-exceed fee of ~~$6,800~~ on a time and materials basis. The fees will be billed in accordance with the hourly rates and charges outlined in the attached fee schedule.

If the proposal meets with your approval and you would like us to proceed with the work described herein, please sign and return the Professional Services Agreement attached; otherwise, please send us your contract for consulting services.

Thank you for the opportunity to present this proposal. If you have any questions regarding the scope, schedule or cost of the services described herein, please do not hesitate to call the undersigned at (949) 642-0245.

Sincerely,
AMEC GEOMATRIX, INC.

James J. Weaver, PE, GE
Vice President and
Principal Geotechnical Engineer

Enclosures: Professional Services Agreement
Schedule of Charges

Professional Services Agreement
Time-and-Materials

PARTIES
This Agreement made this 6th day of ~~June~~ July 2011, between:

Client Name	**Applied Earth Sciences**	and	**AMEC Geomatrix Inc.**
Address	4742 San Fernando Road Glendale, CA 91204		510 Superior Ave, Suite 200 Newport Beach, California 92663
Attn:	Shant Minas		Attn: Jay Weaver
hereinafter called "Client"			hereinafter called "AMEC"

PROJECT
Client engages AMEC to provide services in connection with:

PROPOSAL FOR SITE-SPECIFIC GROUND MOTION HAZARD EVALUATION - ARARAT HOME OF LOS ANGELES-SNF EXPANSION

SCOPE OF SERVICES
AMEC agrees to perform services as follows:

Services are described on the attached letter proposal dated June 2011.

COMPENSATION
Client agrees to compensate AMEC for all hours worked and other costs incurred at the rates and terms set forth herein. Should the total cost of AMEC's performance be greater than the estimated amount shown below, AMEC will notify CLIENT and provide a revised estimate for Client's approval. In such event, continued performance is subject to additional funding as mutually agreed. In addition to the Agreement amount, CLIENT assumes full responsibility for the payment of any applicable sales, use, or value-added taxes under this Agreement, except as otherwise specified.

Labor Categories and Hourly Labor Rates:
See attached proposal

Other Direct Costs (Reimbursed at cost plus 10 % mark-up):
See attached proposal

Total Estimated Cost: ~~$6,800~~ NOT to EXCEED $6000.00 as agreed

ATTACHMENTS
The listed attachments form part of this agreement:

1. This professional services agreement has been included as an attachment to the letter proposal (PROPOSAL FOR SITE-SPECIFIC GROUND MOTION HAZARD EVALUATION - ARARAT HOME OF LOS ANGELES-SNF EXPANSION) dated June 21, 2011.

TERMS AND CONDITIONS

1. AUTHORIZATION TO PROCEED. The signing of this Agreement by the Client and AMEC will serve as written authorization for AMEC to proceed with the services called for in this Agreement.
2. EXTENT OF AGREEMENT. This Agreement, including attachments incorporated herein by reference, represents the entire agreement between AMEC and Client and supersedes all prior negotiations, representations, or agreements, either written or oral. This Agreement may be altered only by written instrument signed by authorized representatives of both Client and AMEC.
3. CHANGES. Work beyond the scope of services or redoing any part of the project through no fault of AMEC, shall constitute extra work and shall be paid for on a time-and-materials basis in addition to any other payment provided for in this Agreement. In the event AMEC's work is interrupted due to delays other than delays caused by AMEC, AMEC shall be compensated equitably (based on AMEC's current Fee Schedule) for the additional labor or other charges associated with maintaining its work force for Client's benefit during the delay, or at the option of the Client, for charges incurred by AMEC for demobilization and subsequent remobilization. If, during the course of performance of this Agreement, conditions or circumstances are discovered which were not contemplated by AMEC at the commencement of this Agreement, AMEC shall notify Client in writing of the newly discovered conditions or circumstances and the impact on the Agreement. Client and AMEC agree to negotiate in good faith any changes to the price, terms and conditions or schedule of this Agreement. All previous proposals, offers, and other communications relative to the provisions of these services are hereby superseded. CLIENT acknowledges and agrees that it's use of any purchase order or other form to procure services is solely for administrative purposes and in no event shall AMEC be bound to any terms and conditions on such form regardless of reference to or signature. CLIENT shall endeavor to reference this Agreement on any purchase order (or any other form), but CLIENT's failure to do so shall not operate to modify this Agreement.
4. PAYMENT. AMEC shall invoice Client periodically for the services performed under this Agreement. Client shall pay such invoice upon receipt. Invoices not paid within thirty (30) days of the invoice date shall be subject to a late fee of one and one-half percent (1.5%) per month computed at 31 days from the date of invoice. In addition, any collection fees, attorney's fees, court costs, and other related expenses

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8. STANDARD OF CARE. AMEC shall perform its services in a manner consistent with the standard of care and skill ordinarily exercised by members of the profession practicing under similar conditions in the geographic vicinity and at the time the services are performed. This Agreement neither makes nor intends a warranty or guarantee, express or implied.
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13. EXCLUSIVE USE. Services provided under this Agreement, including all reports, information or recommendations prepared or issued by AMEC, are for the exclusive use of the Client for the project specified. No other use is authorized under this Agreement. Client will not distribute or convey AMEC's reports or recommendations to any person or organization other than those identified in the project description without AMEC's written authorization. Client releases AMEC from liability and agrees to defend, indemnify, protect and hold harmless AMEC from any and all claims, liabilities, damages or expenses arising, in whole or in part, from such unauthorized distribution.
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18. GOVERNING LAW. This Agreement is governed by the law the judicial jurisdiction of the AMEC office that entered this Agreement.

Client and AMEC acknowledge that each has read and agrees to the Terms and Conditions, which are incorporated herein and made a part of this Agreement.

Client:	AMEC Geomatrix Inc.
By: Shant Minas	By:
Title: Project Geologist, AES	Title: Vice President
Date: July 6, 2011	Date: June 21, 2011

STATE OF CALIFORNIA, NATURAL RESOURCES AGENCY ARNOLD SCHWARZENEGGER, GOVERNOR

DEPARTMENT OF CONSERVATION

CALIFORNIA GEOLOGICAL SURVEY

REVIEW UNIT • 801 K STREET, MS 12-32 • SACRAMENTO, CALIFORNIA 95814

PHONE 916 / 324-7324 • FAX 916 / 322-4765 • TDD 916 / 324-2555 • WEB SITE conservation.ca.gov/cgs

Catherine F. Slater, CEG 2219
Senior Engineering Geologist
Facilities Development Division
Office of Statewide Health Planning and Development
400 R Street, Suite No. 200
Sacramento, CA 95811

September 28, 2010

Subject: **Engineering Geology and Seismology Review**
Ararat Home of Los Angeles-SNF Expansion
15099 Mission Hills Road, Mission Hills, Los Angeles County
OSHPD No. HL-091126-19A Facility 22413

Dear Ms. Slater:

In accordance with your request and transmittal of documents on October 27, 2009, the California Geological Survey (CGS) performed an engineering geology and seismology review for OSHPD of this hospital project in Mission Hills. It is our understanding that the project is the construction of a new sixty bed, two-story skilled nursing addition at the existing facility. This review was performed in accordance with Title 24, California Code of Regulations, Part 2: the 2007 California Building Code and followed CGS Note 48. We reviewed the following consulting reports:

Crook, Richard, Certified Engineering Geologist 924 and Minas, Caro J., Registered Geotechnical Engineer 601, (2009), **Supplement No. 1, Geotechnical Investigation, Proposed 62-Bed Addition To The Existing Skilled Nursing Facility Within The Confines Of The Ararat Home Of Los Angeles, 15105 Mission Hills Road, Mission Hills, California:** Applied Earth Sciences, 4742 San Fernando Road, Glendale, CA 91204, **report dated September 10, 2009**, Project No. 09-322-22, 6 pages.

Minas, Caro J., Registered Geotechnical Engineer 601, (2009), **Report of Geotechnical Investigation, Proposed Addition To Skilled Nursing Facility Within The Confines Of The "Ararat Home Of Los Angeles", 15105 Mission Hills Road, Mission Hills, California:** Applied Earth Sciences, 4742 San Fernando Road, Glendale, CA 91204, **report dated May 22, 2009**, Project No. 09-322-02, 6 pages.

Minas, Caro J., Registered Geotechnical Engineer 601, (1997), **Observation and Testing of Compacted Fill, Proposed Expansion of Skilled Nursing Facility Within The Confines Of Ararat Home Of Los Angeles, Lot 3 Tract 3660, 15105 Mission Hills Road, Mission Hills, California:** Applied Earth Sciences, 4742 San Fernando Road, Glendale, CA 91204, **report dated November 19, 1997**, Project No. 95-525-02, 15 pages.

Scullin, Michael, Certified Engineering Geologist 170, (1984), **Engineering Geologic/Seismic Investigation and Geotechnical Evaluation, Portion of Sec. #4, T2N, R15W and Lot 3, Tract 3660, M.B. 38, Pages 96-97, Armenian Ararat Institutions, 15103-15105 Mission Hills Road, Mission Hills, CA:** Robert Stone & Associates, 8020 Deering Avenue, Canoga Park, CA 91304, **report dated February 21, 1984**, Job No. 2159-00, 34 pages.

In the numbered paragraphs below, this review is keyed to the paragraph numbers of California Geological Survey Note 48 (October, 2007 edition), *Checklist for the Review of Engineering Geology and Seismology Reports for California Public Schools, Hospitals, and Essential Services Buildings*. This checklist may be downloaded from the CGS website at: http://www.consrv.ca.gov/CGS/information/publications/cgs_notes/note_48/note_48.pdf

Project Location

1. Site Location Map, Street Address, and County Name: Adequately addressed.
2. Plot Plan with Exploration Data with Building Footprint: Adequately addressed. The consultants' September 10, 2009 report indicates subsurface exploration conducted for this investigation included 6 hollow-stem borings to depths of 21 to 51; all encountering bedrock. Boring number, location, and depth, as well as the description of drilling, and sampling methods, are all adequate, appropriate, and sufficient to evaluate subsurface soil, bedrock and groundwater conditions, and characterize site geologic hazards, including liquefaction and seismic settlement.
3. Site Coordinates: Not provided. The coordinates are: 34.2828°N and 118.4613°W.

Engineering Geology

4. Regional Geology and Regional Fault Maps: Adequately addressed.
5. Geologic Map of Site: Adequately addressed.
6. Subsurface Geology: Adequately addressed. The consultants' May 22, 2009 and September 10, 2009 reports and boring logs indicate the site is underlain by, in order of increasing depth: fill; Recent alluvium; Older alluvial deposits; and Tertiary aged Modelo Formation. The fill consists of medium dense to dense, slightly gravelly silty sand to sandy silt and clay to depths of about 4 to 7 feet. The Recent alluvium consists of up to 10 feet of very stiff sandy silt and medium dense to dense silty sand. The Older Alluvium consists of medium dense to dense gravelly silty sand to depths of about 20 to 30 feet. The Modelo Formation consists of very stiff shale to the depth explored. Groundwater was encountered in the borings to about 20 feet. The consultants include the map of historically highest groundwater levels from CGS *Seismic Hazard Evaluation of the San Fernando 7.5-minute*

14. Classify Geologic Subgrade: Adequately addressed. The consultants' May 22, 2009 report classifies the soil conditions as Site Class D as per 2007 CBC section 1613A.5.5 and Table 1613A.5.2. This appears to be reasonable.
15. Site Coefficients and Adjusted Maximum Considered Earthquake (MCE) parameters: Adequately addressed. The consultants' May 22, 2009 report provides site coefficients F_a = 1.0 and F_v = 1.5. The September 10, 2009 report presents calculated MCE spectral acceleration parameters for Site Class D are S_{MS} = 2.34 and S_{M1} = 1.23. These values appear to be reasonable.
16. Design Spectral Acceleration Parameters S_{DS} and S_{D1}: Adequately addressed. The consultants' September 10, 2009 report provides code-based design spectral acceleration parameters of S_{DS} = 1.56 and S_{D1} = 0.82. These values appear reasonable.
17. Seismic Design Category: Not provided. Because the proposed building Occupancy Category is IV and S_{D1} = 0.82, the Seismic Design Category is F.
18. Deaggregated Seismic Source Parameters: Not addressed.
19. Site-Specific Ground Motion Analysis: **Additional information is requested.** The consultants' report the results of a code-based ground motion analysis. Because the proposed building Seismic Design Category is F, the ground motion analysis must include a site–specific ground motion analysis as per 2007 CBC Section 1614A.1.2, ASCE 7-05 Ch. 21, and the OSHPD CAN 2-1802.A.6.2 and 2-1614A1.2. CGS recommends the consultants provide a site–specific ground motion analysis as described above.
20. Time-Histories of Earthquake Ground Motion: Not applicable.

Liquefaction/Seismic Settlement Analysis

21. Geologic Setting: Adequately addressed.
22. Liquefaction Calculations: Adequately addressed. The consultants' May 22, 2009 report concludes liquefaction will not occur at the site because the granular soils below the historically highest groundwater level are dense. This appears reasonable.
23. Seismic Settlement of the Entire Soil Column: Adequately addressed. The consultants' May 22, 2009 report estimates total seismically induced liquefaction and dry sand settlement to be less than 3/8 inch, with differential settlement at 1/4 inch. This appears reasonable.
24. Potential for Lateral Spreading: Adequately addressed. The consultants' May 22, 2009 report indicates because of the flat and level site conditions, the potential is nil. This appears reasonable.
25. Mitigation Options for Liquefaction: Not required.

Slope Stability Analyses

26. Landslide Mapping: Adequately addressed. The consultants' May 22, 2009 report indicates due to relatively level site conditions the landslide risk is "nil." This appears reasonable.
27. Static and Dynamic Strength Parameters: Not required.
28. Pseudo-Static Coefficient: Not required.
29. Critical Slip Surfaces for Analyses: Not required.
30. Dynamic Site Conditions: Not required.
31. Mitigation Options for Unstable Slopes: Not required.

quadrangle, Los Angeles County, California: California Geological Survey, Open-File Report 98-06 that depicts a groundwater level of 40 feet for the site vicinity.

7. Geologic Cross Sections: Adequately addressed. The consultants September 10, 2009 report includes one cross sections.
8. Active Faulting & Coseismic Deformation: Adequately addressed. The September 10, 2009 report states: the site is not located within an Alquist-Priolo Earthquake Fault Zone; the site is approximately 1,000 feet north of the Mission Hills Fault, and approximately 1,000 feet south of the Mission Wells Fault zone; these faults may be associated with the Verdugo fault system or Slymar Fault system, or both, and both fault systems are presumed to be active. CGS notes the Mission Hills Fault is classified as Late Quaternary and the Mission Wells Fault is within an Alquist-Priolo Earthquake Fault Zone.

   The Applied Earth Sciences' September 10, 2009 report states the February 21, 1984 Robert Stone & Associates (RSA) report included "...an extensive geologic investigation involving several fault-study trenches, geotechnical borings, and downhole geologic logging of multiple deep borings..." and Applied Earth Sciences summarizes the RSA findings as "...RSA postulates that a splay fault—possibly related to the Verdugo Fault zone—extends through the subject property, and delineated it's postulated location in their original geologic map..." and the geologic map depicts "...the 50-foot structural setback, as required by UBC from suspected active faults...." The September 10, 2009 report states: the certified engineering geologist of record reviewed and approved the February 21, 1984 report; the proposed addition is outside the 50 foot setback; and geologic and groundwater data presented in that report "...suggests that the proposed addition is not underlain by a splay fault". These conclusions appear reasonable.
9. Geologic Hazard Zones (Liquefaction and Landslides): Adequately addressed. The consultants May 22, 2009 report includes the Seismic Hazards Zone map from CGS *Seismic Hazard Evaluation of the San Fernando 7.5-minute quadrangle, Los Angeles County, California: California Geological Survey, Open-File Report 98-06* that depicts the site being outside the liquefaction and landslide zone of required investigation.
10. Geotechnical Testing of Representative Samples: Adequately addressed.
11. Geologic Consideration of Grading Plans and Foundation Plans: Adequately addressed. The consultants' May 22, 2009 report states the upper 2 feet of existing fill is inadequate to support foundations and grade slabs, and the clay soils in the fill are potentially expansive. They recommend overexcavating the fill to 2 feet and replacing same as engineered compacted fill, placed at about 3% above optimum moisture content, and supporting the buildings on conventional spread footings and grade slabs. *The proposed recommendations appear to address the geologic conditions at the site. However, CGS reviewers are not geotechnical engineers, and cannot review the foundation design recommendations.*

Seismology & Calculation of Earthquake Ground Motion

12. Evaluation of Historic Seismicity: Adequately addressed.
13. Mapped Spectral Acceleration Parameters: Adequately addressed. The consultants' May 22, 2009 report presents values of $S_S = 2.34$ and $S_1 = 0.82$, which are consistent with our independent findings.

Other Geologic Hazards or Adverse Site Conditions

32. Expansive Soils: Adequately addressed. The consultants' May 22, 2009 report states the clay soils in the fill are potentially expansive, with an EI of 68.
33. Corrosive Soils: Adequately addressed. The consultants' May 22, 2009 report states the soils should be assumed to be corrosive and recommend that following grading samples should be analyzed for soil corrosivity.
34. Conditional Geologic Hazards: Minimally addressed. The consultants' May 22, 2009 report states the site is not subject to tsunamis and hydrocollapse. These conclusions appear reasonable. CGS notes the site does not appear to be within the 100- or 500-year flood zone as designated by FEMA.

Report Documentation

35. Geology, Seismology, and Geotechnical References: Adequately addressed.
36. Certified Engineering Geologist: signature, valid license number: Adequately addressed. Richard Crook, Certified Engineering Geologist 924.
37. Registered Geotechnical Engineer: signature, valid license number & seal: Adequately addressed. Caro J. Minas, Registered Geotechnical Engineer 601.

Conclusions and Recommendations

1. This hospital site has the following principal engineering geology issues:
- strong seismic shaking;
- shallow loose, potentially compressible soil not suitable for shallow foundation support;
- shallow expansive soils
- potentially corrosive soils

2. The consultants' report the results of a code-based ground motion analysis. Because the proposed building Seismic Design Category is F, the ground motion analysis must include a site–specific ground motion analysis. CGS recommends the consultants provide a site–specific ground motion analysis as per 2007 CBC Section 1614A.1.2, ASCE 7-05 Ch. 21, and the OSHPD CAN 2-1802.A.6.2 and 2-1614A1.2.

3. The consultants conclude liquefaction will not occur at the site because the granular soils below the historically highest groundwater level are dense and because of the flat and level site conditions, the potential for Lateral Spreading is nil. They estimate total seismically induced liquefaction and dry sand settlement to be less than 3/8 inch, with differential settlement at 1/4 inch. This appears reasonable.

4. The consultants' May 22, 2009 report states the upper 2 feet of existing fill is inadequate to support foundations and grade slabs, and the clay soils in the fill are potentially expansive. They recommend overexcavating the fill to 2 feet and replacing same as engineered compacted fill, placed at about 3% above optimum moisture content, and supporting the buildings on conventional spread footings and grade slabs. *The proposed recommendations*

appear to address the geologic conditions at the site. However, CGS reviewers are not geotechnical engineers, and cannot review the foundation design recommendations.

Based on our review, the engineering geology and seismology issues at this site **are not adequately assessed** in the referenced reports and **additional information is requested** from the consultants. Any subsequent consulting geotechnical reports should include the OSHPD Permit Number HL-091126-19A and Facility Number 22413 on the title page. Three copies should be submitted to the OSHPD Senior Engineering Geologist Catherine F. Slater at OSHPD Sacramento at the address shown on the title page.

If you have any further questions about this review letter, you may contact the California Geological Survey at (707) 576-2162.

Respectfully submitted,

707-576-2162
Santa Rosa

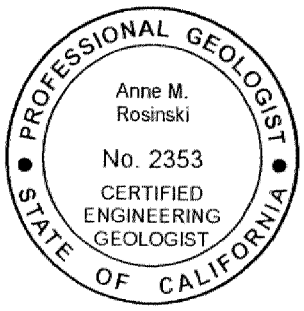
Wayne D. Haydon
Engineering Geologist
PG 4747, CEG 1740

650-688-6329 fax
6327
Menlo Park



Concur:

Anne M. Rosinski
Senior Engineering Geologist
PG 7481, CEG 2353



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Office of Statewide Health Planning
and Development
OCT 12 2010

Facilities Development Division
Sacramento, CA 95811

Applied
Soil
Technology, Inc.

dba C.M. Applied Earth Sciences

GEOTECHNICAL. GEOLOGY. ENVIRONMENTAL ENGINEERING CONSULTANTS

September 10, 2009 09-322-22

Ararat Home of Los Angeles
c/o Sobin Hearte Architects
23147 Ventura Boulevard
Woodland Hills, California 91364

Attention: Mr. Bob Simonian

Subject: Supplement No. 1
Geotechnical Investigation
Proposed 62-Bed Addition To The Existing Skilled Nursing Facility
Within The Confines Of The Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California

Ladies/Gentlemen:

INTRODUCTION

We are pleased to submit this Supplement No. 1 presenting the results of our additional geotechnical engineering and engineering-geologic evaluation for the subject project. The original report of geotechnical investigation for the subject project was issued by this office on May 22, 2009.

This submittal is in response to comments in a letter dated July 29, 2009, by the Office of Statewide Health Planning and Development. (OSHPD No. HL091126-19A). For convenience, we have included a copy of the Comment Letter with this Supplement No. 1. Our responses are presented in the original order of the comments:

RESPONSE TO COMMENTS

Comment No. 1- Engineering Geology

The undersigned engineering geologist and staff geologist reviewed the previous geotechnical and geological investigation reports on file for the subject property. In addition, two additional test borings were advanced (B-5 and B-6) in the vicinity of the proposed addition, to verify findings from previous excavations by AES and others. Below is the summary of our geologic findings.

An engineering-geologic and seismic investigation report for the subject property by Robert Stone and Associates (RSA), dated February 21, 1984, was reviewed by the undersigned geologist(s). A copy of this report is attached for further reference.

Regional Geology

The subject site is situated in a geologically and seismically active setting, as expounded upon by RSA in their 1984 report. Furthermore, a regional geologic map by Dibblee, 1991 (attached as Figure No. 1) shows the subject site to be located approximately 1000 north of the Mission Hills Fault, and approximately 1000 feet south of the Mission Wells Fault zone. These faults may be associated with the Verdugo fault system or Sylmar fault system, or both. Both fault systems are presumed to be active, evidenced by surface ruptures that occurred in the vicinity of the subject site as a result of ground shaking from the 1971 San Fernando Earthquake, as well as from the 1994 Northridge earthquake.

The undersigned geologists concur with all other comments regarding regional geology made by RSA in their 1984 report.

Site Geologic and Soils Conditions

Based on an extensive geologic investigation involving several fault-study trenches, geotechnical borings, and downhole geologic logging of multiple deep borings, the

report by RSA postulates that a splay fault--possibly related to the Verdugo Fault zone--extends through the subject property, and delineated its postulated location in their original geologic map. The site plan that accompanies this supplemental report (Drawing No. 1) shows this postulated fault in the same location. In addition, the 50-foot structural setback, as required by UBC from suspected active faults, in shown on the Site Plan.

The proposed addition is located outside the 50-foot structural setback line, as can be seen on the Geologic Map and Site Plan (Drawing No. 1).

To verify findings of our previous investigation as well as those of other consultants, the undersigned geologists logged core samples of soil and bedrock from two additional borings, B-5 and B-6, on August 31, 2009. The following geologic units were encountered during our investigation:

Af- Artificial fill of variable depth blankets the surface of the site. It generally consists of compacted silty sand to sandy silt, slightly gravelly, brown, and slightly moist.

Qa- Recent alluvium (Qa) consisting of light brown to brown sandy silt to silty sand was found in three of the four borings, up to ten feet in thickness. Recent alluvium is differentiated from older alluvium by its relative lack of consolidation and induration, as well as grain size (more recent sediments are generally finer-grained locally).

Qoa- Older alluvial deposits of sand and gravel, slightly consolidated and weakly indurated, underlie the fill and recent alluvial sediments onsite. This unit was found to be tan to light brown, medium dense to dense, and moist to very moist.

Tm- Sedimentary bedrock of the Modelo formation, alternating sequences of fine-grained arkosic sandstone and fissile shale, underlies the older alluvial sediments onsite. The rock is soft to slightly hard, moist to very moist, light brown to brown, and thin-bedded to laminated. Pore spaces within the bedrock are generally saturated, since this unit is found mostly below the local water table (see below).

Groundwater was encountered at a depth of 22.5 and 20 feet below ground surface in B-5 and B-6 respectively. The findings concur with previous geologic findings by Robert

Stone and Associates, as well as geotechnical findings by AES. The consistent groundwater and bedrock depths suggest that the proposed addition is not underlain by a splay fault.

AES Borings 3 and 4 were advanced using a hollow-stem auger on March 10, 2009 and logged by a field soil engineer. Because of the drilling technique used, the cuttings that were brought to the surface from depths exceeding approximately 25 feet were broken up and resembled dense soil, and as a result were inadvertently logged as a dense sand and clay instead of as fine sandstone and shale. Based on the recent core samples logged in B-5 and B-6, as well as inspection of remaining samples from B-4, the boring logs for B-3 and B-4 have been corrected to reflect bedrock at the appropriate depths and are presented at the end of this report in Appendix I.

The undersigned CEG geologist also reviewed the previously submitted geotechnical report by this office dated May 22, 2009, and approves of this report, as well as all other previously made findings and recommendations by the geotechnical engineer.

Comment No. 2

Copies of the previous reports relating to the existing controlled fill (to remain in-place) are enclosed with this Supplement No. 1: geotechnical report dated October 20, 1995 and compaction report dated November 19, 1997 (Project No. 95-525-02).

Comment No. 3

The values of Sms, Sm1, Sds and Sd1, are mathematically related to the presented mapped spectral accelerations Ss (short period), S1 (1-second period) and the coefficients Fa and Fv presented in our original report. Normally, the project Structural Engineers, given the above data, make the requested calculations.

For the purpose of this Supplement No. 1, however, the requested seismic design parameters are calculated as follows:

Sms= Fa (Ss),

Sm1=Fv (S1),

Sds=2/3 (Sms), and

Sd1=2/3 (Sm1)

Based on the values given in our original report, the calculated values will be as follows:

Sms= 1.0 (2.34) = 2.34

Sm1= 1.5 (0.82) = 1.23

Sds=2/3 (2.34) = 1.56

Sd1=2/3 (1.23) = 0.82

Comment No. 4

The given friction coefficient and passive pressures in our original report are the allowable values. The given values can be combined. The available factors of safety for the recommended coefficient of friction and passive pressure values are greater than 1.5

Comment No. 5

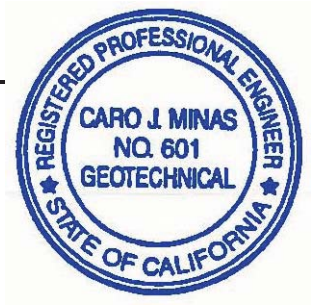
Considering that both the existing building and the proposed addition will have near grade support systems, surcharge effects will not be an issue for this project.

-o0o-

Thank you for the opportunity to be of continued service on this project. Should you have any question regarding this Supplement No. 1, or wish to discuss the project further, please do not hesitate to call this office.

Respectfully submitted,

APPLIED EARTH SCIENCES



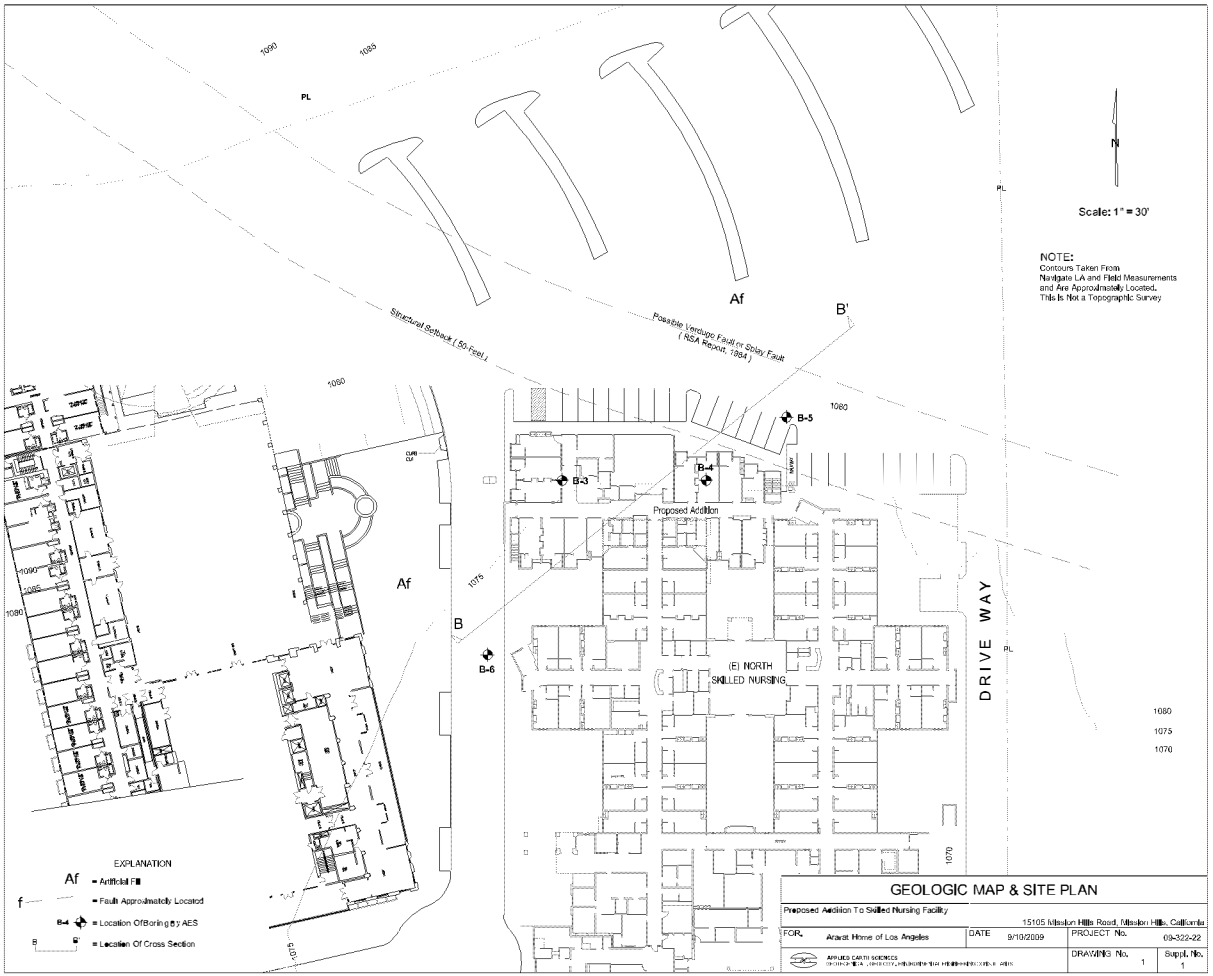
Caro J. Minas, President
Geotechnical Engineer
GE 601

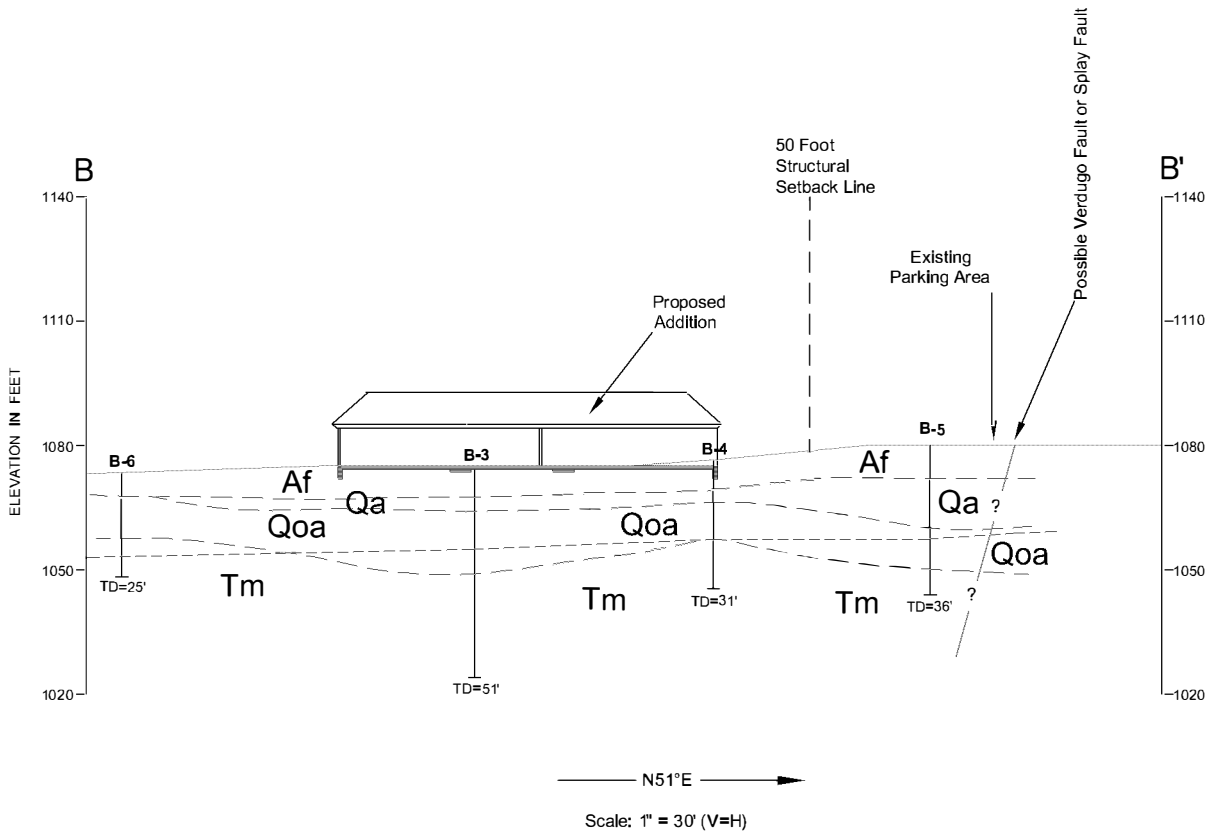
Shant Minas
Staff Geologist

Richard Crook Jr.
Engineering Geologist
CEG 924

CJM/RC/ra

Enclosure: Drawing No. 1 - Revised Geologic Map and Site Plan
Drawing No. 2 - Geologic Cross-Section B-B'
Figure No. 1 - Regional Geologic Map, Dibblee, 1991
Appendix I: Revised Borings Logs
Appendix II:
Copy of Review Letter By OSHPD dated July 29, 2009
Copy of Previous Investigation Report by AES dated October 20, 1995
Copy of Compaction Report dated November 19, 1997 (95-525-02)
Copy of Previous Engineering-Geologic Report
Robert Stone and Associates - February 21, 1984


N
Scale: 1" = 30'
NOTE:
Contours Taken From
Navigate LA and Field Measurements
and Are Approximately Located.
This Is Not a Topographic Survey
Af
B'
B
Structural Setback (50 Feet)
Possible Verdugo Fault or Splay Fault
(NSA Report, 1984)
B-3
B-4
B-5
B-6
Proposed Addition
(E) NORTH
SKILLED NURSING
DRIVE WAY
EXPLANATION
Af = Artificial Fill
f = Fault Approximately Located
B-4 = Location Of Boring by AES
B B' = Location Of Cross Section
GEOLOGIC MAP & SITE PLAN
Proposed Addition To Skilled Nursing Facility
15105 Mission Hills Road, Mission Hills, California
FOR: Ararat Home of Los Angeles
DATE 9/10/2009
PROJECT No. 09-322-22
APPLIED EARTH SCIENCES
DRAWING No. 1
Suppl. No. 1



Scale: 1" = 30' (V=H)

EXPLANATION

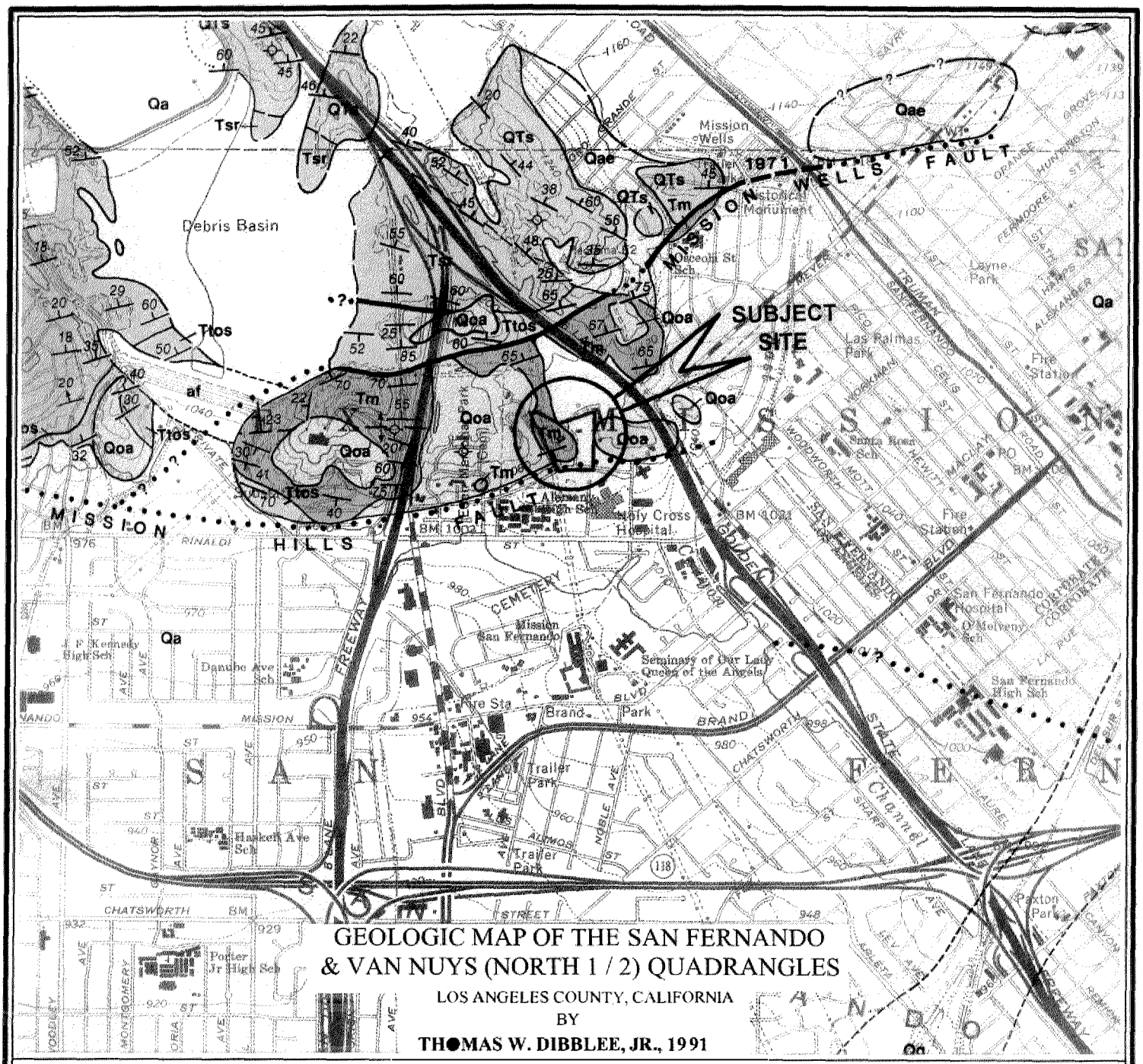
Af	= Artificial Fill
Qa	= Recent Alluvium: Sandy Silt
Qoa	= Older Alluvium: Sand & Gravel Deposits
Tm	= Sedimentary Bedrock, Modelo Formation
— — —	= Contact, Approximately Located
- - - - - -	= Water Table Elevation

GEOLOGIC CROSS SECTION B-B'

Proposed Addition To Skilled Nursing Facility

15105 Mission Hills Road, Mission Hills, California

FOR. Ararat Home of Los Angeles	DATE 9/10/2009	PROJECT No. 09-322-22	
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS		DRAWING No. 2	Suppl. No. 1



GEOLOGIC MAP OF THE SAN FERNANDO & VAN NUYS (NORTH 1 / 2) QUADRANGLES

LOS ANGELES COUNTY, CALIFORNIA

BY

THOMAS W. DIBBLEE, JR., 1991

REGIONAL GEOLOGIC MAP

Proposed Addition To Skilled Nursing Facility

15105 Mission Hills Road, Mission Hills, California

FOR.	Ararat Home of Los Angeles	DATE	9/10/2009	PROJECT No.	09-322-22
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS				FIGURE No. 1	Suppl. No. 1

APPENDIX I

BORING LOGS 3 THROUGH 6

Borings 3 and 4 were excavated on March 10, 2009 using an 8-inch hollow-stem auger and discrete sampler; Borings 5 and 6 were excavated August 31, 2009 using a hollow-stem auger and 2" core sampler.

BORING No. 3

DATE EXCAVATED: 03/10/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					SAND (SM)		**Fill:** Moderately compact, moist, brown, clayey sand with gravel
	120	12	48	24	(SM)		Grades to compact, silty, slightly clayey sand
5							
	113	12	54	30	SILT (ML)		Grades to sandy silt, dark gray, moist, gravelly
	118	14	57	37	SILT (ML/SM)		Stiff, moist, light brown, sandy silt, gravelly. RECENT ALLUVIUM (Qa)
10							
	119	12	45	40	SAND (SM/ML)		Dense, moist, light brown, silty, fine to medium grained with gravel OLDER ALLUVIUM (Qoa), slightly consolidated, weakly indurated.
15							
	111	20	42	38	(SM)		Grades to very moist
20							
	112	21	45	45	(SM)		Grades to wet, brown, fine grained sand, less gravel
25							
	68	50	96	43*/35 (SPT)	Bedrock (Tm)		Stiff, wet, olive brown, sedimentary bedrock of the Modelo Formation; SHALE (Tm), slightly sandy, slightly hard.
30							
	80	42	75	44*/33 (SPT)			Grades to very stiff, light gray, SHALE, hard

LOG OF BORING

JOB NAME: ARARAT HOME OF LOS ANGELES JOB No. 09-322-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-3-1

BORING No. 3(continued)

DATE EXCAVATED: 03/10/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					(Tm)		**Continued from previous page**
35	78	54	56	46*/32 (SPT)			
40	96	30	40	59*/38 (SPT)			Very dense, wet, brown, clayey, fine-grained sandstone, tan-brown, slightly gravelly.
45	74	51	80	53*/32 (SPT)	(Tm)		Stiff, wet, light gray, SHALE, slightly sandy
50	73	54	39	62*/36 (SPT)			Very dense, wet, brown, clayey, fine grained sandstone with gravel

End of Boring @ 51 feet
Water @ 20 feet
*Field/Corrected SPT

LOG OF BORING

JOB NAME: ARARAT HOME OF LOS ANGELES JOB No. 09-322-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-3.2

BORING No. 4

DATE EXCAVATED: 03/10/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					CLAY (CL)		**Fill:** Moderately compact, very moist, brown, sandy clay with gravel
	110	15		35	(SM)		Grades to compact, moist, light brown, silty, slightly clayey sand with gravel
5	119	15		42	(ML)		Grades to dark brown, sandy silt with gravel
					SILT (ML)		Stiff, moist, brown, sandy silt with gravel RECENT ALLUVIUM (Qa)
10	115	14		48	SAND (SM/ML)		Grades to dark brown, occasional cobbles OLDER ALLUVIUM (Qoa)
15	117	15		32*/36 (SPT)	(SM)		Grades to brown, very moist
20	109	19		37*/34 (SPT)	Bedrock (Tm)		Stiff, moist to wet, light to dark brown, silty, SHALE bedrock of the Modelo Formation (Tm)
25	70	52		39*/32 (SPT)			
30	72	43		41*/31			End of Boring @ 31 feet Water @ 20 feet * Field/Corrected SPT

LOG OF BORING

JOB NAME: ARARAT HOME OF LOS ANGELES JOB No. 09-322-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-4

BORING No. 5

DATE EXCAVATED: 08/31/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					SAND (SM)		**Fill:** Loose to moderately compact, moist, brown, clayey, slightly gravelly.
5				33 (SPT)	SAND (SM)		Moderately compact, slightly moist, light brown to dark grey and black, fine-grained silty sand with trace of clay, gravelly, angular fragments to 3/4" of diorite.
10				22 (SPT)	SILT (ML)		Slightly firm, slightly moist to moist, sandy and clayey , slightly gravelly. RECENT ALLUVIUM (Qa)
15				26 (SPT)			Grades to firm.
20				50	SAND (SW)		Medium dense, moist to very moist, tan to light brown, well-graded sand with gravel and fines. OLDER ALLUVIUM (Qoa)
				75	(SW)		Grades to wet, dense
25				50	(SP/GP)		Grades to wet, poorly graded, moderately well-sorted, sand and gravel, little or no fines. Rounded cobbles of igneous rock to 3".
30				65	Bedrock (Tm)		Sedimentary bedrock of the Modelo Formation, SHALE, laminated, shallow dipping ~15 degrees, slightly graded bedding, dark and light laminated bands.

LOG OF BORING

JOB NAME: ARARAT HOME OF LOS ANGELES JOB No. 09-322-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-5.1

BORING No. 5 (continued)

DATE EXCAVATED: 08/31/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
35				75			**Continued from previous page** SHALE of the Modelo Formation, damp to moist, fewer fractures, fissile. End of Boring @ 36 feet Water @ 22 ½ feet Bedrock @ 30 feet

LOG OF BORING

JOB NAME: ARARAT HOME OF LOS ANGELES JOB No. 09-322-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-5.2

BORING No. 6

DATE EXCAVATED: 08/31/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					SAND (SM)		**Fill:** Loose to moderately compact, slightly moist, light brown, slightly silty, gravelly.
					CLAY (CL)		Firm, slightly moist to moist, buff to light gray, somewhat tuffaceous appearance.
5				60	SAND (SP)		Medium dense, slightly moist, tan-orange, sand with gravel, little or no fines. OLDER ALLUVIUM (Qoa)
10				60	GRAVEL GW/SW)		Grades to medium dense to dense, slightly moist to moist gravel with sand, trace of fines, moderately well-graded. Cobbles to 3", source material presumed to be San Gabriel Mountains.
15					Bedrock (Tm)		Sedimentary bedrock of the Modelo Formation, SHALE, Lightweight, porous, moist, upper few feet weathered, bedding dip angle indistinct, grey-white color, fissile, interbedded siltstone and tuffaceous beds/laminations. Grades to brown, firm, well-indurated
20							Grades to saturated, slightly hard, grey-buff color, punky, slightly porous, approximate dip 30-50 degrees, laminated Clayey cuttings around borehole are very moist to wet, indicating penetration of water table.
25							End of Boring @ 25 feet Water @ 20 feet Bedrock @ 15 feet
30							

LOG OF BORING

JOB NAME: ARARAT HOME OF LOS ANGELES JOB No. 09-322-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-6

oshpd "Equitable Healthcare Accessibility for California"
Office of Statewide Health Planning and Development

Facilities Development Division
400 R Street, Suite 200
Sacramento, CA 95811
(916) 440-8300 Fax (916) 324-9188
www.oshpd.ca.gov/fdd

RECEIVED
AUG 0 4 2009
SOBIN-HARTE ARCHITECTS

Mr. Jeffrey L. Sobin C18249
Sobin-Harte Architects, Inc.
23147 Ventura Boulevard, Suite 200
Woodland Hills, CA 91364

DATE 7/29/2009
OSHPD NO HL091126-19A
SUB 0

Facility Name: Ararat Home of Los Angeles – 22413
15105 Mission Hills Road
Mission Hills, CA 91345

Project Scope: SKILLED NURSING FACILITY EXPANSION

Dear Mr. Jeffrey L. Sobin:

As requested, we have conducted a precursory assessment of the **Engineering Geology and Geotechnical Engineering Reports** submitted for the project noted above, to determine conformance with the standards of the California Code of Regulations, Title 24, Part 2.

We are returning the following documents UNREVIEWED.

- "Report of Geotechnical Investigation; Proposed Addition to Skilled Nursing Facility within the Confines of the Ararat Home of Los Angeles". Report prepared by Applied Earth Sciences, dated May 22, 2009.

Consideration must be given to all comments.

1. Engineering geology reports signed by a Certified Engineering Geologist (CEG) are required for all proposed construction in accordance with the 2007 CBC, Section 1802.7 or 1802A.6.1. Previously prepared documents can be submitted, but must be accompanied by wet-signed authorization/reevaluation letters specific to the project.
2. For where existing fill is proposed to remain in place, provide the original geotechnical recommendations for that project and the compaction report with observation/testing.
3. Include the following seismic design parameters: S_{MS}, S_{M1}, S_{DS} and S_{D1}.
4. Clarify if the friction and passive friction for lateral resistance are allowable or ultimate values. Provide recommendations for minimum factors of safety. Can friction and passive friction be combined?
5. Address surcharging on the foundations of the new structure on the existing one, and of the existing structure on the new one.

Please provide **three (3) sets of wet-signed documents** with your response. Send documents to the **OSHPD North Los Angeles Region** office at 700 North Alameda Street, Suite 2-500; Los Angeles, CA 90012 for processing. Reference project number HL091126 on all correspondence.

Responses to the triage comments are required before we can transmit the documents to the California Geological Survey (CGS) for review. If you have any questions, please contact me at (916) 440-8469 or cslater@oshpd.state.ca.us.

Thank you,

Catherine F. Slater

Catherine F. Slater
Senior Engineering Geologist

cc: Armen Hampar – Ararat Home of Los Angeles
Caro Minas – Applied Earth Sciences
Ramin Sadr – OSHPD North Los Angeles Region (report previously retained)
Geotechnical File

REPORT OF
GEOTECHNICAL INVESTIGATION
PROPOSED ADDITION TO SKILLED NURSING FACILITY
WITHIN THE CONFINES OF THE "ARARAT HOME OF LOS ANGELES"
15105 MISSION HILLS ROAD
MISSION HILLS, CALIFORNIA

FOR

ARARAT HOME FOR THE AGED

PROJECT NO. 09-322-02

MAY 22, 2009

May 22, 2009 09-322-02

Ararat Home For The Aged
c/o Sorbin Hearte Architects
23147 Ventura Boulevard
Woodland Hills, California 91364

Attention: Mr. Bob Simonian

Subject: Report Of Geotechnical Investigation
Proposed 62-Bed Addition To The Existing Skilled Nursing Facility
Within The Confines Of The Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California

Ladies/Gentlemen:

INTRODUCTION

This report presents the results of a geotechnical investigation for the subject project. During the course of this investigation, the engineering properties of the subsurface materials were evaluated in order to provide recommendations for design and construction of foundations. The investigation included subsurface exploration, soil sampling, laboratory testing, engineering evaluation and analysis, consultation and preparation of this report.

This office has previously conducted a geotechnical investigation for the southern expansion of the Skilled Nursing facility. Our report was issued on October 20, 1995. As part of such work, fill was placed over a previously existing mild slope to the front of the facility in order to create a graded fill slope with gradients of about 2.7:1 (horizontal:vertical). The fill placement was made under observation and testing of this office. A compaction report to that effect was also issued by this office.

During the course of this investigation, the project plans provided by the offices of Sorbin Hearte Architects, was used as reference.

The enclosed Drawing No. 1, entitled Site Plan, shows the approximate locations of the exploratory test holes (old and new) in relation to the existing facility and proposed addition. This plan also shows the approximate location of Cross Section A-A'. Drawing No. 2 shows the profile of the Cross Section A-A'.

Figure No. 1 shows the Seismic Hazard Zone Map. Figure No. 2 shows the Regional Geologic Maps. Figure Nos. 3 through 7 show the associated Site Location Maps, Seismic Hazard Maps as well as the Historically Highest Groundwater Contour Map of the site.

The attached Appendix I, describes the method of field exploration. Figure Nos. I-1 through I-4 present summaries of the materials encountered at the location of our test holes. Figure No. I-5 presents a key to the log of exploratory test holes.

The attached Appendix II describes the laboratory testing procedures. Figure Nos. II-1 and II-2 present the results of direct shear and consolidation tests performed on selected undisturbed samples.

PROJECT CONSIDERATIONS

It is our understanding that the proposed project will consist of making a 62-bed addition to the existing skilled nursing facility. The proposed addition will be a 2-story structure with grade slabs flooring system.

As part of the proposed construction, minor amount of cutting will be made on the northern side in order to create the proposed finished grade. The resulting vertical cuts will then be supported by retaining walls having vertical heights of less than 5 feet.

The footings of the south exterior walls of the proposed addition will be established near the levels of the existing building footing. On this basis, surcharge effects will not be an issue.

Structural loading data was not available during the course of preparation of this report. For the purpose of this report, however, it is assumed that the magnitude of the collected load in the area of the proposed second story addition would be on the order of 150 kips, combined dead, plus frequently applied live loads. Wall loads are expected to be on the order of 3 kips per lineal foot.

SITE GRADING

For the proposed addition, site grading will involve minor excavation on the northern side in order to create the proposed finished grades. Within the unexcavated areas, the top 2 feet of the existing controlled fill should be removed and recompacted. The new fill will be used for support of grade slabs and foundations. Against the existing building, the vertical zone of removal should be limited to the footing bottom of the existing building. Where possible, the zone of removal and recompaction should be extended beyond the footprint of the proposed addition a horizontal distance equal to the depth of excavation.

The site upper soils were found to be fine grained (silt and clay) in nature in local areas. These soils are considered to be potentially expansive. Therefore, when using the fine grained soils in the areas of the new compacted fill, they should be placed at some 3 percent higher than the optimum moisture content. Also, the grade slabs should be designed for expansive soil condition.

As part of the site grading work minor wall backfilling will also be made. All wall backfill materials should be non-expansive and granular in nature. Therefore, only the excavated sandy soils should be used for wall backfilling.

SITE CONDITIONS

SITE SURFACE CONDITIONS

The area of the proposed construction occurs to the north of the existing Skilled Nursing facility within the confines of the Ararat Home Of Los Angeles located at 15105 Mission Hills Road, Mission Hills, California. See the enclosed Drawing No. 1 for site location.

At the time of our investigation, the proposed construction area to the north of the existing facility was paved. The area was being used as parking.

SUBSURFACE CONDITIONS

Correlation of the subsoil between the test borings was considered to be good. Generally, the site, to the depths explored, was found to be covered by controlled fill underlain by natural deposits of sandy/clayey silt, silty sand and silty clay soils.

Thickness of the existing fill was found to range from about 4 feet to as much as 7 feet in our borings. The top 2 feet of the existing fill is considered to be inadequate for support of structural foundations and grade slabs. In the area of the proposed building, the existing fill should be excavated and properly recompacted for support of grade slabs and foundations.

The underlying native soils, were found to be generally dense and stiff and adequate to support structural foundations. The results of our laboratory testing indicated that the site native soils were of relatively high strengths and low compression.

The fine grained soils (silts and clays) were found to be potentially expansive. The expansion index of the site upper soils was found to be 68.

During the course of our investigation, water was encountered in our Boring No. 3 at a depth of about 20 feet. This could be a perched water.

Due to the method of drilling (using continuous casing) caving was not detected during our field exploration. Because of the fine content of the site materials, forming will not be required during foundation construction.

SEISMIC DESIGN CONSIDERATIONS

In accordance with the 2007 California Building code(CBC 2007), the project site can be classified as site D. The mapped spectral accelerations of S_S=2.34 (short period)and S_1 =0.82 (1-second period) can be used for this project. These parameters corresponds to site Coefficients values of F_a =1.0 and F_V =1.5, respectively.

EVALUATION OF LIQUEFACTION POTENTIAL

During the course of our investigation, water was encountered in our Boring No. 3 at a depth of 20 feet. This could be a perched water condition.

For the purpose of evaluating liquefaction potential, therefore, SPT (Standard Penetration Test) were conducted from a depth of 15 feet.

The results of our in-situ testing indicated that the sand layers below the historically highest groundwater level were generally dense to very dense in-place

(having corrected SPT values of greater than 30). The clay soils below the historically highest groundwater level were found to be generally stiff in-place and also had corrected SPT values of greater than 30. See the Log Of Boring No. 1 in Appendix I. On this basis, it is our opinion that soil liquefaction will not occur at the subject site.

SOIL CHEMICAL IMPURITIES AND CORROSION CONSIDERATIONS

After the proposed finished grades are established, samples of the subgrade materials in contact with foundations and utility lines, should be tested for chemical impurity (soil corrosivity). For the purpose of this report, however, it should be assumed that the site soils are corrosive. Subject to the results of chemical testing during construction, the design may be changed.

OTHER GEOTECHNICAL/SEISMIC HAZARDS

Potential for Lurching and Topographic-related Site Effects: Due to relatively level conditions of the subject site, it is our opinion that the potential for lurching or other topographic related effects, including landsliding, is nil.

Potential for Lateral Spreading: Due to the flat and level conditions of the subject site it is our opinion that the potential for lurching or lateral spreading is nil.

Potential for Seismically Induced Settlement: The results of our field exploration indicated that the subject site, to the depths explored consisted of stiff silt-clay and dense sand. Typically, the settlement of dense sand soils as a result of strong ground shaking is minimal/insignificant. Also, stiff fine grained soils are not susceptible to seismic induced settlement. For the purpose of the subject project, however, it is estimated that seismically induced settlement at the subject site would be less than 3/8 of one inch. The associated seismically induced differential settlement is expected to be on the order of 1/4 of one inch. Such settlements should be added to those resulting from gravity loads.

Potential for soil expansion, and hydrocollapse: The fine grained soils were found to be potentially expansive. For this reason, we have recommended that the grade slabs for this project be maintained thicker than normal (5 inches thick and be reinforced with rebars).

Also, the results of our laboratory consolidation testing indicated that the soils below the foundation level were not susceptible to hydrocollapse. See the consolidation test results on Figure II-2 in Appendix II.

Seismically-Induced Slope Instability: The subject site does not lie within an identified hazard zone on the seismic hazard evaluation map (California Department of Conservation (1998). It is our opinion that the site is not subject to seismically-induced slope instability.

Tsunami: The subject site is not subject to tsunamis.

EVALUATION AND RECOMMENDATIONS

GENERAL

Based on the geotechnical engineering data derived from this investigation, the site can be developed as planned. The top 2 feet of the existing fill is considered to be inadequate for support of structural foundations and grade slabs. In the area of the addition, the top 2 feet of the existing fill should be excavated and properly compacted to receive grade slabs and structural foundations. Where possible, the zone of removal should be extended beyond the exterior walls of the proposed building a horizontal distance equal to the thickness of fill. Against the existing building, the vertical zone of removal should be limited to the footing bottom of the existing building.

The existing fill can be reused in the areas of new compacted fill. Due to potentially expansive character, the site soils, when used in the areas of new compacted fill should be placed at some 3 percent higher than the optimum moisture content. Also, grade slabs should be designed based on expansion soil condition.

After proper site grading, conventional spread footing foundation system can be used for support of the proposed structure. The foundation bearing soils will be properly compacted fill soils.

Grade slabs can be supported on the finished grades which would be properly compacted fill soils. Due to potentially expansive character, the grade slabs for this project should be at least 5 inches thick and should be reinforced with # 4 bars placed at every 18 inches on center.

The following sections present our recommendations for temporary excavation, site grading, site drainage, foundations, lateral design, grade slabs, basement walls, swimming pool, and observation during construction.

TEMPORARY EXCAVATION

Where space limitations permit, unshored temporary excavation slopes could be used. Based upon the engineering characteristics of the site upper soils, it is our opinion that temporary excavation slopes in accordance with the following table should be used:

Maximum Depth of Cut (Ft)	Maximum Slope Ratio (Horizontal:Vertical)
0-4	Vertical
>4	3/4:1

Water should not be allowed to flow over the top of the excavation in an uncontrolled manner. No surcharge should be allowed within a 45-degree line drawn from the bottom of the excavation. Excavation surfaces should be kept moist but not saturated to retard raveling and sloughing during construction.

It would be advantageous, particularly during wet season construction, to place polyethylene plastic sheeting over the slopes. This will reduce the chances of moisture changes within the soil banks and material wash into the excavation.

It should be noted that the recommendations presented in this section of this report are for use in design and for cost estimating purposes prior to construction. The contractor is solely responsible for safety during construction.

GRADING RECOMMENDATIONS

Site grading will involve minor excavation on the northern side in order to create the proposed finished grades. Within the unexcavated areas, the top 2 feet of the existing controlled fill should be removed and recompacted. The new fill will be used for support of grade slabs and foundations. Against the existing building, the vertical zone of removal should be limited to the footing bottom of the existing building. Where possible, the zone of removal and recompaction should be extended beyond the footprint of the proposed addition a horizontal distance equal to the depth of excavation.

The fine grained (silt and clay) soils were found to be potentially expansive. Therefore, when using the site materials in the areas of the new compacted fill, they should be placed at some 3 percent higher than the optimum moisture content. Also, the grade slabs should be designed for expansive soil conditions.

Prior to placement of any fill on the site, the Soil Engineer should observe the excavation bottoms. The areas to receive compacted fill should be scarified to a depth of about 8 inches, moistened as required to bring to near optimum moisture content and compacted to at least 90 percent of the maximum dry density as determined by the ASTM Designation D 1557-07 Compaction Method.

All imported soils should be granular in nature (similar to the site soils) and be free of organic and rocks larger than 6 inches in diameter). Before import soils are brought to the site, a 20-pound sample of the proposed import soils should be submitted to the Soil Engineer (at least 48 hours in advance) so that the maximum density and expansion character of the import materials can be determined.

General guidelines regarding site grading are presented below in an itemized form which may be included in the earthwork specification. It is recommended that all fill be placed under engineering observation and in accordance with the following guidelines:

1. All vegetation should be shaved and removed from the site before site grading work is initiated;

2. Subdrain should be installed behind all retaining walls before backfill is placed. The backs of all retaining walls should be properly waterproofed. All subdrain should be observed and approved by this office before backfilling;

3. The subdrain pipes should be laid at a minimum grade of ¼ of one percent.

4. The excavated materials from the site may be reused in the areas of new fill. Wall backfill, however, should consist of granular materials.

5. Rocks larger than 6 inches in diameter should be excluded from the areas of compacted fill .

6. Fill material, approved by the Soil Engineer, should be placed in controlled layers. Each layer should be compacted to at least 90 percent of the maximum unit weight as determined by ASTM designation D 1557-02 for the material used. All new fill should be benched into rock;

7. The fill material shall be placed in layers which, when compacted, shall not exceed 8 inches per layer. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to insure uniformity of material in each layer.

8. When moisture content of the fill material is too low to obtain adequate compaction, water shall be added and thoroughly dispersed until the moisture content is near optimum.

9. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material shall be aerated by blading or other satisfactory methods until near optimum moisture condition is achieved.

10. Inspection and field density tests should be conducted by the Soil Engineer during grading work to assure that adequate compaction is attained. Where compaction of less than 90 percent is indicated, additional compactive effort should be made with adjustment of the moisture content or layer thickness, as necessary, until at least 90 percent compaction is obtained.

SITE DRAINAGE

Site drainage should be provided to divert roof and surface waters from the property through non-erodible drainage devices to the street. In no case should the surface waters be allowed to pond behind the walls or flow over the slope surfaces in an uncontrolled manner. A minimum surface slope of one and two percent should be maintained in paved and unpaved areas, respectively.

FOUNDATIONS

Conventional spread footing foundation system can be used for support of the proposed addition. The foundation bearing materials will be properly compacted fill soils. New footings should be at least 24 inches wide and be placed at a minimum depth of 24 inches below the lowest adjacent final grades. Properly designed

and constructed spread footings established in native or properly compacted fill soils may be based on an allowable maximum bearing pressure of 2,400 pounds per square foot. This value could be increased at a rate of 120 and 240 pounds per square foot foe each additional foot of footing width and depth, to a maximum value of 3,000 pounds per square foot.

The above given values are for the total of dead, plus frequently applied live loads. For short duration transient loading, such as wind or seismic forces, the given values may be increased by one-third.

Under the allowable maximum soil pressure, footings carrying the assumed maximum concentrated loads of 150 kips is expected to settle less than 3/4 of one inch. Continuous footings, with loads of about 3 kips per lineal foot are expected to settle on the order of 1/2 of one inch. Maximum differential settlements are expected to be on the order of 1/4 of an inch. The major portion of the settlements are expected to occur during construction.

LATERAL DESIGN

Lateral resistance at the base of footings in contact with compacted fill can be assumed to be the product of the dead load forces and a friction coefficient of 0.35. Passive pressure on the face of footings may also be used to resist lateral loads. A passive pressure of zero at the finished grades and increasing at a rate of 250 pounds per square foot per foot of depth to a maximum value of 1,800 pounds per square foot may be used for footings poured against properly compacted fill soils.

GRADE SLABS

Grade slabs can be supported on the finished grades which would be properly compacted fill soils. Due to potentially expansive character, the grade slabs for this project should be at least 5 inches thick and should be reinforced with # 4 bars placed at every 18 inches on center.

In the areas where moisture sensitive floor covering is used and slab dampness can not be tolerated, a vapor-barrier should be used beneath the slabs. This normally consists of a 10-mil polyethylene film covered with 2 inches of clean sand.

MINOR RETAINING WALLS

Static design of minor cantilevered retaining walls supporting cuts of fill and/or properly compacted granular backfill with level ground condition may be designed based on an equivalent fluid pressure of 30 pounds per square foot per foot of depth. This assumes that no hydrostatic pressure will occur behind the retaining walls. This will require that proper subdrain be installed behind the walls. The back of all walls should be properly waterproofed before backfill is placed.

Subdrain normally consists of 4-inch diameter perforated pipes encased in gravel (at least one cubic foot per lineal foot of the pipes). In order to reduce the chances of siltation and drain clogging, the free-draining gravel should be wrapped in filter fabric proper for the site soils.

In addition to the lateral earth pressure, the basement garage walls should also be designed for any applicable uniform surcharge loads imposed on the adjacent building/grounds. Uniform surcharge effects may be computed using a coefficient of 0.40 times the assumed uniform loads.

OBSERVATION DURING CONSTRUCTION

The presented recommendations in this report assume that all structural foundations will be established in properly compacted fill soils. All foundation excavations should be observed by a representative of this office before reinforcing is placed. It is essential to assure that all excavations are made at proper dimensions, are established in the recommended bearing material and are free of loose and disturbed soils.

Site grading work, such as wall backfilling, and subgrade preparation for basement slab support, should be conducted under observation and testing by a representative of this firm. All backfill soils should be properly compacted to at least 90 percent relative compaction. For proper scheduling, please notify this office at least 24 hours before any observation work is required.

CLOSURE

The findings and recommendations presented in this report were based on the results of our field and laboratory investigations combined with professional engineering experience and judgment. The report was prepared in accordance with generally accepted engineering principles and practice. We make no other warranty, either express or implied.

It is noted that the conclusions and recommendations presented are based on exploration "window" borings and excavations which is in conformance with accepted engineering practice. Some variations of subsurface conditions are common between "windows" and major variations are possible.

-oOo-

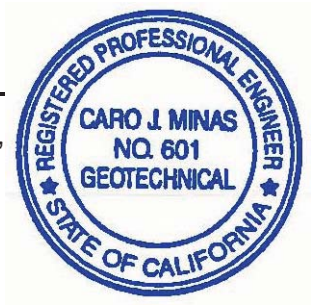
The following Figures and Appendices are attached and complete this report:

Site Plan - Drawing No. 1
Cross Section A-A' - Drawing No. 2
Figure No. 1 - Seismic Hazard Zone Map

Figure No. 2 - Regional Geologic Maps
Figure No. 3 - Site Location Map (Portion Of Thomas Bros. Maps)
Figure No. 4 -Site Location Map (Portion Of Assessor Maps)
Figure No. 5 - Seismic Hazard Zone Map (Peak Ground Acceleration For Alluvium Conditions)
Figure No. 6 - Seismic Hazard Zone Map (Predominant Earthquake Magnitude And Distance)
Figure No. 7 - Historically Highest Groundwater Contour Map
Appendix I-Method of Field Exploration
Figure Nos. I-1 through I-5
Appendix II- Methods of Laboratory Testing
Figure Nos. II-1 and II-2

Respectfully submitted,

Applied Earth Sciences



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GE 601

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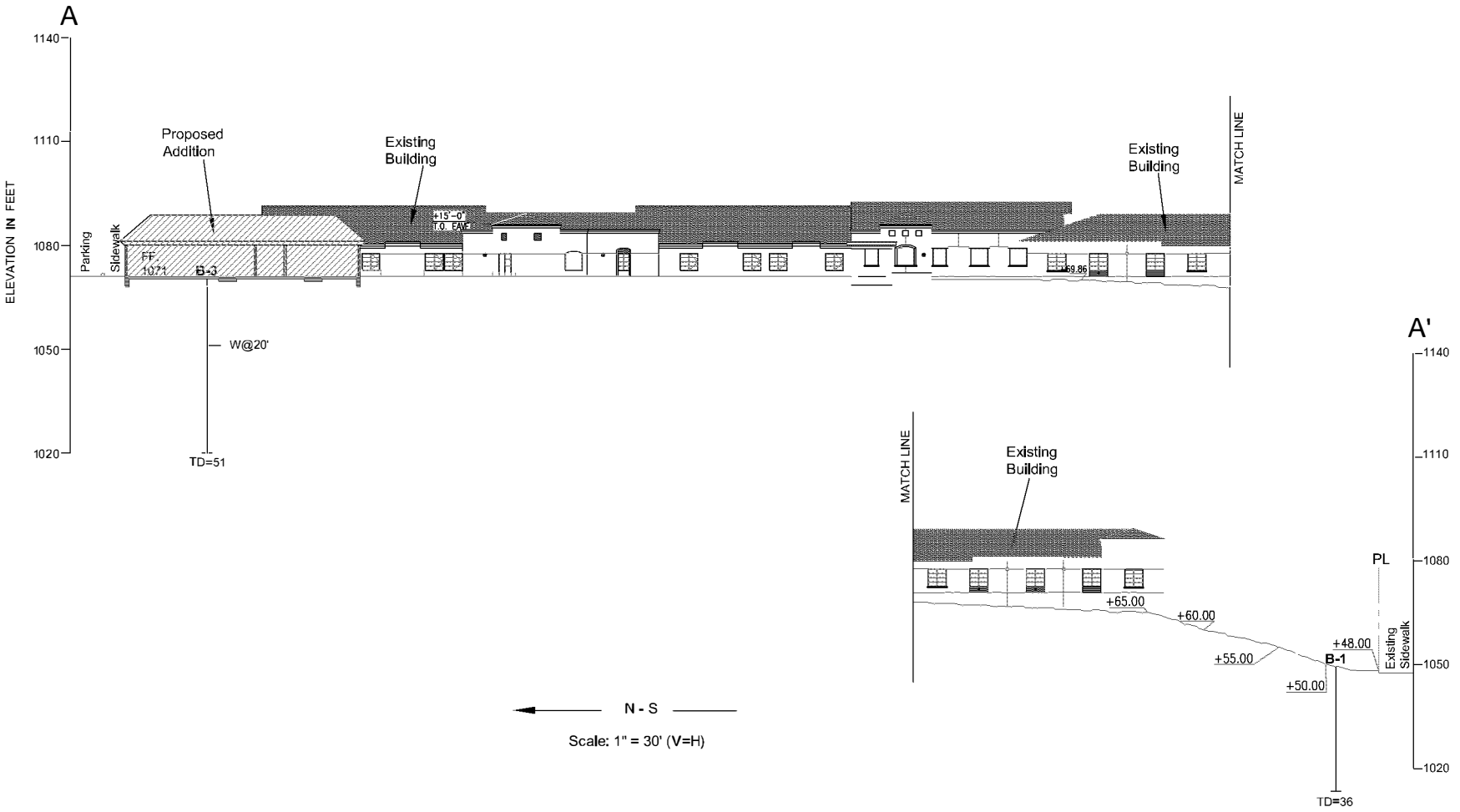
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SITE PLAN

Proposed Addition To Skilled Nursing facility Within The Confines of The "ARARAT"Home of Los Angeles — 15105 Mission Hills Road, Mission Hills, California

FOR	DATE	PROJECT No.
Mt. Ararat Home For The Aged	5/22/2009	09-322402
APPLIED EARTH SCIENCES		DRAWING No. 1

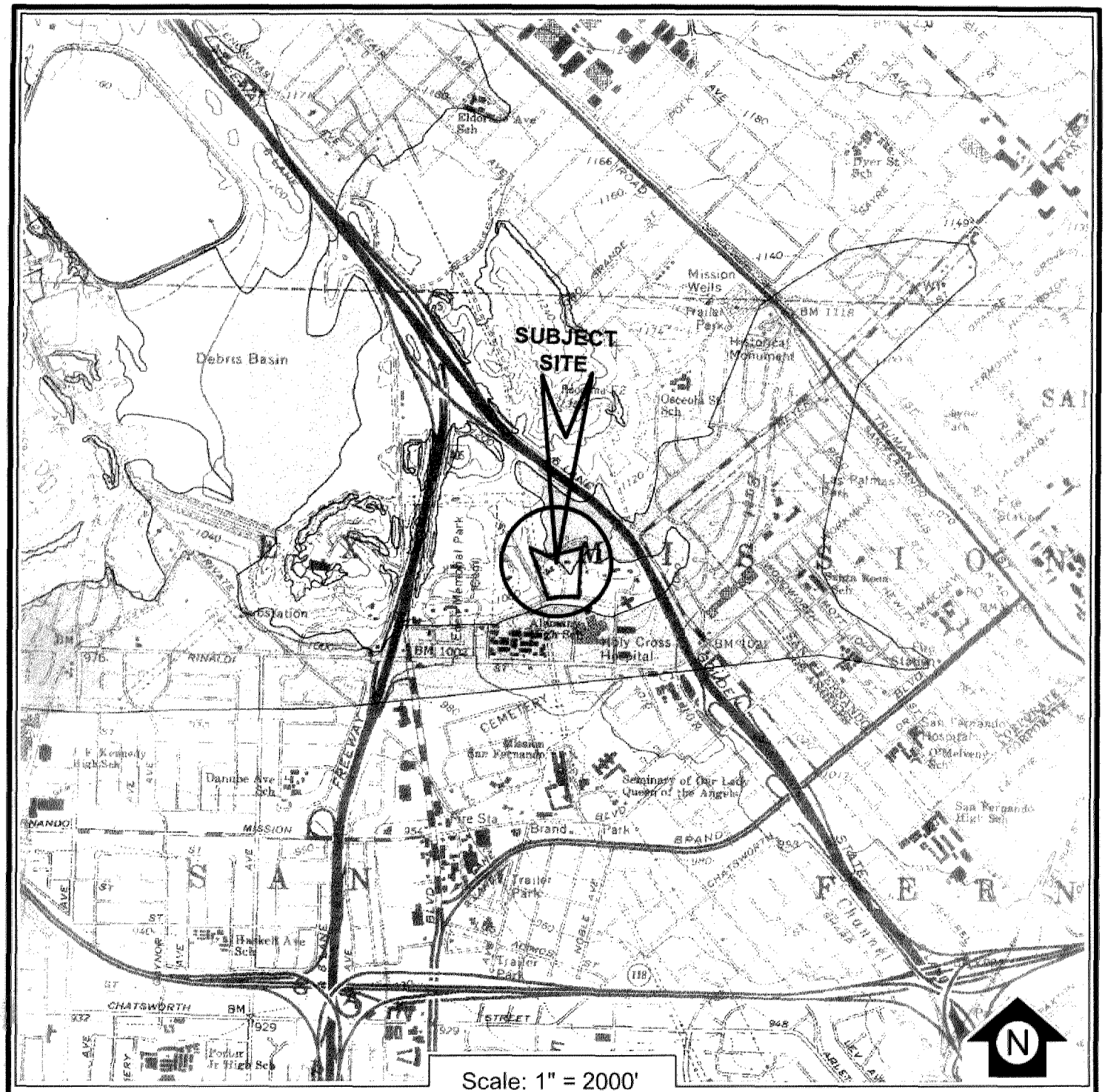


CROSS SECTION A-A'

Proposed Addition To Skilled Nursing facility Within The Confines of The "ARARAT"Home of Los Angeles

15105 Mission Hills Road, Mission Hills, California

FOR. Mr. Ararat Home For The Aged	DATE 5/22/2009	PROJECT No. 09-322-02	
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS		DRAWING No. 2	



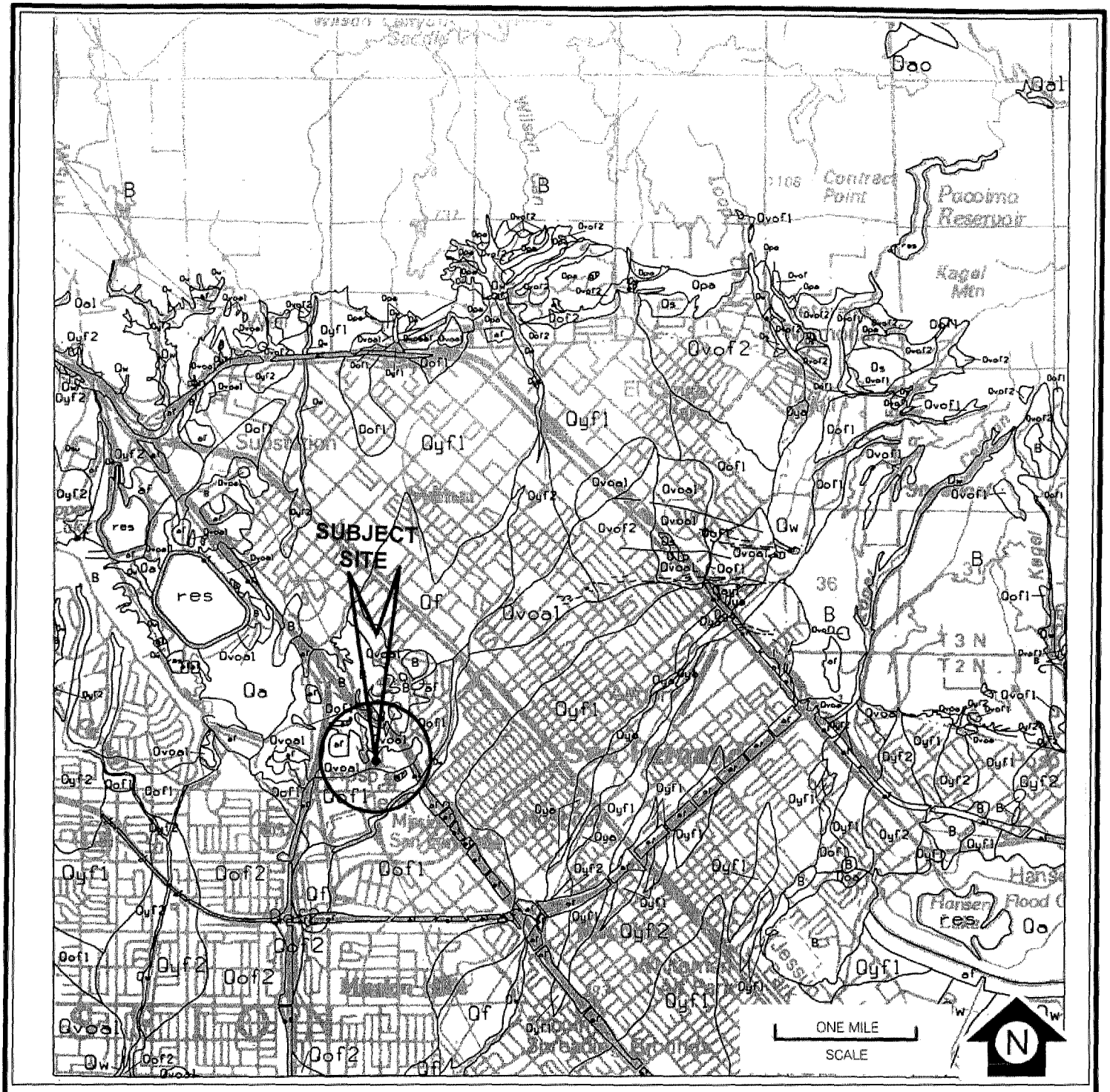
Reference: Portion of Seismic Hazard Zone Map of The San Fernando Quadrangle

SEISMIC HAZARD ZONES MAP

Proposed Addition To Skilled Nursing facility Within The Confines of The "ARARAT"Home of Los Angeles

15105 Mission Hills Road, Mission Hills, California

FOR.	Mr. Ararat Home For The Aged	DATE	4/4/2009	PROJECT No.	09-322-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS				FIGURE No.	1



Reference: San Fernando 7.5 Quadrangles

REGIONAL GEOLOGIC MAP

Proposed Addition To Skilled Nursing facility Within The Confines of The "ARARAT"Home of Los Angeles

15105 Mission Hills Road, Mission Hills, California

FOR.	Mr. Ararat Home For The Aged	DATE 4/4/2009	PROJECT No. 09-322-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS			FIGURE No. 2

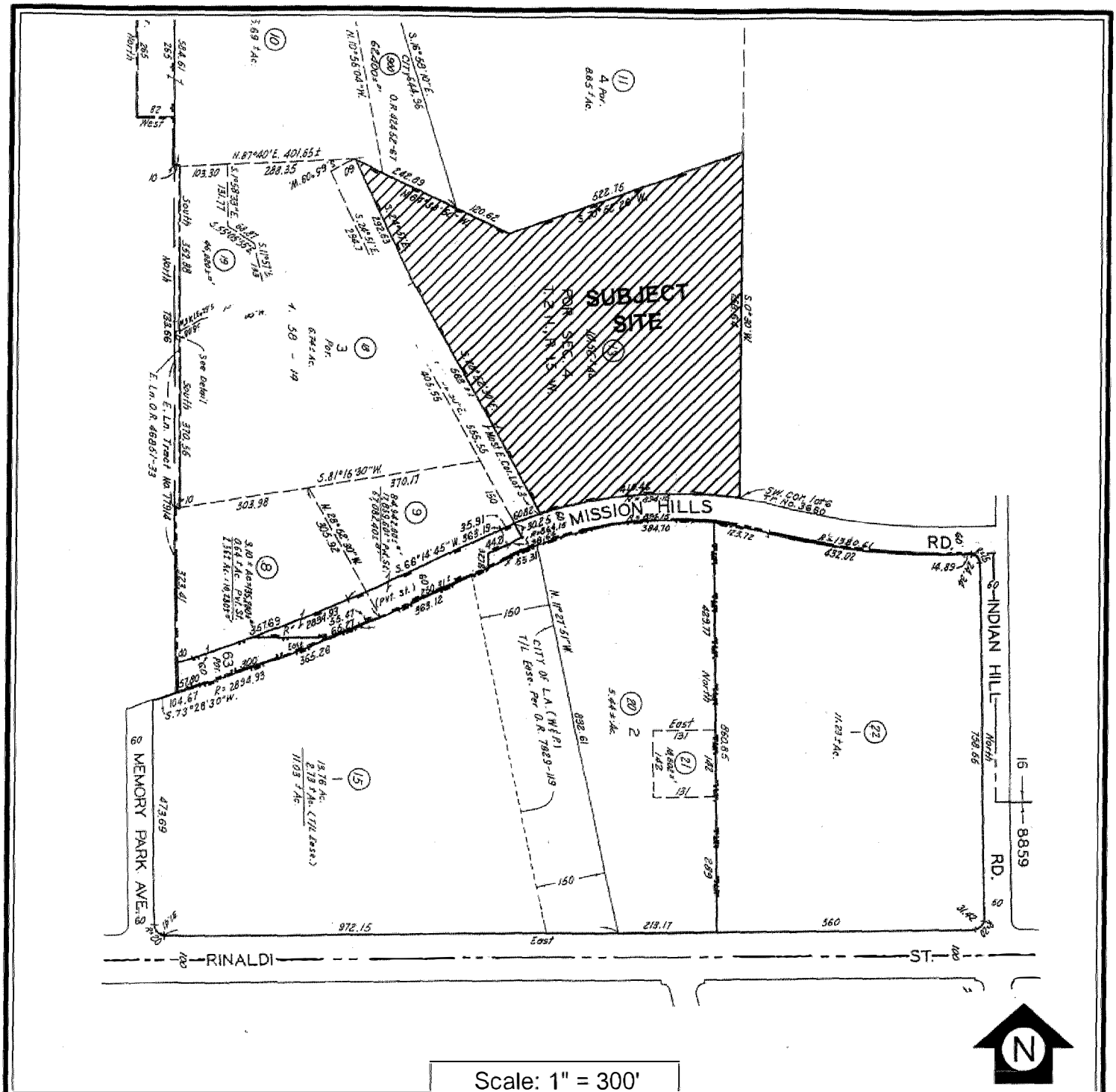


SITE VICINITY MAP

Proposed Addition To Skilled Nursing facility Within The Confines of The "ARARAT"Home of Los Angeles

15105 Mission Hills Road, Mission Hills, California

FOR.	Mr. Ararat Home For The Aged	DATE	4/4/2009	PROJECT No.	09-322-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS				FIGURE No.	3



Scale: 1" = 300'

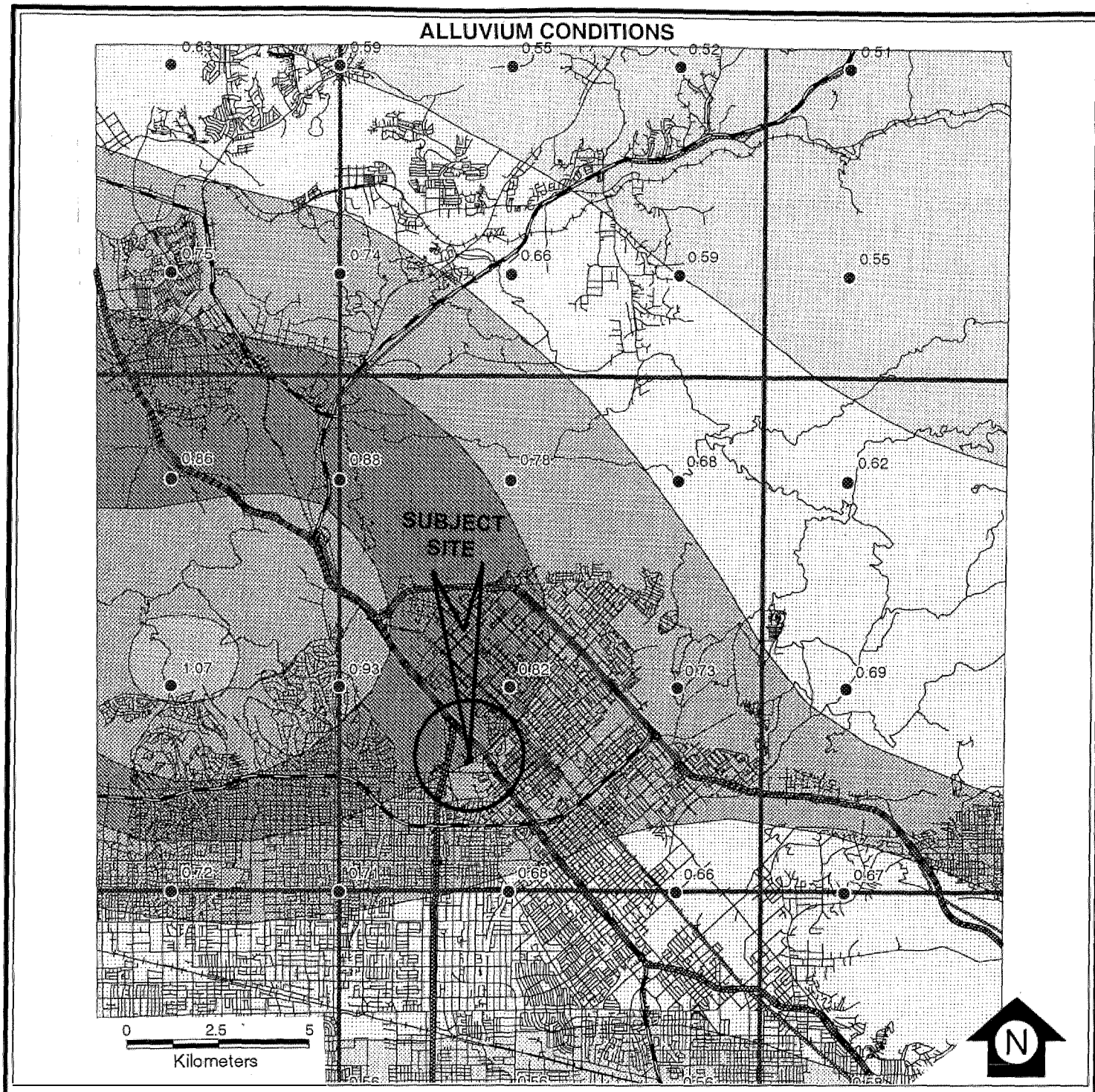
Reference: Portion of Assessor Map of Simi Valley

SITE LOCATION

Proposed Addition To Skilled Nursing facility Within The Confines of The "ARARAT"Home of Los Angeles

15105 Mission Hills Road, Mission Hills, California

FOR.	Mr. Ararat Home For The Aged	DATE	4/4/2009	PROJECT No.	09-322-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS				FIGURE No.	4



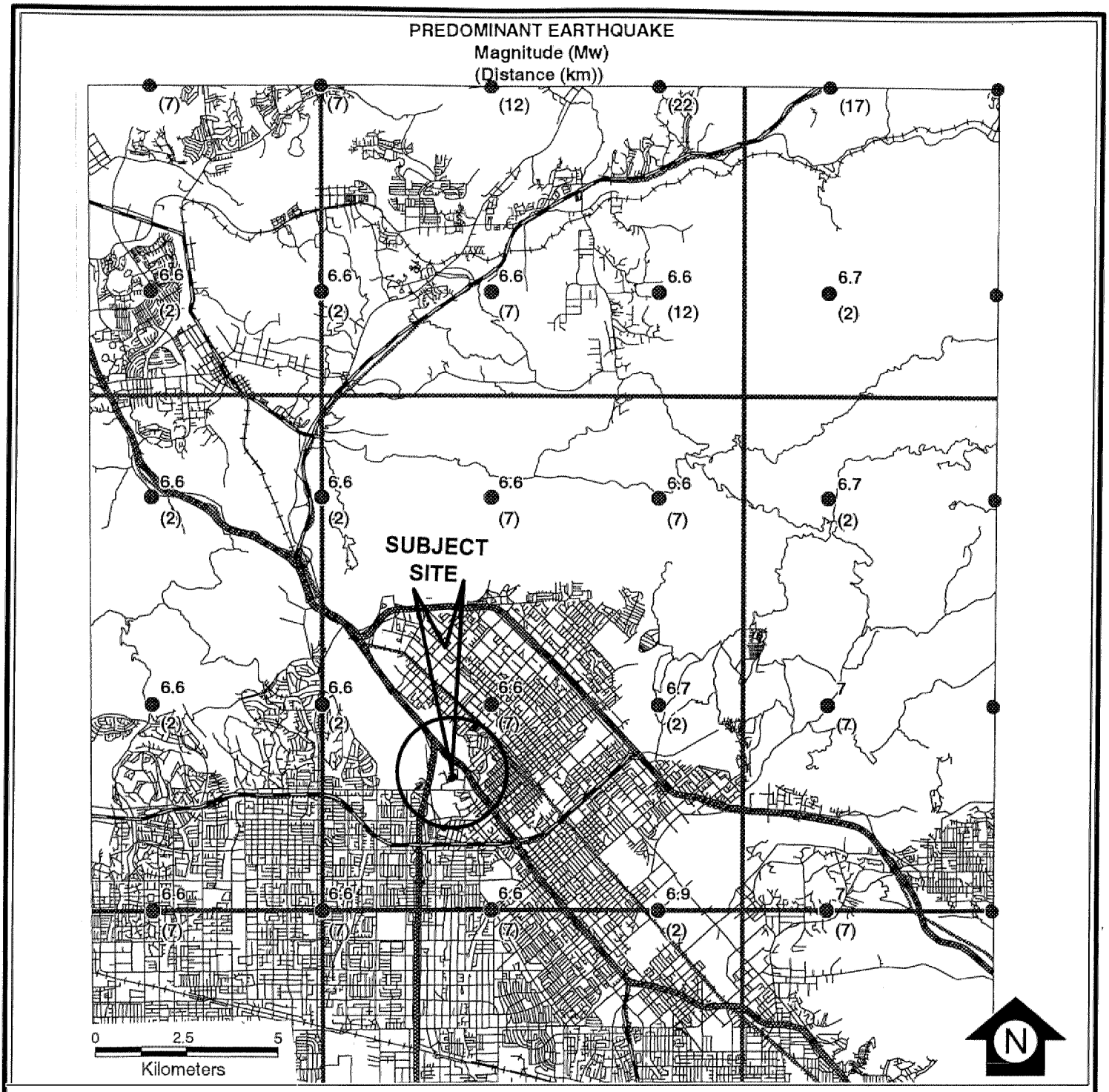
Reference: San Fernando 7.5 Quadrangles

SEISMIC HAZARD MAP (Alluvium Conditions)

Proposed Addition To Skilled Nursing facility Within The Confines of The "ARARAT"Home of Los Angeles

15105 Mission Hills Road, Mission Hills, California

FOR.	Mr. Ararat Home For The Aged	DATE	4/4/2009	PROJECT No.	09-322-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS				FIGURE No.	5



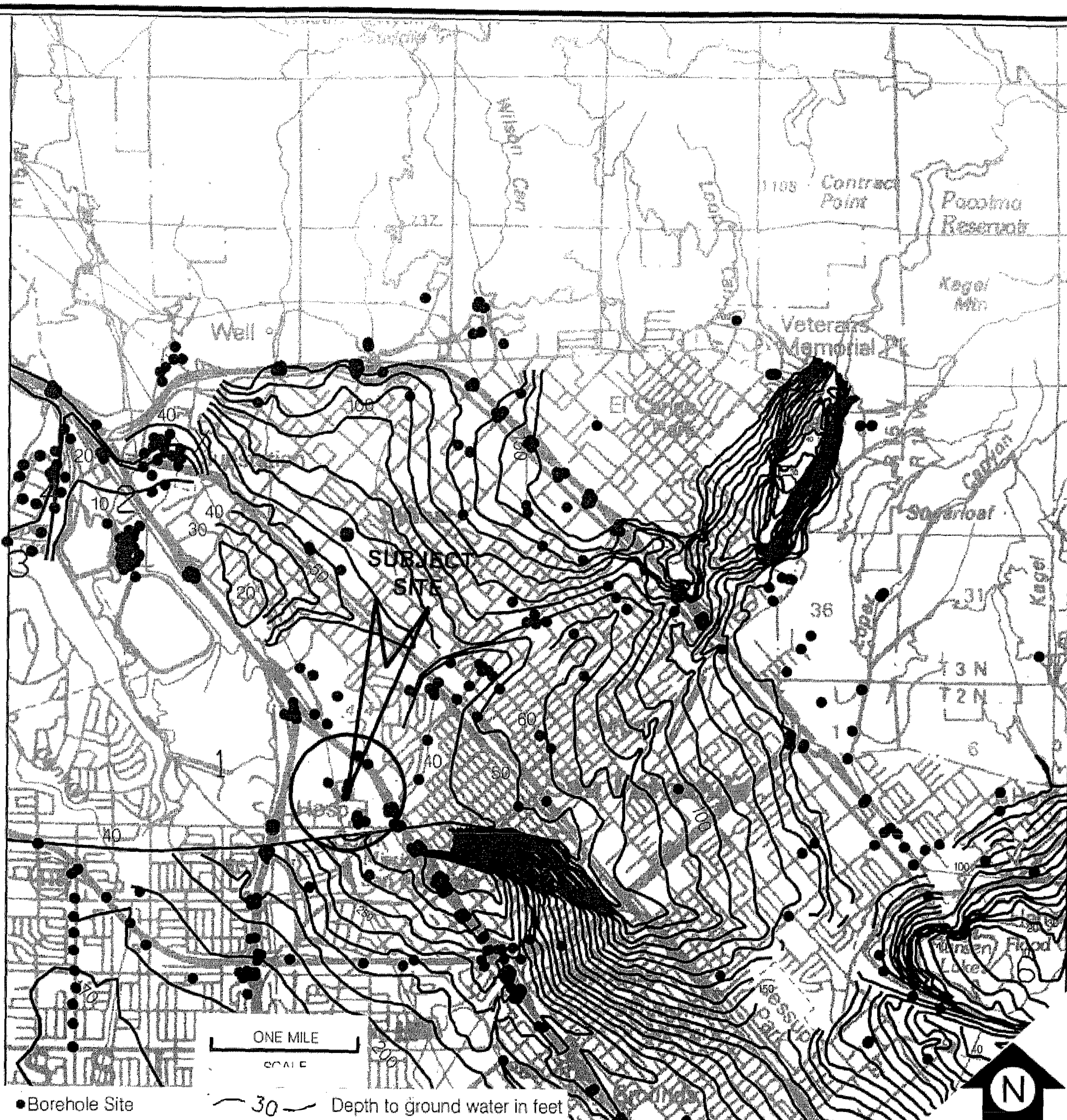
Reference: San Fernando 7.5 Quadrangles

SEISMIC HAZARD MAP (Predominant Earthquake)

Proposed Addition To Skilled Nursing facility Within The Confines of The "ARARAT"Home of Los Angeles

15105 Mission Hills Road, Mission Hills, California

FOR.	Mr. Ararat Home For The Aged	DATE	4/4/2009	PROJECT No.	09-322-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS				FIGURE No.	6



●Borehole Site — 30 — Depth to ground water in feet

Reference: San Fernando 7.5 Quadrangles

HISTORICALLY HIGHEST GROUNDWATER (Contour Map)

Proposed Addition To Skilled Nursing facility Within The Confines of The "ARARAT"Home of Los Angeles

15105 Mission Hills Road, Mission Hills, California

FOR. Mr. Ararat Home For The Aged	DATE 4/4/2009	PROJECT No. 09-322-02
APPLIED EARTH SCIENCES GEOTECHNICAL . GEOLOGY . ENVIRONMENTAL ENGINEERING CONSULTANTS		FIGURE No. 7

APPENDIX I
METHOD OF FIELD EXPLORATION

In order to define subsurface conditions four borings were drilled at the site. The approximate locations of the borings with respect to the existing building are shown on the enclosed Site Plan. The borings were drilled with a hollow stem drilling machine.

Logs of the subsurface materials, as encountered in the borings, were recorded in the field and are presented Figure Nos. I-1 through I-4 within Appendix I. These figures also show the number and approximate depths of each of the recovered soil samples.

Relatively undisturbed samples of the subsoil were obtained by driving a steel sampler with successive drops of a 140-pound sampling hammer free-falling a vertical distance of about 30 inches. The number of blows required for one foot of sampler penetration was recorded at the time of drilling and are shown on the log of exploratory borings. The relatively undisturbed soil samples were retained in brass liner rings 2.5 inches in diameter and 1.0 inch in height.

Field investigation for this project was performed on March 10, 2009. The material excavated from the borings was placed back and compacted upon completion of the field work. Such material may settle. The owner should periodically inspect these areas and notify this office if the settlement creates a hazard to persons or property.

BORING No. 1

DATE EXCAVATED: 03/10/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					CLAY (CL)		**Fill:** Moderately compact, very moist, dark brown, sandy, little gravel
	124	17		25	SAND (SM)		Grades to compact, clayey sand, gravelly, occasional cobbles
5	114	13		30	SAND (SM)		Dense, moist, light brown, silty, slightly clayey, fine grained sand with gravel
10	122	9		50/6"	(SM)		Grades to very dense, yellowish brown, silty, more gravel, occasional cobbles
15	112	8		75	(SM)		Grades to slightly silty, slightly coarse grained, less gravel
20	113	7		50/4"	(SM/SP)		Grades to little silty
25	112	10		100/5"	(SM/SP)		Grades to brown
30	119	10		50/2"	(SM)		Grades to silty, more gravel and cobbles

LOG OF BORING

JOB NAME: ARARAT HOME FOR THE AGED JOB No. 09-322-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-1.1

BORING No. 1(continued)

DATE EXCAVATED: 03/10/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					(SM)		**Continued from previous page**
35	129	3	13	100/2"	(SM)		Grades to little sillt, more gravel and cobbles
45							End of Boring @ 36 feet No Water
50							

LOG OF BORING

JOB NAME: ARARAT HOME FOR THE AGED

JOB No. 09-322-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-1.2

BORING No. 2

DATE EXCAVATED: 03/10/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					CLAY (CL)		**Fill:** Moderately compact, very moist, brown, sandy clay with gravel
	122	16		23	(SM)		Grades to compact, clayey sand, gravelly
5	117	17		29	SAND (SM)		Dense, moist, brown, silty, slightly clayey, fine grained sand with gravel
	125	9		50/6"	(SM)		Grades to very dense, dark gray, more gravel, cobbles
10	119	10		50/6"	(SM)		Grades to yellowish brown, fine to medium grained with gravel
15	115	9		50/5"	(SM)		Grades to slightly silty, little gravel
20	112	9		50/3"	(SM)		Grades to silty
25							End of Boring @ 21 feet No Water
30							

LOG OF BORING

JOB NAME: ARARAT HOME FOR THE AGED JOB No. 09-322-22

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS

FIGURE NO : I-2

BORING No. 3

DATE EXCAVATED: 03/10/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					SAND (SM)		**Fill:** Moderately compact, moist, brown, clayey sand with gravel
	120	12	48	24	(SM)		Grades to compact, silty, slightly clayey sand
5							
	113	12	54	30	SILT (ML)		Grades to sandy silt, dark gray, moist, gravelly
	118	14	57	37	SILT (ML/SM)		Stiff, moist, light brown, sandy silt, gravelly. RECENT ALLUVIUM (Qa)
10							
	119	12	45	40	SAND (SM/ML)		Dense, moist, light brown, silty, fine to medium grained with gravel OLDER ALLUVIUM (Qoa), slightly consolidated, weakly indurated.
15							
	111	20	42	38	(SM)		Grades to very moist
20							
	112	21	45	45	(SM)		Grades to wet, brown, fine grained sand, less gravel
25							
	68	50	96	43*/35 (SPT)	Bedrock (Tm)		Stiff, wet, olive brown, sedimentary bedrock of the Modelo Formation; SHALE (Tm), slightly sandy, slightly hard.
30							
	80	42	75	44*/33 (SPT)			Grades to very stiff, light gray, SHALE, hard

LOG OF BORING

JOB NAME: ARARAT HOME OF LOS ANGELES JOB No. 09-322-22

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FIGURE NO : I-3-1

BORING No. 3(continued)

DATE EXCAVATED: 03/10/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					(Tm)		**Continued from previous page**
35	78	54	56	46*/32 (SPT)			
40	96	30	40	59*/38 (SPT)			Very dense, wet, brown, clayey, fine-grained sandstone, tan-brown, slightly gravelly.
45	74	51	80	53*/32 (SPT)	(Tm)		Stiff, wet, light gray, SHALE, slightly sandy
50	73	54	39	62*/36 (SPT)			Very dense, wet, brown, clayey, fine grained sandstone with gravel

End of Boring @ 51 feet
Water @ 20 feet
*Field/Corrected SPT

LOG OF BORING

JOB NAME: ARARAT HOME OF LOS ANGELES JOB No. 09-322-22

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FIGURE NO : I-3.2

BORING No. 4

DATE EXCAVATED: 03/10/09 **GROUND ELEVATION:**

DEPTH IN FEET	DRY DENSITY (PCF)	FIELD MOISTURE (%DRY WEIGHT)	% PASSING #200	BLOWS PER FOOT	MATERIAL TYPE	MATERIAL SYMBOL	MATERIAL DESCRIPTION
					CLAY (CL)		**Fill:** Moderately compact, very moist, brown, sandy clay with gravel
	110	15		35	(SM)		Grades to compact, moist, light brown, silty, slightly clayey sand with gravel
5	119	15		42	(ML)		Grades to dark brown, sandy silt with gravel
					SILT (ML)		Stiff, moist, brown, sandy silt with gravel RECENT ALLUVIUM (Qa)
10	115	14		48	SAND (SM/ML)		Grades to dark brown, occasional cobbles OLDER ALLUVIUM (Qoa)
15	117	15		32*/36 (SPT)	(SM)		Grades to brown, very moist
20	109	19		37*/34 (SPT)	Bedrock (Tm)		Stiff, moist to wet, light to dark brown, silty, SHALE bedrock of the Modelo Formation (Tm)
25	70	52		39*/32 (SPT)			
30	72	43		41*/31			End of Boring @ 31 feet Water @ 20 feet * Field/Corrected SPT

LOG OF BORING

JOB NAME: ARARAT HOME OF LOS ANGELES JOB No. 09-322-22

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FIGURE NO : I-4

MAJOR DIVISIONS			GROUP SYMBOLS	TYPICAL NAME
COARSE GRAINED SOILS (More than 50% of material is LARGER than No. 200 sieve size)	GRAVELS (More than 50% of coarse fraction is LARGER than the No. 4 sieve size)	CLEAN GRAVELS (Little or no fines)	GW	Well graded gravels, gravel - sand mixtures, little or no fines.
			GP	Poorly graded gravels or gravel-sand mixtures, little or no fines.
		GRAVELS WITH FINES (Appreciable amt. of fines)	GM	Silty gravels, gravel-sand-silt mixtures.
			GC	Clayey gravels, gravel-sand-clay mixtures.
	SANDS (More than 50% of coarse fraction is SMALLER than the No. 4 sieve size)	CLEAN SANDS (Little or no fines)	SW	Well graded sands, gravelly sands, little or no fines.
			SP	Poorly graded sands or gravelly sands, little or no fines.
		SANDS WITH FINES (Appreciable amt. of fines)	SM	Silty sands, sand-silt mixtures.
			SC	Clayey sands, sand-clay mixtures.
FINE GRAINED SOILS (More than 50% of material is SMALLER than No. 200 sieve size)	SILTS AND CLAYS (Liquid limit LESS than 50)		ML	Organic silts and very fine sands, rock flour, silty or clayey fine sands or clayey silts with slight plasticity.
			CL	Organic clay of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays.
			OL	Organic silts and organic silty clays of low plasticity.
	SILTS AND CLAYS (Liquid limit GREATER than 50)		MH	Organic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts.
			CH	Organic clays of high plasticity, fat clays.
			OH	Organic clays of medium to high plasticity, organic silts.
HIGHLY ORGANIC SOILS			Pt	Peat and other highly organic soils.

BOUNDARY CLASSIFICATIONS: Soils possessing characteristics of two groups are designated by combinations of group symbols.

PARTICLE SIZE LIMITS

SILT OR CLAY	SAND			GRAVEL		COBBLES	BOULDERS
	FINE	MEDIUM	COARSE	FINE	COARSE		

NO. 200 NO. 40 NO. 10 NO. 4 3/4 in. 3 in. (12 in.)

U. S. STANDARD SIEVE SIZE

UNIFIED SOIL CLASSIFICATION SYSTEM

JOB NAME : Mr. Ararat Home For The Aged

JOB No. 09-322-02

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FIGURE No. I-5

APPENDIX II

LABORATORY TESTING PROCEDURES

Moisture Density

The moisture-density information provides a summary of soil consistency for each stratum and can also provide a correlation between soils found on this site and other nearby sites. The tests were performed using ASTM D 2216-04 Laboratory Determination of water content Test Method. The dry unit weight and field moisture content were determined for each undisturbed sample, and the results are shown on log of exploratory borings.

Shear Tests

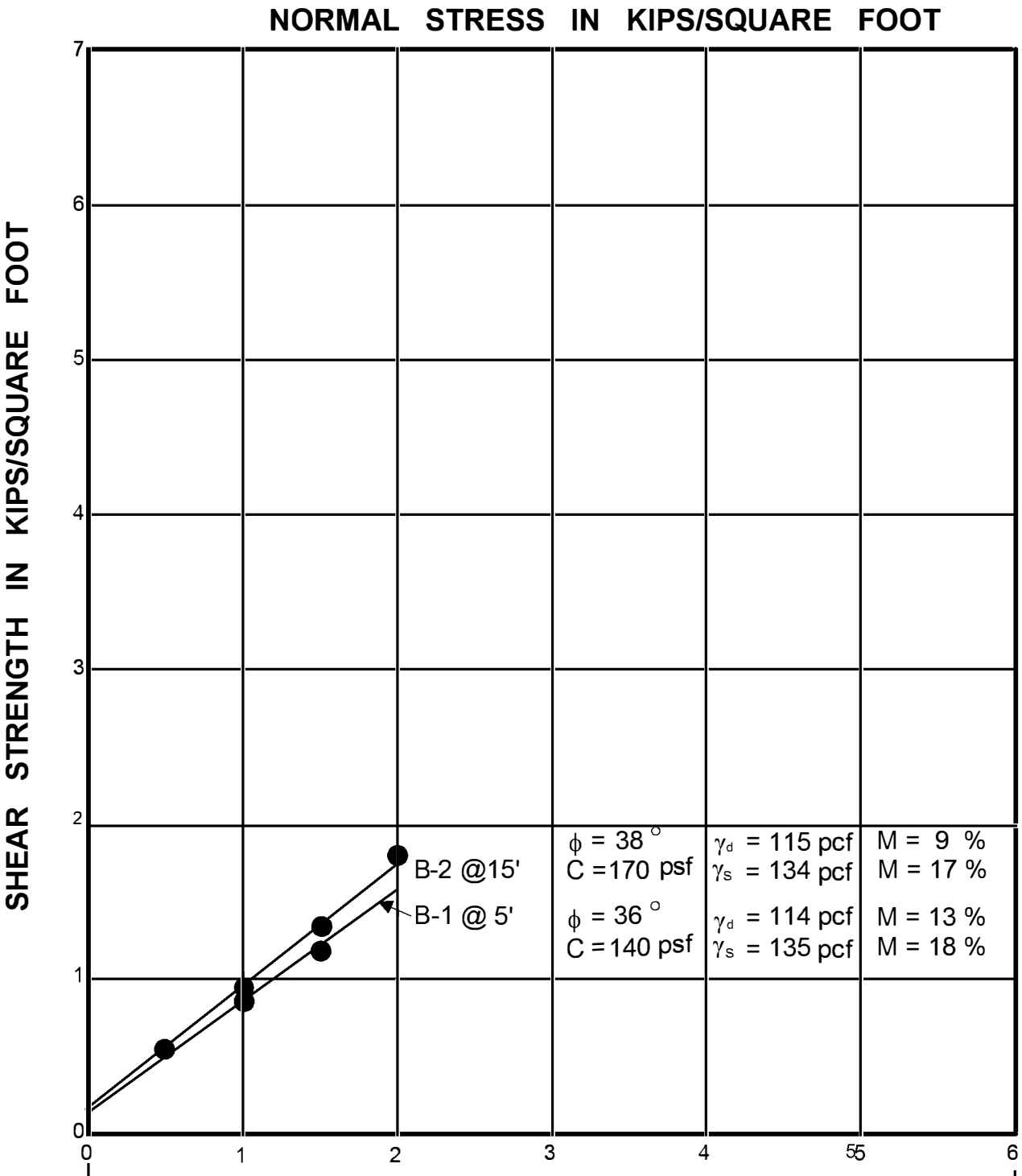
Shear tests were made with a direct shear machine at a constant rate of strain. The machine is designed to test the materials without completely removing the samples from the brass rings. The rate of shear was determined through determination of the rate of consolidation of the foundation bearing materials.

A range of normal stresses was applied vertically, and the shear strength was progressively determined at each load in order to determine the internal angle of friction and the cohesion. The tests were performed using ASTM D 3080-04 Laboratory Direct Shear Test Method. The Ultimate shear strength results of direct shear tests are presented on Figure No. II-1 within this Appendix.

Consolidation

The apparatus used for the consolidation tests is designed to receive the undisturbed brass ring of soil as it comes from the field. Loads were applied to the test specimen in several increments, and the resulting deformations were recorded at time intervals. Porous stones were placed in contact with the top and bottom of the specimen to permit the ready addition or release of water. ASTM D 2435-04 Laboratory Consolidation Test Method.

Undisturbed specimens were tested at the field and added water conditions. The test results are shown on Figure No. II-2 within this Appendix.



DIRECT SHEAR TESTS

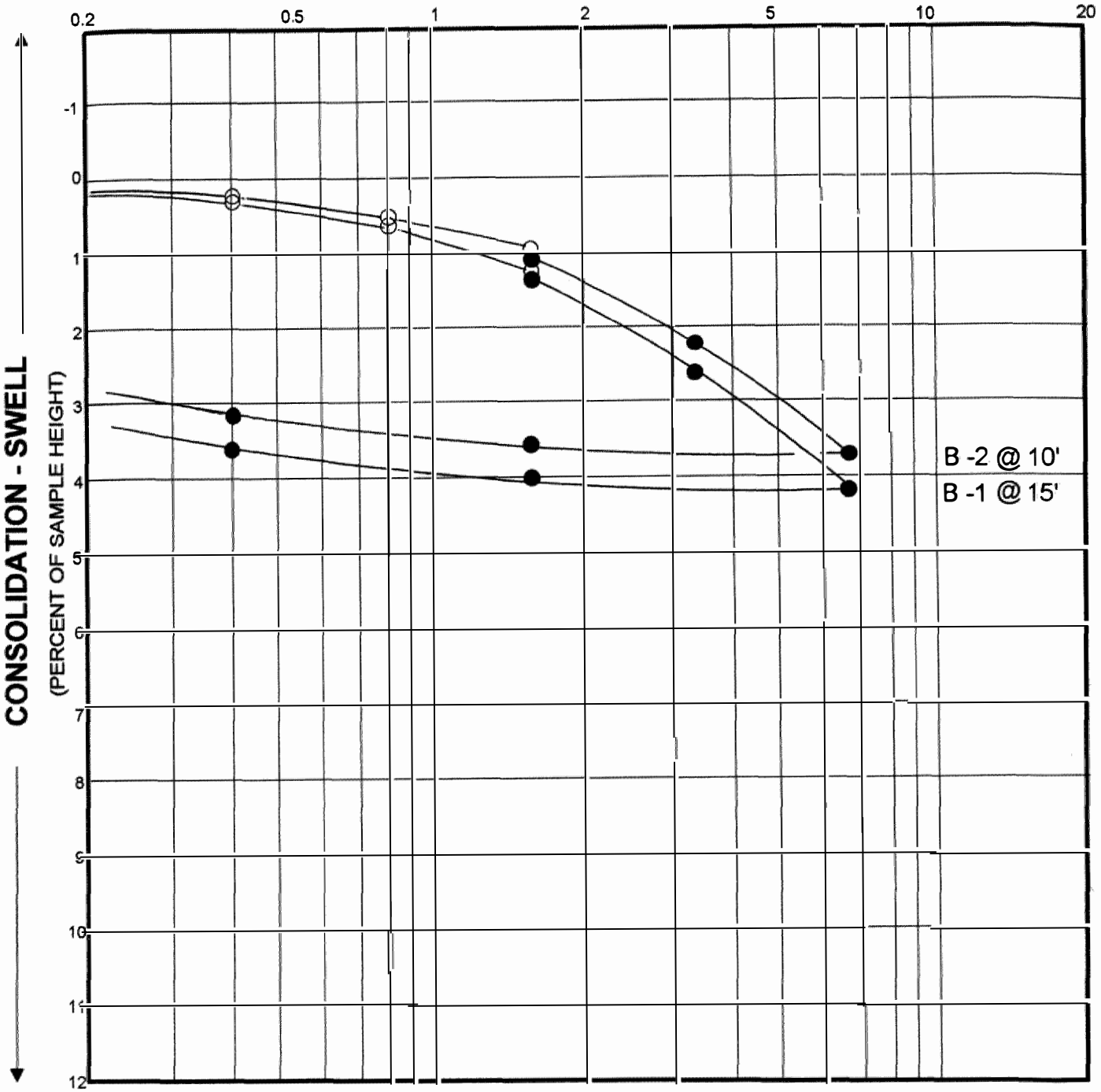
JOB NAME: Ararat Home For The Aged

JOB NO. 09-322-02

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FIGURE NO. II-1

PRESSURE IN KIPS/SQUARE FOOT



○ FIELD MOISTURE ● WATER ADDED

SWELL-CONSOLIDATION TESTS

JOB NAME: Ararat Home For The Aged JOB NO. 09-322-02

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FIGURE NO. II-2

Applied Earth Sciences
a division of Applied Soil Technology, Inc.
GEOTECHNICAL & ENVIRONMENTAL ENGINEERING CONSULTANTS

November 19, 1997 95-525-02

Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California 91344

Subject: Observation and Testing of Compacted Fill
Proposed Expansion Of Skilled Nursing Facility
Within The Confines Of Ararat Home Of Los Angeles
Lot 3 Tract 3660
15105 Mission Hills Road
Mission Hills, California

Ladies/Gentlemen:

INTRODUCTION

This report presents the results of our observation and testing of the compacted fill placed on the subject site between August 7, 1996, through October 9, 1997. The purpose of site grading basically involved filling operations in order to establish the finished grades of the proposed building. Site grading also involved backfilling behind the newly constructed basement retaining walls. The original geotechnical investigation report prepared by this office was issued on October 20, 1995.

This office provided periodic observation and testing services during the course of site grading. The presence of our field representative was to provide source of professional advice, opinion, and recommendations based on our observation of the contractors work and did not include any superintending, supervision, or direction of the actual work of the contractor's workmen.

This report basically includes our conclusions and recommendations regarding the work accomplished and the intended use of the compacted fill placed in the site.

The enclosed Site Plan; Drawing No. 1, indicates the approximate location of the field density tests taken during the course of our field observation. This Site Plan also shows the approximate depths and limits of the placed fill.

The attached Appendix I, describes the method of field density testing. Table I presents a summary of field density test results. The attached Appendix II describes the laboratory testing procedures. Table II-1 presents the results of maximum density-optimum moisture content of the materials used in the compacted fill.

PROPOSED GRADING

The purpose of site grading basically involved cut and fill operations in order to establish the finished grades of the proposed building. Fill was placed over the existing slope which had gradients ranging from near level to about 5:1 (horizontal:vertical). As a result of such grading work, a new fill slope with a gradient of about 2:1 (horizontal:vertical) was created within the southern portion of the site.

A minimum of 2 feet of the upper fill soils was removed and recompacted. The depth of removal ranged from 2 to a maximum of 8 feet (the removal of more than 2 feet was made in areas where pockets of saturated soils were found in the existing fill. Saturated soils were removed from these areas aerated, replaced with gravel and/or compacted fill soils for stabilization).

The zone of removal and recompaction was extended beyond the exterior walls of the proposed building a horizontal distance of at least 5 feet. Along the existing building to the North, the placement of fill could not be extended beyond the proposed building lines (see enclosed site plan, Drawing No. 1). The exterior wall footings of the new building were placed at the same elevation of the footings of the existing building.

The height of the basement retaining walls was on the order of 13 feet.

PROJECT SPECIFICATION

Compacted fill was placed in accordance with the recommendations of the original geotechnical investigation report issued on October 20, 1995. All fill soils were compacted to a relative compaction of at least 90 percent at optimum moisture content. The maximum densities of the materials used were determined in accordance with ASTM Designation D1557-91 laboratory compaction method. The in-place density tests of the compacted fill soils were made using Sand Cone Method, as outlined under ASTM designation D 1556-90.

GRADING OBSERVATION

A. The grading operation of the slope for the proposed building was observed to be performed in the following general manner:

1. The key bottom excavation at the toe of the fill slope was observed and approved by a representative of this office before new fill was placed. The excavated area for the key was noted to be as recommended in the original report (8-feet wide and extended at least 4 feet into native soils material) . A field memorandum to that effect was left on the subject site;

2. The exposed surfaces were scarified to a depth of 8-inches, moisture conditioned to near the optimum moisture content, and then compacted in-place to a relative compaction of at least 90 percent before new fill was placed;

3. Fill materials were placed in 8-inch loose layers on the prepared surface. Each layer was compacted to a relative compaction of at least 90 percent before the next layer was added. Soils were placed by a loader and compacted by a sheepsfoot vibratory compactor;

4. As recommended in the original report, the new fill soils were constructed on native and/or the existing fill below a depth of about 2 feet. Horizontal benches were extended into native and/or 2 feet below the existing fill;

5. Pockets of soils with excessive moisture in the existing fill (below the recommended depth of removal of 2 feet) were removed, replaced with gravel and/or aerated, mixed with dry soils and compacted in place for stabilization;

6. The excavated on-site soils were reused to construct the compacted fill. Also, import soils were used in the compacted fill;

7. Subdrain system consisted of 4-inch diameter perforated pipe encased in 3/4 of an inch free draining gravel were installed within the key and at elevations of 53 and 62. The perforated drainage pipes were connected to the existing vertical drain pipe. Field memorandums to those effects were left on the subject site;

8. Placement of compacted fill was continued until the proposed finish grades were established;

9. Maximum density and optimum moisture content of the materials used were determined by ASTM D1557-91 method; and

10. The materials used to construct the compacted fill were on-site and import soils. On-Site and import soils consisted of silty sands which were found to be non-expansive.

B. Basement retaining walls and the utility trenches were observed to be backfilled in the following general manner:

1. After the subdrain system was installed over the basement wall footings , a representative of this office observed and approved the bottom, the 4-inch diameter perforated pipe encased in 3/4 of an inch free draining gravel. A field memorandum to that effect was left on the subject site;

2. The fill soils were placed in 8-inch loose layers (4-inch layers where hand held vibratory compactor was used for compaction). Each layer was moisture conditioned to near optimum moisture content and compacted to a relative compaction of at least 90 percent before the next layer was added. Soils were placed by a loader and compacted by a loader and by hand held vibratory compactor;

3. A mixture of the materials excavated from site and imported materials were used for wall and trench backfilling;

4. Maximum density and optimum moisture content of the materials used were determined by ASTM D1557-91 Laboratory Compaction method; and

5. The materials used for the wall backfill consisted of silty sand. These soils were found to be non expansive.

Field density tests were made during the placement of the fill to determine the degree of compaction and moisture content. Where test results indicated insufficient density, additional compactive effort or adjustment of layer thickness, as necessary, were made until at least 90 percent compaction was attained.

CONCLUSIONS AND RECOMMENDATIONS

Based on the results of our tests, our observation of the construction procedure used in the field, and our experience, it is our opinion that the compacted fill shown on the enclosed Site Plan; Drawing No. 1, has been placed to at least 90 percent relative compaction. The compacted fill discussed in this report is intended to support structural footings and grade slabs. The basement wall backfill and trench backfill discussed in this report will be used for slab support and for landscaping.

It is our opinion that the previously recommended allowable maximum bearing pressure of 2,000 pounds per square foot may be used for footings having a minimum width of 12 inches, established at a minimum depth of about 24 inches below the lowest adjacent final grade. Under the allowable maximum soil pressure, the total and differential settlements of the proposed structure are expected to be on the same order as those presented in our original report; 3/4 and 1/4 of one inch, respectively. It is expected that the major portion of the settlements will occur during construction.

-o0o-

The following drawing and appendices are attached and complete this report:

Site Plan-Drawing No. 1
Appendix I - Method of Field Testing
Table I - Summary of Field Testing
Appendix II- Methods of laboratory Testing
Table II-1
Certificate of compliance

Respectfully submitted,

APPLIED EARTH SCIENCES

Reviewed By:

Vahik Hacopian
Staff Engineer

Caro J. Minas
Geotechnical Engineer
GE 601



VH/aa
Dist: (4) Addressee

APPENDIX I

METHOD OF FIELD TESTING

The in-place density test of the compacted fill soils were made using Sand Cone Method, as outlined under ASTM designation D 1556-90. The maximum density of the soil was obtained as per ASTM D 1557-91.

TABLE I

SUMMARY OF FIELD DENSITY TESTS

TEST NO.	DATE	ELEVATION IN FEET	FIELD DRY DENSITY (PCF)	FIELD MOISTURE CONTENT (%)	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT %	COMPACTION %
1	8/8/96	44	111	10	122	9	91
2	8/8/96	46	112	9	122	9	92
3	8/9/96	46	111	10	122	9	91
4	8/13/96	46	113	10	122	9	93
5	8/13/96	48	112	9	122	9	92
6	8/13/96	48	111	10	122	9	91
7	8/13/96	48	110	9	122	9	90
8	8/14/96	48	114	10	122	9	93
9	8/14/96	48	112	10	122	9	92
10	8/14/96	48	110	11	122	9	90
11	8/15/96	50	114	12	122	9	93
12	8/15/96	50	110	10	122	9	90
13	8/15/96	50	113	11	122	9	93
14	8/15/96	50	114	10	122	9	93
15	8/15/96	50	112	12	122	9	92
16	8/16/96	52	113	11	122	9	93
17	8/16/96	52	113	10	122	9	93
18	8/28/96	52	113	10	122	9	93
19	8/28/96	52	114	9	122	9	93
20	8/28/96	52	111	11	122	9	91
21	8/28/96	52	114	9	122	9	93
22	8/28/96	52	115	10	122	9	94
23	9/9/96	54	115	9	122	9	94
24	9/9/96	54	111	11	122	9	91
25	9/10/96	54	114	9	122	9	93
26	9/10/96	54	112	10	122	9	92

NOTE: See Site Plan for test locations

TABLE I

SUMMARY OF FIELD DENSITY TEST

TEST NO.	DATE	ELEVATION IN FEET	FIELD DRY DENSITY (PCF)	FIELD MOISTURE CONTENT (%)	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT %	COMPACTION %
27	9/12/96	54	112	9	122	9	92
28	9/12/96	54	112	11	122	9	92
29	9/13/96	56	112	11	122	9	92
30	9/13/96	56	113	9	122	9	93
31	9/13/96	56	114	9	122	9	93
32	9/13/96	56	113	11	122	9	93
33	9/13/96	56	114	9	122	9	93
34	9/13/96	56	114	9	122	9	93
35	9/14/96	58	113	10	122	9	93
36	9/14/96	58	111	9	122	9	91
37	9/14/96	58	113	10	122	9	93
38	9/14/96	58	111	9	122	9	91
39	9/16/96	60	113	10	122	9	93
40	9/16/96	60	112	9	122	9	92
41	9/16/96	60	113	9	122	9	93
42	9/16/96	60	112	10	122	9	92
43	9/16/96	62	113	9	122	9	93
44	9/16/96	62	114	11	122	9	93
45	9/17/96	62	112	9	122	9	92
46	9/17/96	62	112	11	122	9	92
47	9/17/96	62	113	9	122	9	93
48	9/17/96	60	114	10	122	9	93
49	9/18/96	64	114	9	122	9	93
50	9/18/96	64	113	10	122	9	93
51	9/18/96	64	114	10	122	9	93
52	9/18/96	64	113	11	122	9	93

NOTE: See Site Plan for test locations

TABLE I

SUMMARY OF FIELD DENSITY TESTS

TEST NO.	DATE	ELEVATION IN FEET	FIELD DRY DENSITY (PCF)	FIELD MOISTURE CONTENT (%)	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT	COMPACTION %
53	9/18/96	64	118	8	122	9	97
54	9/18/96	64	117	8	122	9	96
55	9/19/96	66	118	9	122	9	97
56	9/19/96	66	117	9	122	9	96
57	9/19/96	68	118	7	122	9	97
58	9/19/96	68	118	8	122	9	97
59	9/19/96	68	117	8	122	9	96
60	9/19/96	68	119	8	122	9	98
61	9/20/96	62	119	9	127	8	94
62	9/20/96	64	119	9	127	8	94
63	9/20/96	60	118	7	127	8	93
64	9/20/96	62	118	7	127	8	93
65	9/23/96	64	119	8	127	8	94
66	9/23/96	64	117	8	127	8	92
67	9/24/96	66	117	9	127	8	92
68	9/24/96	68	118	9	127	8	93
69	9/24/96	66	117	9	127	8	92
70	9/24/96	68	119	9	127	8	94
71	9/24/96	68	118	8	128	7	92
72	9/24/96	68	118	8	128	7	92
73	9/25/96	68	118	9	128	7	92
74	9/25/96	68	117	8	128	7	91
75	9/25/96	68	119	9	128	7	93
76	9/25/96	68	120	7	128	7	94
77	9/25/96	68	120	7	128	7	94
78	9/25/96	70	121	8	128	7	95

NOTE: See Site Plan for test locations

TABLE I

SUMMARY OF FIELD DENSITY TESTS

TEST NO.	DATE	ELEVATION IN FEET	FIELD DRY DENSITY (PCF)	FIELD MOISTURE CONTENT (%)	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT %	COMPACTION %
79	9/26/96	70	121	7	128	7	95
80	9/26/96	70	120	8	128	7	94
81	9/26/96	68	117	7	128	7	91
82	9/26/96	68	116	7	128	7	91
83	9/27/96	68	118	8	127	8	93
84	9/27/96	70	117	8	127	8	92
85	9/27/96	70	118	9	127	8	93
86	9/27/96	70	118	8	127	8	93
87T	10/18/96	F.G.-2	114	10	122	9	93
88T	10/18/96	F.G.	114	11	122	9	93
89T	10/21/96	F.G.	113	12	122	9	93
90T	10/21/96	F.G.	113	11	122	9	93
91T	10/21/96	F.G.	115	10	122	9	94
92T	10/22/96	F.G.	113	11	122	9	93
93T	10/22/96	F.G.	113	12	122	9	93
94T	10/23/96	F.G.	114	10	122	9	93
95T	10/23/96	F.G.	112	11	122	9	92
96T	11/26/96	F.G.	117	9	127	8	92
97T	11/26/96	F.G.	117	9	127	8	92
98B	11/29/96	57	119	10	127	8	94
99B	11/29/96	59	118	10	127	8	93
100B	11/29/96	59	118	9	127	8	93
101B	11/29/96	61	120	9	127	8	94
102B	11/29/96	61	120	8	127	8	94
103B	11/29/96	63	117	9	127	8	92
104B	11/30/96	63	116	9	127	8	91

NOTE: See Site Plan for test locations
B: Basement wall backfill tests

TABLE I

SUMMARY OF FIELD DENSITY Tests

TEST NO.	DATE	ELEVATION IN FEET	FIELD DRY DENSITY (PCF)	FIELD MOISTURE CONTENT (%)	MAXIMUM DRY DENSITY (PCF)	OPTIMUM MOISTURE CONTENT %	COMPACTION %
105B	11/30/96	63	119	8	127	8	94
106B	11/30/96	65	117	10	127	8	92
107B	11/30/96	65	115	11	127	8	91
108B	11/30/96	65	115	10	127	8	91
109B	11/30/96	65	115	11	127	8	91
110B	11/30/96	67	114	10	127	8	90
111T	12/19/96	67	114	11	127	8	90
112T	12/20/96	67	115	12	127	8	91
113	12/21/96	69	117	10	127	8	92
114T	12/21/96	69	117	11	127	8	92
115	2/11/97	69	118	11	127	8	93
116	2/11/97	69	117	11	127	8	92
117	3/7/97	70	118	11	127	8	93
118	3/7/97	F.G.	117	9	127	8	92
119	3/12/97	F.G.	119	9	127	8	94
120	3/12/97	F.G.	118	9	127	8	93
121	3/19/97	F.G.	117	10	127	8	92
122	3/19/97	F.G.	117	10	127	8	92
123	10/8/97	F.G.-2'	117	11	127	8	92
124	10/8/97	F.G.	118	11	127	8	93
125	10/9/97	F.G.	117	9	127	8	92
126	10/9/97	F.G.	119	9	127	8	94

P =Plumbing Trenches Backfill
B=Basement retaining wall backfill

APPENDIX II

LABORATORY TESTING PROCEDURES

Maximum Density-Optimum Moisture Tests

Three bag samples of the fill materials were tested in the laboratory to determine maximum dry density and optimum moisture content of the soils. The tests were performed using ASTM D1557-91 Laboratory Compaction Test Method. The results of the tests are presented in table II-1 below.

Table II-1

Soil Description	Maximum Dry Density (pcf)	Optimum Moisture Content (% of dry weight)
1. Brown, silty sand (SM) (On-site)	122	9
2. Light brown, silty sand (SM) (import)	128	7
3. Brown, silty sand (SM) (On-site and import Mix)	127	8

The Maximum Density was obtained on sample portion finer than a #4 screen. Where required, each field density test was adjusted to account for that fraction of gravel size larger than the #4 screen size openings.

CITY OF LOS ANGELES

DEPARTMENT OF BUILDING AND SAFETY

ENGINEER'S CERTIFICATE OF COMPLIANCE FOR CONSOLIDATED EARTH FILLS

LEGAL OR STREET ADDRESS:	Lots 3 Tract 3660 15105 Mission Hills Road Mission Hills, California
SOIL TESTING AGENCY:	C.M. Applied Earth Sciences
PROPERTY OWNER'S NAME:	Ararat Home Of Los Angeles
OWNER'S ADDRESS:	15105 Mission Hills Road Mission Hills, California
AREA TESTED:	(See Site Plan)
PER REPORTS ON THE PROJECT:	October 20, 1995
DATE WORK STARTED ON PROJECT:	August 7, 1996
DATE FILL WAS COMPLETED:	October 9, 1997
DATE OF THIS CERTIFICATE:	November 19,1997

TO THE SUPERINTENDENT OF BUILDING:

* I HEREBY CERTIFY THAT I HAVE PERSONALLY SUPERVISED THE PLACING OF CONSOLIDATED EARTH FILL ON THE ABOVE DESCRIBED PROPERTY, AND THAT THE SAME WAS PLACED IN CONFORMITY WITH REQUIREMENTS OF THE LOS ANGELES BUILDING CODE OF THE CITY OF LOS ANGELES.



CARO J. MINAS
Geotechnical Engineer
G.E. 601

MY ADDRESS IS: 731 NORTH HOLLYWOOD WAY
BURBANK, CALIFORNIA 91505

* FOR THE PURPOSE OF THIS CERTIFICATE, TO "HAVE PERSONALLY SUPERVISED" SHALL INCLUDE SUPERVISION PERFORMED BY ANY PERSON OR PERSONS EMPLOYED BY, AND RESPONSIBLE TO, THE LICENSED ENGINEER SIGNING THIS CERTIFICATE. WHERE THE SUPERVISION OF ALL OR PART OF THE WORK ABOVE IS DELEGATED, FULL RESPONSIBILITY SHALL BE ASSUMED BY THE LICENSED ENGINEER WHOSE SIGNATURE IS AFFIXED HEREON.

XB&S G-16 5.66

CITY OF LOS ANGELES
CALIFORNIA

COMMISSIONERS
Joyce L. Foster
Mabel Chang
Jeanette Applegate
Lee K. Alpert
Nancy H. Zamora

RICHARD J. RIORDAN
MAYOR

DEPARTMENT OF
BUILDING AND SAFETY
400 CITY HALL
LOS ANGELES, CA 90012-4869

ARTHUR J. JOHNSON JR
GENERAL MANAGER

ARTHUR C DEVINE
EXECUTIVE OFFICER

DATE 12-8-97 (COMPACTION FILE - 5)

NAME Ararat Home of Los Angeles
ADDRESS 15105 Mission hills Rd
CITY MH ST CA ZIP 91344

TRACT: Rancho Ex-Mission de San Fernando; 3660 PERMIT: 96VN04064
BLOCK: DM #: 213B145
LOT(S): 4 ; 3 CTY REF #: EX04T2NR15
LOCATION: 15105 Mission Hills Rd

SUBJECT: PRIMARY STRUCTURAL FILL

FILL SOIL CLASSIFICATION, PER TABLE 18.1-A
LOTS HAVING COMPACTED FILL: same

Soils Compaction Report No. 95-525-02, dated 11-19-97, prepared by Applied Earth Sciences.

Approval is granted for compacted fill constructed on the above lots as described in the compaction report. Approval is limited to the area shown in the report and by the following requirements:

A. **Compacted fill shall extend beyond the footings a minimum distance equal to the depth of fill below the footings.**
B. **Continuous footing bearing pressure for all structures shall not exceed a value of** 2000 **psf at** 24 **inches minimum, below approved compacted surface.**
C. **Isolated footing bearing pressure for all structures shall not exceed a value of** 2000 **psf at** 24 **inches minimum, below approved compacted surface.**
D. **Dwelling foundations located partially or wholly upon compacted fill ground shall meet the requirements of Section 91.1806.10.**
E. **Building or structure footings shall be located a distance of one-third (1/3) of the vertical height of the slope with a minimum of 5 feet and a maximum of 40 feet, measured horizontally from the slope surface to the lower edge of the footing per Code Section 91.1806.4.3.**
F. **The soil engineer shall inspect the footing excavations to determine that they are founded in the recommended strata before calling the Department for footing inspection.**
G. **Slope erosion control, planting, and irrigation of fill slopes, and run-off control are required as per Code Sections 91.7012 and 91.7013.**
H.

Grading Engineer
213-485-3435 - LA Office
818-756-8211 - VN Office

HT : cm
TGRPSF/GR

cc: Iwaoka-VN Office
AES

NOTE: A grading oversized document is/is not attached to the Compaction Report. (Document Type 92)

AN EQUAL EMPLOYMENT OPPORTUNITY - AFFIRMATIVE ACTION EMPLOYER

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 3/12/97

To: Superintendant / Building inspector

The foundation excavations for the proposed building in the area between grid lines 1 and 4 and from D3 to the existing building to the north have been observed and approved by a representative of this office. Footings are noted to be in Compacted fill soils.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 3/19/97

To: Superintendant / Building inspector

The Subgrade removal and Compaction was made (area North-West corner grid lins 1 through 4 and B to F and Compaction of Subgrade is satisfactory.

4" Sand and Viscuine for the subject area have been observed and approved for placing Concrete slab by a representative of this office.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 2/27/97

To: Superintendent / Building inspection

The slab area for the proposed building from grid line 4 throug 8 and D. through F, 4" of sand sand & Viscuine have been observed and approved for placing concrete by a representative of this office.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date _____

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature _____

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 3/7/97

To: Superintendent / Building inspection

The last area to be covered with slab and foundation excavations have been under heavy construction traffic (A to F & 1 to 6 line. One to two feet holes have been observed & filled at times (not compacted) therefor there are areas with 6" to more than one foot of loose subgrade soils. Prior to placing subgrade sand & Viscuine the soils should be moisture conditioned & recompacted (preferably scarified & recompacte

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date _____

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature _____

Title Staff / Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 2/12/97

To: Superintendent / Building inspector

The Foundation excavations for the proposed building along the north existing building (excavated to the level of the existing footing) have been observed and approved for placement of concrete by a representative of this office. 4" sand & Viscous A3 to C and 5.5 to 7 grid lines was observed & approved.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff / Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 2/21/97

To: Superintendent / Building inspector

The Continuous footing excavations for and nine pads located at grid lines from 4 to 7.5 and D through E (the pads beyond E) for the proposed building have been observed and approved by a representative of this office. All footings are noted to be in Compacted fill.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff / Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 2/7/97

To: Superintendant / Building inspector

The continuous footing excavations for the proposed building pad in the area grid lines 1 thru 11 & B, C and D have been observed and approved by a representative of this office.

The perimeter footing excavations along the north existing building should be:

1- clean soils from the face of the existing building footings all along to the bottom & break thin concrete pieces. stop water from leaking inside footings.

2- Compact the bottom of footings for an even bottom. 3- Consult structural Engineer.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By V.C

Signature

Staff Engineer

Title

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 2/11/97

To: Superintendant / Building inspector

The Subgrade Compaction and 4 inches of sand And viscuine for concrete slab in the areas indicated below have been observed and approve by a representative of this office

Connecti- between line 7 and 8 & grid lines F through I.

North-West corner grid lines 8 through 11 and A.3 through D.

20 feet long North-West Corner footings along existing building have some loose fill that should be removed. (remove existing loose soil along Concrete and recompact, do not undermine existing footings

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

2

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills S.F., CA

Observed By V.C

Signature

Staff Engineer

Title

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 1/28/97

To: Superintendant / Building inspector

The following square pad and continuous foundation excavations locations have been observed and approved by a representative of this office.

7.5 and I line.
7.3 and H line.
7.3 and G line.
7.5 and F line.
B.5 and 10 line
C line and 4 line.

Total 5 G footing location approved.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA Observed By VIC

Signature VIC Haojian

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 2/3/97

To: Superintendant / Building inspector

One Square pad footing located at C line and 7.7 J have been observed and approved for placement of Concrete by a representative of this office.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA Observed By VIC

Signature VIC Haojian

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 12-20-96

To: Owners / Ararat Home

This is a field memo to inform the owners of the Ararat Home / Addition project that the cost of the Geotechnical Engineering services for the subject project may surpass the original estimated cost / limit.

The excess cost may be related to the fact that the building area being constructed in two Phases and unpredicted amount of Trench backfills etc.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. _____ Report Date _____

Project Address 15105 Mission Hills L.A., CA

Observed By _____

Signature _____

Staff Engineer

Title

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 1/10/97

To: Superintendant / Building inspector

The following footing locations have been observed and approved by a representative of this office

Pad ftg at 7.7 and C lns.
" " " C " a
" " " 10 and between C & B.
continuous ftg 7.6 and I.
Pad " 7.4 and H.
" " 7.4 and G.
" " 7.6 and F.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-07 Report Date _____

Project Address 15105 Mission Hills S.F., CA

Observed By VK

Signature

Staff Engineer

Title

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 11/28/96

To: Superintendant / Building inspector

The bottom of the The West wall of the basement 4" ϕ Perforated Pipe & 3/4" gravel was observed by a representative of this office.

Saturated Soils from the recent rains at the bottom of wall need to be removed Prior to placing backfill. One foot of gravel blanket could be placed on top of soils with high moisture (instead of removal) Prior to Compacted fill.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 12-17-96

To: Superintendant / Building inspector

In the north half of the proposed building area (2nd Phase) there is indication that some trenches have been loosely backfilled without any compaction of the backfill soils.

All areas with loose soils should be removed and recompacted under observation and testing of a representative of this office.

Plumbing Trenches south-east corner of Area I were Compacted & Tested OK

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 11/7/96

To: Superintendant / Building inspector

The retaining wall South West corner of the proposed building have been backfilled with 3/4 of an inch ~~[illegible]~~ gravel on the inside of the building floor slab area.
(also below a small portion of the internal building footings 10 to ±15 feet long.
Gravel backfill on the inside of the building area is ok. The footing backfills outside of building should be Compacted soils.
prior to all backfills the bottom of the backfill area should be cleaned of construction debris.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date _____

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 11/27/96

To: Superintendant / Building inspector

2" of sand, visquine and another 2' sand for all of the building slab area / have been observed and approved by a representative of this office.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date _____

Project Address 15105 Mission Hills L.A., CA

Observed By

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 10/15/96

To: Superintendant / Building inspector

Foundation excavations north-east corner of the proposed basement connecting to the existing building's south-east corner have been observed and approved by a representative of this office.

Removal and recompaction of saturated soils were made under these footings to create a uniform bottom (soils with excessive moisture removed).

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills S.F., CA

Observed By VIC

Signature

Staff Engineer

Title

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 10/31/96

To: Superintendant / Building inspector

The building foundation excavation were reinspected after the rains as requested by the Superintendant / inspector.

Areas with ~~more~~ / ~~than~~ loose slush at the bottom of the footings were marked for removal of top 2" to 3" prior to the placing of concrete.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Staff Engineer

Title

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 10/10/96

To: Superintendant / Building inspector

The stepped footing excavations on the north-east corner of the proposed basement Connecting to the existing building was observed by a representative of this office. The footing excavations are made in the Compacted fill from the previous grading on site. However, the Compaction and the moisture at the bottom of footings does not appear to be uniform. Compactting the bottom of the footings and/or removal of soils with excessive moisture is recommended.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 10/15/96

To: Superintendant / Building inspector

All plumbing trenches in the proposed building pad area should be backfilled in 6" lifts, moisture conditioned and compacted to above 90% relative Compaction under observation and Testing of a representative of this office

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 9/30/96

To: Superintendant / Building inspector.

The foundation excavations for the proposed Basement have been observed and approved by a representative of this office.

Footing excavations were noted to be in compacted fill. Native soils, where encountered in footing locations, were removed 2' and recompacted. To further make a uniform footing bottom (between recent and previously placed compacted fill) all footings were recompacted by hand Tampers.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission hill, L.A., CA Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 10/4/96

To: Superintendant / Building inspector

The foundation excavations for the proposed building from "F" through "J" line "1" through "7" and from "D3" through "F" line "1" through "5" have been observed and approved by a representative of this office.

The footing excavations are in compacted fill soils & are in accordance with the recommendations of our soils report.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission hill, L.A., CA Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 9/16/96

To: Superintendant / Building inspector
The Third level drainage Pipe and graved (4" Perforated Pipe & 3/4" graved) placed at elevation about 162 in the fill, have been observed and approved by a representative of this office.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date _____

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 9/19/96

To: Superintendant / Building inspector
At elevation of about 168' in the building Pad area 2 areas (20'x40') were overexcavated from FG-2' to FG-4' to remove and recompact (after proper mix & aeration). An area of 50'x60' to the west of the Proposed basement has an appropriate 7 feet of onerly saturated Soils, These materials should be removed mixed with dry soils and/or aerated and recompacted in place to above 90% Compaction.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date Oct. 20, 95

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 8/28/96

To: Superintendant / Building inspector

Two to three feet of fill was placed from key +5' to key +8' (approximately) Although, some gravel was placed and mixed with soil at the bottom. There are signs that there is an underground flow (the water line that is close by present elevation might be broken) locate the existing water line & the source of water flow befor resuming the grading.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VC Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 9/12/96

To: Superintendant / Building inspector

The second level drainage pipe (4"ϕ) and gravel (3/4" crushed rock) at approximately 5' above sidewalk level (8' above key) and 45' from edge of sidewalk horizontally have been observed and approved for fill placement by a representative of this office.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills L.A., CA

Observed By VC Signature

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 8/16/96

To: Superintendant / Building inspector

As new slope is being built with compacted fill benches are being made in the old fill. Saturated soils have been encountered in some areas of this benches. To stabilize these areas of high moisture soils need to be scarified, aerated & left to dry (if time permits) and/or gravel need to be placed (depth of the blanket of gravel will depend on the amount of water in soil or degree of saturation) then dry fill soils will be placed on gravel and Compacted.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date OCT. 20, 95

Project Address 15105 Mission Hills L.A., CA

Observed By VIC

Signature Vic Hopper

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 8/22/96

To: Superintendant / Building inspector

The Eastern 1/3 of the opened Key (area was shown to the grader) with high moisture should be covered with 6" thick gravel blanket prior to placing Compacted fill. the area is about 20' long.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.
This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.
This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date

Project Address 15105 Mission Hills

Observed By VIC

Signature Vic Hopper

Title Staff Engineer

APPLIED EARTH SCIENCES
731 North Hollywood Way, Suite 103
Burbank, California 91505
(818) 843-6600 · Fax: (818) 845-0681

OBSERVATION MEMORANDUM

Date 8/13/96

To: SUPERINTENDENT / BUILDING INSPECTOR

THE EXPOSED EXCAVATION OF THE BOTTOM OF THE KEY OF SLOPE ADJACENT TO THE SIDEWALK OF THE MISSION HILLS ROAD HAS BEEN OBSERVED AND APPROVED BY A REPRESENTATIVE OF THIS OFFICE. NOTE; THE KEY OF SLOPE IS 204 FEET LONG X 8 FEET WIDE X 4 FEET-DEEP AND IS 42 FEET FROM SOUTH-EAST CORNER NEXT TO THE SIDE ROAD.

Any looses material, debris, mud, or ponded water should be removed from excavations prior to casting concrete.

This approval applies only to conditions existing on this date. Subsequent changes in condition (e.g. effects of rainfall, etc.) may invalidate the approval.

This field Memorandum does not waive inspection by government agencies.

Project No. 95-525-02 Report Date 10-20-95

Project Address 15105 MISSION HILLS RD MISSION HILLS, CA

Observed By REZA M. GHAMSARI
Signature

FIELD ENGINEER
Title

Applied Earth Sciences
a division of Applied Soil Technology, Inc.
GEOTECHNICAL & ENVIRONMENTAL ENGINEERING CONSULTANTS

July 24, 1996 95-525-02

Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California 91344

Attention: Mr. L. Leonian

Subject: Supplement No. 3
Geotechnical Investigation-
Fill Slope Key Considerations
Proposed Expansion Of Skilled Nursing Facility
Within The Confines Of Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California

Ladies/Gentlemen:

We are pleased to submit this Supplement No. 3 report presenting our additional recommendations for the subject project. The original report of geotechnical investigation for the subject project was issued by this office on October 20, 1995. Our Supplement Nos. 1 and 2 were later issued on December 8, 1995 and April 22, 1996 presenting additional recommendations.

In our original report, we had recommended that the new fill slope which is planned to be constructed over the existing fill, to have a key at the toe. The width of key for typical fill slope (having a vertical height of bout 15 feet) is normally maintained at about 12 feet (equipment width).

During the course of our pre-grading meeting at the subject site on July 23, 1996, we learned that some utility lines occur parallel to the front pourparty line. These are a concrete box public utility line (containing all electric lines) some 8 feet from the front property line and the gas and telephone lines which occur some 18 feet from the front property line.

Considering the above, it is now believed that the width of the key of the new fill slope would be limited to 8 feet. Noting the vertical height of the slope (being on the order of 15 feet) and the difficulty associated with removing the existing utility lines, it is our opinion that the width of the key of the new fill slope could be maintained at about 8 feet. It should be noted, however, that during construction of the key for the new fill slope, standard equipment can not be used. In order to assure an overlap of the compaction energy through wheel loading, a smaller equipment having a width of no more than 4 feet should be used.

In our original report, we had indicated that the fill slope key to be constructed against competent native soils. For the purpose of the subject project, the new fill slope key could also be constructed against the previously controlled fill material.

In order to maintain a safe distance from the gas and telephone lines which occur some 18 feet from the street, it would be necessary to use 6-foot high benches. This is considered to be acceptable by this office.

-oOo-

Thank you for the opportunity to be of continued service on this project. Should you have any questions regarding this Supplement No. 3, or wish to discuss the project further, please do not hesitate to call this office.

Respectfully submitted,

APPLIED EARTH SCIENCES





Caro J. Minas
Geotechnical Engineer
GE 601

CJM/nm

Distribution: (2) Addressee
(1) Sobin-Harte Architects

Applied Earth Sciences
a division of Applied Soil Technology, Inc.
GEOTECHNICAL & ENVIRONMENTAL ENGINEERING CONSULTANTS

April 22, 1996 95-525-02

Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California 91344

Attention: Mr. L. Leonian

Subject: Supplement No. 2
Geotechnical Investigation-
Permanent Fill Slope Gradient Considerations
Proposed Expansion Of Skilled Nursing Facility
Within The Confines Of Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California

Ladies/Gentlemen:

We are pleased to submit this Supplement No. 2 presenting additional geotechnical engineering comments/recommendations for the subject project. The original report of geotechnical investigation for the subject project was issued by this office on October 20, 1995. Supplement No. 1 was later issued on December 8, 1995 presenting recommendations for basement wall design.

In our original report, we had stated, based on the provided preliminary grading plan, that the gradient of the fill slope along the front of the area of the proposed construction would be about 2.7:1 (horizontal:vertical) with a vertical height of about 15 feet. Due to an increase in the front setback of the toe of the fill slope from the front property line, it is now believed that the gradient of the proposed fill slope along the front of the site would be 2:1 (horizontal:vertical). This gradient is within the requirements of the Modern Building Code, therefore, it is acceptable by this office.

-oOo-

All the other recommendations presented in the previous reports will remain applicable.

Thank you for the opportunity to be of continued service on this project. Should you have any questions regarding this Supplement No. 2, or wish to discuss the project further, please do not hesitate to call this office.

Respectfully submitted,

APPLIED EARTH SCIENCES





Caro J . Minas
Geotechnical Engineer
GE 601

CJM/nm

Distribution: (2) Addressee
(1) Sinanian Development, Inc.
(1) Sobin-Harte Architects
Attention: Mr. Jeff Sobin
(1) Freet, Yeh & Rosenbach, Inc.
Attention: Mr. Paul Yeh

CITY OF LOS ANGELES
CALIFORNIA

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DEPARTMENT OF
BUILDING AND SAFETY
400, CITY HALL
LOS ANGELES, CA 90012-4869

ARTHUR J. JOHNSON, JR.
GENERAL MANAGER

ARTHUR C. DEVINE
EXECUTIVE OFFICER

December 15, 1995

Log # 16532
(SOILS/GEOLOGY FILE - 2)

Ararat Armenian Center
15105 Mission Hills Road
Mission Hills, CA 91344

TRACT: 3660
LOT: 3
LOCATION: 15105 MISSION HILLS ROAD

CURRENT REFERENCE REPORT/LETTER(S)	REPORT NO.	DATE(S) OF DOCUMENT	PREPARED BY
Soils Report	95-525-02	10/20/95	Applied Earth Sci

The soils report regarding the proposed expansion of existing nursing facility has been reviewed by the Grading Division of the Department of Building and Safety. According to the report, adjacent descending slope shall be filled to provide level pad for the building addition.

The report is acceptable, provided the following conditions are complied with during site development:

1. The soils engineer shall review and approve the detailed plans prior to issuance of any permit. This approval shall be by signature on the plans which clearly indicates that the soils engineer has reviewed the plans prepared by the design engineer and that the plans included the recommendations contained in his report.

2. All fill slopes shall be no steeper than 2:1.

3. All recommendations of the report dated October 20, 1995 which are in addition to or more restrictive than the conditions contained herein shall be incorporated into the plans.

4. The applicant is advised that the approval of this report does not waive the requirements for excavations contained in the State Construction Safety Orders

enforced by the State Division of Industrial Safety.

5. A grading permit shall be obtained.

6. A copy of the subject and appropriate referenced reports and this approval letter shall be attached to the District Office and field set of plans. Submit one copy of the above reports to the Building Department Plan Checker prior to issuance of the permit.

7. All man-made fill shall be compacted to a minimum 90 percent of the maximum dry density of the fill material per the latest version of ASTM 1557.

8. All existing loose soils shall be removed and recompacted under the geotechnical supervision of the soils engineer.

9. Subdrains must be installed in benches every 8 vertical feet within which compacted fill is to be placed.

10. Adequate temporary erosion control devices acceptable to the Department, and if applicable the Department of Public Works, shall be provided and maintained during the rainy season.

11. All graded slopes are subject to erosion and shall be planted and an irrigation system installed conforming to Section 91.7007.

12. All roof and pad drainage shall be conducted to the street in an acceptable manner.

13. All concentrated drainage shall be conducted in an approved device and disposed of in a manner approved by the Department.

14. Prior to issuance of the building permit, the design of the subdrainage system required to prevent possible hydrostatic pressure behind the retaining wall shall be approved by the Soil Engineer and accepted by the Department. Installation of the subdrainage system shall be inspected and approved by the Soil Engineer.

15. Footings adjacent to a descending slope which is steeper than 3:1 in gradient shall be located a distance away from the face of the slope as required by Section 91.2907(d)3 of the Code.

16. The soil engineer shall inspect all excavations to determine that conditions are as anticipated and shall make recommendations for correction of hazards found during grading.

17. The soil engineer shall inspect the excavations for the footings to determine

that they are founded in the recommended strata before calling the Department for footing inspection.

18. A supplemental report shall be submitted to the Grading Division containing recommendations for shoring, underpinning, and sequence of construction in the event that any excavation would remove lateral support to the public way or adjacent structures. A plot plan showing the type, number of stories, and location or absence of any structures adjacent to the excavation shall be part of the excavation plans.

19. Existing loose fill shall not be used for support of footings, concrete slabs or new fill.

20. Prior to the placing of compacted fill, a representative of the consulting Soils Engineer shall inspect and approve the bottom excavations. He shall post a notice on the job site for the City Grading Inspector and the Contractor stating that the soil inspected meets the conditions of the report, but that no fill shall be placed until the City Grading Inspector has also inspected and approved the bottom excavations. A written certification to this effect shall be filed with the Department upon completion of the work. The fill shall be placed under the inspection and approval of the Foundation Engineer. A compaction report shall be submitted to the Department upon completion of the compaction.

21. Prior to the pouring of concrete, a representative of the consulting Soil Engineer shall inspect and approve the footing excavations. He shall post a notice on the job site for the City Building Inspector and the Contractor stating that the work so inspected meets the conditions of the report, but that no concrete shall be poured until the City Building Inspector has also inspected and approved the footing excavations. A written certification to this effect shall be filed with the Department upon completion of the work.

LARRY WESTPHAL
Chief of Grading Division

SAMUEL MOON
Structural Eng. Asst.

SM:rlm
A:\DEC16532
(213) 485-2160

cc: Sinar Sinanian
Applied Earth Sci
VN District Office

Applied Earth Sciences
a division of Applied Soil Technology, Inc.
GEOTECHNICAL & ENVIRONMENTAL ENGINEERING CONSULTANTS

December 8, 1995 95-525-02

Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California 91344

Attention: Mr. L. Leonian

Subject: Supplement No. 1
Geotechnical Investigation-
Basement Wall Design Considerations
Proposed Expansion Of Skilled Nursing Facility
Within The Confines Of Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California

Ladies/Gentlemen:

We are pleased to submit this letter presenting additional recommendations for the subject project. The original report of geotechnical investigation for the subject project was issued by this office on October 20, 1995.

During the course of our original investigation, we understood that the proposed expansion will be a one story constructed established near grade (no basement was proposed). On this basis, recommendations for design of basement walls were not presented.

Based on the newly provided project plans from the offices of Sobin-Harte Architects, we understand that the proposed expansion will have a basement within the northern portion. The floor-to-floor elevation of the basement is expected to be on the order of 14 feet.

Based on the results of our previous investigation and review of the new project plans, it is our opinion that subsurface (basement) walls restraint at top against rotation should be designed based on lateral "at-rest" earth pressure with a magnitude of 40 pounds per square foot per foot of depth. A triangular distribution may be used for the earth pressure against the basement walls.

Thank you for the opportunity to be of continued service on this project. Should you have any questions regarding this Supplement No. 1, or wish to discuss the project further, please do not hesitate to call this office.

Respectfully submitted,

APPLIED EARTH SCIENCES

Caro J. Minas
Geotechnical Engineer
GE 601



CJM/nm

Distribution: (2) Addressee
(1) Sinanian Development, Inc.
(1) Sobin-Harte Architetcs
Attention: Mr. Jeff Sobin
(1) Freet, Yeh & Rosenbach, Inc.
Attention: Mr. Paul Yeh

REPORT OF

GEOTECHNICAL INVESTIGATION

PROPOSED EXPANSION OF EXISTING SKILLED NURSING FACILITY

WITHIN ARARAT HOME OF LOS ANGELES

15105 MISSION HILLS ROAD

MISSION HILLS, CALIFORNIA

Revised

FOR

ARARAT HOME OF LOS ANGELES

3
5
6
7
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117
122

PROJECT NO. 95-525-02

OCTOBER 20, 1995

October 20, 1995 95-525-02

Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California 91344

Subject: Geotechnical Investigation-
Proposed Expansion Of Skilled Nursing Facility
Within The Confines Of Ararat Home Of Los Angeles
15105 Mission Hills Road
Mission Hills, California

Ladies/Gentlemen:

INTRODUCTION

This report presents the results of a geotechnical investigation for the subject project. During the course of this investigation, the engineering properties of the subsurface materials; existing fill and native soil were evaluated in order to provide recommendations for design and construction of foundations, and grading. The investigation included review of existing technical document, subsurface exploration, soil sampling, laboratory testing, engineering evaluation and analysis, consultation and preparation of this report.

During the course of this investigation, a site plan showing the area of the proposed addition prepared by the offices of Sobin-Harte Architects, was used as reference. The map was dated September 14, 1995. Also used as reference during the course of preparation of this report were the engineering reports (original investigation, supplements, during construction and final reports) for the existing facility prepared by others.

The enclosed Drawing No. 1, shows the approximate location of the exploratory test pits in relation to the existing building and the area of the proposed addition. The attached Appendix I, describes the method of field exploration. Figure Nos. I-1 through I-6 present summaries of the materials encountered at the location of our exploratory test pits. Figure No. I-7 presents a key to the log of exploratory test pits.

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The attached Appendix II describes the laboratory testing procedures. Table I presents summary of laboratory test results. Figure Nos. II-1 and II-2 present the results of direct shear and consolidation tests on selected undisturbed samples.

PROJECT CONSIDERATIONS

It is our understanding that the proposed project will consist of expanding the existing skilled nursing facility of the Ararat Home of Los Angeles Complex. The structure is expected to be one story high constructed of wood frame. The flooring system of the area of the proposed addition is expected to be in a form of concrete grade slabs established near the floor level of the existing building.

Structural loading data was not available during the course of this report preparation. It is anticipated, however, that structural loadings will be light and typical of one story wood frame building. For the purpose of this report, it is assumed that concentrated loads will be on the order of 50 kips, combined dead plus frequently applied live loads. The continuous wall footings are expected to have loads of on the order of 2 kips per lineal foot.

SITE GRADING

Based on the provided preliminary plans, and in order to establish the proposed finished grades, it will be necessary to place new fill over the existing grade which has gradients ranging from near level to about 5:1 (horizontal:vertical). As a result of such grading work, a new fill slope with a gradient of about 2:1 (horizontal:vertical) will be created within the southern portion of the site. The toe of the fill slope will occur some 5 feet from the south property line (along Mission Hills Road). The vertical height of the new fill slope is expected to be on the order of 15 feet. The enclosed Site Plan; Drawing No. 1, shows an approximate profile of the present and proposed finished grades in the area of the proposed construction.

In order to accomplish the site grading work, imported soils will be required. All imported soils should be granular in nature and similar to the existing site soils.

SITE CONDITIONS

SURFACE CONDITIONS

The site of the proposed skilled nursing facility expansion occurs to the south of the existing hospital facility within the confines of Ararat Home Of Los Angeles, 15105 Mission Hills Road, Mission Hills, California. See the enclosed Site Plan; Drawing No. 1 for approximate location of the site with respect to the existing buildings.

At the time of our field investigation, the proposed site was covered by trees and grass. The gradient of the site ranged from near level within the northern portion to a mild gradient of about 5:1 (horizontal:vertical) within the southern portion.

SUBSURFACE CONDITIONS

Correlation of the subsoils between the test holes was considered to be good. Generally, the site, to the depths explored, was found to be covered by existing fill underlain by natural deposits of mainly silty sand soils to the depths explored. Thickness of the existing fill was found to range from about 6 feet to 9 feet at the location of our test holes. In accordance with the previous grading plan, fill thickness in the area of the proposed construction, however, ranges from minimal along the front property line to as much as 11 feet within the northern portion of the site. The deeper fill has been placed within a minor natural drainage course that run north-south near the center of the area of the proposed construction. See the enclosed Drawing No. 1 for approximate contours of the original ground.

The existing fill, consisting of silty sand, sandy and/or clayey silt and silty and/or sandy clay soils, is considered to be an engineering fill placed on the site as part of the development of the existing facility. Documentations exits to indicate that the existing fill has been placed under engineering observation and testing by the offices of Hakimian Engineering.

Except the top 2 feet, the existing fill was found to be moderately compact in-place. The top 2 feet of the existing fill was noted to be somewhat porous (has undergone deterioration as a result of normal weathering process).

The underlying native soils (below the existing fill) was found to be generally medium dense to dense in-place. The results of our laboratory testing indicated that the existing fill below a depth of about 2 feet and the native soils are of moderate strengths and low to moderate compression.

The site upper soils were found to be granular in nature. These soils were found to be of low expansion potential.

During the course of our field investigation, no groundwater was encountered. No caving was experienced in the excavated test holes.

EVALUATION AND RECOMMENDATIONS

GENERAL

Based on the geotechnical engineering data derived from this investigation, the site is considered to be suitable for the proposed development. The top 2 feet of the existing is considered to be inadequate to receive new fill and structural foundations at their present state. Such materials, however, may be excavated and reused in the compacted fill areas.

The finished grades for the proposed addition is expected to be created through mainly filling operations. The excavated materials from the site may be reused in the compacted fill areas. Imported soil, however, wil lbe required in order to accomplish the site grading work. All new fill soils should be constructed on native soils and/or the existing fill below a depth of about 2 feet. As the fill grade is raised, proper horizontal benches, extending into native and/or 2 feet below the existing fill should be made.

The permanent fill slope which will be created along the front of the site is planned to have a gradient of about 2:1 (horizontal:vertical). The vertical height of the new fill slope is expected to be on the order of 15 feet. Due to moderate height and relatively mild inclination, the new fill slope is expected to remain grossly and surficially stable on the permanent basis.

It is recommended that all permanent slopes be covered with erosion-resistant vegetation requiring minimal irrigation. This will reduce the chances of normal erosion during heavy rain and/or extensive irrigation.

After proper site grading, conventional spread footing foundation systems could be used for support of the proposed building. The foundation bearing soils are expected to be properly compacted fill soils.

The south exterior wall of the proposed building which will be constructed closer to the top of the new, 2:1 fill slope should be established deeper than normal. For the purpose of this project, a minimum horizontal distance of 1/3 of the vertical height of the slope should be maintained between the slope surface and the outside faces of all foundations which will be established close to the top of the descending fill slope.

Grade slabs may be cast on the finished grades which consists of properly compacted fill soils. Assuming that all imported soils will be granular in nature, soil expansion will not be a problem at this site.

The following sections present our specific recommendations for site grading, foundations, lateral design, grade slabs, minor walls, site drainage and observation during construction.

SITE GRADING

Site grading for the proposed project is expected to basically involve filling operations in order to establish the proposed finished grades. Imported soils will be required in order to accomplish the site grading work.

All fill should be granular in nature and placed on approved materials (native soils or existing fill below a depth of about 2 feet). The new fill should be properly benched into approved materials. A key should be constructed at the base of the new fill slope. The key should be extended at least 4 feet into competent native materials.

As the fill grade is brought up, subdrain should be installed within the horizontal benches. For the purpose of this project, one subdrain should be installed every 8 vertical feet of the fill placed. The subdrain systems should consist of at least 4-inch diameter perforated pipes embedded in about 2 cubic feet of free draining gravel per foot of the pipes. An approved filter fabric should then be wrapped around the free draining gravel in order to reduce the chances of siltation. Non-perforated outlet pipes should then be used to pass through the fill core to the slope surface. Note, however,

that lateral drains should be properly diverted to an approved drain system and not be exposed on the surface to cause erosion. The subdrain pipes should be laid at a minimum grade of two percent for self cleaning.

Prior to placing any fill, the Soil Engineer and a representative of the Building Department should observe the excavation bottoms. In the areas of fill, all soils should be removed until native, or existing fill below a depth of about 2 feet, is exposed. The areas to receive compacted fill should be scarified to a depth of about 8 inches, moistened as required to bring to approximately optimum moisture content, and compacted to at least 90 percent of the maximum dry density as determined by the ASTM Designation D 1557-80 Compaction Method.

General guidelines regarding site grading are presented below in an itemized form which may be included in the earthwork specification. All fill be placed under engineering observation and in accordance with the following guidelines:

1. All vegetation occurring on the site, should be collected and hauled off-site. In the areas of fill, the top 2 feet of the existing fill should be excavated until competent materials are exposed.

2. The excavated areas and the width and depth of the fill key should be observed and approved by the Soil Engineer prior to placing any fill.

3. The excavated materials from the site are considered to be satisfactory for reuse in the compacted fill areas provided that organic and decomposable materials are removed and that the larger pieces are broken down to acceptable sizes. Rocks and bedrock fragments larger than 6 inches in diameter should not be placed in the compacted fill without special treatment.

4. Fill material, approved by the Soil Engineer, should be placed in controlled layers. Each layer should be compacted to at least 90 percent of the maximum unit weight as determined by ASTM designation D 1557-80 for the material used.

5. The fill material shall be placed in layers which, when compacted, shall not exceed 8 inches per layer. Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to insure uniformity of material in each layer.

6. When moisture content of the fill material is too low to obtain adequate compaction, water shall be added and thoroughly dispersed until the moisture content is near optimum.

7. When the moisture content of the fill material is too high to obtain adequate compaction, the fill material shall be aerated by blading or other satisfactory methods until near optimum moisture condition is achieved.

8. When placing fill over slopes, the loose soil shall first be removed from the slopes, and the fill benched into the exposed, competent material. Competent material is defined as being essentially free of loose soil, heavy fracturing, or erosion-prone material.

9. When constructing fill slopes, the grading contractor shall avoid spillage of loose material down the face of the slope on the dumping and rolling operations. Preferably the incoming load shall be dumped back to the face of the slope and bladed into place.

10. After a maximum of 4 feet of compacted fill (approximately 6 to 8 lifts) the contractor shall backroll the outer face of the slope by backing the tamping roller over the top of the slope, thoroughly covering all of the slope surface with overlapping passes of the roller. The foregoing will be repeated after the placement of additional fill, or the slope shall be cut back to expose the compacted core.

11. Inspection and field density tests should be conducted by the Soil Engineer during grading work to assure that adequate compaction is attained. Where compaction of less than 90 percent is indicated, additional compactive effort should be made with adjustment of the moisture content or layer thickness, as necessary, until at least 90 percent compaction is obtained.

FOUNDATIONS

Conventional spread footing foundation systems in properly compacted fill soils are expected to provide adequate support for the proposed structure. Exterior and interior footings should be a minimum of 12 inches wide and should be placed at a minimum depth of 24 inches below the lowest adjacent final grades. The south exterior wall of the proposed building which will be constructed closer to the top of the new, 2:1 fill slope should be established deeper than normal. For the purpose of this project, a

minimum horizontal distance of 1/3 of the vertical height of the slope should be maintained between the slope surface and the outside faces of all foundations which will be established close to the top of the descending fill slope.

Properly designed and constructed spread footings may be based on an allowable maximum bearing pressure of 2,000 pounds per square foot. This value could be increased at a rate of 150 and 300 pounds per square foot foe each additional foot of footing width and depth, to a maximum value of 3,000 pounds per square foot.

The above given values are for the total of dead, plus frequently applied live loads. For short duration transient loadings, such as wind or seismic forces, the given values may be increased by one-third.

Under the allowable maximum soil pressure, footings carrying the assumed maximum concentrated loads of 50 kips is expected to settle on the order of 3/4 of an inch. Continuous footings, with loads of about 3 kips per lineal foot are expected to settle on the order of 1/2 of an inch. Maximum differential settlements are expected to be on the order of 1/4 of an inch. The major portion of the settlements are expected to occur during construction.

LATERAL DESIGN

Lateral resistance at the base of footings in contact with properly compacted fill soils may be assumed to be the product of the dead load forces and a coefficient of friction of 0.4. Passive pressure on the face of footings may also be used to resist lateral forces. A passive pressure of zero at the ground surface and increasing at a rate of 250 pounds per square foot per foot of depth to a maximum value of 2,500 pounds per square foot may be used for footings poured against native and/or properly compacted fill soils.

GRADE SLABS

Grade slabs, may be cast on the finished grades which consists of properly compacted fill soils. Assuming that imported soils will be granular in nature, soil expansion will not be a problem at this site.

In the areas where moisture sensitive floor covering is used and slab dampness can not be tolerated, a vapor-barrier should be used beneath the slabs. This normally consists of a 6-mil polyethylene film covered with 2 inches of clean sand.

RETAINING WALLS

Static design of minor cantilevered retaining walls supporting horizontal backfill may be based on an equivalent fluid pressure of 30 pounds per square foot per foot of depth. The walls supporting 2:1 slope should be designed based on an equivalent fluid pressure of 40 pounds per square foot per foot of depth. These values could also be used for basement walls.

The above given pressures assume that no hydrostatic pressure will occur behind the walls. Hydrostatic pressures should be relieved from the back of the retaining walls through properly designed and constructed subdrain. This normally consists of 4-inch in diameter perforated pipes encased in free draining gravel (at least one cubic foot per lineal foot of the pipe). To reduce the chances of siltation, an approved filter fabric should be used around the gravel.

Uniform surcharge effects may be computed using a coefficient of 0.30 times the uniform loads. For allowable vertical and lateral pressures refer to the preceding sections.

SITE DRAINAGE

Site drainage should be provided to divert roof and surface waters from the property through nonerodible drainage devices to the street. In no case should the surface waters be allowed to pond adjacent to building, behind the retaining walls or flow over the slope surfaces in an uncontrolled manner. A minimum slope of one and two percent is recommended for paved and unpaved areas.

OBSERVATION DURING CONSTRUCTION

The presented recommendations in this report assume that all structural foundations will be established in properly compacted fill soils. All footing excavations should be observed by a representative of this office before reinforcing is placed.

All site grading work should be observed and tested by a representative of this office. For proper scheduling, please notify this office at least 24 hours before any observation work is required.

-o0o-

The following Figures and Appendices are attached and complete this report:

Site Plan - Drawing No. 1
Appendix I-Method of Field Exploration
Figure Nos. I-1 through I-7
Appendix II-Methods of Laboratory Testing
Figure Nos. II-1 and II-2

Respectfully Submitted,

APPLIED EARTH SCIENCES

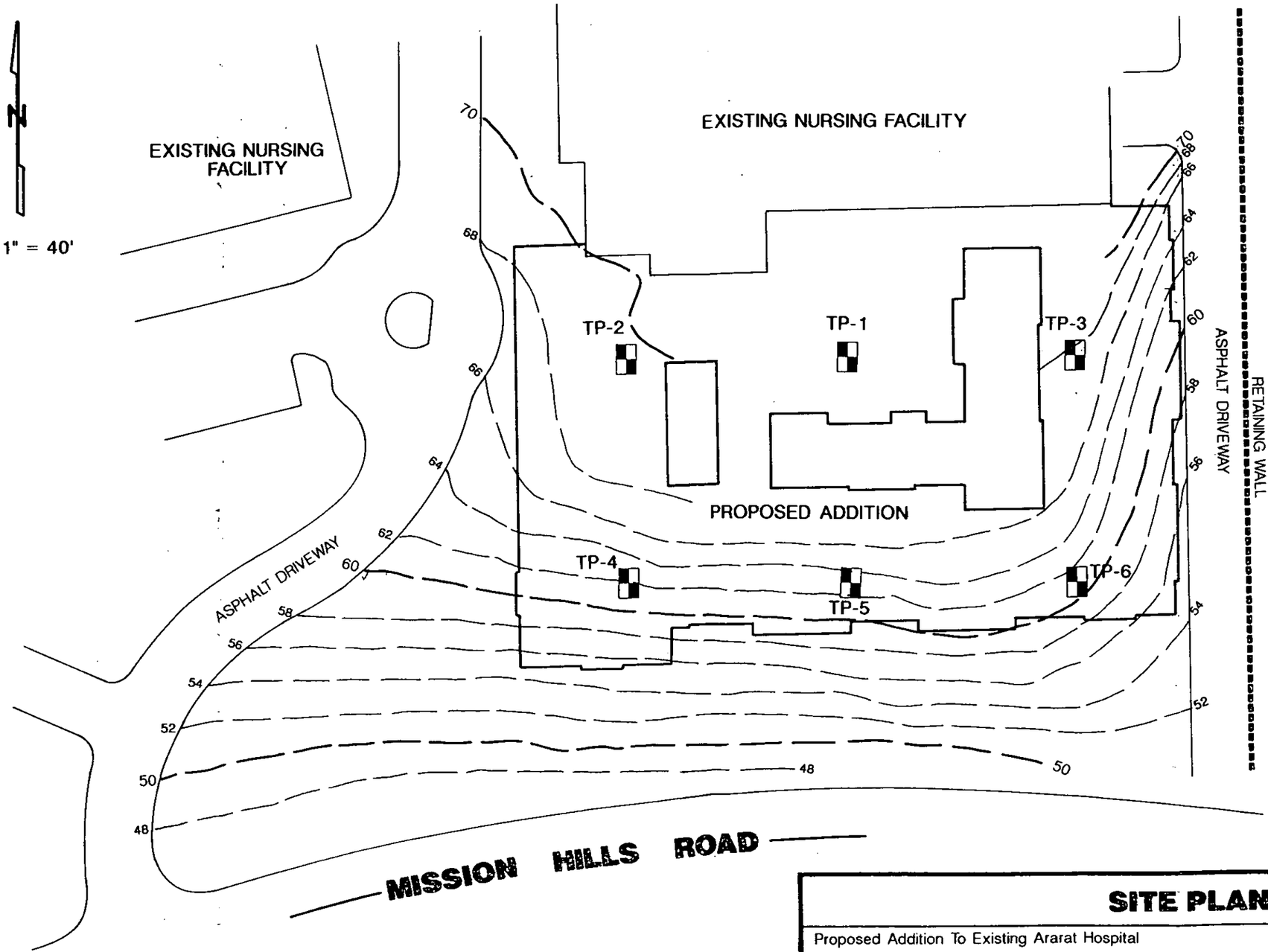


Caro J. Minas
Geotechnical Engineer
GE 601

Distribution: (5)

N

Scale: 1" = 40'



SITE PLAN

Proposed Addition To Existing Ararat Hospital

15099 Mission Hills Road Mission Hills, California

For: Ararat Home of Los Angeles	DATE: October 20, 1996	PROJECT NO. 95-525-02
APPLIED EARTH SCIENCES GEOTECHNICAL ENGINEERING CONSULTANTS		DRAWING NO. 1

APPENDIX I

METHOD OF FIELD EXPLORATION

In order to define subsurface conditions, six test pits were excavated in the area of the proposed addition. The test pits, extended to a maximum depth of about 12 feet were excavated using hand tools. The approximate location of the excavated test pits are shown on the enclosed Site Plan.

Continuous logs of the subsurface conditions, as encountered in the test pits, were recorded during the field work and are presented on Figure Nos. I-1 through I-6 within Appendix I. These figures also show the number and approximate depths of each of the recovered soil samples.

Relatively undisturbed samples of the subsoils were obtained by driving a steel sampler with successive drops of a 50-pound metal weight free falling a vertical distance of about 30 inches. The number of blows required for one foot of sampler penetration was recorded at the time of drilling and are shown on the log of exploratory borings. The relatively undisturbed soil samples were retained in brass liner rings 2.5 inches in diameter and 1.0 inch in height.

Field investigation for this project was performed on September 27, 1995. The materials excavated from the test pits were placed back and compacted upon completion of the field work. Such material may settle. The owner should periodically inspect these areas and notify this office if the settlement creates a hazard to persons or property.

APPENDIX II

LABORATORY TESTING PROCEDURES

MOISTURE DENSITY

The moisture-density information provides a summary of soil consistency for each stratum and can also provide a correlation between soils found on this site and other nearby sites. The dry unit weight and field moisture content were determined for each undisturbed sample, and the results are shown on the log of exploratory test holes.

SHEAR TESTS

Shear tests were made with a direct shear machine at a constant rate of strain. The machine is designed to test the soil without completely removing the samples from the brass rings. A range of normal stresses were applied vertically, and the shear strength was progressively determined at each load in order to determine the internal angle of friction and the cohesion. The results of direct shear tests are presented on Figure No. II-1 within this Appendix.

CONSOLIDATION

The apparatus used for the consolidation tests is designed to receive the undisturbed brass ring of soil as it comes from the field. Loads were applied to the test specimen in several increments, and the resulting deformations were recorded at selected time intervals. Porous stones were placed in contact with the top and bottom of the specimen to permit the ready addition or release of water.

Undisturbed specimens were tested at the field and added water conditions. The test results are shown on Figure No. II-2 within this Appendix.

HAKIMIAN ENGINEERING

(213) 946-7783
FAX (213) 696-5443

13003 LADANA COURT • SANTA FE SPRINGS, CA 90670

GT 20608-P
July 16, 1992

Ararat Home of Los Angeles
15105 Mission Hills Road
Mission Hills, California 91345

Subject: Update Recommendations for the Proposed Skilled Nursing Facility at 15105 Mission Hills Road, Mission Hills, California, dated November 2, 1990.

References:

1. "Soils Engineering Investigation for Proposed Ararat Convalescent Hospital in Mission Hills, California," by Hakimian Engineering, Inc., dated September 13, 1984.

2. "Supplemental Geotechnical Investigation for the Ararat Armenian Community Center, 15105 Mission Hills Road, Mission Hills, California," by Hakimian Engineering, Inc., dated August 26, 1987.

3. Addendums GT 20608-B,C,D,E,F,G,H, and I. Respectively dated April 20, 1989, August 21, 1989.

Dear Sirs:

This addendum provides recommendations for the foundations of the proposed Skilled Nursing Facility at the subject site.

The review of the floor plans prepared by Sobin-Harte Architects, dated September 24, 1990, for the proposed one to two-story facility indicated that it will be constructed over an area, which underlies different types of soils, including subdrain trenches backfilled with gravel and compacted fill.

The depth to bedrock varies from zero near the westerly side to about 20 feet near the middle of the facility.

The constructed subdrains are wider and deeper than originally anticipated, due to encountering unsuitable loose soils along the bottom of the water course. The unsuitable soils were removed and the subdrains were placed on competent soil.

On July 7, 1992, three borings were excavated in the proposed building area, which indicated that the capped subdrains have no water flowing through them. No water was encountered down to 28 feet.

Differential settlement is expected to occur in time, due to hydro-consolidation of the non-uniform depth and different types of soils. In order to minimize differential settlement of a conventional foundation system for the proposed facility, the following recommendations should be implemented as site preparation before placing the footings.

1. The existing subdrains shall be connected to the site storm drain north of the proposed building. The subdrains remaining under the building site should be capped and left undisturbed.

2. A minimum of 6 feet of soil from the west side of the proposed building area and extending 10 feet outside the building boundaries shall be removed. This removal shall not interfere with the existing filter fabric of the subdrains. After the bottom of the excavation has been observed by the Geotechnical Engineer and inspected by the City Grading Inspector, the excavated soil shall be placed in 8-inch lifts, moisture controlled, and compacted to a minimum of 90 percent relative compaction per ASTM D1557-78. The new fill shall be bunched into the older fill.

The bearing values recommended in our previous reports could be used in the design of the footings.

All other recommendations of our previous reports and addendums remain in effect and are unchanged.

If you have any questions regarding the content of this report, please contact our office.

This opportunity to be of continued professional service is greatly appreciated.

Respectfully submitted,

HAKIMIAN ENGINEERING, INC.

Krikor D. Hakimian
GE 939

KDH:jb

REGISTERED PROFESSIONAL ENGINEER
KRIKOR D. HAKIMIAN
No. 939
Exp. 6-30-93
GEOTECHNICAL
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13003 LADANA COURT • SANTA FE SPRINGS, CA 90670

GT 20608-J
November 2, 1990

Ararat Home of Los Angeles
3730 West 27th Street
Los Angeles, California 90018

Subject: Foundation Recommendations For the Proposed Skilled Nursing Facility at 15105 Mission Hills Road, Mission Hills, California.

References:
1. "Soils Engineering Investigation For Proposed Ararat Convalescent Hospital in Mission Hills, California," by Hakimian Engineering, Inc., dated September 13, 1984.
2. "Supplemental Geotechnical Investigation for Ararat Armenian Community Center, 15105 Mission Hills Road, Mission Hills, California," by Hakimian Engineering, Inc., dated August 26, 1987.
3. Addendums GT 20608-B, C, D, E, F, G, H, and I. Respectively dated April 20, August 21, November 3, 1989, March 8, May 11, June 13, June 25 and July 18, 1990.

Dear Sirs:

This addendum provides specific recommendations for the foundations of the proposed skilled Nursing Facility at the subject site.

The review of the floor plans prepared by Sobin-Harte Architects, dated September 24, 1990, of the proposed one to two-story facility indicates that it will be constructed over an area, which underlies with different types of soils, including subdrain trenches backfilled with gravel and compacted fill.

The depth to bedrock varies from zero near the westerly side to about 20 feet near the middle of the facility.

Differential settlement is expected to occur in time, due to hydroconsolidation of the non-uniform depth and different types of soils. In order to minimize differential settlement of a conventional foundation system for the proposed facility, the following recommendations should be implemented as site preparation before placing the footings.

1. The existing subdrains shall be diverted around the north side of the building and directed along the east property line. The subdrains remaining under the building site should be capped and left undisturbed.
2. A minimum of 6 feet of soil from the proposed building area and extending 10 feet outside the building boundaries should be removed. This removal shall not interfere with the existing filter fabric of the subdrains. After the bottom of the excavation has been observed by the geotechnical engineer and inspected by the City grading inspector, the excavated soil shall be placed in 8-inch lifts, moisture controlled, and compacted to a minimum of 90 percent relative compaction per ASTM D1557-78.

The bearing values recommended in our previous reports could be used in the design of the footings.

All other recommendations of our previous reports and addendums remain in effect and are unchanged.

If you have any questions regarding the content of this report, please contact our office.

This opportunity to be of professional service is greatly appreciated.

Respectfully submitted,

HAKIMIAN ENGINEERING, INC.

Simon Garboushian
RCE 34675

SG:lc

Reviewed by,

Krikor D. Hakimian
President

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KRIKOR D. HAKIMIAN
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STATE OF CALIFORNIA

CITY OF LOS ANGELES
CALIFORNIA

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3730 West 27th Street
Los Angeles, CA 90013

RECEIVED
JAN 22 1990
ROBIN-HARTE ARCHITECTS, INC.

TRACT: 3660
LOT: Portion 3
LOCATION: 15105 MISSION HILLS ROAD

Geological Seismic Reports No. 2159-00, dated, February 21, 1984, August 4, 1987, February 24, 1989, August 16, 1989, October 6, 1989 prepared by RSA Associates and Soil Engineering Reports No. 20608-C, dated September 13, 1984, August 26, 1984 ,April 20, 1989 and August 21, 1989 prepared by Hakimian Engineering.

REFERENCE: Department letter dated December 2, 1988, June 27, 1989 and September 20, 1989.
Geophysical Report, dated July 21, 1987 by David J. Leeds and Associates and Undated report by E.R. Browne.

The subject reports and department letters concerning a proposed convalescent hospital site along the alignment of an active fault zone have been reviewed by the Grading Division of the Department of Building and Safety.

According to the reports, the trace of the Verduco and Mission Hills faults lies within the northeastern portion of the property and off-site area. A building setback area is established and shown on the geologic map within the October report. The reports state that higher ground motion potentials for this area should be considered in the building design. The geophysical reports have been submitted which are in general concurrence with the fault zone location defined in the geologic-seismic study.

In reference to the Department concerns on the seismicity of this site, the report has responded with a revised map and clarification of analyzed data. The primary concern of the Department is found in the graphic log of T-10, where a feature is noted which could be the result of active faulting. The report indicates that the feature plotted 35 feet from one of the trench ends would lie northerly of the south fault trace plotted by geophysical methods. As T-10 is not oriented on the graphic log and no trench information is presented from which an orientation can be derived, the left end of the trench was presumed by the Department to be the southern end. That trench orientation would locate the faults below the proposed buildings rather than north of the south fault location. However, the supplemental report states that the fault would plot northerly of the southern-most fault. Therefore, the left end of the trench must be the north end. Based upon this assumption, the concerns expressed by the Department have been ameliorated. However, the site is still located within a zone of potentially severe ground shaking which must be recognized and considered in the building design and occupancy use.

The reports are acceptable, provided the following conditions are complied with during site development:

1. Prior to issuance of any permits, the owner shall record a sworn affidavit with the Office of the County Recorder attesting to his knowledge that the site is located within an area subject to surface fault rupture and/or severe ground shaking.

2. Based upon the recognition of high ground shaking and the planned convalescent hospital use for the site, every patient shall be given adequate and clear notification of the potential for high ground shaking on the site in the event of an earthquake centered on one of the proximal faults.

3. The geologist and soils engineer shall review and approve the detailed plans prior to issuance of any permits. This approval shall be by signature on the plans which clearly indicates that the geologist and soils engineer have reviewed the plans prepared by the design engineer and that the plans include the recommendations contained in their reports.

4. All recommendations of the report which are in addition to or more restrictive than the conditions contained herein shall be incorporated into the plans.

5. Prior to the issuance of grading permits, the required buttress fills for north-facing cut slopes planned on the northern portion of the developed site shall be located on the grading plans and a supplemental buttress design study submitted for department review and approval.

6. Prior to the issuance of a grading permit, it may be determined that the project is subject to the requirements of the California Environmental Quality Act.

7. The applicant is advised that the approval of this report does not waive the requirements for excavations contained in the State Construction Safety Orders enforced by the State Division of Industrial Safety.

8. Grading shall be scheduled for completion prior to the start of the rainy season, or detailed temporary erosion control plans shall be filed in a manner satisfactory to the Department and the Department of Public Works.

9. The consulting geologist shall periodically inspect the grading and upon completion submit a final report stating that the completed work complies with his recommendations. Geological data shall be obtained from grading exposures, particularly at back slope cuts for fills and buttress and on cut surfaces. This data shall be presented on a final geological map and as-graded plan.

10. All existing or proposed slopes exposing soil or other non-bedrock materials shall be trimmed to firm bedrock or supported with a designed retaining wall or buttress fill.

11. Any unsupported shale planes, either existing or exposed by grading, shall be supported by a designed retaining wall or buttress fill.

12. All existing fill, soils, exploratory trench backfill, seismically unstable alluvium and earth materials shall be removed and recompacted under the direct supervision of the soils engineer.

13. Subdrains must be installed in all natural drainage courses within which compacted fill is to be placed.

14. Both the geologist and the soils engineer shall inspect and approve all fill and subdrain placement areas prior to placing fill. Both consultants shall include in their final reports a certification of the adequacy of the foundation

material to support the fill without undue settlement and/or consolidation.

15. The consultants shall inspect the buttress fill subdrain outlets to insure the lateral drains extend beyond the slope surface and are functioning as designed.

16. All graded slopes are subject to erosion and shall be planted and an irrigation system installed conforming to Section 91.7007.

17. All roof and pad drainage shall be conducted to the street in an acceptable manner.

18. All retaining walls shall be provided with a standard surface backdrain system and all drainage shall be conducted to the street in an acceptable manner and in a non-erosive device.

19. Prior to issuance of the building permit, the design of the subdrainage system required to prevent possible hydrostatic pressure behind retaining wall shall be approved by the Soil Engineer and accepted by the Department. Installation of the subdrainage system shall be inspected and approved by the Soil Engineer.

20. Footings adjacent to a descending slope steeper than 3:1 in gradient shall be located a distance of one-third the vertical height of the slope with a minimum of 5 feet but need not exceed 40 feet measured horizontally from the face of the bedrock slope.

21. The geologist and soils engineer shall inspect the excavations for the footings to determine that they are founded in the recommended strata before calling the Department for footing inspection.

22. Buildings adjacent to ascending slopes shall be set back from the toe of the slope a level distance equal to one half the vertical height of the slope, but needs not to exceed 15 feet in accordance with Code Section 91.2907(d)2.

23. Existing fill shall not be used for support of footings, floor slabs or proposed fill.

24. Prior to the pouring of concrete, a representative of the consulting Soil Engineer shall inspect and approve the footing excavations. He shall post a notice on the job site for the City Building Inspector and the Contractor stating

that the work so inspected meets the conditions of the report, but that no concrete shall be poured until the City Building Inspector has also inspected and approved the footing excavations. A written certification to this effect shall be filed with the Department upon completion of the work.

25. A copy of the subject and appropriate referenced reports and this approval letter shall be attached to the District Office and field set of plans. Submit one copy of the above reports to the Building Department Plan Checker prior to issuance of the permit.

JAMES D. KAPRIELIAN
Chief of Grading Division

JOSEPH W. COBARRUBIAS
Engineering Geologist III

Burr E. Peck

BURR E. PECK
Geotechnical Engineer

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cc: State Geologist's Office
Hakimian Engineering
RSA Associates
GTK
VN District Office

SUPPLEMENTAL GEOTECHNICAL INVESTIGATION
ARARAT ARMENIAN COMMUNITY CENTER
15103-15105 MISSION HILLS ROAD
MISSION HILLS, CALIFORNIA

GT 20608-A AUGUST 26, 1987

FOR
ARARAT HOME OF LOS ANGELES
3730 WEST 27TH STREET
LOS ANGELES, CALIFORNIA 90018

HE. HAKIMIAN ENGINEERING 13003 LADANA COURT • SANTA FE SPRINGS, CALIFORNIA 90670 • (213) 948-7783

GT 20608-A
ARARAT HOME

T A B L E O F C O N T E N T S

Part A: General: Page

- Introduction....1
- Brief description of the new master plan....2
- Brief summary of the superficial grading operations....3
- Scope of additional investigation....3
- Additional subsurface investigation....4
- Summary of the geologic study of the site....4,5
- Summary of the seismologic study of the site....5,6
- Laboratory testing....7

Part B: Conclusions and Recommendations:

I - General 8

II - Site Preparation 8

1) Removal of debris....8
2) Removal of fill....8
3) Maximum slope height....9
4) Suitability of native material for fill....9
5) Shrinkage....9
6) Potential rock location and removal method....9
7) Subsurface water and sub-drains....9,10
8) Subsurface structures....10

III - Design Recommendations: 11

1) Non-structural set-back line....11
2) Foundations....11
3) Lateral design....12
4) Retaining walls....13

Page

5) Subterranean basement retaining wall.....14
6) Temporary excavations.....14,15
7) Utility trenches.....15
8) Settlement (Subsidence).....15
9) Expansion (Swell).....15
10) Slabs on-grade.....15,16
11) Pavement sections.....16
12) Surface drainage.....16
13) Slope planting.....17

IV- Review 17

V - Warranties 19

Part C: Appendices:

Appendix A: Plot Plan

Boring Logs

Laboratory Procedures and Results

Stability of Fill Slopes

Appendix B: Geology report by Robert Stone & Associates

Appendix C: Seismology report by David Leeds & Associates

Appendix D: General Earthwork and Grading notes

GEOTECHNICAL INVESTIGATION

ARARAT HOME

PART A - GENERAL

INTRODUCTION

This report is an up-date of our previous report dated September 13, 1984. The recommendations and findings of this report supersede those presented in our previous report. These recommendations were necessary to review the conditions after the changes of the architectural master plan of the complex. There has been some unauthorized rough grading done on the site after our original site investigation, which included the removal of trees, buildings, and leveling of some areas.

For the site location and the site description, refer to our previous report.

BRIEF DESCRIPTION OF THE NEW MASTER PLAN

The revised master plan will include the following:

(a) A skilled nursing facility, which will be constructed on the topographically low area situated on the east side of the property. It will consist of 3 levels above-grade and a basement placed at elevation 1055 feet.

(b) A board and care building will be constructed on the knoll and over the slope to its south. This building will consist of 4 levels above-grade and up to 3 basement levels near the southerly slope, the lowest of which is at elevation 1056 feet.

(c) A chapel will be built over a museum on the northeast side of the knoll; the museum floor elevation is 1078 feet.

(d) A paved road will be constructed along the west and northwest sides of the circumference of the knoll, providing access to the north side of the board and care building.

(e) Two paved parking locations; one on the northeast corner of the property, north of the skilled nursing facility building, beyond the non-structural set-back line. The other will be on the south side of the board and care building, near Mission Hills Road.

(f) The remainder of the property will be landscaped.

BRIEF SUMMARY OF THE SUPERFICIAL GRADING OPERATIONS

The superficial grading operations mainly consisted of smoothing uneven surfaces, for the purpose of having a ground breaking ceremony at the site.

A few feet of earth material were cut from the surface of the knoll, in order to produce a relatively level pad area.

The material produced by that cutting was used to fill the adjacent trough to the east of the knoll, and to smooth the surface of the slopes descending from the knoll.

These grading operations were not observed, nor tested by our office. The uncertified fills will either have to be completely removed, where grading dictates, or removed and recompacted as an engineered fill where they will stay.

SCOPE OF ADDITIONAL INVESTIGATION

The scope of our additional investigation included the following:

1) Review of older reports on the subject site.
2) Subsurface investigation to account for the changes in the proposed building locations.
3) Additional geologic study by Robert Stone.
4) Seismologic study by David Leeds & Associates.
5) Aerial topographic survey by Bowers Survey.
6) Laboratory testing of samples.

7) Engineering analysis.

8) Preparation of this report.

ADDITIONAL SUBSURFACE INVESTIGATION

After changes were made in the proposed location of the buildings, it became necessary to explore additional areas that are planned to support structures.

The additional exploration, to that described in our previous report, consisted of drilling four 24-inch borings with a truck mounted bucket-auger rig, and three borings with a 6-inch hollow stem auger rig. Five additional trenches were also dug using both tire-mounted and truck-mounted back-hoes. Three of the trenches were in the north side of the property, in the vicinity of the suspected fault, and the remaining two were across the westerly stream/channel area, in order to determine the amount of debris and silt in the channel bed.

The excavations were supervised partly by our office and partly by representatives of Robert Stone and Associates, the geologists of the project.

The locations of the recent borings and trenches are shown on Plate I, along with the locations of previous excavations.

SUMMARY OF THE GEOLOGIC STUDY OF THE SITE

The geologic study of the site was undertaken by Robert

Stone and Associates, and their findings are presented in this report, herein included as Appendix B. The purpose of the additional geologic study was, among others, to locate the fault near the north boundary of the site, and to study the subsurface geologic conditions under the relocated proposed buildings.

In summary, the geologic report states the following:

(a) Although no definite fault was located near the north boundary of the property, it is possible that such fault may exist and it is recommended that the previously assigned non-structural setback zone be kept.

(b) It was found that the colluvium beneath 1 foot of topsoil, in the L.A.D.W.P. transmission line right-of-way is suitable for use as utility line and culvert foundations.

(c) The bedrock (Tm) Modelo formation on the knoll has an attitude between N 20° E and N 20° W, and dips northerly at angles between 25° and 55°.

SUMMARY OF THE SEISMOLOGIC STUDY OF THE SITE

The seismologic study of the site was undertaken by David Leeds & Associates.

The wave refraction method was used to collect data from which to estimate the characteristic site period and the design response spectra, for use in the design against the seismic forces on the structures of the complex. The seismology report is herein included as Appendix C.

In summary, the seismologic report states the following:

(a) A characteristic site period "Ts" of value 1.1 seconds should be used for design purposes.

(b) Maximum probable earthquake: A ground acceleration exceeding 0.40g for a duration of at least 40 seconds is expected with a 50% probability of occurrence within the next 50 years. The response spectra to be used for the design against maximum probable earthquake can be found on Figure 6 of Appendix C.

(c) Maximum credible earthquake: A ground acceleration exceeding 0.50g for a duration of at least 60 seconds is expected with a 10% probability of occurrence within the next 50 years. The response spectra to be used for the design against maximum credible earthquake can be found on Figure 7 of Appendix C.

LABORATORY TESTING

Laboratory tests were performed on representative soil samples obtained in order to determine their physical properties. These tests included direct shear (undisturbed and remolded at 90% relative density) consolidation, expansion index, maximum dry density and moisture density determination. A representative sample was also sent for CBR testing to determine its suitability for flexible pavement design. The procedures and results of these tests are presented in Appendix A.

PART B - CONCLUSIONS AND RECOMMENDATIONS

I. GENERAL:

Based on the data gathered in our investigation, the geology and the seismology reports, it is our opinion that the construction of the proposed complex is suitable from a geotechnical engineering standpoint, provided the recommendations set forth in this report are adhered to.

The site should first be prepared for construction as specified. Construction could then proceed conforming to our design recommendations.

II SITE PREPARATION:

1 - Removal of Debris: Debris can be found at 2 locations on-site: on the northeast and southeast corners of the property. They should be hauled off-site. The locations of the debris are indicated on Plate I.

2 - Removal of Fill: All uncertified fill materials that have recently been placed during the unsupervised superficial grading operations should be removed. The excavations so produced may be filled according to grading specifications, where grading plans call for it. The location of these superficial fills are indicated on Plate I.

3 - Maximum Slope Height: Using Taylor's stability number (Sn), and combined remolded shear values of the on-site soils, the proposed 2:1 fill slopes with a safety factor of 1.5 were determined to have a maximum vertical height of 49 feet (See appendix 1 for calculations). Surficial stability was not analyzed because the proposed slopes will not exceed 2:1 (horizontal to vertical). After final grading plans are submitted to this office, it may be necessary to reanalyze some proposed slopes.

4 - Suitability of Native Materials for Fill: Native materials are suitable for fill provided:

(a) they are free from organic vegetable matter and other deleterious substances.

(b) they do not contain rocks greater than 8 inches in diameter within a vertical distance of ten feet from any finished compacted surface.

5 - Shrinkage: Based on the laboratory test results, the average shrinkage, during grading operations, will be roughly 20%.

6 - Potential Rock Location and Removal Method: No rocks exceeding 2 feet in size are expected to be found on-site. The largest size rocks will be found at the base of the southerly slope of the knoll. Rocks could be removed by available earth-moving equipment.

7 - Subsurface Water and Sub-drains: The north side of the site (north of the fault line) has a relatively high water table. In order to prevent future problems resulting from the groundwater interaction with the foundations, sub-drains should be placed along the north structural set-back line.

An additional sub-drain should be placed extending through the filled trough to the east of the knoll. The location of the sub-drains are indicated on Plate 1.

Sub-drains should be a minimum of 2 feet wide and 3 feet deep. They should include a perforated 8-inch CMP pipe, in No. 3 gravel pack. The subdrains should be sealed with a minimum of one-foot of clayey compacted fill, or paved over. The sub-drains should discharge in the storm drains located along the south side of the site. All sub-drains and other drainage devices should maintain a 2% slope where possible.

8 - Subsurface Structures: Although no subsurface structures were encountered during the field investigation, it is considered likely that they may be present. If subsurface structures are encountered during construction, or are known to exist, they must be completely removed and their voids compacted to 90 percent relative compaction, or filled with lean (3 sack mix) concrete to within 3 feet of structural foundations. The rest of the void should be compacted to 90% with native materials.

III. DESIGN RECOMMENDATIONS:

1 - Non-structural Set-back Line: It is probable that a fault exists near the north boundary of the property. In order to prevent future problems associated with that fault, a non-structural set-back line has been established (see Plate I). No structures may be constructed from 50 feet south of the fault to the north property line. Those non-structural areas could be used for parking purposes.

2 - Foundations: The proposed structures may be supported on conventional foundation which may consist of continuous or isolated spread footings.

(a) The board and care building and the chapel, which will be placed on the knoll and its adjoining southerly slope, will be embedded into the Modelo formation bedrock. Their continuous footings should be a minimum of 24 inches wide and may be designed for a bearing value of 2500 pounds per square foot (psf). Their column pads, a minimum size of 24"x24" may be designed for a bearing value of 2800 psf. These bearing values may be increased at the rate of 500 psf for each additional foot of width or depth up to a maximum bearing value of 4000 psf.

4.5' SQ:

2'-0" SQ. 29.9K 4'-0" SQ. 60.8K 3'-6" SQ. 43K

(b) The skilled nursing facility building, which will be placed on the topographically low area on the east part of the property will be embedded partly into the flood plain deposits. Its continuous footings should be a minimum of 36 inches wide which may be designed for a bearing value of 2000 psf. Its column pads, a minimum size of 36"x36" may be designed for a bearing value of 2200 psf. These bearing values may be increased at the rate of 400 psf for each additional foot of width or depth up to a maximum of 3500 psf.

These recommended bearing values are for the total of dead and frequently applied live loads and may be increased by one-third for short duration loading, which includes the effects of wind and seismic forces.

3 - Lateral Design: Resistance to lateral loading may be provided by friction acting at the base of foundations and by passive earth pressure within the alluvium. An allowable coefficient of friction of 0.33 may be used with the dead load forces.

Passive earth pressure at the ground surface is assumed to be zero and may be increased at the rate of 300 psf per foot of depth, to a maximum value of 3000 psf. When combining passive and friction for lateral resistance, the passive component should be reduced by one-third.

4 - Retaining Walls: For drained conditions, retaining walls may be designed on the basis of equivalent fluid pressure of 30 pounds per cubic foot (pcf) for support of level ground and 43 pcf for 2:1 (horizontal to vertical) back-slope.

A foundation bearing value of 2000 psf may be used for retaining wall design.

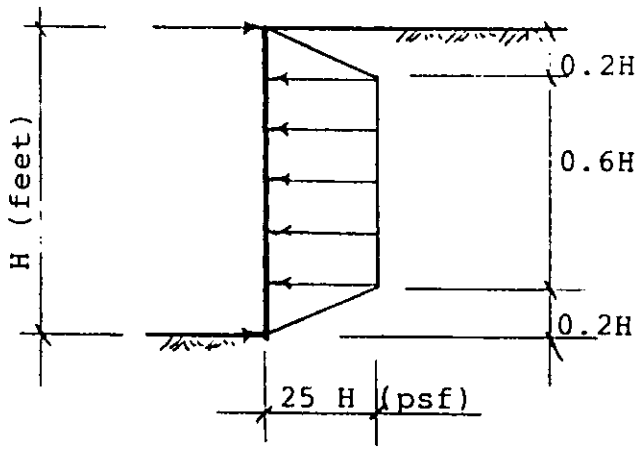
To assure the drained conditions, a drain blanket should be placed behind the wall. The drain blanket should consist of a lower gravel pack overlain by a 12-inch thick blanket of clean sand, which extends to within one foot of the top of the wall. The gravel pack should be at least one cubic foot in volume per foot of wall length. A clayey compacted fill should be used to seal the drain blanket.

Moisture from behind the retaining wall can be discharged through 2-inch diameter weep holes placed at 6-foot centers where applicable. Otherwise, a 4-inch diameter perforated pipe should be placed within the gravel pack and drained to an appropriate location via 4-inch diameter solid pipes.

Any fill placed behind retaining walls should be compacted to at least 90 percent relative density per ASTM D1557-78. Pea gravel may be used to fill confined spaces.

Retaining walls supporting sloping grade should be provided with a minimum of 1-foot high freeboard and 2-foot wide concrete "V" drain.

5 - Subterranean Basement Retaining Wall: For drained conditions, basement walls could be designed using a trapezoidal distribution of soil pressure, as illustrated by the sketch below. The maximum pressure would be equal to 25H, in pounds per square foot (psf), where H is the height of the wall in feet.



The surcharge from the adjacent structures should be accounted by the structural engineer in designing the basement walls.

Walls should be back-filled with free-draining soil, compacted to 90 percent relative compaction per ASTM D1557-78. Where the voids to be filled are confined, the use of crushed rock or pea gravel is recommended. The surface of the backfills should be paved or sealed with clayey compacted fill.

6 - Temporary Excavations: Temporary excavations could be made up to 5 feet in height. Excavations higher than 5 feet should be sloped no steeper than 1:1. As an alternate, excavations

higher than 5 feet could be shored with H-piles placed at 10 feet on center. The space between the "H" piles should be gunited and reinforced with wire mesh. The H-piles should be encased in concrete up to the bottom of the footing excavation level, and one sack mix concrete used for filling the spaces around the upper portion of the piles. An equivalent fluid pressure of 25 pcf could be used for shoring design purposes.

7 - Utility Trenches: All utility trenches should be backfilled with granular materials and compacted to a minimum of 90 percent relative compaction as determined by ASTM Test Method D1557-78.

8 - Settlement (Subsidence): The total settlement is estimated to be about $\frac{1}{2}$-inch. The differential settlement on the bedrock should be negligible, and it should not exceed $\frac{1}{4}$-inch on the flood plain deposit. More exact settlement calculations may be provided upon presentation to this office of the foundation plans and acting loads.

9 - Expansion (Swell): Most of the on-site soils are granular and considered non-expansive. No special reinforcement or other precautions are required to resist expansion forces.

10 - Slabs On-grade: Slabs should be cast on 4 inches of wetted sand on a sub-grade that has been moistened and tamped to a firm and unyielding condition. Thickness and reinforcement of slabs

should reflect its anticipated use and be designed by a structural engineer. Slabs which will be provided with a floor covering should be protected by a 6-mil polyethylene vapor barrier placed under one additional inch of wetted sand, to prevent punctures during construction.

11 - Pavement Sections: The roadway and parking lot sections were designed based on the following information:

	Parking	On-Site Driveway	Off-Site Street
CBR =	35	35	35
T.I.=	4	5	7

The on-site driveway and parking should have a pavement section consisting of a minimum of 3 inches of asphalt concrete over 4 inches of crushed aggregate base. The off-site street pavement should consist of 4 inches of asphalt concrete over 4 inches of crushed aggregate base.

All curbs and gutters should be placed over 4 inches of crushed aggregate base. All road sections should be properly graded for drainage.

12 - Surface Drainage: The site should be graded such that water will not pond anywhere on-site, especially along foundations. Pad and roof drainage should be collected and transferred to the street in non-erodible drainage devices. All drainage devices should preferably maintain a grade of 2 percent.

13 - Slope Planting: All graded slopes should be planted with approved erosion resistant brush or ground cover. A permanent sprinkler system should be installed to promote and maintain the vegetative growth.

IV: REVIEW:

A final set of grading and building plans should be submitted to this office for review prior to submittal to the building officials. This office shall be promptly notified if any conditions substantially differing from that disclosed by the test excavations are encountered during construction. All grading and compaction work shall be under the observation of a representative of this office to confirm compliance with the recommendations in this report and with local ordinances. All footing and pile excavations shall be observed by the engineering geologist or the geotechnical engineer prior to placing concrete or steel. All cuts shall be observed by the geologist. This office should be notified at least 48 hours prior to any required observation.

The following page describes the limits of our liability and warranties for data contained in this report.

If you have any questions regarding the content of this report, please do not hesitate to contact our office.

This opportunity to be of professional service is greatly appreciated.

Respectfully submitted,

HAKIMIAN ENGINEERING, INC.

George Farra
Project Engineer

Reviewed by,

Krikor D. Hakimian
RCE 18736

GF:jb
cc: Five to Client

REGISTERED PROFESSIONAL ENGINEER
KRIKOR D. HAKIMIAN
No. 18736
Exp. 6-30-89
CIVIL
STATE OF CALIFORNIA

WARRANTIES

This report is based on the development plans furnished to our office. In the event that any significant changes in the design or location of the structure(s), as outlined in this report, are planned, the conclusions and recommendations contained in this report may not be considered valid unless the changes are reviewed and the conclusions of this report are modified or approved by the soil engineer and/or geologist.

The subsurface conditions, excavation characteristics, and geologic structure described herein and shown on the enclosed cross sections have been projected from individual borings or test pits placed on the subject property. The subsurface conditions, excavation characteristics, and geologic structure shown should in no way be construed to reflect any variations which may occur between these borings or test pits.

It should be noted that fluctuations in the level of the groundwater may occur due to variations in rainfall, temperature, and other factors not evident at the time measurements were made and reported herein. Hakimian Engineering, Inc. assumes no responsibilities for variations which may occur across the site.

If conditions encountered during construction appear to differ from those disclosed, this office shall be notified so as to consider the need for modifications. No responsibility for construction compliance with the design concepts, specifications or recommendations is assumed unless on-site construction review is performed during the course of construction which pertains to the specific recommendations contained herein.

The soil engineer and geologist have prepared this report in accordance with generally accepted engineering practice and make no other warranties either expressed or implied as to the professional advice provided under the terms of the agreement and included in this report.

A P P E N D I X
"A"

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, LA

Drilling Contr. DATUM

Equipment Hollow stem auger rig

6" diameter hole

Driving Weight

Surface Elevation

Reference

Boring No. B-20

Sheet 1 of 3

Logged By GF

Date 07-13-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
5						**Fill:** Silty Sand	Yellowish Light Brown	Slightly Loose	Moist		
10						**Flood Plain Deposit:** Coarse sand with pebbles	Light Yellow Brown		Damp		
15						Fine sandy, clayey silt	Yellowish Greenish Brown		Damp		
						Water table at 18.5 feet					
20						**Bedrock: Modelo Formation:** Sandy clay	Grayish Green		Damp		
25											

PLATE 2

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, LA

Drilling Contr. Datum

Equipment Hollow stem auger rig
6" diameter hole

Driving Weight

Surface Elevation

Reference

Boring No. B-20

Sheet 2 of 3

Logged By GF

Date 07-13-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
30											
35											
40											
45											
						Siltstone	Dark Green				
50											

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, L.A.

Drilling Contr. Datum
Equipment Hollow Stem Auger
6" diameter hole
Driving Weight
Surface Elevation
Reference

Boring No. B-20
Sheet 3 of 3

Logged By GF
Date 07-13-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
55											
60											
65											
70						Stop @ 70 Feet Caving filled the bottom 10 feet after withdrawal of rig					

PLATE 4

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, L.A.

Drilling Contr. Datum

Equipment Hollow stem auger rig
6" diameter hole

Driving Weight

Surface Elevation

Reference

Boring No. B-21

Sheet 1 of 1

Logged By GF

Date 07-13-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
						Fill: Silty sand	Dark Brown	Dense	Dry		
5						**Bedrock:** Silty sand, fine to coarse grained, contains clasts of slightly metamorphasedigneous rocks up to 6" in diameter	Brownish to yellowish brown				
10											
15											
20											
25						Stopped @ 25' because of increasing boulder size					

PLATE 5

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, LA

Drilling Contr Tri Valley
Equipment Bucket rig
24" diameter hole
Driving Weight 2900 lbs
Surface Elevation
Reference

Boring No. B-22
Sheet 1 of 2

Logged By GF
Date 07-14-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
						Flood Plain Deposit					
						Sand, well graded with pebbles (5% by volume)	Yellowish Greenish Brown		Moist		
5						Pebbles disappear; sand becomes siltier	Becomes Darker and Yellower		Becomes Moister		
						Decreasing sand size	Dk greenish Br to black				
						Bedrock: Modelo Formation Sandy clay with some pebbles; irregular staining	Grayish green		Moist	19	107
15						Water table @ 15' caving occurred below it pebbles disappeared			Wet	23	107
20										60	62.3
25											

PLATE 6

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat HOme	Mission Hills, LA

Drilling Contr. Tri Valley
Equipment Bucket Rig
24" diameter hole
Driving Weight 2900 lbs
Surface Elevation
Reference

Boring No. B-22
Sheet 2 of 2

Logged By GF
Date 07-14-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
30											
35	■			4						36	77
40	■			3		Stop @ 40'				43	77
45											
50											

PLATE 7

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, LA

Drilling Contr. Tri Valley
Equipment Bucket rig
24" diameter hole
Driving Weight 2900 lbs
Surface Elevation
Reference

Boring No. B-23
Sheet 1 of 2

Logged By GF
Date 07-14-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
5						**Fill:** Silty sand	Brown	Loose	Moist		
						Bedrock: **Modelo Formation** Weathered sandstone	Light yellowish brown				
10						Cobbles start to appear oxidation spots increase with depth	Yellow brown		Getting moister with depth		
15						Contains clasts of slightly metamophosed igneous rocks.	Grayish				
20						Clasts decrease in size	Grayish brown blackish				
25						Silt content increases	Grayish green				

PLATE 8

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, LA

Drilling Contr. Tri Valley — Boring No. B-23
Equipment Bucket rig
24" diameter hole — Sheet 2 of 2
Driving Weight 2900 lbs
Surface Elevation
Reference

Logged By GF — Date 07-14-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
				5						10.5	110
						Very oxidized	Reddish				
30											
35											
40						Water table					
45						Stop @ 48'					

PLATE 9

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, LA

Drilling Contr. Tri Valley
Equipment Bucket rig
24" diameter hole
Driving Weight 2900 lbs
Surface Elevation
Reference

Boring No. B-24
Sheet 1 of 2

Logged By GF
Date 07-14-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
						Flood Plain Deposit:					
						Silty sand	Dark brn		Dry		
5							Yellow-ish brn				
						Pebbles and cobbles appear					
10						Cobbles disappear					
						Caving occurred between 11' and 13'				9	106
15							Dark yellow-ish brown				
						Bedrock: Modelo Formation					
20						Silty sand, hard to excavate because of clasts of slightly metamorphosed igneous rocks.	Dark brown		Moist		
25				5		Sand, some caving occurred	reddish grayish green				

PLATE 10

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, LA

Drilling Contr. Tri Valley — Boring No. B-24

Equipment Bucket rig

24" diameter hole — Sheet 2 of 2

Driving Weight 2900 lbs

Surface Elevation

Reference

Logged By CF — Date 07-14-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
						Water table @ 26'					
						Sandy clay with patches of oxidation	Green			35	84
30				4							
35						Mudstone	Green				
										38	77
40				8							

PLATE 11

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, LA

Drilling Contr. Tri Valley — Boring No. B-25
Equipment Bucket rig — Sheet 1 of 1
24" diameter hole
Driving Weight 2900 lbs
Surface Elevation
Reference

Logged By GF — Date 07-14-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
						Fill: Silty sand	Dark brown		Dry		
10						**Bedrock:** Weathered sandstone	Reddish brown		Dry		
						Cobbles start to appear	Becomes yellowish				
15						Sand with pebbles and cobbles of slightly metamorphosed rocks	Becomes reddish yellowish lt.brn		Moist Moist		
20											
25						stopped @25' because of					

PLATE 12

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat Home	Mission Hills, LA

Drilling Contr. Datum	Boring No.
Equipment Hollow stem aguer rig	B-26
6" diameter hole	Sheet
Driving Weight	1 of 1
Surface Elevation	
Reference	

Logged By GF | Date 07-13-87

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistency	Moisture	Moisture Content	Dry Unit Weight
						Fill: Silty sand	Dark brown		Dry		
5						**Bedrock:** Weathered gravelly sandstone	Reddish brown				
10											
15							Yellow				
						Large boulders, difficult drilling.					
20						Stop @ 21'					
						No groundwater Some caving					
25											

PLATE 13

LABORATORY TESTING

Maximum Density-Optimum Moisture

Bulk soil samples were tested in the laboratory to determine dry density and optimum moisture content using the ASTM D1557-78 compaction test method. These tests are made on the minus four (-4) fraction of the samples in a four-inch diameter mold having 1/30 cubic foot volume, with 25 blows of a ten-pound hammer falling 18 inches on each of five layers. The results of the test are presented below:

Soil Tested	Description	Depth	Maximum Dry Density (pcf)	Optimum Moisture Content (% of Dry Weight)
B-22	Floor Deposit Sand w/pebbles	0-24"	133	7.4
B-26	Flood Deposit Gravelly sand	17'	131	6.6

Direct Shear

Direct shear tests were made on undisturbed 2.6 inch diameter samples to determine the strength of the soil. The samples were saturated under normal load before testing. Shear loads were applied quickly in accordance with the standard procedure for the consolidated undrained shear tests. The results of these tests and their graphic plots are shown on Plates

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Consolidation

The apparatus used for the consolidation tests, as is the shear machine, is designed to receive undisturbed specimens in the field condition. Porous stones were placed in contact with the top and bottom of the specimen to permit the ready addition and release of water. Successive load increments were applied to the top of each specimen and progressive and final settlements under each load increment were recorded to an accuracy of 0.0001 inch. The final settlements obtained were plotted to determine the curves shown on Plate XIV and XV.

Expansion Index

In order to determine the potential expansive character of the soil, a typical sample was tested for expansion potential according to UBC Standard 29-2. The specimen was prepared at 50% saturation and placed under a normal load of 144 pounds per square foot and submerged in water. The results are as follows:

Sample Location	Sample Description	Expansion Index	Potential Expansion:
6'	B-20	9	Very Low
0-24"	B-22	10	Very Low

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DIRECT SHEAR TEST

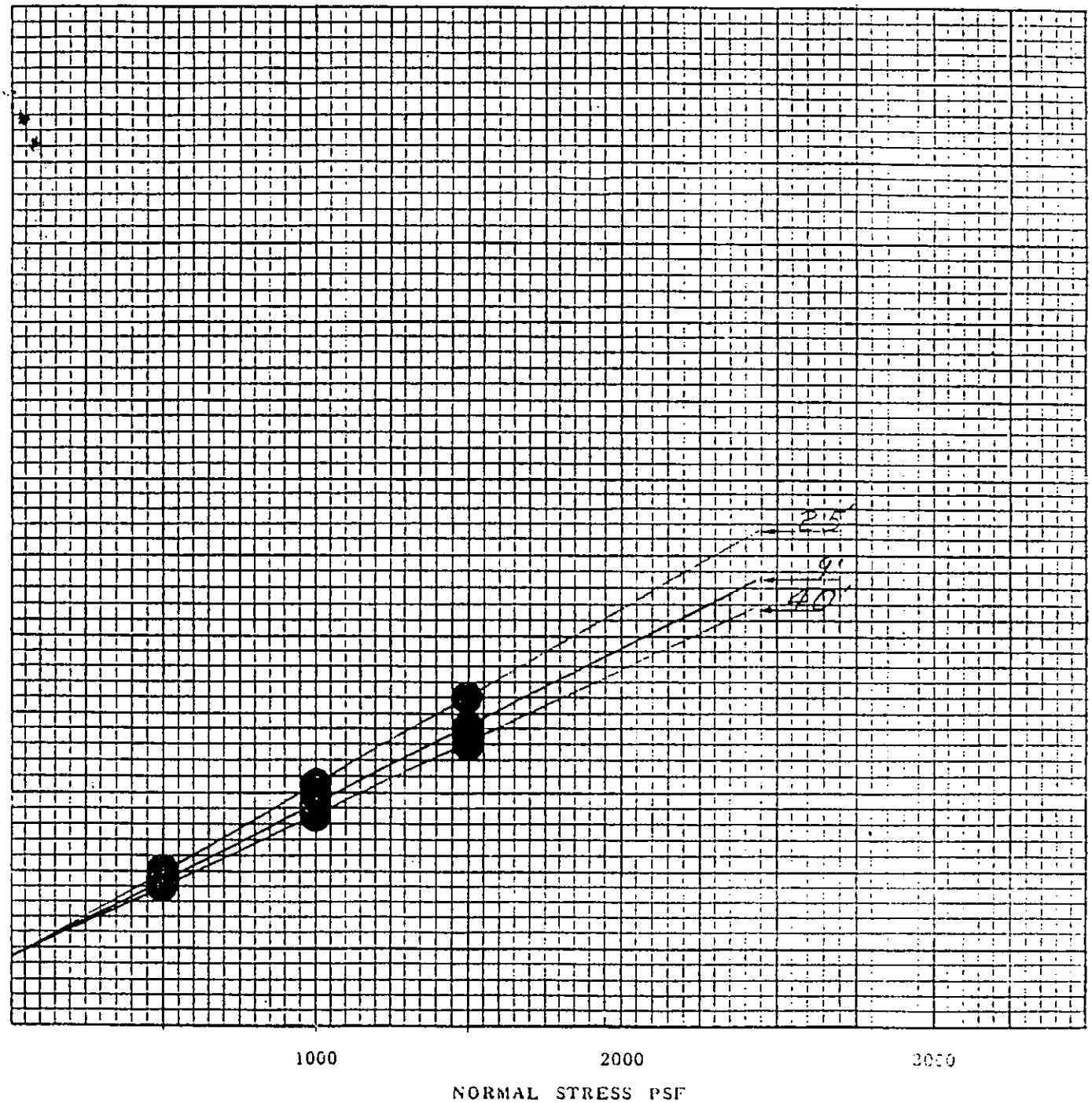
CLIENT : ARARAT HOME — JOB NO. GT-20608

CLASSIFICATION: BEDROCK-SILTSTONE / BEDROCK-SANDY CLAY — SAMPLE NO. B-22 @ 25' / B-22 @ 40' FT.

LOTTED BY: Y.B — DATE 7-31-1987 — CHECKED BY

18 %	22 %	106	230		26°
60 %	ω_s = 60 %	γ_d = 66 PCF	C = 225 PSF		ϕ = 29°
= 41 %	45 %	81	230		25°

NDISTURBED ✓ REMOLDED



▲ Gp & Øp = Peak values

● C_u & $Ø_u$ = Ultimate values

⬢ C_r & $Ø_r$ = Residual values

PLATE : 16

DIRECT SHEAR TEST

CLIENT : ARARAT HOME JOB NO. GT-20608

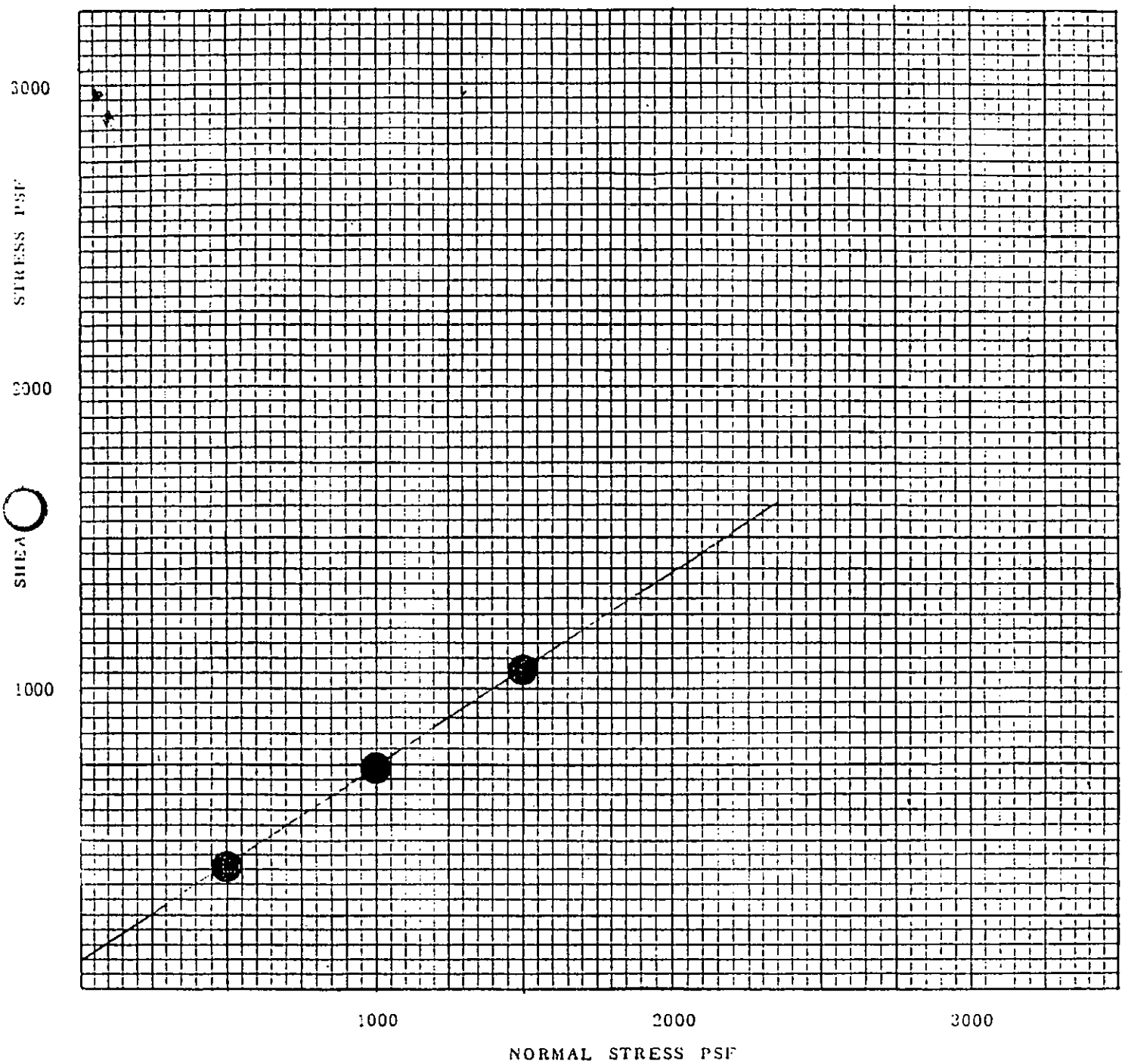
CLASSIFICATION: SILTY SAND SAMPLE NO. B-20 @ 6' FT.

TED BY: Y.B. DATE 7-24-1987 CHECKED BY

ω = 9 % γ_d = 113 PCF C = 100 PSF ϕ = 33°

ω_s = 16 %

UNDISTURBED REMOLDED ✓ @ 90%



▲ Gp & Øp = Peak values

● C_u & $Ø_u$ = Ultimate values

⬢ C_r & $Ø_r$ = Residual values

PLATE : 17

DIRECT SHEAR TEST

CLIENT : ARARAT HOME JOB NO. GT-20608

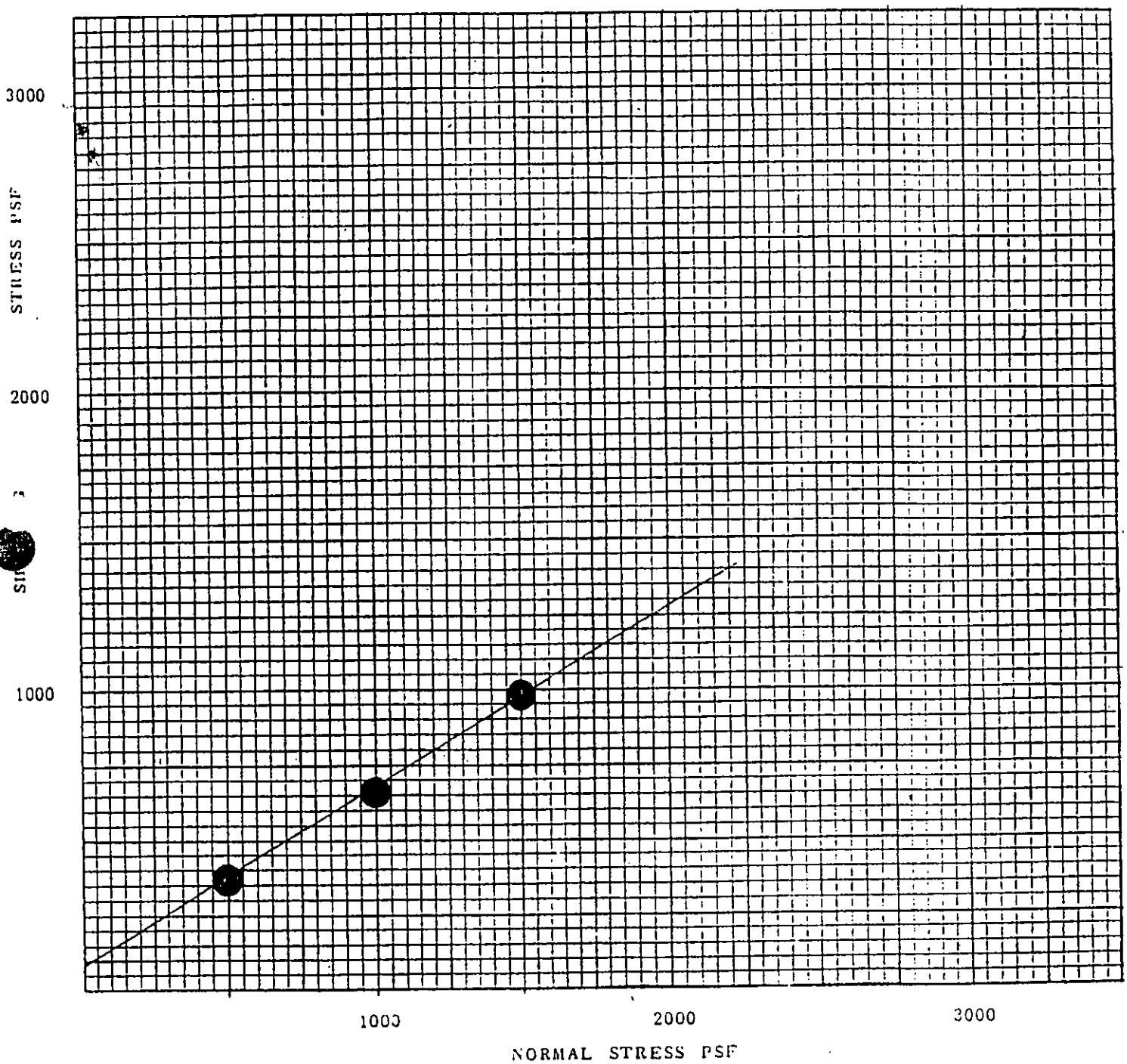
CLASSIFICATION: SAND WITH PEBBLES SAMPLE NO. B-22 @ 0-2' FT.

TED BY: YB DATE 7-23-1987 CHECKED BY

[redacted] = 7 % γ_d = 118 PCF C = 90 PSF ϕ = 31 °

γ_s = 13 %

UNDISTURBED REMOLDED ✓ @ 90%



▲ Gp & Øp = Peak values

● C_u & $Ø_u$ = Ultimate values

● C_r & $Ø_r$ = Residual values

PLATE: 18

DIRECT SHEAR TEST

.IENT : ARARAT HOME — JOB NO. GT-20608

FLOOD DEPOSIT-SILTY SAND — B-24 @ 12'

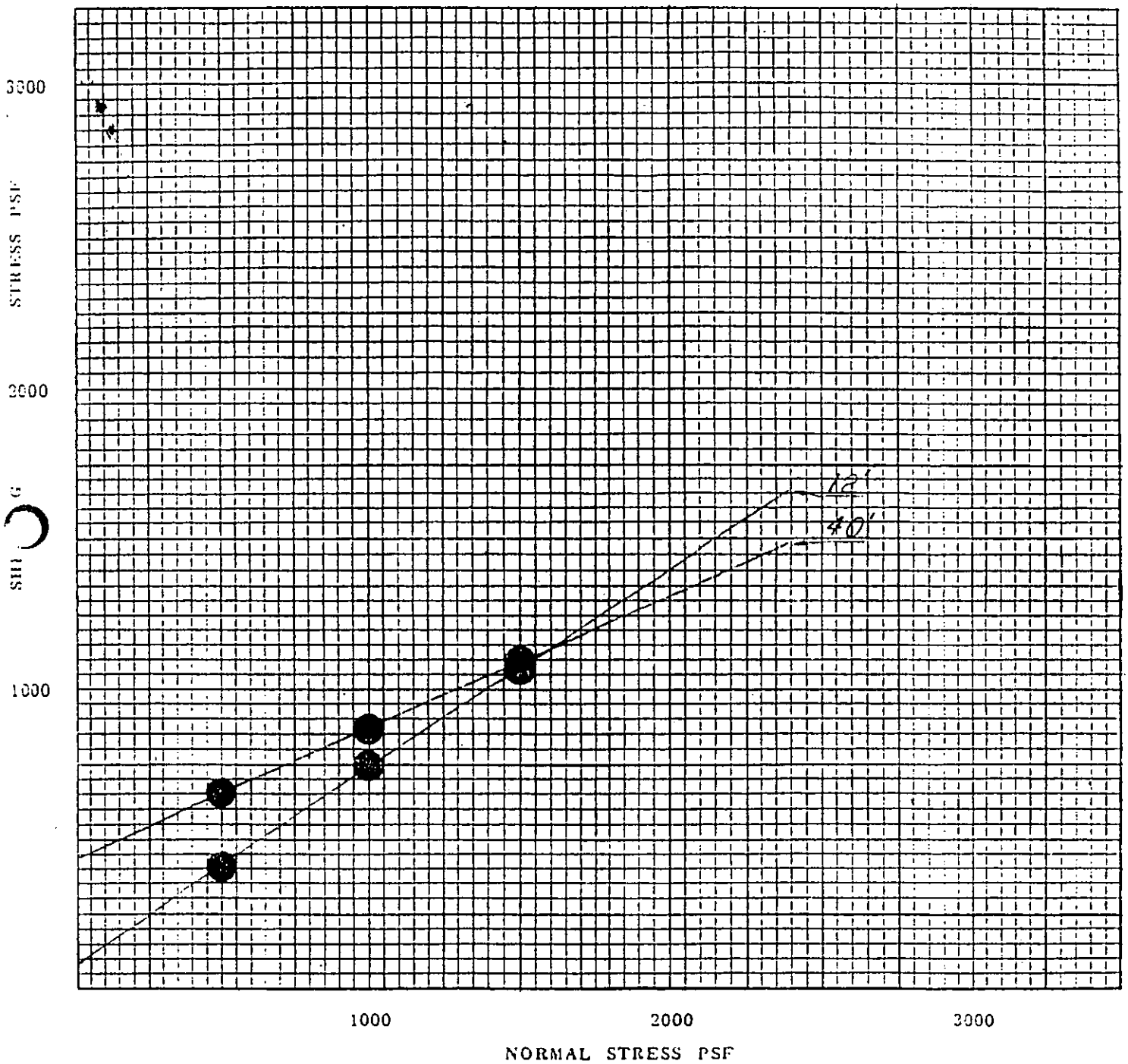
CLASSIFICATION: BEDROCK-SILTY CLAY — SAMPLE NO. B-24 @ 40' FT.

TED BY: Y.B. — DATE 7-31-1987 — CHECKED BY

9	17	108	90	33°
D = 41 %	w_s = 48 %	γ_d = 75 PCF	C = 440 PSF	ϕ = 23°

= ____ %

NDISTURBED ✓ REMOLDED ____



▲ Cp & Øp = Peak values

● C_u & $Ø_u$ = Ultimate values

● C_r & $Ø_r$ = Residual values

PLATE : 19

HAKIMIAN ENGINEERING

LOAD - PERCENT CONSOLIDATION CURVE

CLIENT ARARAT HOME

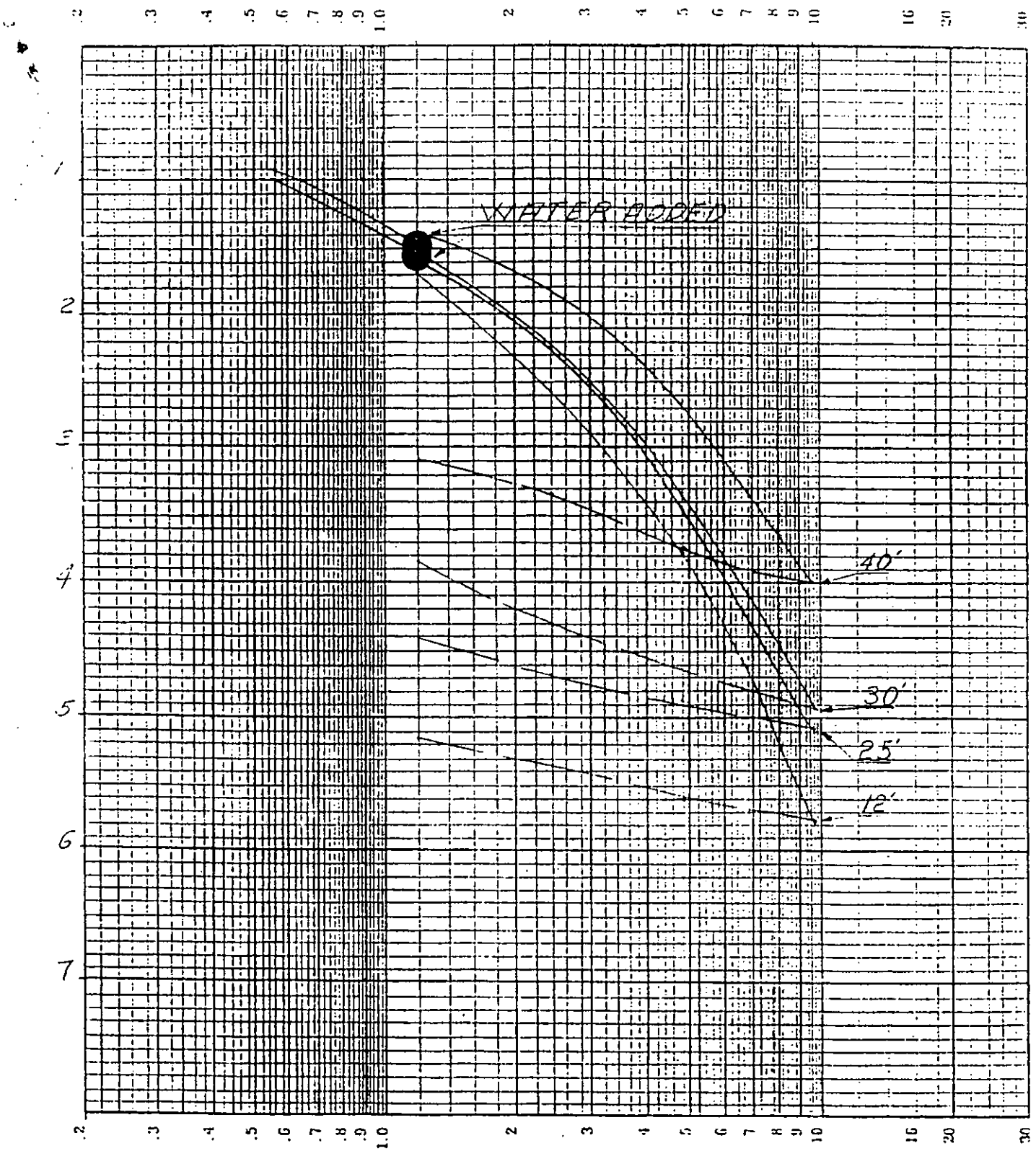
LAB NO. GT-20603

PLOTTED BY Y. B.

SAMPLE NO. B-24

CHECKED BY

DATE 7-29-87



HAKIMIAN ENGINEERING

LOAD - PERCENT CONSOLIDATION CURVE

CLIENT ARARAT HOME

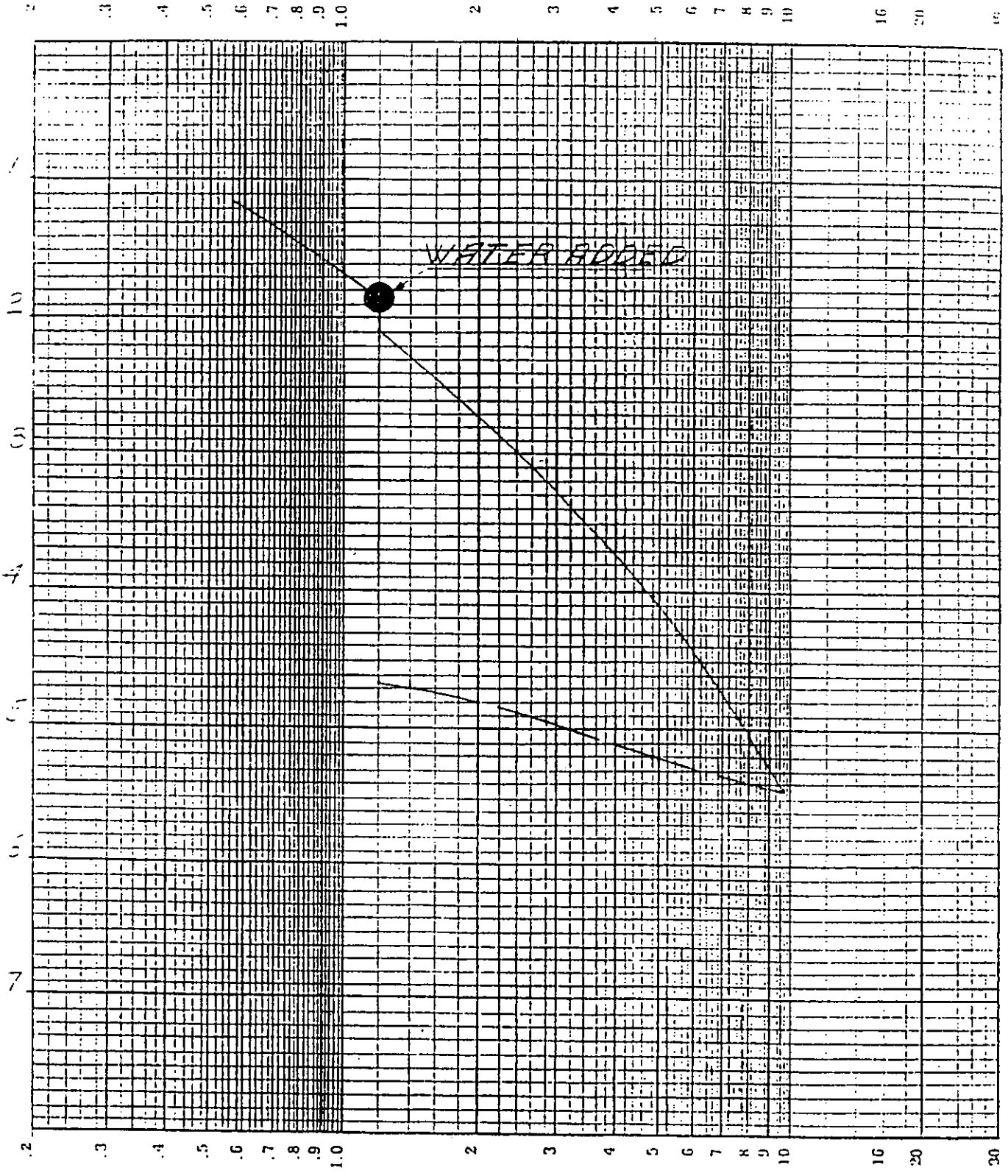
LAB NO. GT-20603

PLOTTED BY Y.B.

SAMPLE NO. B-23@2.5'

CHECKED BY _____

DATE 7-27-87



Load - Kips/Sq. Ft.

PLATE 22

HAKIMIAN ENGINEERING

LOAD - PERCENT CONSOLIDATION CURVE

CLIENT ARARAT HOME

LAB NO. GT-20608

PLOTTED BY Y. B.

SAMPLE NO. B-22

CHECKED BY _____

DATE 7-27-'87

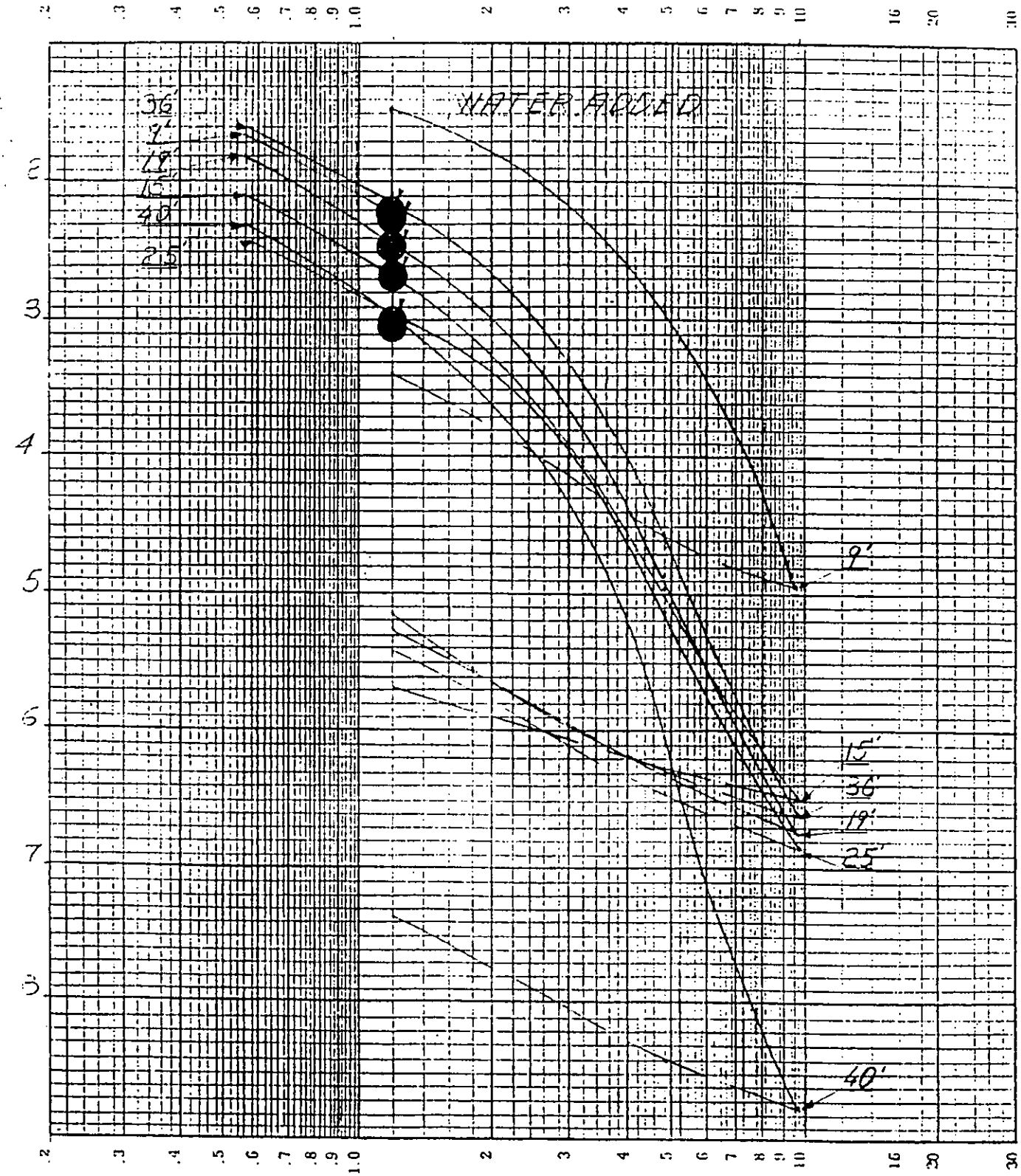


PLATE 23

Osborne
Geotechnical
Engineering, Inc.

P.O. Box 3107 • 12060 Clark Street
Santa Fe Springs, California 90670
(213) 944-8716

Report to:	Hakimian Engineering 13003 Ladana Court Santa Fe Springs, CA 90670
Attention:	Mr. K. Hakimian
Project:	Ararat Residence, Mission Hills, CA Job # GT 20608
Subject:	BEARING RATIO PER ASTM D-1883
Laboratory Number:	G7-08-001
Date:	August 6, 1987

Acting at the request of Mr. K. Hakimian of Hakimian Engineering, we determined bearing ratio in accordance with ASTM D-1883 on a soil sample delivered to our laboratory on July 31, 1987. Test results are as follows:

Soil I.D.:	North
Soil Type:	Brown Silty Sand
Maximum Dry Density lbs./c.f.:	122.5
Optimum Moisture, percent:	10.0
Expansion after soaking for 72 hours, percent:	1
Moisture Content of Sample preparation, percent:	9.7
Moisture Content top 1" after tests, percent:	14.1
Bearing ratio at 0.1" penetration:	35

The opportunity to be of continued service to you is sincerely appreciated. If you have any questions in this matter, please call.

Very truly yours,
OSBORNE GEOTECHNICAL ENGINEERING, INC.

for Jay H. Tan
Staff Engineer

Karl T. Blaufuss, PE # C16501
Certificate expires June 30, 1989

JHT/KTB/crs:2
02-7-08-607

PLATE 21

HAKIMIAN ENGINEERING INC.
13003 LaDana Court
SANTA FE SPRINGS, CALIFORNIA 90670
(213) 946-7783

JOB HKHKH1 HOME - 91 20000
SHEET NO. 1 OF 1
CALCULATED BY GF DATE 8/26/87
CHECKED BY DATE
SCALE

STABILITY OF FILL SLOPES

BY TAYLOR'S STABILITY NUMBER (SN)

SOIL PROPERTIES (COMPACTED @ 90%)

$\phi = 31°$
$c = 100$ psf
$\gamma_d = 118$ pcf
$\gamma_s = 136$ pcf

MAXIMUM SLOPE ANGLE = 26.6° (2:1)

$$\phi_d = \text{TAN}^{-1}\left(\frac{\text{TAN } 31°}{1.5}\right) = 21.8°$$

$$c_d = \frac{100}{1.5} = 67 \text{ psf}$$

(SN) FROM TAYLOR'S "FUNDAMENTALS OF SOIL MECHANICS" FIGURE 16-20

SN = 0.01

$$\text{SAFE HEIGHT OF SLOPE} = H = \frac{c_d}{\gamma_s (SN)} = \frac{67}{136 \times 0.01} = 49 \text{ FT}$$

ASSUMES ALL SATURATED
NO EXCESS HYDROSTATIC PRESSURE.

PLATE 25

A P P E N D I X

"B"

SUPPLEMENTARY ENGINEERING GEOLOGY AND FAULT INVESTIGATION

Armenian Ararat Institutions
15103-15105 Mission Hills Road
Mission Hills, California

Job No.: 2159-01
Log No.: 11795
August 4, 1987

Prepared For:

Hakimian Engineering
13003 Ladana Crt.
Santa Fe Springs, CA 90670

Robert Stone & Associates

R.S.A.
since 1956 Robert Stone & Associates, Inc.
Corporate Office: 15414 Cabrito Road, Unit A, Van Nuys, CA 91406 • (818) 989-5338 • 28545-B2 Felix Valdez Avenue, Rancho California, CA 92390 • (714) 676-8382

August 4, 1987

Job No.: 2159-01
Log No.: 11795

Hakimian Engineering
13003 Ladana Crt.
Santa Fe Springs, CA 90670

Attention: Mr. Krikor D. Hakimian

Subject: SUPPLEMENTARY ENGINEERING
GEOLOGY AND FAULT INVESTIGATION
Armenian Ararat Institutions
15103-15105 Mission Hills Road
Mission Hills, California

SCOPE

In accordance with your request, additional field investigations have been completed at the subject site. The purpose of this supplemental work was to:

A. Improve the resolution of, or "pinpoint", the location of a previously postulated splay fault of the Verdugo fault mapped off-site to the Northwest.[1] The splay fault was previously projected through the northeast portion of the site, based on differential ground water elevations and a subtle lithologic change in trenched Modelo bedrock.

---

[1]RSA Report 2159-00 by M. Scullin, February 21, 1984.

B. Further enhance our knowledge of the subsurface geology of the bedrock beneath the site. This was accomplished by the drilling and downhole logging of a 24" bucker auger hole HB-23.

C. Examine the shallow subsurface foundation materials in two locations (Trenches T-16 & T-17) on the westerly portion of the site, within the L.A.D.W.P. transmission line right-of way.

FAULT INVESTIGATION

Additional exploration trenches T-13, T-14 and T-15 were excavated to depths 15'-17' in order to more precisely locate the postulated splay fault previously inferred to cross the northeast portion of the site. These trenches were field-located so as to cross the mapped splay fault at angles conducive to observing the fault in the trench walls. The plan locations of these trenches are shown on the attached revised Geologic Map, Plate 1. Logs of the exploration trenches are included as Plate 2.

CONCLUSIONS AND RECOMMENDATIONS

1) Although we could not definitively locate a fault splay, shear or other distinct fault feature in any of the additional trenches, we would nonetheless leave the splay fault and non-structural setback zone as shown on the earlier geologic map by Scullin and Oborne (February, 1984). We did encounter subtle, but persistent lithologic

changes in Trenches T-14 and T-15 at trench stations that closely coincide with the fault splay location as previously inferred. In both trenches, the change consists of clayey sands abutting or rather abruptly changing to sandy gravels. This is a very similar situation-in terms of fault splay association-as noted in Trench T-5 in the earlier investigation. Trench T-13 was abandoned in caving materials.

2. The earlier investigation also determined a ground water elevation differential of about 10 feet across the inferred fault splay. The additional trenches show that this condition does not exist during this season. Rather, groundwater was encountered in Trenches T-14 and T-15 at a fairly consistent depth of about seventeen (17) feet or elevation 1062. Groundwater in new Boring HB-23, some 300' southwest of Trench T-15, was found at depth 42', elevation 1058.

3. Test Pits T-16 and T-17, located within the L.A.D.W.P. transmission line right-of-way showed competent foundation materials exist at fairly shallow depths in these locations. These test pits were requested by Haminian Engineering on July 27, 1987 as supplemental work to the fault investigation trenching. It is our understanding that some related utility (water pipeline) structures may be placed here. Based on field observations only, the colluvium beneath the uppermost 1 foot of topsoil would suffice for utility line foundations.

4. The geologic assessments and recommendations contained in our previous Report 2159-00 (M. Scullin, February 21, 1984) remain valid and are substantiated by the supplemental work.

This report has been prepared for the exclusive use of Hakimian Engineering, their design consultants and for the specific project discussed herein. Since the report has not been prepared for use by other parties, it may not contain sufficient information for other parties or other uses.

The recommendations and opinions expressed in this report reflect our best estimate of project requirements based on information obtained at the exploratory trench locations on the date indicated. It must be recognized, however, that evaluation of subsurface deposits such as those present at the site is subject to the influence of undisclosed and unforeseen variations in soil conditions that may occur at different times and in intermediate, unexplored areas. This report has been prepared in accordance with generally accepted engineering geology practices. No other warranties, either expressed or implied, are made as to the professional advice provided under the terms of our contract and included in this report.

We appreciate the opportunity to perform these geotechnical services. Should you have any questions regarding this additional work, please do not hesitate to call. Thank you.

Very truly yours,

ROBERT STONE & ASSOCIATES, INC.

Raymond L. Blum, C.E.G. 790

RLB:am

Enclosure: Plates 1 and 2
Boring Log, B-23 (HB-23), Trench Logs

Distribution: (6) Hakimian Engineering

Robert Stone & Associates, Inc.

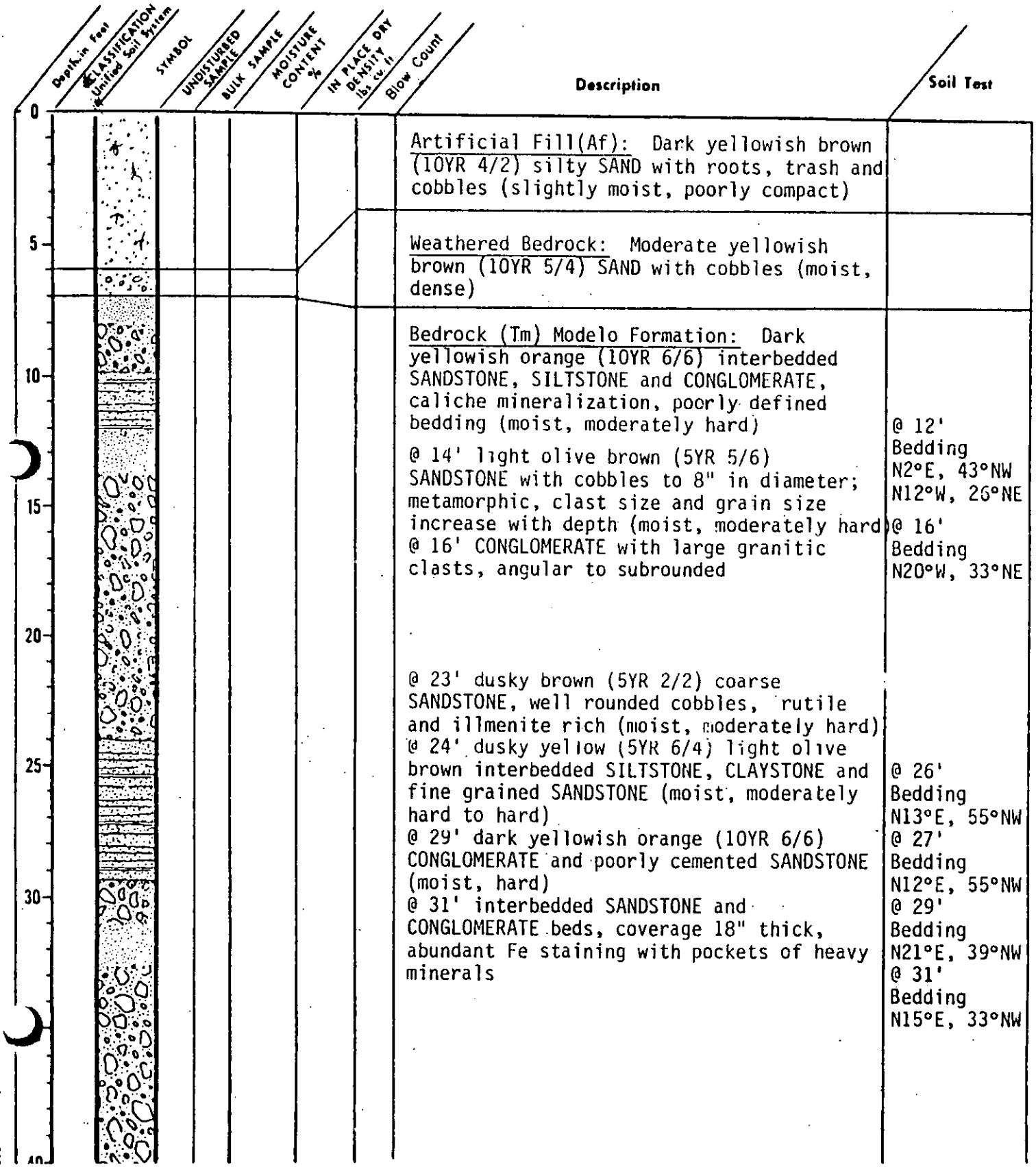
SUB-SURFACE DATA

Log No. HB-23

PROJECT: Hakimian

Method of Drilling: 24" Bucket Auger **Logged by** DLS **Job No.** 2159-01

Ground Elevation: **Location:** See Geologic Map **Date Observed:** 7/14/87



Description	Soil Test
Artificial Fill(Af): Dark yellowish brown (10YR 4/2) silty SAND with roots, trash and cobbles (slightly moist, poorly compact)	
Weathered Bedrock: Moderate yellowish brown (10YR 5/4) SAND with cobbles (moist, dense)	
Bedrock (Tm) Modelo Formation: Dark yellowish orange (10YR 6/6) interbedded SANDSTONE, SILTSTONE and CONGLOMERATE, caliche mineralization, poorly defined bedding (moist, moderately hard)	@ 12' Bedding N2°E, 43°NW N12°W, 26°NE
@ 14' light olive brown (5YR 5/6) SANDSTONE with cobbles to 8" in diameter; metamorphic, clast size and grain size increase with depth (moist, moderately hard)	@ 16' Bedding N20°W, 33°NE
@ 16' CONGLOMERATE with large granitic clasts, angular to subrounded	
@ 23' dusky brown (5YR 2/2) coarse SANDSTONE, well rounded cobbles, rutile and illmenite rich (moist, moderately hard)	
@ 24' dusky yellow (5YR 6/4) light olive brown interbedded SILTSTONE, CLAYSTONE and fine grained SANDSTONE (moist, moderately hard to hard)	@ 26' Bedding N13°E, 55°NW
@ 29' dark yellowish orange (10YR 6/6) CONGLOMERATE and poorly cemented SANDSTONE (moist, hard)	@ 27' Bedding N12°E, 55°NW
@ 31' interbedded SANDSTONE and CONGLOMERATE beds, coverage 18" thick, abundant Fe staining with pockets of heavy minerals	@ 29' Bedding N21°E, 39°NW
	@ 31' Bedding N15°E, 33°NW

Robert Stone & Associates, Inc.

SUB-SURFACE DATA

Log No: HB-23 (CONTINUED)

PROJECT: Hakimian

Method of Drilling: 24" Bucket Auger **Logged by** DLS **Job No.** 2159-0J

Ground Elevation: **Location** See Geologic Map **Date Observed:** 7/14/87

Depth in Feet	Classification Unified Soil System	Blow Count	Undisturbed Sample	Bulk Sample	Moisture Content %	In Place Dry Density lbs/cu ft	Description	Soil Tests
40							▽ Water	
45								
50							T.D. 48' Water @ 42' No Caving	

ROBERT STONE & ASSOCIATES, INC.

SUB-SURFACE DATA

PROJECT: Hakimian

Method of Drilling: Crawler Backhoe Logged by RLB/ HD Job No. 2159-01

Depth in Feet	Classification Unified Soil System	Blow Count	Undisturbed Sample	Bulk Sample	Moisture Content %	In Place Dry Density lbs./cu. ft.	DESCRIPTION	SOIL TESTS

Log No. T-16 **Location** See Geologic Map **Date** 7/17/87

0

Topsoil (ts): Dusky yellowish brown (10YR 2/2) silty SAND (loose, dry)

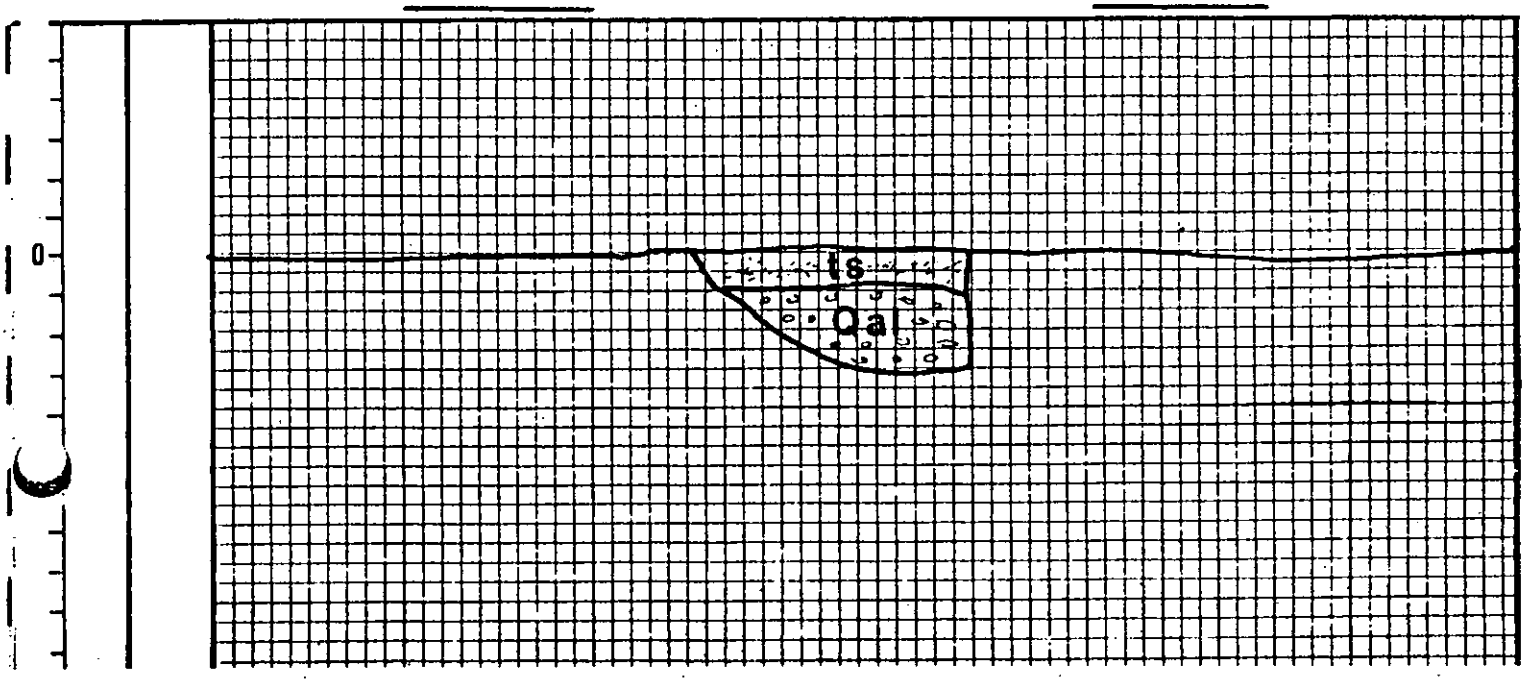
5

Collumium (Qcol): Moderate yellow brown (10YR 4/4) sandy GRAVEL with boulders up to 8" interbedded with moderate brown (5YR 4/4) SAND with cobbles, moderately indurated, firm (moist, dense)

15

T.D. 5'
No Water
No Caving

SCALE: 1" = 5'



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SUB-SURFACE DATA

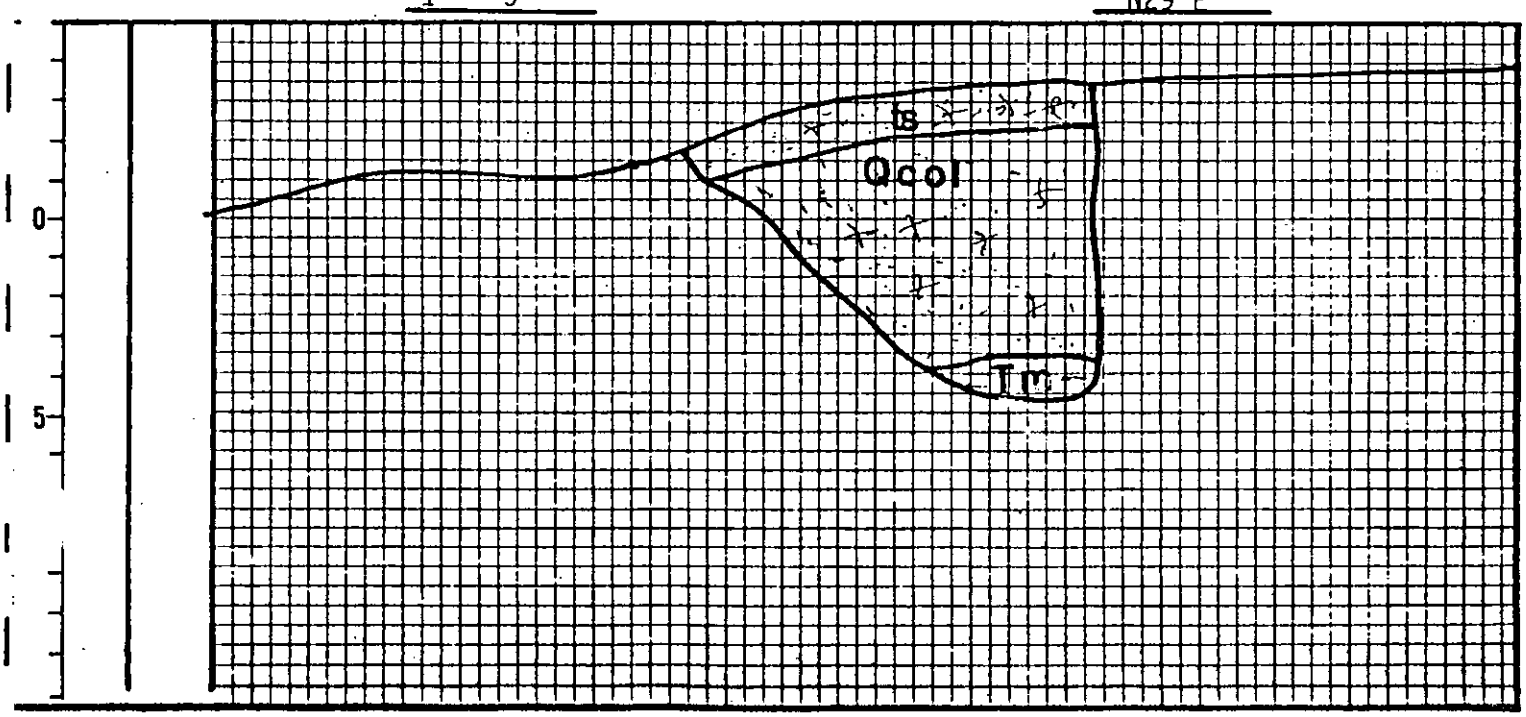
PROJECT: Hakimian

Method of Drilling: Crawler Backhoe Logged by RLB/HD Job No. 2159-0J

Depth in Feet	Classification Unified Soil System	Blow Count	Undisturbed Sample	Bulk Sample	Moisture Content %	In Place Dry Density lbs./cu. ft.	DESCRIPTION	SOIL TESTS
0							Topsoil (ts): Dusky yellow brown (10YR 2/2) silty SAND with abundant roots (loose, dry)	
5							Colluvium (Qcol): Moderate yellow brown (10YR 4/4) silty SAND with abundant roots, moderately consolidated, massive, irregular contact (moist, dense)	
							Bedrock - Modelo Formation (Tm): Tan diatomaceous SHALE, weathered (slightly moist, hard)	
10							White silty diatomaceous SHALE (slightly moist, hard)	Bedding N75°E, 80°SE Joint N-S, 60°W
15							T.D. 8' No Water No Caving	

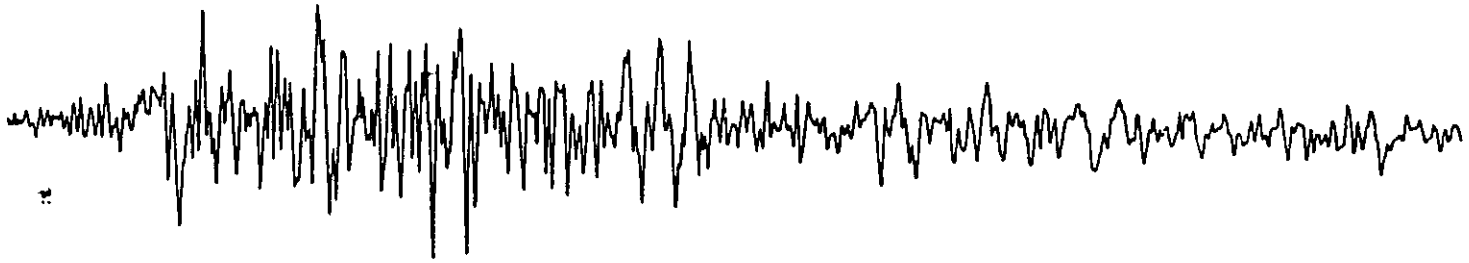
Log No. T-17 Location See Geologic Map Date 7/17/87

SCALE: 1" = 5' N29°E



A P P E N D I X

"C"



DAVID J. LEEDS AND ASSOCIATES

Consultants in Engineering Seismology/Geology/Geophysics

11972 Chalon Road
Los Angeles, CA 90049
(213) 472-0282

21 July 1987
DJLA 87-147-1

Hakimian Engineering
13003 Ladana Court
Santa Fe Springs, CA 90670

Attention: Mr. Krikor D. Hakimian

Gentlemen:

Characteristic Site Period, T_s,
and Recommended Response Spectra
Ararat Hospital & Old Age Home
15103-15105 Mission Hills Road
Mission Hills, California

At your request we performed two downhole surveys and a refraction shear-wave investigation on July 14, 1987 at the site of the proposed Ararat Hospital and Old Age Home in Mission Hills, California. Locations of the boreholes and refraction line are shown in Figure 1.

The investigation was conducted for the purpose of collecting in-situ seismic shear-wave velocity measurements, V_s, from which to calculate the characteristic site period, T_s, and as an aid in development of recommended response spectra.

This letter report presents the results of our investigation, a discussion of the field methods used, the calculated characteristic site period, and recommended response spectra.

Field Methods

The field equipment and downhole data collection methods employed are depicted in Figure 2. The 60 and 15 foot boreholes were cased with 3-inch ID plastic pipe and backfilled with granular material. The holes were actually drilled much deeper, but as a result of the drilling method could not be cased to their full depth. We recorded seismic shear-wave velocities at 5-foot increments inside the boreholes.

The recording equipment used was a Geometrics/Nimbus multichannel signal enhancement seismograph, Model EL-1210F. The detecting instrument was a specially built three-component borehole geophone. An 8-pound sledge hammer provided the power source.

Since the seismic refraction method for velocity determination uses the same process of measuring the time interval of the progression of a seismic (acoustic) wave traveling over a fixed distance as that used in the borehole velocity determination, similar recording equipment may be used. For our surveys, ground-motion sensitive transducers (geophones) were placed at 15-foot intervals along the survey line (see Figure 1). A refraction line length of 180 feet was used with 15-foot geophone spacing. Compressional wave velocities were measured using vertically oriented geophones, with the energy input to the ground also being vertical.

A second series of transverse horizontally oriented geophones were used to detect the arrival of shear waves. For the shear-wave observations, a similar arrangement to that of the downhole survey was used, with the sledge hammer impact directed against a plank secured to the ground by the weight of the truck. In this method, the geophone output is fed into the amplifier/recorder. The signal enhancement seismograph has the ability to build up, or "stack", the small signals generated by several impacts into a larger amplitude signal with improved signal-to-noise ratio. When a clear signal develops on the oscilloscope, it is transferred to the recorder for a permanent paper record.

Field Data

Table I presents the results of the field surveys.

TABLE I. IN-SITU VELOCITY MEASUREMENTS

	Depth, ft	Shear Velocity, ft/sec
15-ft borehole	0 to 15	1380
60-ft borehole	0 to 16 16 to 41 51 to 55	560 710 1480
180-ft refraction	0 to 45 45 to 75	830 1400

The field data are shown graphically in Figures 3 and 4.

An applicable model adjusting for elevation of the data points and extrapolated taking local geology into consideration is as follows:

Depth, ft	Velocity, ft/sec
0 to 45	800
45 to 125	1440
125 to 250	1800
Below 250	2500

Characteristic Site Period, T_s

The characteristic site period, T_s, has been calculated from the measured and extrapolated values of shear-wave velocity. We have assumed the values shown for the underlying formations based on measurements at nearby sites.

The calculation utilizes the City of Los Angeles Department of Building and Safety Rule of General Application RGA 1-76:

$$T_s = \frac{4H}{V_s} \times 1.5 = 1.1 \pm 0.1 \text{ seconds}$$

where H is the thickness (in feet) of the underlying formation and V_s is its shear-wave velocity (in feet per second). The calculated value is increased by a factor of 50% to accommodate the low strain used in testing.

We suggest a value of T_s of 1.1 seconds be used for your design and believe that it is within a range of ±0.1 second. Our determination may be utilized with the usual structural "resonance" graph, as shown in Figure 5.

Response Spectra

The seismic response of the ground at a given site can most easily and precisely be specified by means of seismic response spectra. The "recommended" response spectra are derived as a composite of the spectra of actual time-history accelerograms. Good records (i.e., time-history accelerograms) exist of earthquake ground motion in a variety of soils/geologic conditions, and from a variety of seismic sources. The inventory is largest in the moderate distance, moderate magnitude range. The inventory is weak for great earthquakes and even for large earthquakes at near-field distances. This suite of records, plus the observations of structural behavior of buildings exposed to shaking, permits us to extrapolate to what we postulate ground motion should be at a given site. Note that the recommended ground motion must take into account varying sources, varying distances to the fault, varying magnitudes of the earthquake, and most important, actual site conditions. In the selection of actual records used in developing the composite model, an effort is made to use real records that were written in conditions analogous to those of the site under investigation. That is, in the Mission Hills case we would search for records (accelerograms) that duplicate the distance/magnitude/fault types specified and also require that they had been observed on sites possessing similar soils/geologic conditions to those of the Ararat Hospital/Old Age Home site.

Response spectra of each of these selected accelerograms are studied and a smoothed envelope developed which best represents the predicted spectral behavior of the specific site. The envelope is further modified to reflect conditions not present in the suite of accelerograms used, and is shown in varying degrees of damping.

Note that for the Mission Hills site the model spectra must incorporate ground motions from earthquakes originating on the nearby (on-site) San Fernando Valley Faults as well as the distant San Andreas Fault. We would expect short-period (high frequency) motion from the closer events, and long-period (low frequency) motion from the distant, larger magnitude event. In addition, we would expect the only moderately firm site conditions would somewhat limit the ground motion from a nearby event but remain elastic for a distant event.

The response spectra that best model these conditions are based on standard Newmark-Hall procedures. Additional discussion may be found in ATC-2 material. Two recommended response spectra are presented which should satisfy the design requirements:

Figure 6 – Maximum probable earthquake: A lower level of ground motion at 0.40 g having a 50% probability of exceedance in the next 50 years, with a duration of 40 seconds.

Figure 7 – Maximum credible earthquake: An upper level of ground motion at 0.50 g having a 10% probability of exceedance in the next 50 years, with a duration of 60 seconds.

It should be pointed out that the spectra do not reflect the duration of ground motion. Duration implies "bracketed duration," which is defined as the interval between the first and last peaks (excursions) that exceed 0.05 g. Our estimates of duration are stated above.

Should you have any questions regarding this report, please contact us.

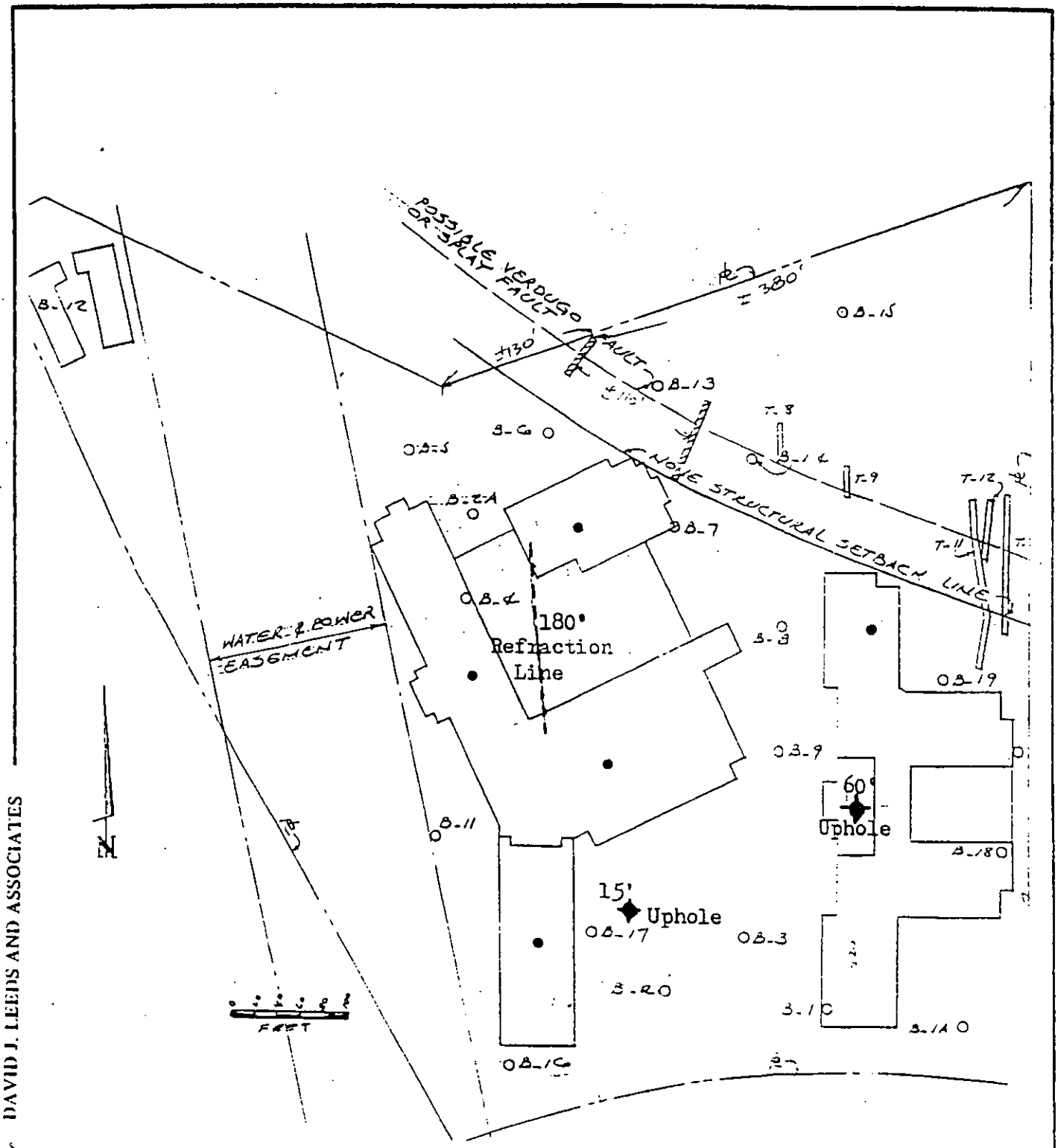
Respectfully submitted,

DAVID J. LEEDS

Engineering Geologist #EG 373
Geophysicist #GP 17

REGISTERED GEOLOGIST
DAVID J. LEEDS
No. EG-373
CERTIFIED ENGINEERING GEOLOGIST
STATE OF CALIFORNIA

DJL:z



PLOT PLAN

Showing locations of

GEOPHYSICAL INVESTIGATIONS

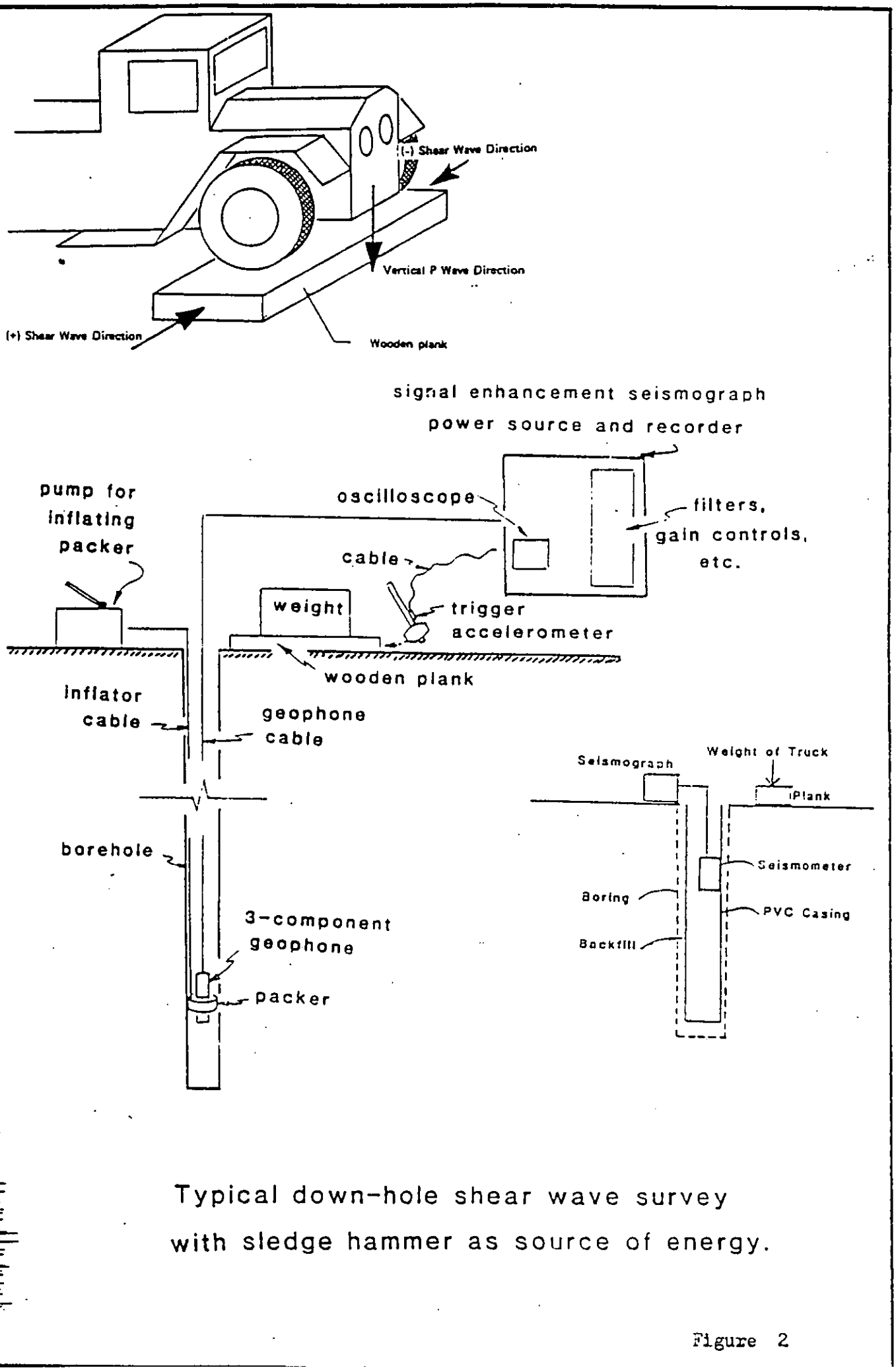
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Figure 1

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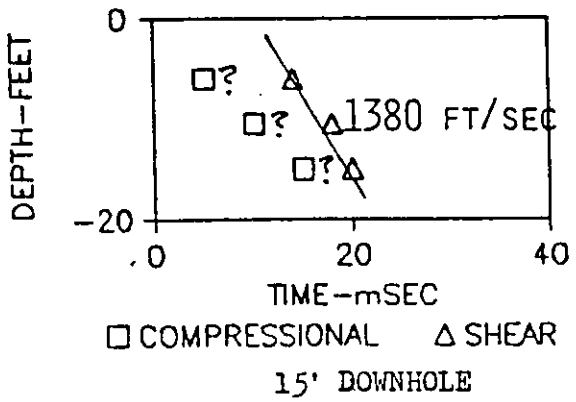
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BY _____ DATE 2-21-87
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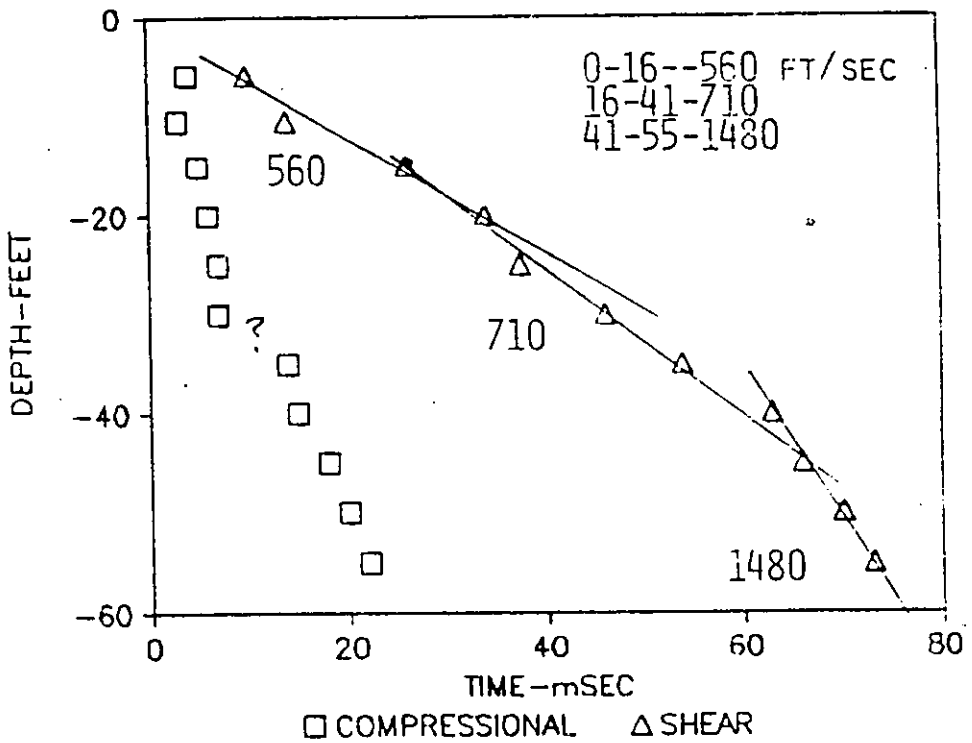


Typical down-hole shear wave survey with sledge hammer as source of energy.

Figure 2



15' DOWNHOLE



60' DOWNHOLE

DOWNHOLE SEISMIC DATA

Figure 3

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180° REFRACTION LINE

REFRACTION DATA

Figure 4

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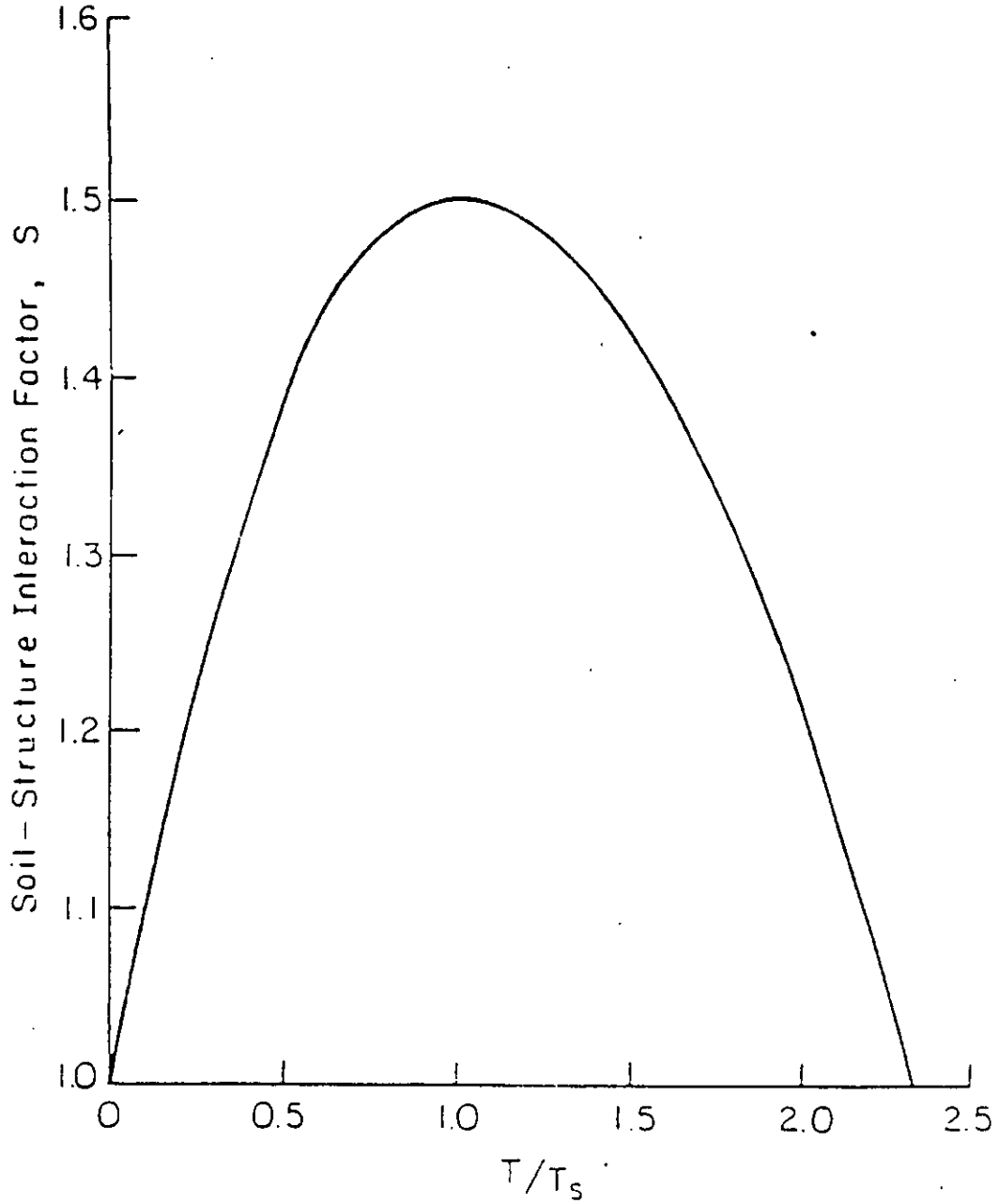
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DAVID J. LEEDS AND ASSOCIATES

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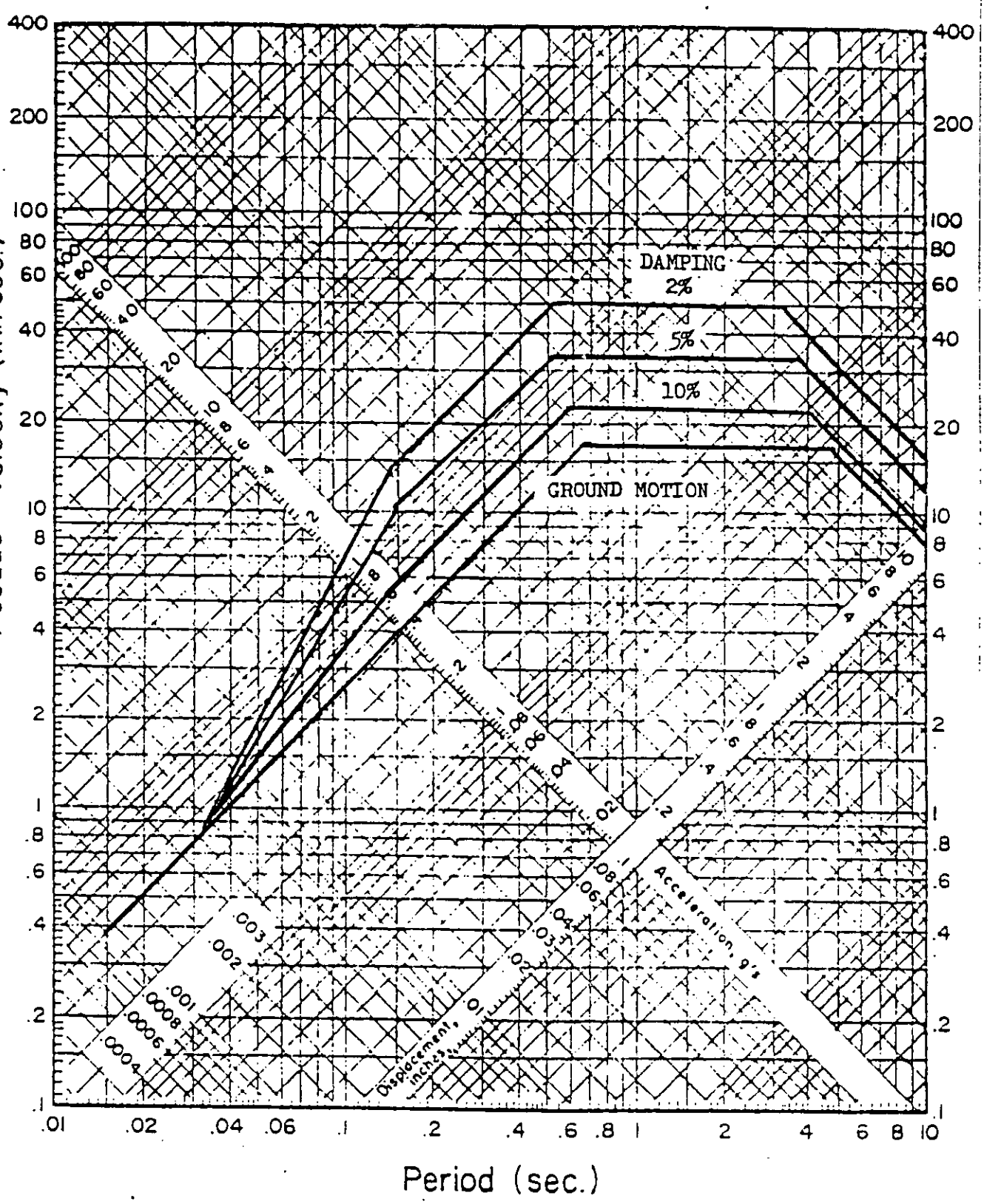
H.Bolton Seed, "Design Provisions for Assessing the Effects of Local Geology and Soil Conditions on Ground and Building Response During Earthquakes", in New Earthquake Design Provisions, Seminar Papers Oct-Nov 1975, Structural Engineers Association of Northern California and San Francisco Section, American Society of Civil Engineers. 1975

VARIATION OF SOIL-STRUCTURE INTERACTION

Figure 5

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BY _____ DATE _____

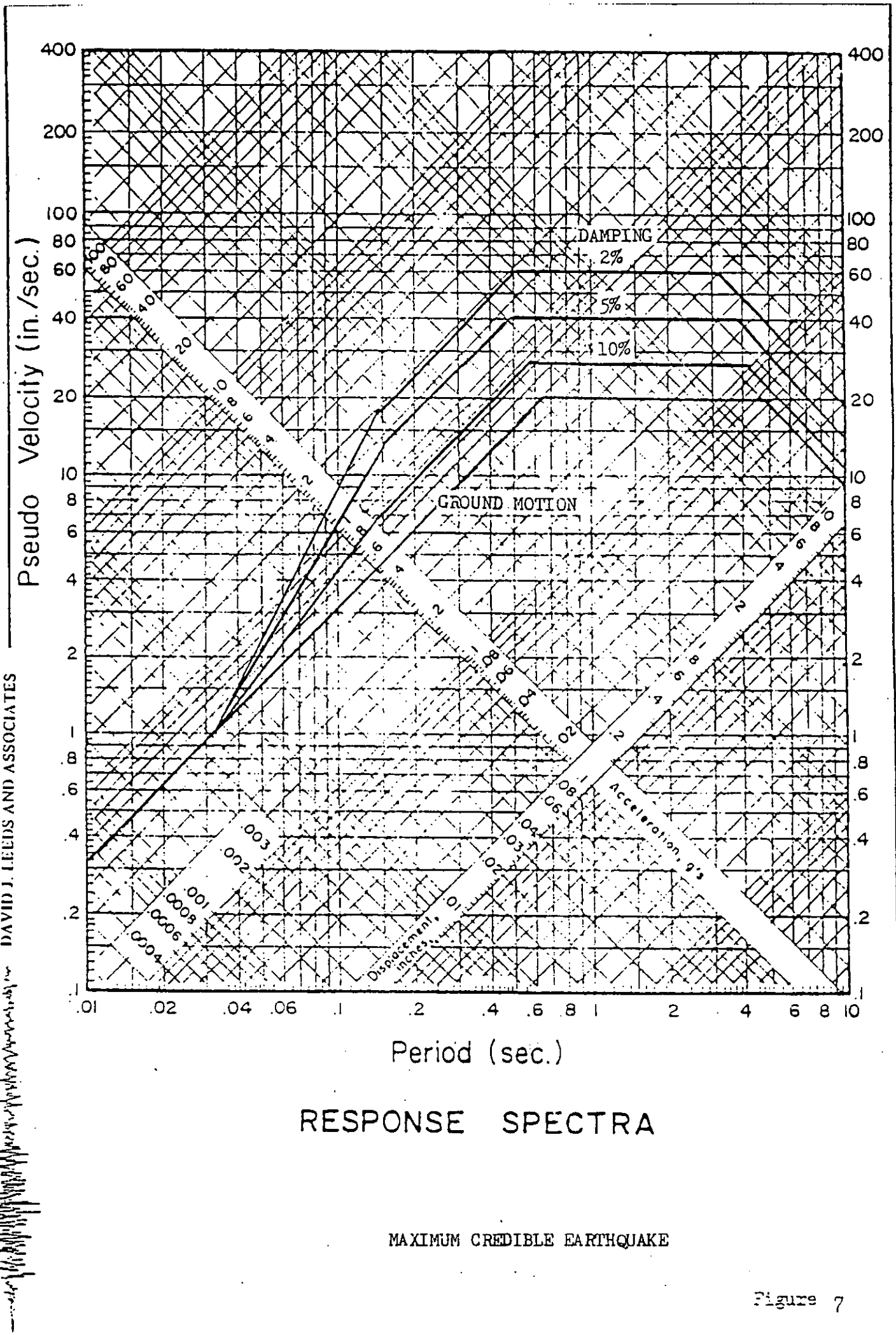
DAVID J. LEEDS AND ASSOCIATES



RESPONSE SPECTRA

MAXIMUM PROBABLE EARTHQUAKE

Figure 6



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RESPONSE SPECTRA

MAXIMUM CREDIBLE EARTHQUAKE

Figure 7

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A P P E N D I X
"D"

GENERAL GRADING AND EARTHWORK SPECIFICATIONS

1. Scope

a) This section contains general specifications for work relating to the following construction:

1) Site Clearing and Grubbing
2) Preparation of Subgrade in Areas to be Filled
3) Placement of Fill
4) Subdrains
5) Trench Backfill

b) The owner shall employ a qualified soil engineer to observe and test the fill as placed to verify the uniformity of compaction to the specified density requirement. The soil engineer shall advise the owner and grading contractor immediately if any unsatisfactory soil related conditions exist and shall have the authority to reject the compacted fill ground until such time as corrective measures necessary are taken to comply with the specifications. It shall be the sole responsibility of the grading contractor to achieve the specified degree of compaction.

2. Clearing, Grubbing and Preparing Areas to be Filled

a) All brush, vegetation, rubbish and desiccated top clay soil shall be removed, piled, or otherwise disposed of so as to leave the areas to be filled free of vegetation, debris and desiccated top clay soil. Any soft and swampy spots in the canyon areas shall be corrected by draining or by removal of the unsuitable materials.

b) The natural ground which is determined to be satisfactory for the support of the filled ground shall then be plowed or scarified to a depth of at least six inches (6") and until the surface is free from ruts, hummocks, or other uneven features which would tend to prevent uniform compaction by the equipment to be used. The scarified ground should be compacted to at least 90 percent of the maximum laboratory density. Where undisturbed bedrock is exposed at the surface, scarification and recompaction may not be required.

c) Where fills are made on hillsides or exposed slope areas, the existing top unstable materials should be removed. If existing slopes are steeper than 5 horizontal to 1 vertical, horizontal benches shall be cut into firm and competent undisturbed soil or bedrock in order to provide both lateral and vertical stability. (See benching detail attached).

d) All areas to receive controlled fill, including all removal areas and toe-of-fill benches, shall be observed and approved by the soil engineer and/or engineering geologist prior to placing controlled compacted fill.

3. Fill Materials and Special Requirements

The fill soils shall consist of select materials approved by the project soil engineer or his representative. These materials may be obtained from the excavation areas and any other approved sources, and by blending soils from one or more sources. The material used shall be free from organic vegetable matter and other deleterious substances, and shall not contain rocks or lumps of greater than eight inches in diameter within a distance of ten feet from any finished compacted surface. If excessive vegetation, rocks, or soil with inadequate strength or other unacceptable physical characteristics are encountered, these shall be disposed of. During grading operation, if potential problem soils are found, these soils shall be tested to determine their physical characteristics. Any special treatment recommended shall become an addendum to these specifications. Boulders greater than eight inches but less than or equal to two feet in diameter should be uniformly distributed in the compacted fill areas but no closer than ten feet from final grade and should be surrounded with sufficient amounts of compacted finer-grained materials. No nesting will be permitted. Boulders greater than two feet in diameter shall be placed in approved disposal areas no closer than ten feet from final grade and shall be placed in windrows in such a manner that voids will not exist around boulders. (See rock disposal detail, attached). Continuous observation by the project soil engineer is required during rock disposal operations.

4. Placing, Spreading and Compacting Fill Materials

a) The suitable fill material shall be placed in approximately level layers which, when compacted, shall not exceed six inches (6"). Each layer shall be spread evenly and shall be thoroughly mixed during the spreading to insure uniformity of material and moisture in each layer.

b) When the moisture content of the fill material is below that specified by the soil engineer, water shall be added until the moisture content is near optimum as specified by the soil engineer to assure thorough bonding during the compacting process.

c) When the moisture content of the fill material is above that specified by the soil engineer, the fill material shall be aerated by blending and scarifying or other satisfactory methods until the moisture content is near optimum as specified by the soil engineer.

d) After each layer has been placed, mixed, and spread evenly, it shall be thoroughly compacted to not less than 90 percent of maximum density in accordance with ASTM D1557-78 (five layers). Compaction shall be accomplished with sheepsfoot rollers, multiple wheel pneumatic-tired rollers or other approved types of compaction equipment. Rollers shall be of such design that they will be able to compact the fill material to the specified density.

e) Special mixing and watering effort may be required where diatomaceous materials are encountered to achieve the recommended moisture content and density.

f) Fill slopes shall be compacted by means of sheepsfoot rollers or other suitable equipment. Compacting of the slopes shall be accomplished by backrolling the slopes increments of three to five feet in elevation gain or by other methods producing satisfactory results. Relative compaction shall be at least 90 percent to the finished slope face.

g) The soil engineer and/or his designated representative shall observe the placement of fill and shall take sufficient tests to provide an opinion on the uniformity and degree of compaction being obtained.

5. Subdrains

a) All materials used in the construction of the subdrain systems shall be of the required kinds and sizes shown on the drawings or approved by the soil engineer. Canyon subdrains shall be constructed as shown on the attached drawing, Canyon Subdrain Construction.

b) All drain lines shall be installed to conform to the grades and alignment shown on the drawing. Modifications of the subdrain layout as may be required in the field must be approved by the soil engineer and civil engineer.

c) The subdrain pipe (perforated and non-perforated) shall be approved by the soil engineer. If the diameter of the pipe called for on the drawing is not available in the material chosen by the contractor, the next size larger pipe available shall be used.

d) Prior to backfilling, the locations of all drains shall be surveyed by the civil engineer. It is imperative that the subdrain outlets be kept clear during grading to avoid damage to the exposed pipe.

e) The fill operation shall be continued to six-inch (6") compacted layers, as specified above, until the fill has been brought to the finished slopes and grades as shown on the accepted plan.

6. Trench Backfills

a) Trench excavations for utility pipes shall be backfilled under engineering observation.

b) After the utility pipe has been laid, the space under and around the pipe shall be backfilled with clean sand or approved granular soil to a depth of at least one foot over the top of the pipe. The sand backfill shall be uniformity jetted into place before the controlled backfill is placed over the sand.

c) The on-site materials, or other soils approved by the soil engineer, shall be watered and mixed as necessary prior to placement in lifts over the sand backfill.

d) The controlled backfill shall be compacted to at least 90 percent of the maximum laboratory density as determined by the ASTM compaction method described above.

e) Field density tests and observations of the backfill procedures shall be made by the soil engineer during backfilling to see that proper moisture content and uniform compaction is being maintained. The contractor shall provide test holes and exploratory pits as required by the soil engineer to enable sampling and testing.

7. Geologic Observations

a) Graded slopes are to be periodically observed by the engineering geologist to provide an opinion on the stability of excavated slopes.

b) Observation of excavations other than cut slopes may be required to refine geologic parameters related to fault hazards, landslide hazards, or other geotechnical hazards that may be indicated.

c) Surcharged cuts are to be observed by the engineering geologist prior to placement of the surcharge fill prism.

d) Canyon cleanouts will be observed by the engineering geologist prior to subdrain placement or placement of fill.

e) Buttress keys will be observed by the engineering geologist prior to placement of the buttress fill.

SOILS ENGINEERING INVESTIGATION
FOR PROPOSED
ARARAT CONVALESCENT HOSPITAL
IN MISSION HILLS, CALIFORNIA

GT 20608 SEPTEMBER 13, 1984

FOR
ARARAT HOME
3730 WEST TWENTY SEVENTH STREET
LOS ANGELES, CALIFORNIA
90018

HAKIMIAN ENGINEERING 13003 LADANA COURT • SANTA FE SPRINGS, CALIFORNIA 90670 • (213) 946-7783

TABLE OF CONTENTS

Title	Page
Introduction	1, 2
Scope of Investigation	2, 3
Site Description	3, 4
Site Exploration	5
Subsurface Conditions	6
Groundwater	6
Liquefaction Potential	6, 7
Laboratory Testing	7
Slope Stability	7
Conclusions	7, 9
Recommendations	9 - 15
Investigation Limitations	15
References	16

APPENDIX A

	Plate
Site Map	I
Plot PLan	II (pocket)
Groundwater Map	III
Boring Log	IV - XXXIV

APPENDIX B

Laboratory Testing	L- 1, L-2
Laboratory Test Results	L-3

APPENDIX B

	Plate
Laboratory Testing	L-1, L-2
Laboratory Test Results	L-3
Direct Shear Graph	L-4 through L-9
Consolidation Curve	L-10 through L-13
Grain Size Distribution	L-14 through L-17

APPENDIX C

Grading Specifications

APPENDIX D

Geologic Report

SOILS ENGINEERING INVESTIGATION
FOR PROPOSED
ARARAT CONVALESCENT HOSPITAL
IN MISSION HILLS, CALIFORNIA

INTRODUCTION

This report presents the results of our soil engineering investigation at the site of the proposed Ararat Convalescent Hospital in Mission Hills, California. This study was authorized by the Ararat Home of Los Angeles, Incorporated. A geologic report prepared by Robert Stone and Associates is included herein as Appendix D. The proposed site of development consists of a 10½ acre hillside parcel located at 15103-15105 Mission Hills Road (Figure 1). The site is located just north of the Allemany High School, between Memory Park Avenue and Indian Hills Road. The Holy Cross Hospital and the Indian Hills Medical Building are located southeast of the site.

The purpose of our investigation was to define the soil conditions at the site and to provide preliminary recommendations for the proposed site development. It is our understanding at this time that it is proposed to develop the site to accommodate a convelescent home, and intermediate care unit, a home for the aged with associated facilities, a chapel and exhibit hall, and, possibly, some residential units.

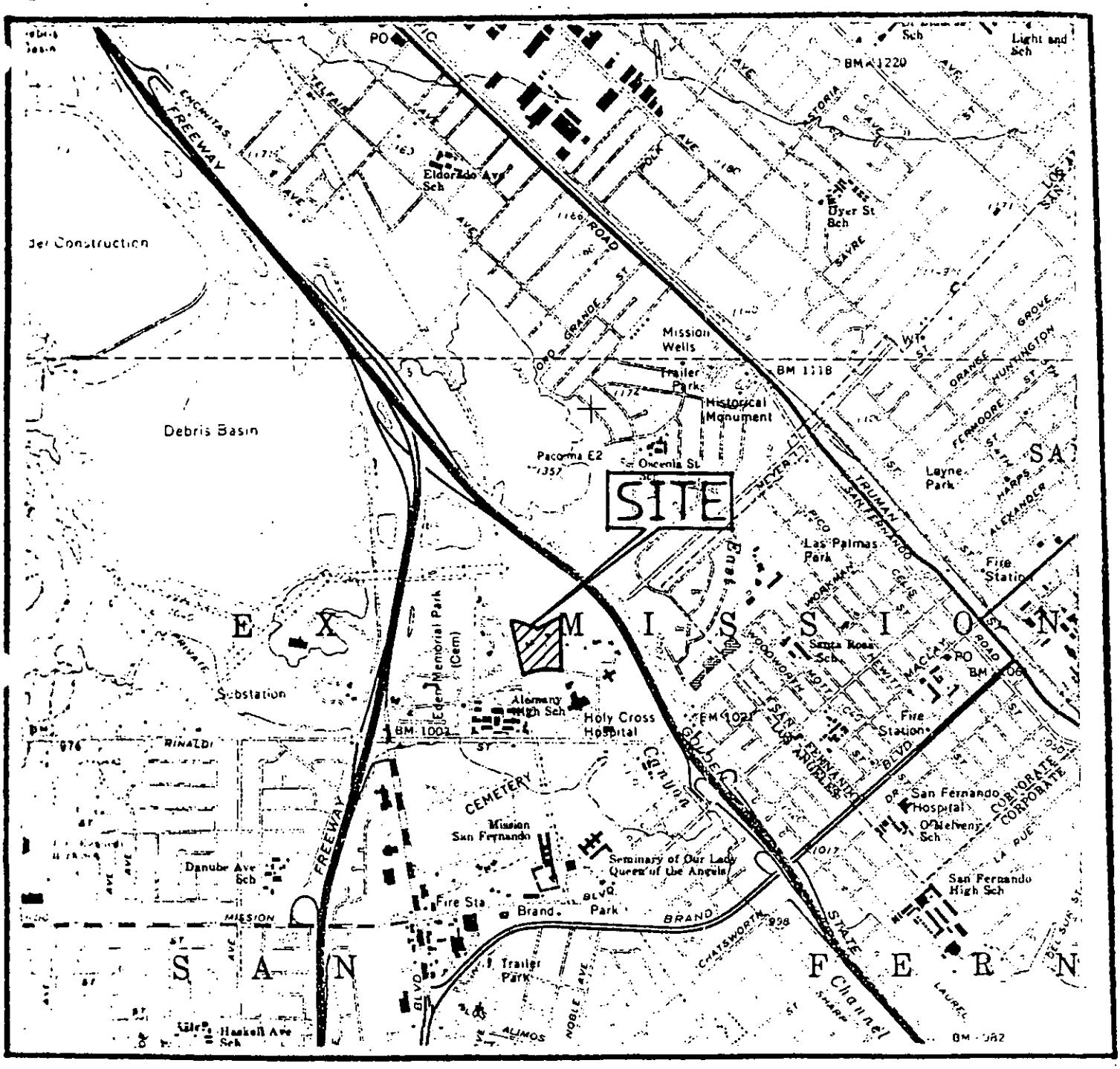
A topographic map prepared for this company, dated November 1, 1983, was used as a base map for both our soil engineering evaluation, and the Robert Stone and Associates investigation. Reports and references used in preparation of this report, are listed in the References Section.

SCOPE OF INVESTIGATION

The scope of our investigation included the following:

1. Review of available aerial photographs which cover the subject site, from the Whittier College aerial photograph collection.
2. Subsurface exploration included the excavation, sampling and detailed logging of 21 borings drilled to a maximum depth of 49 feet and 12 backhoe trenches excavated to a maximum depth of 15 feet (under the direction of Michael Scullin, CEG of Robert Stone and Associates).

FIGURE 1



This Map Is Not A Survey Of The Property

Scale 1" = 2000'

PORTION OF SAN FERNANDO QUADRANGLE, U.S.G.S. 7½' TOPOGRAPHIC MAPS, 1966

LOCATION MAP

N

HC. HAKIMIAN ENGINEERING 8003 LADENA COURT SANTA FE SPRINGS, CA. 90670 (213)949-778

3. Laboratory testing of representative materials obtained from the exploratory excavations on the site.
4. *Engineering analysis of foundation requirements for the* proposed site development.
5. Preparation of illustrations and this report.

SITE DESCRIPTION

The site is located on the south flank of the Mission Hills, about a mile southeast of the Van Norman Dam site. The most prominant topographic feature of the site is a small knoll in the central area on which a single-story adobe residence with pool, has been constructed. An asphalt paved driveway provides access from the unpaved Mission Hills Road to the main residence atop the knoll and to a caretaker's residence, located in the northeast portion of the site (Plate I).

Maximum relief of the site area is about 60 feet. Natural slopes descend from the knoll area at gradients of 2:1 (horizontal to vertical) or less.

Fill slopes, which descend from the pad area, are slightly steeper than 2:1. A cut slope is present along the west side of the knoll where a powerline access road has been graded. Two power line towers are present just west of the knoll within an easement which trends north-south across the west side of the property.

An incised stream channel trends southerly along the west margin of the site. Northerly of the site, an earthen dam has been constructed. The area north of the dam is topographically low with respect to the immediate surrounding area. This low area and adjacent gentle slopes are now being used primarily for agriculture. Rain and irrigation run-off drain toward the low area north of the dam and likely pond there.

The area south of this dam is also topographically low. The caretaker's residence is located in this topographic low and has undergone some settlement. The ground around this area is commonly wet and numerous reeds and trees are present. In general, this area drains southward toward a southerly draining stream channel, which transects the east side of the site.

Drainage at the site consists of stream and sheet flow run-off, directed southward toward the San Fernando Valley. Stream tributaries transect the site on the east and west sides. Drainage from the north adjacent area collects, in part, behind the earthen dam.

The site is vegetated with numerous trees and shrubs. Pine trees are abundant in the pad area and along the access driveway. Pepper trees line the driveway near Mission Hills Road. Reeds are present in the low area south of the dam. Native shrubs are present in the tributary along the west side of the property.

and described in the accompanying geologic report, see Appendix D. A restricted use area, or non-structural zone has been established to the northeast of the fault and extending 50 feet southwest of the fault, see Plate II.

→ 100'

Sect 39002.5 ed. code advisory board

LABORATORY TESTING

Representative bulk and undisturbed samples of soil and bedrock obtained form the exploratory borings were tested in our laboratory in order to determine their engineering properties. These tests included maximum density, direct shear of undisturbed and remolded samples, consolidation, expansion index, sieve analysis and moisture density. The test procedures and their results are presented in Appendix B.

SLOPE STABILITY

Using combined shear values of the on-site alluvial and flood plain deposits and sandstone bedrock, maximum heights of the proposed 2:1 fill and cut slopes were determined to satisfy a gross stability of 1.5.

Surficial stability was not analyzed because the proposed slopes are 2:1 or less.

CONCLUSIONS

Based on our findings, the subject property, with the exception of the restricted use area, is suitable for the proposed development in so far as the recommendations in this report are adhered to. The restricted use area may be utilized for parking.

Our analyses for gross stability of cut and fill slopes indicate 2:1 (horizontal to vertical) slopes, to the designed height, will provide a safety factor in excess of 1.5. When final grading plans are prepared, any slopes that may be different or steeper than 2:1 shall be analyzed. Alluvium, older alluvium, flood plain deposits and bedrock underlying the site are capable of supporting the proposed fills. However, the surficial materials such as soil and fill, are unsuitable for fill support and should be removed and recompacted.

The canyon bottoms are susceptible to groundwater accumulation. Therefore, it is recommended that subdrains be installed along natural drainage flow lines. Specifications for the subdrain along the western boundary of the site and for the eastern canyons should be provided by a civil engineer. The approximate locations of the subdrains are shown on Plate II. The western subdrain will provide drainage for tributary off-site areas to the north as well as on-site drainage. The eastern subdrains

will be for on-site drainage only. All subdrains will outlet into existing storm drains along Mission Hills Road.

On-site alluvium, older alluvium, flood plain deposits and sandstone bedrock have low potential for expansion. According to the present grading plan, the siltstone bedrock is below the level of proposed grading.

It was determined from laboratory testing that the soil and alluvial and flood plain deposits are prone to minor amounts of consolidation, in general, less than 10% under laboratory conditions. Consolidation under the weight of the proposed fill is anticipated to be minor and to occur during initial loading.

RECOMMENDATIONS

Stable Slope Height

Fill slopes at 2:1, to the design height, will have a factor of safety in excess of 1.5.

See Appendix C for grading specifications with regard to procedures for canyon clean-outs, keying, benching and compaction of fills.

A final report, based on a revised grading plan, may be required.

Removal and Recompaction

In cases where a cut/fill contact crosses a building pad, it is recommended that all materials be removed to a depth of 4 feet below finished grade and replaced as compacted fill.

Foundations

Continuous footings founded within approved compacted fill, firm alluvial soils or flood plain deposits, may be designed for a bearing value of 1500 pounds per square foot (psf). Footings for a one-story building should be a minimum of 12 inches wide and be embedded a minimum of 12 inches into compacted fill or firm alluvial soil or flood plain deposits. Footings for a two-story building should be a minimum of 18 inches wide and the minimum embedment should be 18 inches.

Continuous footings founded within the sandstone bedrock, may be designed for a bearing value of 2500 pounds per square foot. The minimum footing width and embedment requirements are the same as described above.

After final grading plans and details of building design have been prepared, individual foundation recommendations will be provided for the various structures.

Lateral Design

The bearing values recommended above are for the total of dead and frequently applied live loads and may be increased by one third for short duration loading, which includes the effects of wind and seismic forces. Resistance to lateral loading may be provided by passive earth pressure within the foundation soils. An allowable coefficient of friction of 0.4 may be used with the dead load forces.

Passive earth pressure at the ground surface is assumed to be zero and may be increased at the rate of 300 pounds per square foot per foot of depth to a maximum unit value of 1500 pounds per square foot. When combining passive and friction for lateral resistance, the passive component should be reduced by one third.

Retaining Walls

Based on review of the latest grading plan, dated September, 1984, a number of retaining walls are planned for the site. The proposed walls will generally retain 2:1 fill slopes. The retaining walls should be designed for a minimum equivalent fluid pressure of 43 pcf.

To assure the drained conditions, a drainage blanket should be placed behind each wall. The drainage blanket should consist of a lower gravel pack overlain by a 12-inch thick blanket of

clean sand, which extends to within about one foot of the top of the wall. The gravel pack should be at least one cubic foot in volume per foot of wall length. A one foot thick layer of compacted fill should be placed to seal the drainage blanket. A reinforced paved "V" ditch should be constructed behind the top of each retaining wall. The "V"-ditch should be a minimum of 2 feet wide and should direct drainage to approved locations.

Moisture collecting behind the retaining wall may be either outletted onto paved driveways and street through weepholes in the base of the walls or collected in a 4-inch diameter perforated pipe placed within the gravel blanket. Drainage from the perforated pipe should be directed to approved locations in non-erodible drainage devices.

Floor Slabs

Floor slabs should be cast on 2 inches of wetted sand placed on a subgrade that has been moistened and tamped to a firm and unyielding condition. Thickness and reinforcement of slabs should reflect the anticipated use and be designed by a structural engineer. Slabs which will be provided with a floor covering, should be protected by a 6-mil polyethylene plastic vapor barrier, placed beneath an additional 2 inches of sand.

Surface Drainage

The site should be graded such that water will not pond anywhere on-site, especially against foundations. Pad and roof drainage should be collected and transferred to paved driveways and to the street in non-erodible drainage devices. All drainage devices should maintain a grade of at least 2 percent.

Parking Lot

Within the proposed parking lot area, a minimum of 2 feet of material below the proposed grade should be removed and recompacted as fill. The fill should be placed at a minimum of 90 percent relative compaction per ASTM D1557-70.

For planning purposes, the parking lot pavement section should be assumed 3-inches asphalt concrete over 4-inches crushed aggregate base. A more accurate section could be provided after the rough grading is completed and an R-value test is performed.

Settlement

If the foundation system bears on competent material, as recommended, the total settlement should be within $\frac{1}{2}$ inch and the differential settlement should be less than $\frac{1}{4}$ inch. After exact foundation configuration and loads are established, a more accurate settlement analysis will be performed.

Expansiveness of On-Site Materials

Typical on-site material was found to have low potential for expansion. Footings or slabs placed on or within the alluvial and flood plain deposits or sandstone bedrock, will not be subjected to excessive expansion forces.

Temporary Excavations

Based on results obtained from direct shear tests on undisturbed samples of the alluvial and flood plain deposits and sandstone bedrock, it is recommended that temporary excavations may be vertical to a depth of 5 feet. Cuts greater than 5 feet, shall be trimmed back to 1:1 or supported by temporary shoring.

Planting and Irrigation

It is recommended that the slopes be planted as soon as practical after placement of the fill, to prevent erosion of the fill. Planting and irrigation of slopes and installation of erosion control and drainage devices, shall comply with the requirements of the Los Angeles City Building Code.

Approval

It is recommended that all excavations be reviewed by this firm prior to placing fill. All fills placed should be tested to verify that they were compacted according to specifications.

All temporary excavations should be examined by the project engineer or geologist.

INVESTIGATION LIMITATIONS

The materials encountered on the project site and utilized in our laboratory investigation are believed representative of the total area; however, soil and bedrock material vary in character between excavations and natural out crops.

Since our investigation is based upon the site materials observed, selective laboratory testing and engineering analyses, the conclusions and recommendations are professional opinions. These opinions have been derived in accordance with current standards of practice and no warranty is expressed or implied.

This opportunity to be of professional service is greatly appreciated.

Resepctfully submitted,

HAKIMIAN ENGINEERING INC.

Sophie M. Dreifuss

Krikor D. Hakimian
RCE 18736

SMD:KDH:ob

Copies: Five to Client

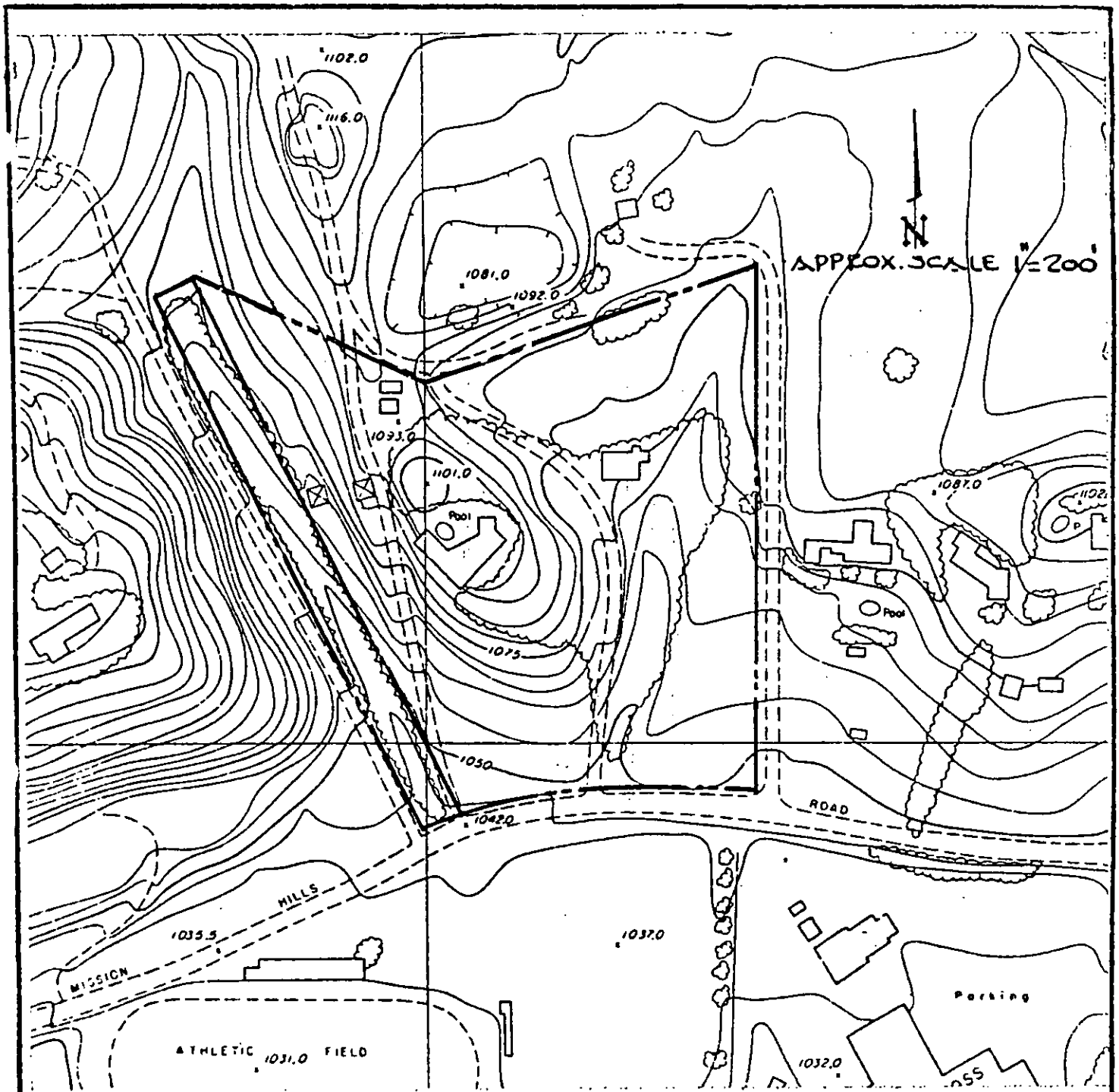
REFERENCES

1. "The San Fernando, California Earthquake of February 9, 1971, Water Resources Aspects", by Waananen, A.O. and W.R. Moyle, Jr., U.S.G.S. Professional Paper 733, pp 119 - 125.

2. "Reconnaissance Geotechnical Investigation of the Proposed Ten and One Half Acre Site for the Armenian Ararat Institutions 15103 - 15105 Mission Hills Road, Mission Hills, California" by Hakimian Engineering Inc., July 12, 1982.

3. "Limited Subsurface Exploration at the Proposed Ararat Home Site, 15103 - 15105 Mission Hills Road, Mission Hills, California" , by Hakimian Engineering Inc., July 12, 1982.

APPENDIX A



PORTION OF CITY OF LOS ANGELES TOPOGRAPHIC MAP SERIES MGG1, SHEET 82

MAKIMIAN ENGINEERING

13003 LADANA COURT SANTA FE SPRINGS CA. 90670 (213) 946-7783

FOR: ARARAT HOME
MISSION HILLS CA.

DATE: 8-24-84 | W.O. NO: MI-20608 | PLATE I

HE. HAKIMIAN ENGINEERING
13003 LADANA COURT SANTA FE SPRINGS CA 90670
(213) 946-7783

FOR: ARAKAT HOME
MISSION HILLS CA.

DATE: 9-3-84

W.O. NO: 11-2909

PLATE III

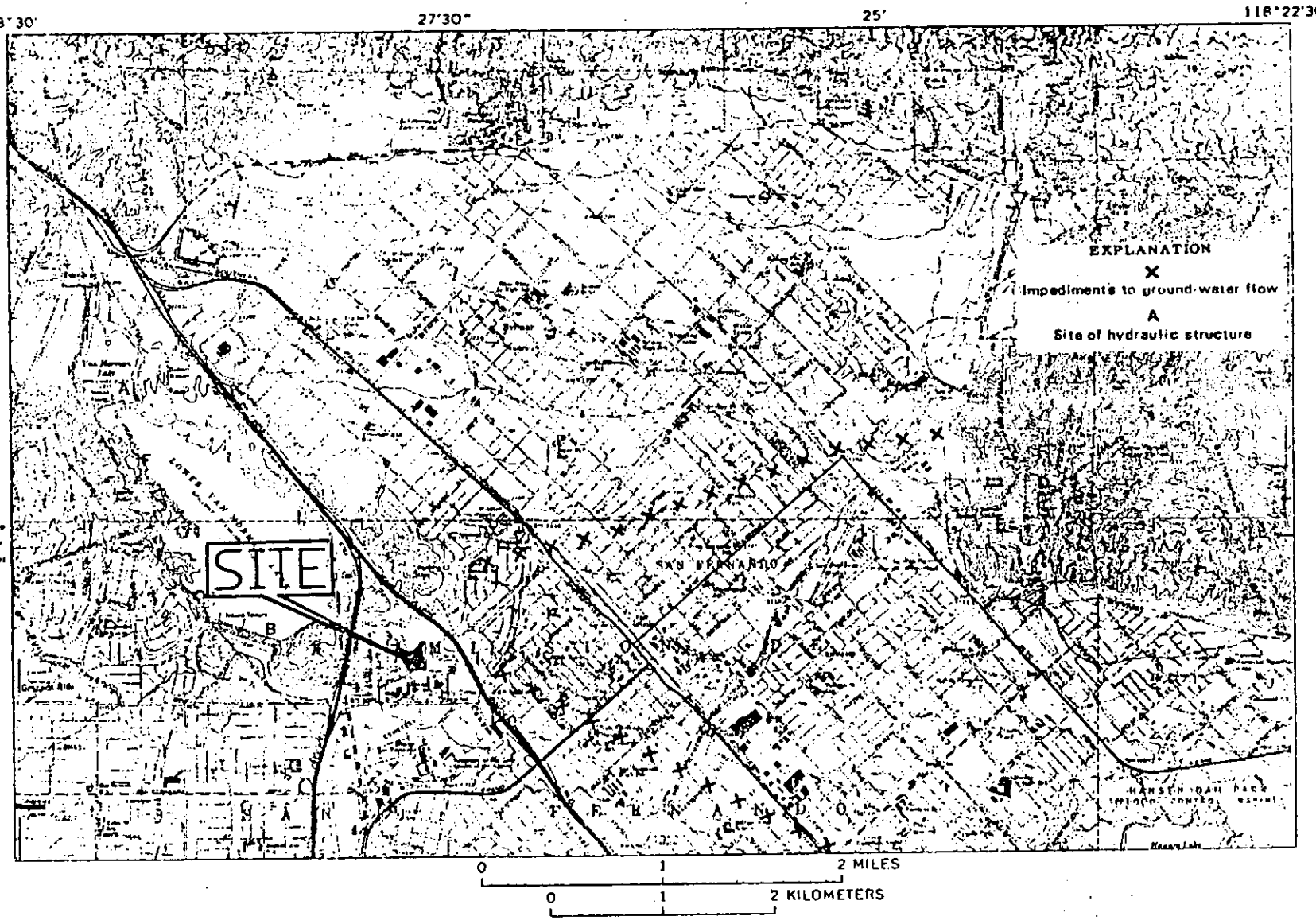


FIGURE 3.—Map showing location of hydraulic structures damaged by the San Fernando earthquake and of impediments to ground-water flow.

FROM: "WATER RESOURCES ASPECTS"
BY A.O. WAANANEN AND W.R. MOTLE, JR. IN "THE SAN FERNANDO, CALIFORNIA, EARTHQUAKE OF FEB. 9-1971", U.S. GEOL. SURVEY PROF. PAPER 733

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD: Hollow-stem auger; Mobile Drill, 8-inches diameter

BORING NO: 1

SHEET: 1 OF 1

SAMPLING METHOD: Tube sampler; 140 lb wt, 30" drop

	DRILLING START TIME	DRILLING FINISH TIME	DATE	DATE
WATER LEVEL				
TIME				
DATE				
CASING DEPTH				

BY: M.S.O.

DATE: 11/1/83 CHK'D BY:

DRILLING CONTR: Cal Testing Lab.

SURFACE CONDITIONS: Native grass cover near level area

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
O	C	5	19/6" 23/6"			4	
T	C/B	10	13/6" 12/6"	10	94	10	
T	C	15	34/6" 50/6"			16½	
T	B/C	20	34/6" 35/6"			20	

TOPSOIL: Sandy silt, damp, loose, dark brown, porous, contains scattered roots and clasts of bedrock

ALLUVIUM: Silty sand with clay, damp, light brown, contains scattered granules and small pebbles, sand is fine to coarse, slightly porous

OLDER FLOOD PLAIN DEPOSITS (?)
Sandy silt, dense, slightly damp, sand is fine to coarse, brown color

At 16½' change to clayey sand, becomes dense, contains scattered pebbles, pebbles increase in abundance with depth to total depth at 20'

C at 20' contains scattered irregular thin seam of black organics(?). No apparent lamination.
Total depth = 20 feet.
No water. No caving.
Hole backfilled.

PLATE: IV

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow-stem mobile drill, 8-inch diameter

BORING NO 2

SHEET 1 OF 1

SAMPLING METHOD Tube sampler

140 lb. wt., 30" drop

DRILLING START TIME / FINISH TIME

BY M.S.O.

DATE 11/2/83 CHK'D BY

DRILLING CONTR Cal Test Lab.

WATER LEVEL					
TIME					
DATE					
CASING DEPTH					

SURFACE CONDITIONS Native grass cover gentle slope

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT
	C/B	5	34/6" 50/4"	7.4	109.3
½T	C	10	52/6" 50/5"	6.6	106.0
0	C	20	50/3"		

DEPTH IN FEET: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 1, 2, 3, 4, 5, 6, 7, 8, 9, 20

SOIL GRAPH

TOPSOIL: loose to medium dense, damp, dark brown, sandy silt, contains roots and scattered clasts.

At 2' to 3' becomes gravelly with small pebbles

OLDER FLOOD PLAIN DEPOSITS: silty sand with clay, damp to slightly damp, medium brown color, contains boulders and scattered pebbles, abundant granules sand is fine to coarse, dense to moderately dense

At 5' sand becomes predominantly coarse-grained

Alluvium, sand is rich in intrusive clasts, weathering of feldspar probably responsible for clay.

At 7' to 8' sandy gravel bed, pebble to cobble size clasts

At 9' to 10' sand becomes somewhat cleaner and predominantly medium-grained.

At 11' beds of dark brown clayey silt to 1" thick.

At 13½' becomes bouldery, light brown sand with pebble to boulder size clasts, with clay difficult drilling

At 16' changes to fine to medium sand with scattered pebbles and cobbles, sand is light greenish-brown, clean, no clay.

At 20' coarse sand with scattered pebbles, clasts are sub-round to angular, dense.

Total Depth 21 feet.
No caving. No water.
Hole backfilled.

PLATE: V

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD: Hollow-stem Auger, 8-inch diameter — BORING NO: 3

SHEET: 1 OF 2

SAMPLING METHOD: Tube sampler, 140 lb wt, 30" drop

BY: M.S.O. — DATE: 11/2/84 — CHK'D BY:

DRILLING CONTR: Cal Test Lab.

WATER LEVEL					DRILLING START TIME
TIME					DRILLING FINISH TIME
DATE					DATE
CASING DEPTH					DATE

SURFACE CONDITIONS: Low grass cover

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT
5"T	C	3'	19/6" 24/6"	12.9	106.5
5"T	C	8	19/6" 45/6"	4.0	103.5
T	C	13	21/6" 40/6"	10.4	92.0
T	C	18	50/6"	4.6	104.8

DEPTH IN FEET: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 1, 2, 3, 4, 5, 6, 7, 8, 9, 20

SOIL GRAPH

TOPSOIL: Silty sand to sandy silt, dark brown damp to moist, contains granules and pebbles to boulder size clasts, mino: roots and organics.

OLDER FLOOD PLAIN DEPOSITS: Silty, clayey sand contains granule to boulder size clasts
At 3' clayey, sandy gravel, abundant clasts of sub-rounded intrusive rocks, clasts are pebble to boulder size, sand is fine to coarse, claye matrix is dark brown.
3' to 8' Scattered large clasts were drilled through, decreasing clay content of matrix to slightly clayey.

At 8' coarse sand with clay, scattered clasts silty, dense, slightly damp.

12' to 14' Change to fine to medium-grained san with scattered granules, moderately dense to dense, sand moderate well sorted, well rounde grain, laminationsof concentrations of mafic minerals, coarse sand in laminations to 4 mm thick.
At 14' clayey sand, sand fine to coarse, scattered clasts.

PLATE: VI

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow-stem Auger
8-inch diameter

BORING NO 3

SHEET 2 OF 2

SAMPLING METHOD Tube sampler
140 lb. wt., 30 " drop

BY M.S.O.
DATE 11/2/83 CHK'D BY
DRILLING CONTR Cal Test Lab.

WATER LEVEL					
TIME					
DATE					
CASING DEPTH					

DRILLING START TIME / FINISH TIME / DATE / DATE

SURFACE CONDITIONS Low grass cover

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT
5"	C	23	60/6" 60/4"	6.9	112.1
4"	C	28	100/6	8.4	101.9

DEPTH IN FEET

SOIL GRAPH

OLDER FLOOD PLAIN DEPOSITS

22' to 23' abundant pebbles, granules and cobbles, decrease in clay content, increase in percentage of coarse san

25' Pebble bed, clasts rounded, slightly clayey sand matrix.

26' Sand is very poorly sorted, well packed

28' Well-packed sand, pebbly gravel, very dense slightly damp.

Total depth 28 feet.
No water. No caving. Hole backfilled

PLATE: VII

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow-stem Auger 8-inch diameter

BORING NO 4

SHEET 1 OF 3

SAMPLING METHOD Tube sampler

140 lb wt, 30 inch drop

BY M.S.O.

DATE 11/2/83 CHK'D BY

DRILLING CONTR

						DRILLING START	DRILLING FINISH
WATER LEVEL	Encount. 40'	36½	36'7"	36'7"	TIME	TIME	
TIME	3:00	7:45	6:46	9:30			
DATE	11-2	11-2	11-4	11-5	DATE	DATE	
CASING DEPTH	7' caving	water sensor	water sensor	water sensor			

SURFACE CONDITIONS Pad area

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
T	C	5	60/6" 42/6"			5	
T	C	15	43/6" 53/6"	3.0	99.0	15	

Bedrock (?)(Modelo Formation)
Silty sand with very minor clay, damp, light brown, sand is fine to coarse, contains scattered pebbles and cobbles, dense, scattered boulders, poorly sorted
Drilling encountered boulders at 2 feet.

At 6½' becomes darker color, medium brown.

At 12' becomes reddish color, sand becomes predominantly medium-grained and moderately well sorted. Contains scattered granules and pebbles, damp.
At 14' changes to slightly silty, pebbly sand with scattered to abundant clasts. Clasts are granule to cobble size, sand is fine to coarse predominantly medium.

PLATE: VIII

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow-stem mobile drill rig, 8-inch diameter

BORING NO 4

SHEET 2 OF 3

SAMPLING METHOD Tube sampler

140 lb wt, 30" drop

DRILLING START TIME / FINISH TIME

BY M.S.O.

DATE 11/2/83 CHK'D BY

DRILLING CONTR Cal Test Lab.

WATER LEVEL					
TIME					
DATE					
CASING DEPTH					

SURFACE CONDITIONS Pad adjacent to driveway of existing residence

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
						20	
						1	
						2	
						3	
						4	
						5	
	B	25-30				6	
						7	
						8	
						9	
T	C	30	23/6" 53/6"			30	
						1	
						2	
						3	
						4	
T	C	35	35/6" 37/6"			5	
						6	
						7	
						8	
						9	
T	C	40	17/6" 3/6"			40	

Increase in clast abundance at 20', sand is well graded, clasts are igneous intrusive, sub-rounded to rounded

Too rocky to sample at 25', dense

Cuttings: sandy clay with granules, damp to moist, dark black, contains scattered granules and pebbles

BEDROCK (MODELO FORMATION): diatomite, siltstone, and very fine sandstone, thin-bedded and laminated, laminae to 1cm thick, fine sandstone lams are light greenish color, diatomite light buff-white to very light brown siltstone dark green, good parting along beddi

Increasing moisture ↓

At 40' encountered water, sample has light brown stain, fractures to 2 mm wide with water apparently localized along fracture surface. Fracture at high angle (~90°) to bedding.

PLATE: IX

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD: Hollow-Stem Auger; 8-inch diameter — BORING NO: 4

SAMPLING METHOD: Tube sampler; 140 lb wt, 30" drop — SHEET: 3 OF 3

DRILLING: START TIME / FINISH TIME

BY: M.S.O.

DATE: 11/2/83 — CHK'D BY:

DRILLING CONTR: Cal Test Lab

WATER LEVEL						TIME	TIME
TIME							
DATE						DATE	DATE
CASING DEPTH							

SURFACE CONDITIONS:

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
T	C	45	39/6" 80/6"			40–50	

MODELO FORMATION

Continues as above

Sample at 45 feet shows fractures with dark brown stain cross-cutting bedding, good parting along laminations, orange-brown stain, patchy on laminae surfaces.

Total depth = 45 feet.
No caving. Water at 40 feet.
Hole backfilled.

NOTE: Hole left open to measure water.
Backfilled 11/5/83

PLATE: X

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO MI 20608	CLIENT Ararat	LOCATION Mission Hills
DRILLING METHOD Hollow-stem Mobile Drill, 8-inch diameter		BORING NO 5
SAMPLING METHOD Tube sampler		SHEET 1 OF 2
140 lb wt., 30" drop		DRILLING START / FINISH
BY M.S.U.	WATER LEVEL	TIME / TIME
DATE 11/2/83 CHK'D BY	TIME	
DRILLING CONTR Cal Test Lab.	DATE	DATE / DATE
	CASING DEPTH	

SURFACE CONDITIONS Sloping area west of driveway

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT
T	C	10	39/6" 45/6"	5.4	97.8
T	C	20	57/6" 63/6"	7.7	108.7

DEPTH IN FEET: 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 1, 2, 3, 4, 5, 6, 7, 8, 9, 20

SOIL GRAPH

ARTIFICIAL FILL: Sandy silt, dry to slightly damp, loose, brown, sand is fine to coarse, contains moderately abundant roots, scattered pebbles and cobbles

BEDROCK (?) (MODELO FORMATION)
Sand with minor clay. Sand is well-graded, predominantly medium to coarse-grained, contai abundant clasts of intrusive rock, pebble to cobble size

At 10' dense sand, interbedded, coarse, poorly sorted and moderately well sorted fine-grained sand

At 20' bedded coarse and medium-grained sand, bed thickness unknown, dense, slightly damp, patches of orange stain

PLATE: X

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow-stem mobile Drill, 8-inch diameter

BORING NO 5

SHEET 2 OF 2

SAMPLING METHOD Tube sampler

140 lb wt, 30" drop

BY S.M.O.

DATE 11/2/83 CHK'D BY

DRILLING CONTR Cal Testing Lab

					DRILLING START TIME	DRILLING FINISH TIME
WATER LEVEL	30'	31½'	Dry	Dry		
TIME	3:30	3:45	7:30	8:50		
DATE	11/2	11/2	11/3	11/4	DATE	DATE
CASING DEPTH	initial	meas. down stem				

SURFACE CONDITIONS Sloping area adjacent to driveway

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
						20	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
T	C	30	45/6" 50/1"	18.5	105.0	30	
						1	
						2	
						3	
						4	
T	C	35	100/5½"	12.8	123.8	5	
						6	
						7	
						8	
						9	
T	C	40	50/6" 75/6"	18.5	112.4	40	

Continues as above

At 26' increase in clay content to clayey sand damp to moist, moderately dense

At 30' water, sand is porous, coarse-sand, mod well-sorted, wet.

At 35' dropped tape in down-stem, 2½' water interbedded wet, porous, mod. well-sorted, me to coarse sand and dryer (?), poorly graded, densely packed sandy pebble and cobble gravel

Total depth = 40 feet. Water at 30 feet. No caving. Hole backfilled 11/5/83.

PLATE: X

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow-Stem Auger
8" diameter

BORING NO 6

SHEET 1 OF 2

SAMPLING METHOD Tube sampler
140 lb wt, 30" drop

DRILLING START TIME / FINISH TIME

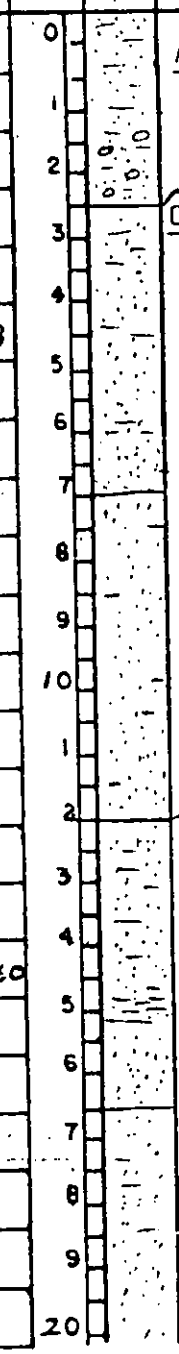
BY M.S.O.
DATE 11/3/83 CHK'D BY
DRILLING CONTR Cal Testing Lab.

WATER LEVEL	24'	14½'	12'10"		
TIME	4:30	7:30	8:53		
DATE	11-3	11-4	11-5		
CASING DEPTH					

DRILLING DATE / FINISH DATE

SURFACE CONDITIONS sloping area adjacent to driveway

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT
	B	3-6			
T	C	5	34/6" 56/6"	5.9	103.3
	C	15	19/6" 65/6"	20	104.0



ARTIFICIAL FILL: sandy silt, damp, dark brown, loose, contains moderately abundant roots, scattered clasts, pebble size

OLDER FLOOD PLAIN DEPOSITS: sand, damp, light brown, contains moderately abundant clasts, some beds of silty sand, sand in upper portion is fine-grained, core at 5' encountered sandy pebble gravel bed

At 7' becomes red-brown in color, sand becomes coarse-grained, minor clay in matrix

BEDROCK (?) (MODELO FORMATION): at 12' changes to gray color, sand becomes well-sorted, fine-grained, damp, contains silt, moderately dense, scattered irregular orange stains

At 15' dense, damp, sandy, clayey silt

At 16½' change to damp, very fine sand, slightly micaceous, minor clay, well-sorted, dense.

PLATE: XI

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow-Stem Auger 8" diameter

BORING NO 6

SHEET 2 OF 2

SAMPLING METHOD Tube sampler

140 lb wt, 30" drop

BY M.S.O.

DATE 11/3/83 CHK'D BY

DRILLING CONTR Cal Testing Lab.

	DRILLING START	DRILLING FINISH
WATER LEVEL		
TIME	TIME	TIME
DATE	DATE	DATE
CASING DEPTH		

SURFACE CONDITIONS Sloping area adjacent to driveway

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
T	C	25	31/6" 47/6"			20	

BEDROCK (?) (MODELO FORMATION):

Cobbles at 21'

Becomes wet at 22', change to light gray, claye sand with scattered pebbles

Water at 24' sandy, clayey silt, fine-grained sand, micaceous mottling of orange stain

Total depth = 25 feet. Water at 24 feet.
No caving. Hole backfilled 11/5/83.

PLATE: XI

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow-stem mobile drill, 8-inch diameter

BORING NO 7

SHEET 1 OF 1

SAMPLING METHOD Tube sampler, 140 lb wt., 30" drop

BY M.S.O.

DATE 11/3/83 CHK'D BY

DRILLING CONTR Cal Testing Lab.

WATER LEVEL	19'	12'8"			DRILLING START TIME
TIME	8:05	11:00			DRILLING FINISH TIME
DATE	11/3	11/5			DRILLING START DATE
CASING DEPTH					DRILLING FINISH DATE

SURFACE CONDITIONS Native grasses adjacent to road

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
T	C	10	27/6" 65/6"	9.0	112.0	10	
O	C	20	75/5½"			20	

TOPSOIL: Sandy silt, damp, dark brown, porous, contains scattered clasts and roots

OLDER FLOOD PLAIN DEPOSITS: sand with gravel, damp, red-brown to light brown, sand is fine to coarse, grains rounded to angular, contains silt and minor clay (?), clasts commonly abundant in beds to 3 (?) feet thick. inter-bedded, poorly-sorted, well-graded, fine-coarse sand, damp.

BEDROCK (?) (MODELO FORMATION): At 12' increa in clay or silt content, change to green-gray color

At 14' increase in moisture to damp, scattered pebbles moderately abundant

At 16' becomes wet, sand becomes better sorted with more fines (silt & clay), greenish color.

At 20' 1' water in hole
Total depth = 20'. Water at 19'. No caving.
Hole backfilled 11/5/83.

PLATE: XV

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow-Stem Auger 8" diameter — BORING NO 8

SAMPLING METHOD Tube sampler — SHEET 1 OF 2

140 lb wt., 30 inch drop — DRILLING

BY M.S.O.

DATE 11/3/83 CHK'D BY

DRILLING CONTR Cal Testing Lab.

						START TIME	FINISH TIME
WATER LEVEL							
TIME							
DATE						DATE	DATE
CASING DEPTH							

SURFACE CONDITIONS Level area adjacent to driveway

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
	B	2-4				2	
T	C	4'	11/6" 15/6"	9.0	107.0	4	
T	C	14	12/6" 25/6"			14	

ARTIFICIAL FILL: sandy silt, loose to mod. dense, contains scattered clasts pebbles and granules, slightly poruos, scattered roots. Becomes denser with depth.

OLDER FLOOD PLAIN DEPOSITS: silty sand, sand well-graded, poorly-sorted, damp, light brown to red-brown, scattered clasts, abundant clast 8' - 13', difficult drilling

Increasing moisture, change to green, wet, sand clay,

BEDROCK (MODELO FORMATION): laminated siltstone claystone and diatomite (?), light brown and green interbedded, good parting along bedding, moderately fractured, soft, dark black, irregular staining along poorly defined fractures, damp to wet.

PLATE: XVI

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow-stem auger 8-inch diameter

BORING NO 8

SHEET 2 OF 2

SAMPLING METHOD Tube sampler

140 lb wt., 30 inch drop

DRILLING START FINISH

BY M.S.O.

DATE 11/3/83 CHK'D BY

DRILLING CONTR Cal TEsting Lab.

WATER LEVEL					TIME	TIME
TIME						
DATE					DATE	DATE
CASING DEPTH						

SURFACE CONDITIONS Level area adjacent to driveway

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
T	C	24'	11/6" 27/6"			20	
	B	26-30				30	

BEDROCK (MODELO FORMATION): Siltstone, very fine sandstone and diatomite (?), laminated and thin bedded, soft, damp to moist

Laminae dip at angle of approximately 45° relative to sampler axis

Total depth = 30 feet. No caving.
Water at ~ 26 feet. Hole backfilled 11/5/83.

PLATE: XVI

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow Stem Mobile Drill, 8" diameter — BORING NO 9

SAMPLING METHOD Tube sampler — SHEET 1 OF 1

140 lb wt, 30" drop — DRILLING START TIME / FINISH TIME

BY M.S.O.

DATE 11/3/83 CHK'D BY

DRILLING CONTR Cal Test Lab

WATER LEVEL					
TIME					
DATE					
CASING DEPTH					

SURFACE CONDITIONS Gentle slope area adjacent driveway

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
						0	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
T	C	10	35/6" 80/6"	6.4	106.7	10	
						1	
						2	
						3	
						4	
						5	
						6	
						7	
						8	
						9	
T	C	20	10/6" 31/6"	35.9	85.2	20	

OLDER FLOOD PLAIN DEPOSIT: silty sand, sand is fine to coarse, damp, silty and dark brown in upper 2½ feet (developing topsoil)

Change to light brown color at 2½ feet, sand, damp scattered pebbles

Change to red-brown, silty sand at 5 feet,

Abundant clasts at 6', silty sand matrix, damp.

At 10 feet interbedded sandy, pebble gravel, well-graded, dense, damp, light brown, pebbles rounded, interbedded coarse sand, well-graded, to fine sand, damp, poorly sorted, dense.

Change to green-gray color

Increasing moisture to wet at 19½ feet

BEDROCK (Modelo Formation): thin bedded and laminated green, very fine sandstone, gray diatomite and dark green siltstone, layers of yellow stain, moderately fractured, soft. Total depth 20 feet. No caving. Water at 19½ feet. Hole backfilled.

PLATE: XVII

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO GT 20608	CLIENT Ararat	LOCATION Mission Hills
DRILLING METHOD Hollow Stem Mobile Drill, 8" diameter		BORING NO 10
SAMPLING METHOD Tube sampler 140 lb wt, 30" drop		SHEET 1 OF 1
BY M.S.O.	WATER LEVEL	DRILLING START TIME / FINISH TIME
DATE 11/3/83 CHK'D BY	TIME	
DRILLING CONTR Cal Testing Lab.	DATE	DATE / DATE
	CASING DEPTH	

SURFACE CONDITIONS grass, ploughed, hit rock moved hole

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
1/2T	C	3	6/6" 12/6"	12.0	116.4	0–3	
T	C	6	16/6" 25/6"	13.3	109.8	4–7	
0	C	15	90/6"			10–15	

TOPSOIL: sandy silt, loose, damp, dark brown, contains rootlets and scattered clasts, ploughed

OLDER FLOOD PLAIN DEPOSITS: predominantly, coarse sand and sandy, pebbly gravel, dense, damp, poorly sorted, well-graded.

At 7 feet, becomes gray color, finer grained (medium predominently) silty, poorly sorted.

AT 11½ feet becomes dark red-brown, increase in silt, minor clay, damp to moist.

At 15 feet, very dense, sandy, pebble gravel, poorly sorted, slightly damp.

Refusal at 17 feet, boulders.

Total depth 17 feet.
No water. No caving.
Hole backfilled.

PLATE: XI

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE 1 • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow stem auger 8" diameter

BORING NO 11

SHEET 1 OF 1

SAMPLING METHOD Tube sampler

140 lb wt, 30 inch drop

	DRILLING START TIME	DRILLING FINISH TIME
WATER LEVEL		
TIME		
DATE	DATE	DATE
CASING DEPTH		

BY M.S.O.

DATE 11/4/83 CHK'D BY

DRILLING CONTR Cal Testing Lab.

SURFACE CONDITIONS Clear area on gently sloping access road

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
	B	9-10				9	
	C	10	27/6" 35/6"	60.7	51.1	10	

TOPSOIL: Sandy silt, dark brown, contains scattered clasts and roots. Loose to moderatel dense

OLDER FLOOD PLAIN DEPOSITS: Clayey sand with silt, damp, red-brown, moderately dense, sand is fine to coarse, no rocks encounterd.

BEDROCK (Modelo Shale): diatomite, laminated off-white color, slightly damp, moderately harc laminations to .5 cm, light green siltstone interbeds.

Total depth 10 feet. No water. No caving. Hole backfilled.

PLATE: X

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow Stem Auger
Mobile Drill, 8 inch diamter

BORING NO 12

SHEET 1 OF 1

SAMPLING METHOD Tube sampler
140 lb wt. 30 inch drop

	DRILLING START	DRILLING FINISH
WATER LEVEL		
TIME	TIME	TIME
DATE	DATE	DATE
CASING DEPTH		

BY M.S.O.
DATE 11/4/83 CHK'D BY
DRILLING CONTR Cal Testing Lab

SURFACE CONDITIONS Level graded area

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
T	C	8	2/6" 2/6"	21.3	110.2	0–20	

ARTIFICIAL FILL: Silty sand, damp, medium brown color, loose, scattered trash on surface, roots

ALLUVIUM & TOPSOIL: silty, clayey sand, wet, loose, black, porous, contains scattered clasts

OLDER FLOOD PLAIN DEPOSITS: silty sand, damp, contains scattered clasts, moderately dense

At 13 feet, refusal on hard rocks, moved hole

At 15 feet, hard drilling, slightly clayey

Refusal at 17 feet.

Total depth, 17 feet. No water. No caving. Hole backfilled.

PLATE: XX

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE 1 • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow Stem Auger
Mobile Drill, 8-inch diameter

BORING NO 13

SHEET 1 OF 2

SAMPLING METHOD Core sampler
140 lb wt, 30 inch drop

BY M.S.O.

DATE 11/4/83 CHK'D BY

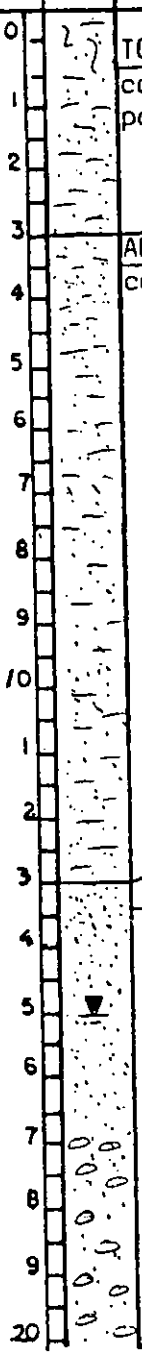
DRILLING CONTR Cal Testing Lab

WATER LEVEL	15'	6'6"			
TIME	2:30	11:30			
DATE	11/4	11/5			
CASING DEPTH		TD=10'3"			

DRILLING START TIME / FINISH TIME / DATE / DATE

SURFACE CONDITIONS Natural grasses

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT
T	C	5	6/6" 11/6"	17.2	103.2
T	C	10	13/6" 24/6"	20.3	108.5
	C	15	16/6" 56/6"	22.2	106.8



TOPSOIL: sandy silt, damp, loose, dark brown, contains scattered clasts and roots, slightly porous

ALLUVIUM: sandy silt, damp, moderately firm, contains scattered granules, contains clay

At 10 feet, dense, damp, clayey, sandy silt, sand is fine to medium grained, moderately well sorted, scattered granules.

OLDER FLOOD PLAIN DEPOSITS: silty sand, wet, sand is fine to very fine, well sorted, light brown, mottling of orange stain.

At 15 feet increase in moisture - ground water

At 17 feet encountered abundant clasts

PLATE: XXI

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission HIls

DRILLING METHOD Hollow Stem Auger
8 inch diameter

BORING NO 13

SHEET 2 OF 2

SAMPLING METHOD Tube sampler
140 lb wt, 30 inch drop

BY M.S.O.

DATE 11/4/83 CHK'D BY

DRILLING CONTR Cal Testing Lab.

WATER LEVEL					DRILLING START TIME	DRILLING FINISH TIME
TIME						
DATE					DATE	DATE
CASING DEPTH						

SURFACE CONDITIONS

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
	C	25	35/6" 50/6"	24.6	101.6	20	
0	C	30	80/6"			30	

Clasts abundant from 17 to 25 feet.
Difficult drilling

At 25 feet sample of very fine sand with silt, wet, micaceous, slightly disturbed
Interbedded fine, sandy gravel and very fine sand with clay and silt.

Total depth 30 feet. Water at 15 feet. Hole caved at end to 10 feet, left open.

Hole backfilled 11/5/83.

PLATE: XX

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD: Hollow Stem Auger; Mobile Drill, 8-inch diameter — BORING NO: 14

SAMPLING METHOD: Tube sampler; 140 lb wt, 30 inch drop — SHEET: 1 OF 3

DRILLING: START / FINISH

BY: M.S.O.

DATE: 11/4/83 — CHK'D BY:

DRILLING CONTR: Cal Testing Lab

WATER LEVEL	13'	7'4"			TIME
TIME	3:00	12:00			TIME
DATE	11/4	11/5			DATE
CASING DEPTH		I.D. 2	7'6"		DATE

SURFACE CONDITIONS: Level area

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT
T	C	3	11/6" 13/6"	15.0	108.0
T	C	8	15/6" 35/6"	23.0	100.0
T	C	13	13/6" 22/6"		
T	C	18	55/6" 50/2"		

TOPSOIL: sandy silt, moderately dense, damp, dark brown, loose in upper 2 feet, ploughed, scattered roots and clasts

ALLUVIUM: silty, clayey sand, moderately dense, slightly porous, damp, contains scattered granules, sand moderately well-sorted

At 7 feet cahnge in color to medium brown

OLDER FLOOD PLAIN DEPOSIT: Clayey, silty sand, contains beds of gravel and scattered clasts, moderately dense, damp

Water at 13 feet, sand is predominantly fine grained, contains scattered coarse granules, mottled green and light brown, wet, patches of irregular shaped caliche (?)

At 18 feet dense, fine sand, well-sorted, scattered granules, in bit, part of a bed of well-sorted, medium-grained sand, dense, wet (not as wet or as fine ?) sample transferred to another tube-dist.

PLATE: XXIV

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow stem auger
8 inch diameter

BORING NO 14

SHEET 2 OF 3

SAMPLING METHOD Tube sampler
140 lb wt, 30 inch drop

DRILLING START TIME / FINISH TIME

BY M.S.O.
DATE 11/4/83 CHK'D BY
DRILLING CONTR Cal TEsting Lab

WATER LEVEL						DATE	DATE
TIME							
DATE							
CASING DEPTH							

SURFACE CONDITIONS Level area

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
T	C	23	70/6"			20 – 30 – 40	
½T	C	23	50/6" 50/2½"				

OLDER FLOOD PLAIN DEPOSITS: (as above)

Sample at 23 feet dense, fine, well-sorted, sand, damp, good sample messy at ends, dense and consolidated in center

At 33 feet core caught clayey silt - sample in upper part disturbed, lower part is dense, fine sand

Mottling or orange stain in gray-green, fine sand, clay or silt appears dense, disturbed

Cuttings of wet fine micaceous sand at 43 feet

At 43 feet greenish, dense sand, micaceous, mottling of orange stain

PLATE: XV

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow stem auger
8 inch diameter

BORING NO 14

SHEET 3 OF 3

SAMPLING METHOD Tube sampler

140 lb wt, 30 inch drop

DRILLING START / FINISH

					DRILLING START TIME	DRILLING FINISH TIME
WATER LEVEL						
TIME						
DATE					DATE	DATE
CASING DEPTH						

BY M.S.O.

DATE 11/4/83 CHK'D BY

DRILLING CONTR Cal Testing Lab

SURFACE CONDITIONS Level area

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
	C	43	58/6" 75/3"			0–48	

OLDER ALLUVIUM: very fine to fine sand, wet to damp, moderately well-sorted, light brown, dense, micaceous

Total depth 48 feet. Water at 13 feet.
Hole left open; hole backfilled 11-5-83

PLATE XXVI

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD: Hollow stem auger mobile drill, 8 inch diameter

BORING NO: 15

SHEET: 1 OF 3

SAMPLING METHOD: Tube sampler 140 lb wt., 30 inch drop

BY M.S.O.

DATE 11/4/83 CHK'D BY

DRILLING CONTR Cal Testing Lab

WATER LEVEL	17'				
TIME	3:30				
DATE	11/4				
CASING DEPTH					

DRILLING START TIME / FINISH TIME / DATE / DATE

SURFACE CONDITIONS: Level area

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT
	B	7-9			
T	C	9	27/6" 60/6"	15.3	98.3
T	C	14	19/6" 46/6"	33.3	84.8
T	C	19	31/6" 60/6"	27.6	98.4

DEPTH IN FEET: 0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20

SOIL GRAPH

TOPSOIL: sandy silt, damp, loose, contains scattered roots and clasts, ploughed, burrowed

ALLUVIUM: sandy silt to silty sand, medium brown to dark brown, slightly porous, damp, roots in upper portion (?) scattered clasts, moderately dense

OLDER FLOOD PLAIN DEPOSITS: silty sand, medium brown, damp, sand is fine to coarse, poorly sorted, well-graded

At 9 feet red-brown, damp, dense, fine to medium-grained sand, laminae to 3 mm of green-brown silt

At 13 feet change to very fine sand with clay micaceous

At 14 feet light brown, silt with very fine sand, stringers of black stain along fractures interbedded with laminae of orange with interbeds of green laminae

water at 17 feet

At 19 feet very fine, micaceous sand, wet, structureless, contains silt and clay

PLATE XXV

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow stem auger mobile drill, 8-inch diameter

BORING NO 15

SHEET 2 OF 3

SAMPLING METHOD Tube sampler 140 lb wt; 30 inch drop

DRILLING START / FINISH

BY M.S.U.

DATE 11-4-83 CHK'D BY

DRILLING CONTR Cal Testing Lab

WATER LEVEL					
TIME					
DATE					
CASING DEPTH					

TIME / DATE (START) TIME / DATE (FINISH)

SURFACE CONDITIONS

RECOVERY	SAMPLE NO	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT
T	C	24	31/6" 60/6"	20.6	102.4
	B	28-34			
T	C	29	21/6" 36/6"	23.8	102.7
T	C	34	27/6" 76/6"	26.9	100.5
½T	C	39	75/5½"	26.4	99.7

DEPTH IN FEET: 20, 1, 2, 3, 4, 5, 6, 7, 8, 9, 30, 1, 2, 3, 4, 5, 6, 7, 8, 9, 40

SOIL GRAPH

OLDER FLOOD PLAIN DEPOSITS: very fine, wet, sand, micaceous, structureless, dense.

At 24 feet coarse sand with small pebbles, fine to coarse sand, poorly sorted, well-graded, mostly coarse size, wet, integrated with mostly medium size sand - sample very disturbed contains silt and clay.

At 29 feet fine micaceous sand, sample very disturbed

At 34 feet very fine sand with clay, laminae of orange, dark green and green, laminae of more clayey sand within very fine sand, micaceous

Sand at 39 feet fine-grained, darker green bedding with light green sand ~1 cm thick, indistinct, micaceous, contains silt and clay

PLATE: XXVII

HAKIMIAN ENGINEERING

11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

JOB NO	CLIENT	LOCATION
MI 20608	Ararat	Mission Hills

DRILLING METHOD Hollow stem auger
8 inch diameter

BORING NO 15

SHEET 3 OF 3

SAMPLING METHOD Tube sampler
140 lb wt, 30 inch drop

BY M.S.O.
DATE 11/4/83 CHK'D BY
DRILLING CONTR Cal Testing Lab

WATER LEVEL					DRILLING START TIME	DRILLING FINISH TIME
TIME						
DATE					DATE	DATE
CASING DEPTH						

SURFACE CONDITIONS Level area

RECOVERY	SAMPLE Nº	SAMPLE DEPTH	BLOWS PER FOOT	MOISTURE CONTENT	DRY UNIT WEIGHT	DEPTH IN FEET	SOIL GRAPH
	C	44	100/5"	25.0	106.6	40	

OLDER FLOOD PLAIN DEPOSITS (as above)

Sand, fine to very fine, micaceous, moderately dense to dense, damp to wet (?)

Total depth = 49 feet. Water at 17 feet.

Hole caving. Hole backfilled.

PLATE: XXIX

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat	Mission Hills

Drilling Contr. Tri Valley
Equipment 24" Ø Bucket Auger
Roy & Dave
Driving Weight K = 2700 lbs
Surface Elevation
Reference

Boring No. 16
Sheet 1 of 1

Logged By C.H.P.
Date June 14, 1984

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot / Core	VISUAL DESCRIPTION	Color	Consistancy	Moisture	Moisture Content	Dry Unit Weight
					Flood Plain Deposit Clay Slightly sandy	Dark reddish brown	Stiff	Dry		
		1		P	Alternating Silt and Clay slightly sandy		firm	slightly moist		
5							stiff			
		2		1	Clay	brown				
10					rounded, granitic cobbles up to 4" diameter and 1% in content					
		3		5	Sand fine to coarse-grained, silty		comp	moist		
15					rounded granitic rock up to 10" Ø and 10% in content Sampler bounced					
					End of boring 17 feet. Would have to core. No fill. No caving. No ground water.					

PLATE XXX

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat	Mission Hills

Drilling Contr. Tri Valley
Equipment 24" Ø Bucket Auger
Driving Weight K = 2700 lbs
Surface Elevation
Reference

Boring No. 17
Sheet 1 of 1

Logged By C.H.P.
Date June 14, 1984

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistancy	Moisture	Moisture Content	Dry Unit Weight
						Flood Plain Deposit Silt sandy	Light brown	Stiff	Dry		
5		1		6		Sand fine to coarse-grained, clayey, rounded granitic rock up to 6" Ø and 10% in content	light orange brown to orange brown	compact	slight moist		
10		2		5		silty	light brown		moist		
							brown				
15						sampler bouncing on rock rock					
							white to or-brn				
20						rock rock	dark or-brn to dark yellow brown				
						End of boring 20 feet. Cored for 2 inches. Took ½ hr. No fill. No caving. No ground water.					

PLATE XXXI

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat	Mission Hills

Drilling Contr. Tri Valley — Boring No. 18
Equipment 24" Ø Bucket Auger — Sheet 1 of 2
Driving Weight K = 2700 lbs
Surface Elevation
Reference
Logged By C.H.P. — Date June 14, 1984

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistancy	Moisture	Moisture Content	Dry Unit Weight
		1		P		Flood Plain Deposit Clay Sandy	Dark brown	Firm	Dry		
									moist		
5		2		1		Sand clayey, fine-grained					
						Clay sandy					
10						Sand fine-grained, clayey					
		3		2							
						fine to coarse-grained, rock up to 2" Ø and 5 % in content	white to orange brown				
15							orange brown	comp			
		4		4			brown				
						rounded granitic rock up to 5" Ø and 10 % in content					
20									very moist		
		5		4							
25				8"		bouncing disturbed					

PLATE XXXII

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No.	Client	Location
GT 20608	Ararat	Mission Hills

Drilling Contr. Tri Valley
Boring No. 18
Equipment 24" Ø Bucket Auger
Sheet 2 of 2
Driving Weight K = 1600 lbs
Surface Elevation
Reference

Logged By C.H.P. Date June 14, 1984

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistancy	Moisture	Moisture Content	Dry Unit Weight
						Flood Plain Deposit Sand medium to coarse-grained, clean – rocks up to 4" Ø and 10 % in content	dark yellow brown to dark red brown	compact	very moist		
30						End of boring 30 feet. No fill. No caving. Ground water at 29½ feet.					

PLATE XXXIII

HAKIMIAN ENGINEERING
13003 LADANA COURT
SANTA FE SPRINGS, CA 90670

Job No. GT 20608	Client Ararat	Location [illegible]
Drilling Contr Tri Valley		Boring No. [illegible]
Equipment 24" Ø Bucket Auger		Sheet [illegible]
Driving Weight K = 2700 lbs		
Surface Elevation		
Reference		
Logged By C.H.P.	Date June 14, 1984	

Depth in Feet	Drive Sample	Sample No.	Bag Sample	Blows per Foot	Core	VISUAL DESCRIPTION	Color	Consistancy	Moisture	Moisture Content	Dry Unit Weight
		1		1		Flood Plain Deposit Clay Slightly sandy	Dark gray brown	Stiff	Dry moist		
							brown	firm			
5		2		P		very sandy lens					
						8" diameter rock					
10						10" diameter rock	medium brown				
		3		1		siltstone fragments		soft	very moist		
						Bedrock very weathered Siltstone ground water well bedded, clayey, diatomaceous	gray		wet		
15		4		P							
		5		1		N 70° W 75° to 90° N					
20						End of boring 20 feet. No caving. No fill. Ground water at 14 feet.					

PLATE XXXIV

APPENDIX B

APPENDIX B

LABORATORY TESTING

Maximum Density-Optimum Moisture

Bulk soil samples were tested in the Laboratory to determine dry density and optimum moisture content, using ASTM D1557-70 Compaction Test Method. These tests are made on samples passing through a No 4 sieve, in a 4-inch diameter mold with a volume of 1/30 cubic foot with 25 blows of a 10-pound hammer falling 18 inches on each of 5 layers of soil. The effort is 56,200 ft-lb/ft^3. The results of these tests are shown on Plate L-3.

Direct Shear

Shear tests were performed on undisturbed soil samples remolded to 90 percent of the maximum dry density. Each sample was presaturated under a confining load representative of its in-situ pressure, for a minimum of 24 hours, then sheared under varying normal loads in order to determine the shear strength parameters, cohesion and angle of internal friction. The results of these tests are shown on Plates L-4 to L-9.

Moisture and Density Tests

The moisture contents and densities of undisturbed samples were determined prior to additional testing. The moisture contents were determined in accordance with the ASTM D21666 Standard Test Method. The results of tehse tests are shown on the boring logs in Appendix A, Plates IV through XXXIV.

Consolidation

Settlement predictions of the soil behavior were made on the basis of consolidation tests. Axial loads were applied in several increments to a laterally restrained, one-inch-high sample. Loads were applied in a geometric progression by doubling the previous load and the resulting deformations were recorded at selected time intervals. Porous stones were placed in contact with the top and bottom of each sample to permit addition and release of pore fluid. Results are plotted on the "Consolidation Pressure Curves", Plates L-10 through L-13

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GT 20608

MAXIMUM DENSITY-OPTIMUM MOISTURE TEST RESULTS

Sample Location	Soil Tested	Description	Maximum Dry Density (pcf)	Optimum Moistur Content (percent of dry weig
B-8 @ 2'-4'	Fill	Sand, gravelly and silty	129.0	8.5
B-1 @ 10'	Alluvium	Sand, silty, and clayey	122.5	9.0
B-4 @ 25'-30'	Flood Plain Deposits	Silt, clayey and sandy	117.0	13.0
B-19 @ 17'-19'	Bedrock	Siltstone, diatomaceous, and clayey	88.0	22.0

PLATE L-3

Expansion Index

In order to determine the potential expansive character of the soil, a typical sample was tested for expansion potential according to UBC Standard 29-2. The specimen was prepared at 50% saturation and placed under normal load of 144 pounds per square foot and submerged in water. The results of this rest is shown below.

Sample Location	Soil Tested	Expansion Index	Potential Expansion
B-8 at 2' - 4'	Sand, gravelly and silty	14.5	Very low

PLATE L-3A

DIRECT SHEAR TEST

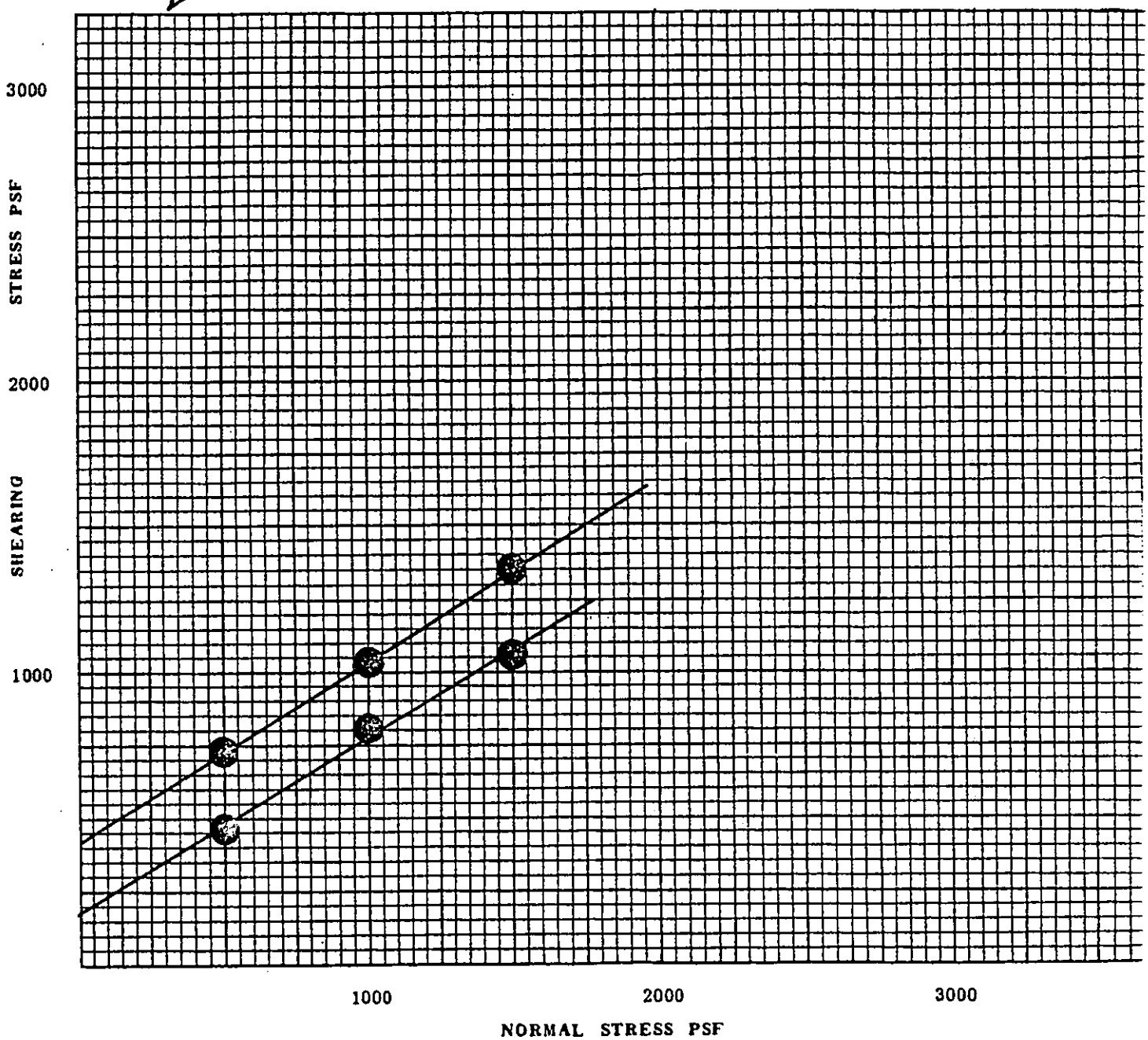
CLIENT : ARARAT HOME JOB NO. MI 80608

CLASSIFICATION: GRAVELLY SILTY SAND SAMPLE NO. B-1 @ 10' FT.

PLOTTED BY: JOHN DATE 12-21-83 CHECKED BY

$\omega = \frac{14}{10}$ % $\gamma_d = \frac{111}{94}$ PCF C = $\frac{420}{180}$ PSF $\phi = \frac{32}{31}$ °

UNDISTURBED ✓ REMOLDED ✓



▲ Gp & Øp = Peak values

● C_u & $Ø_u$ = Ultimate values

⬢ C_r & $Ø_r$ = Residual values

PLATE : L-2

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DIRECT SHEAR TEST

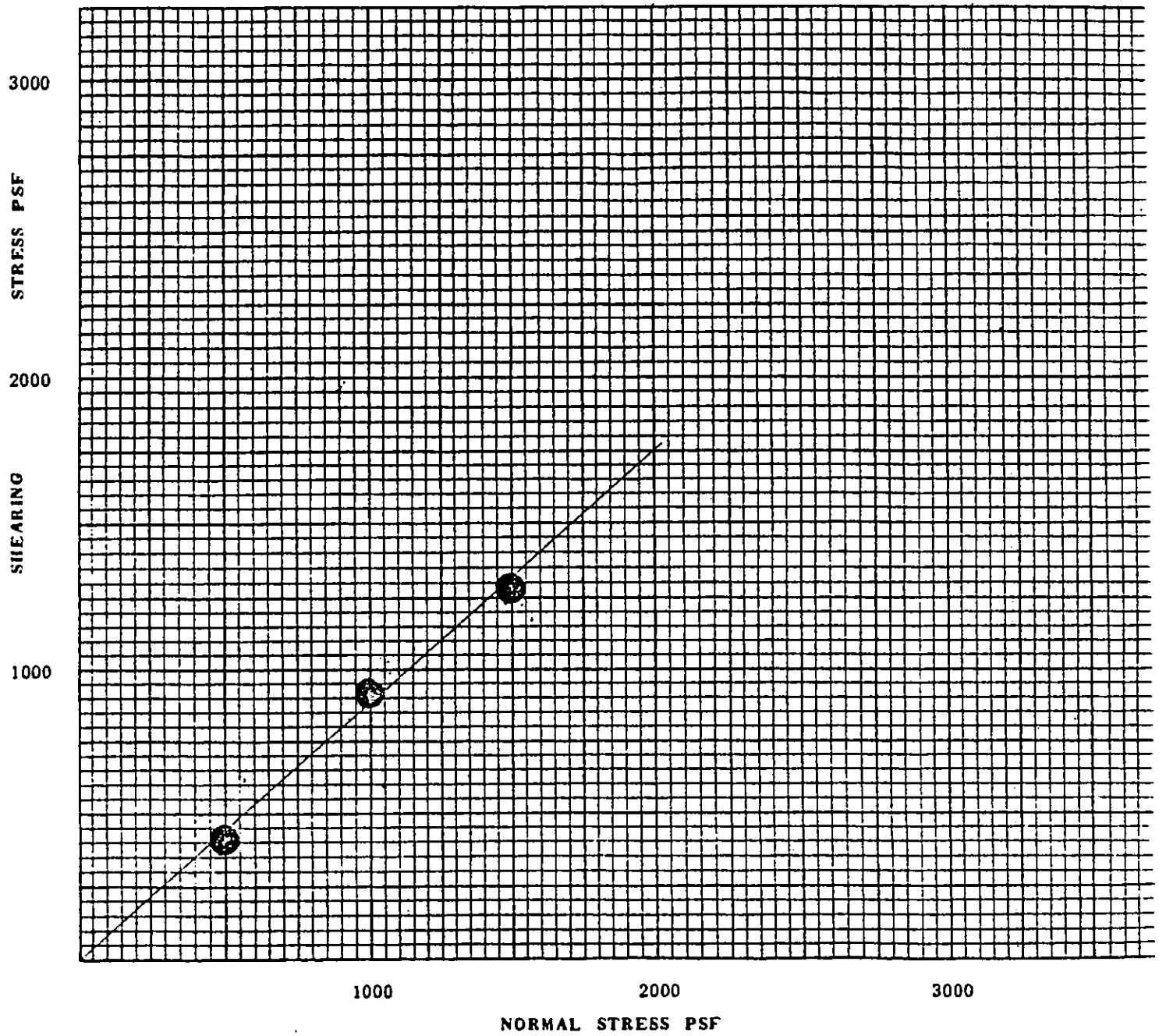
CLIENT ARARAT HOME JOB NO. MI-20608

CLASSIFICATION: GRAVELY SAND SAMPLE NO. B-4 @ 15' FT.

PLOTTED BY: JOHN DATE 12-12-83 CHECKED BY

ω = 3 % γ_d = 99 PCF C = 0 PSF ϕ = 41 °

UNDISTURBED ✓ REMOLDED



▲ Gp & Øp = Peak values

● C_u & $Ø_u$ = Ultimate values

● C_r & $Ø_r$ = Residual values

PLATE: L-5

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DIRECT SHEAR TEST

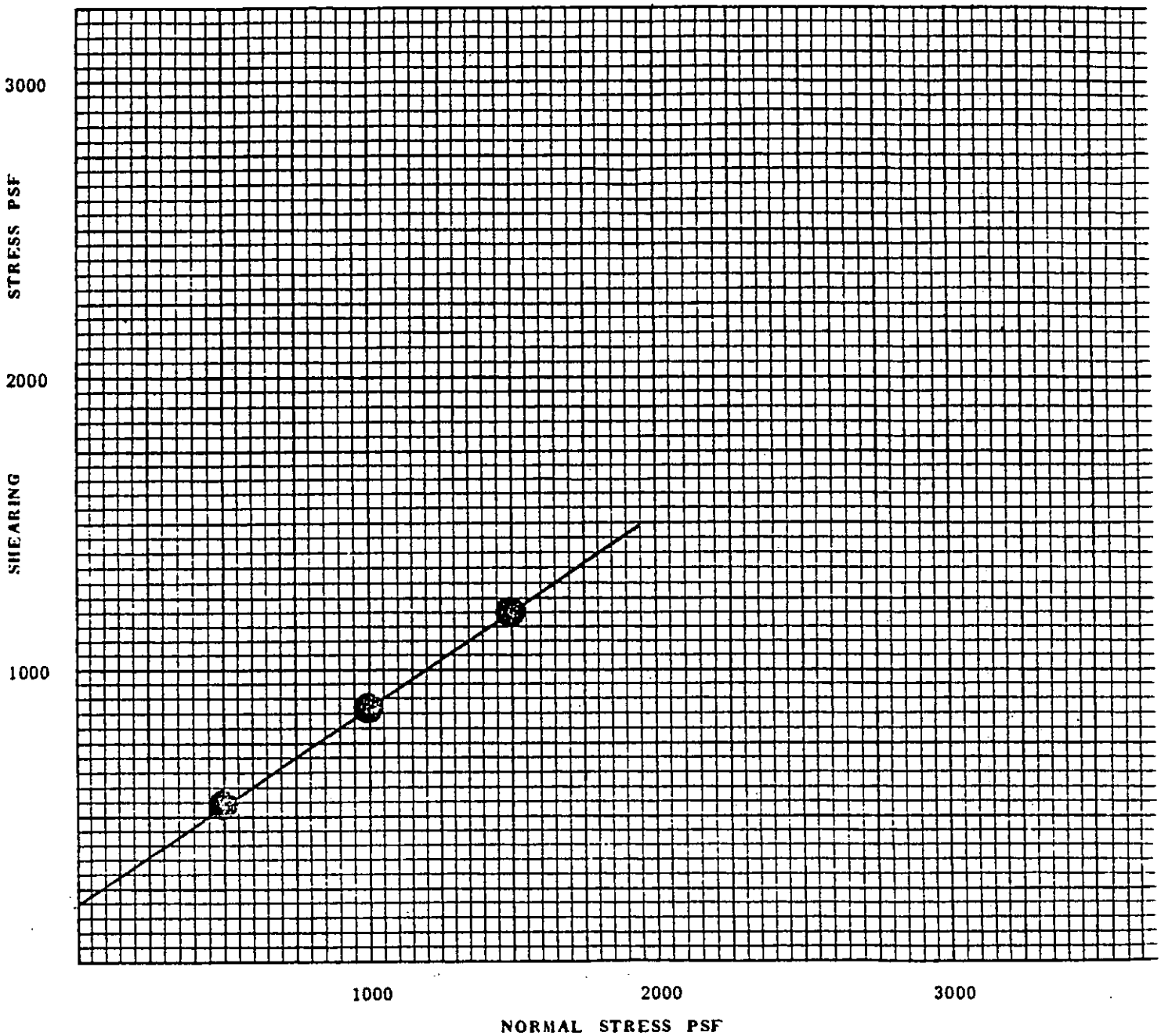
CLIENT ARARAT HOME JOB NO. MI-20608

CLASSIFICATION: SILTY SAND SAMPLE NO. B-6 @ 15' FT.

PLOTTED BY: JOHN DATE 11-22-83 CHECKED BY _____

ω = 20 % γ_d = 104 PCF C = 190 PSF ϕ = 34 °

UNDISTURBED ✓ REMOLDED _____



▲ Gp & Øp = Peak values

● C_u & $Ø_u$ = Ultimate values

⬢ C_r & $Ø_r$ = Residual values

PLATE: L-6

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DIRECT SHEAR TEST

CLIENT : ARARAT HOME JOB NO. MI-20608

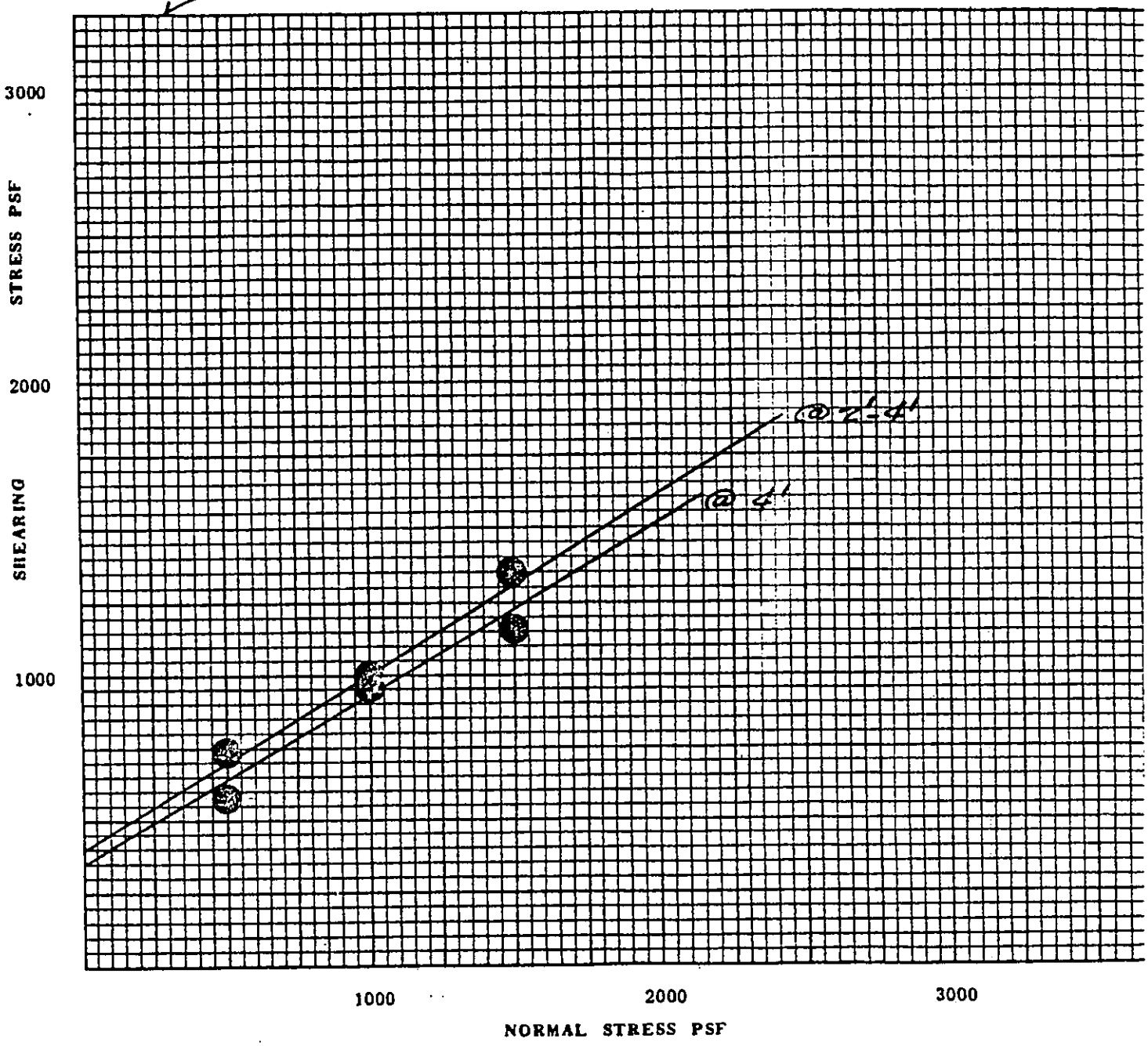
CLASSIFICATION: SILTY SAND W/SOME GRAVEL
SILTY SAND W/SOME GRAVEL & CLAY

SAMPLE NO. B-8 @ 2'-4' FT.
B-8 4'

PLOTTED BY: JOHN DATE 11-25-83 CHECKED BY

ω = 13 / 9 % γ_d = 118 / 107 PCF C = 460 / 340 PSF ϕ = 27 / 31 °

UNDISTURBED REMOLDED ✓



▲ Gp & Øp = Peak values

● C_u & $Ø_u$ = Ultimate values

⬢ C_r & $Ø_r$ = Residual values

PLATE: L-7

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DIRECT SHEAR TEST

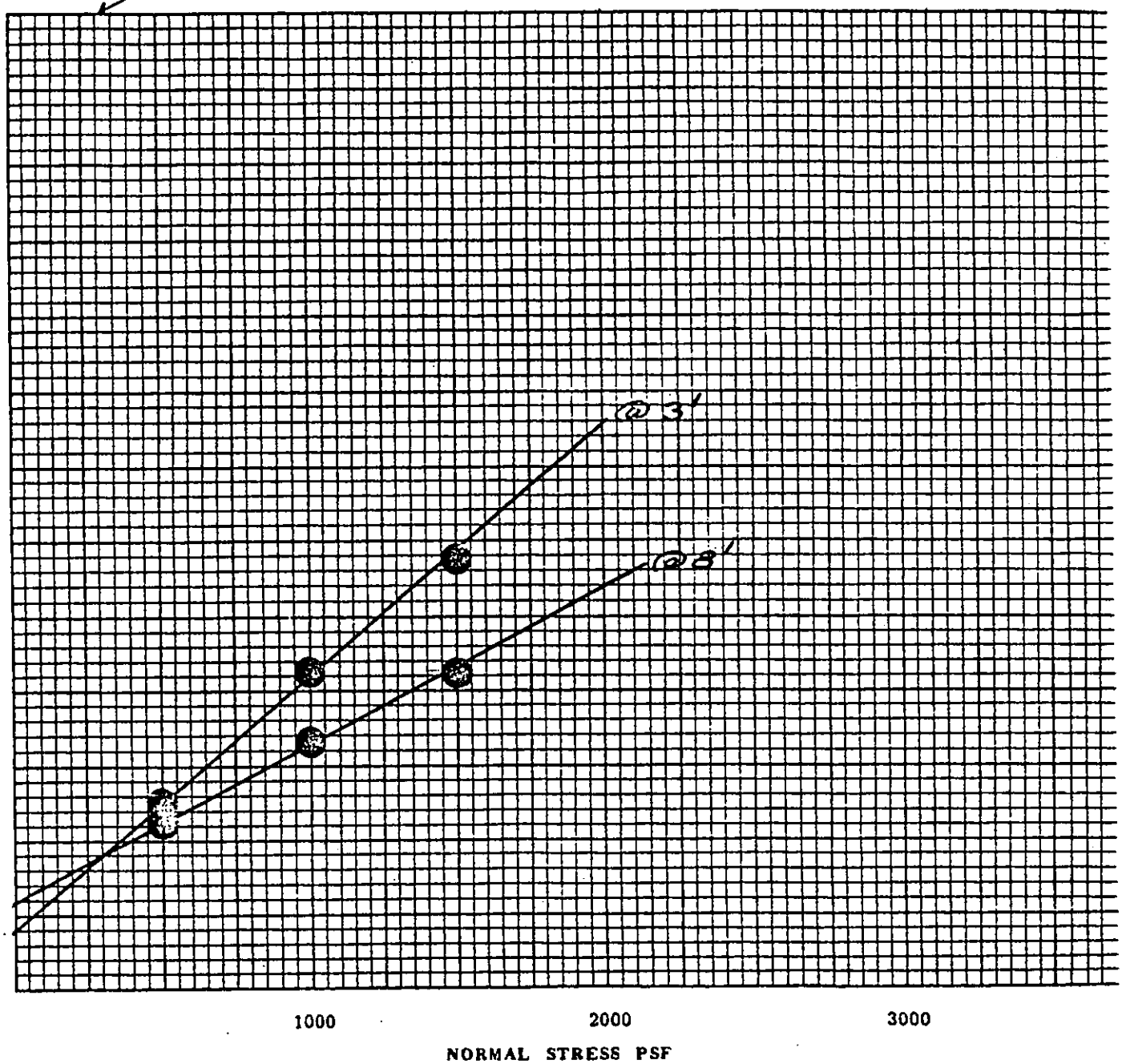
CLIENT : ARARAT HOME JOB NO. MI-20608

CLASSIFICATION: CLAYEY SILTY SAND / SANDY CLAYEY SILT SAMPLE NO. B-14 / B-14 @ 3' / 8' FT.

PLOTTED BY: A.C. DATE 11-29-83 CHECKED BY

ω = 15 / 23 % γ_d = 108 / 100 PCF C = 200 / 290 PSF ϕ = 40 / 28 °

UNDISTURBED ✓ REMOLDED



▲ Gp & Øp = Peak values

● C_u & $Ø_u$ = Ultimate values

● C_r & $Ø_r$ = Residual values

PLATE: L-8

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DIRECT SHEAR TEST

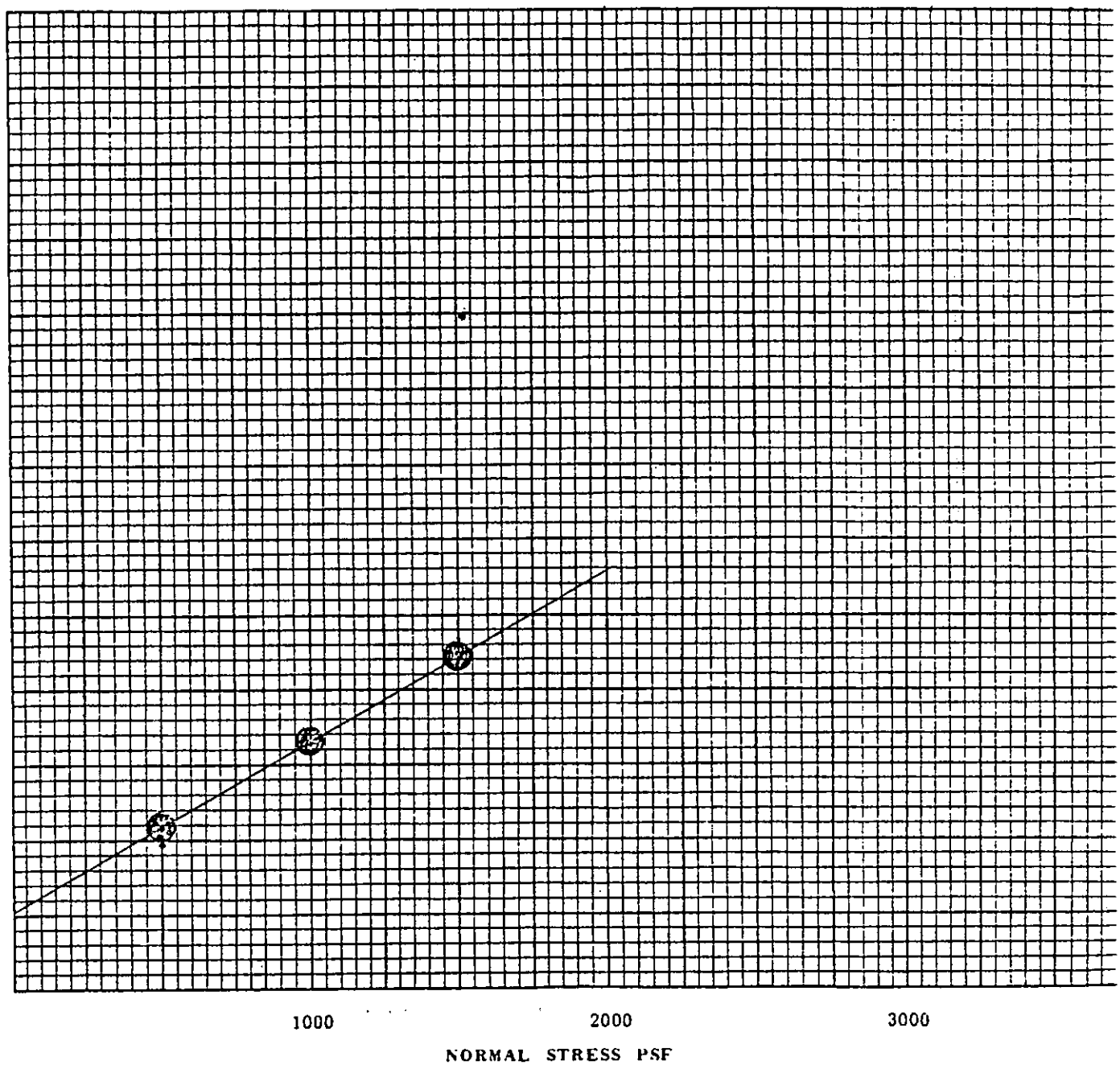
CLIENT ARARAT HOME JOB NO. 4F-20608

CLASSIFICATION: DIATOMACEOUS CLAYEY SILTSTONE (BEDROCK) SAMPLE NO. B-19 15-16' FT.

PLOTTED BY: JOHN DATE 8-30-84 CHECKED BY

ω = 41 % γ_d = 77 PCF C = 260 PSF ϕ = 30°

UNDISTURBED ✓ REMOLDED



▲ Gp & Øp = Peak values

● C_u & $Ø_u$ = Ultimate values

⬢ C_r & $Ø_r$ = Residual values

PLATE: L-9

HAKIMIAN ENGINEERING 11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3028

HAKIMIAN ENGINEERING

LOAD - PERCENT CONSOLIDATION CURVE

CLIENT ARARAT HOME

LAB NO. M1-20608

PLOTTED BY MOHAMMAD

SAMPLE NO. B-1

CHECKED BY _____

DATE 12/21/83

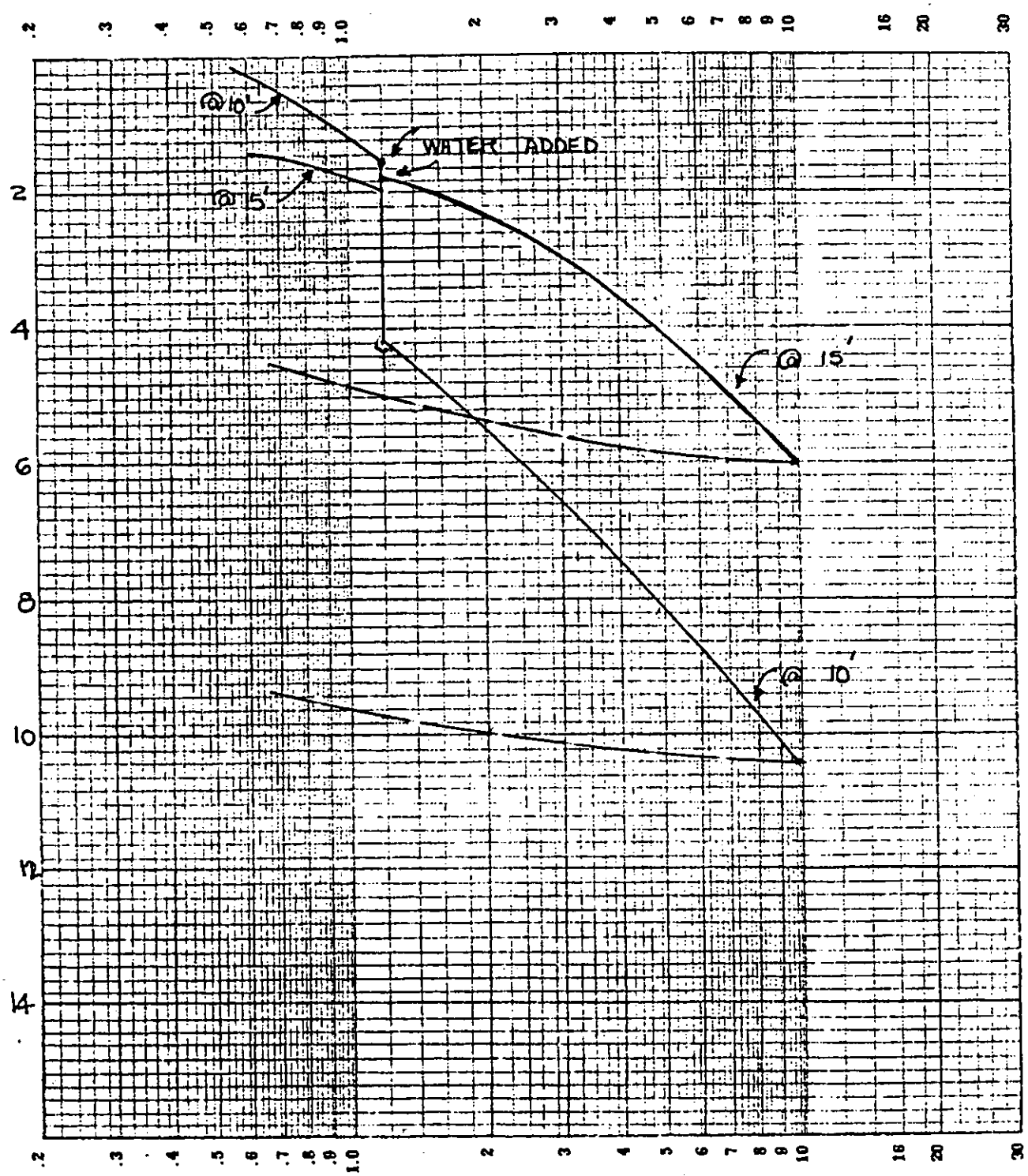


PLATE L-10

HAKIMIAN ENGINEERING

LOAD - PERCENT CONSOLIDATION CURVE

CLIENT ARARAT HOME

LAB NO. M1-20608

PLOTTED BY MOHAMMAD

SAMPLE NO. B-4

CHECKED BY _____

DATE 12/21/83

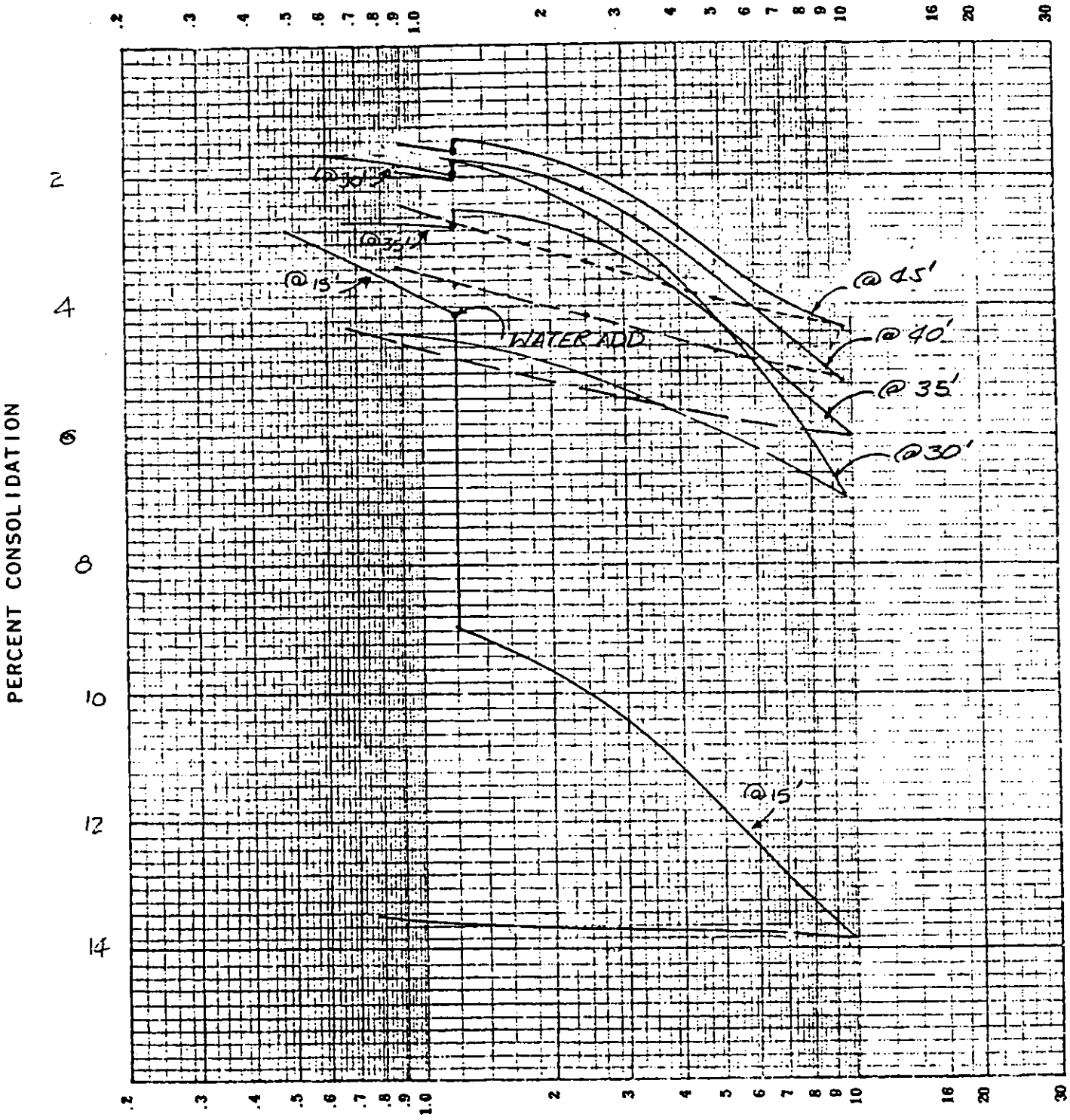


PLATE L-11

HAKIMIAN ENGINEERING

LOAD - PERCENT CONSOLIDATION CURVE

CLIENT ARARAT HOME

PLOTTED BY JOHN

CHECKED BY _____

LAB NO. MI-20608

SAMPLE NO. B-8 @ 4', 14', 24'

DATE 11-22-83

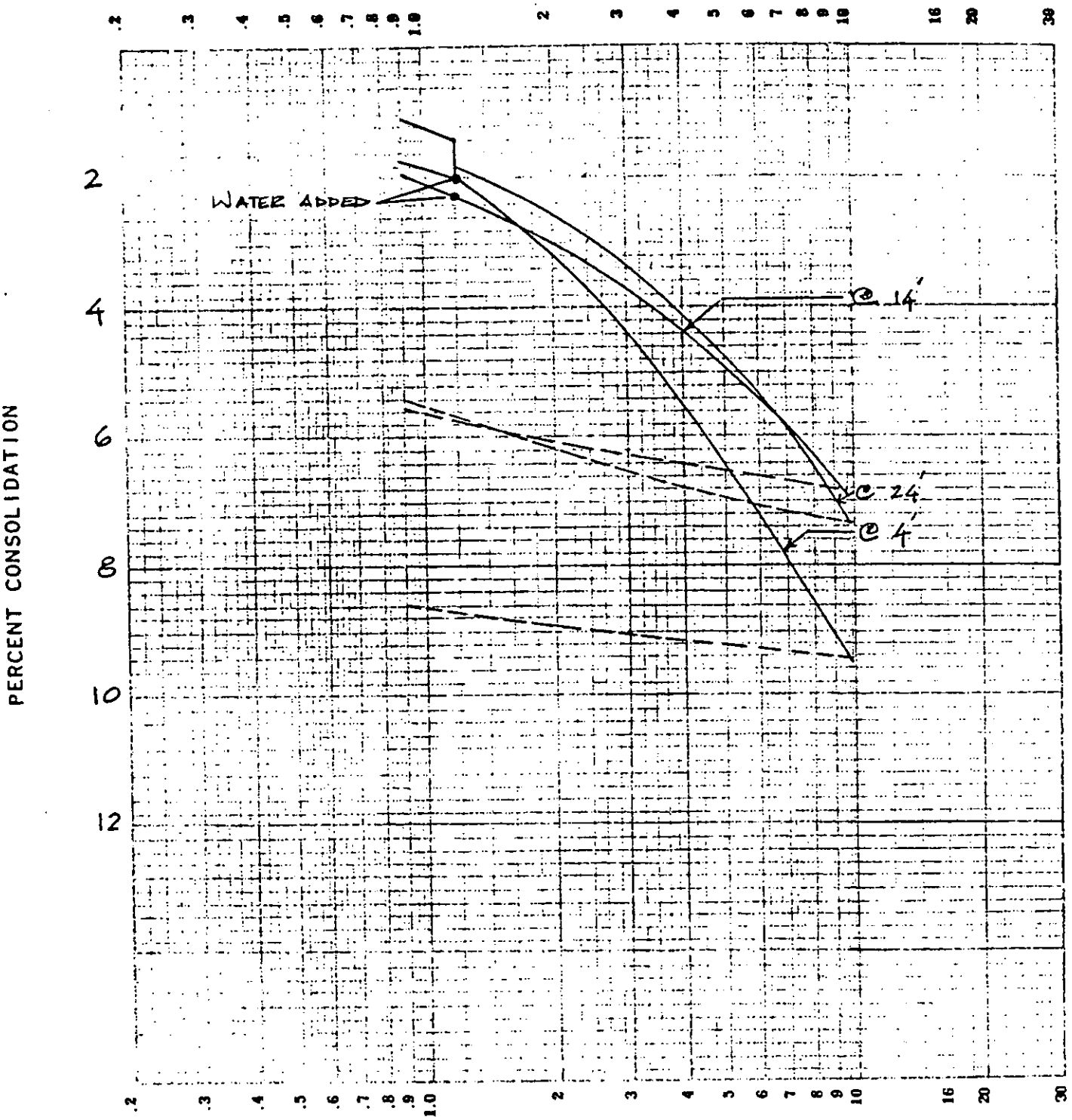


PLATE L-12

HAKIMIAN ENGINEERING

LOAD - PERCENT CONSOLIDATION CURVE

CLIENT ARARAT HOME

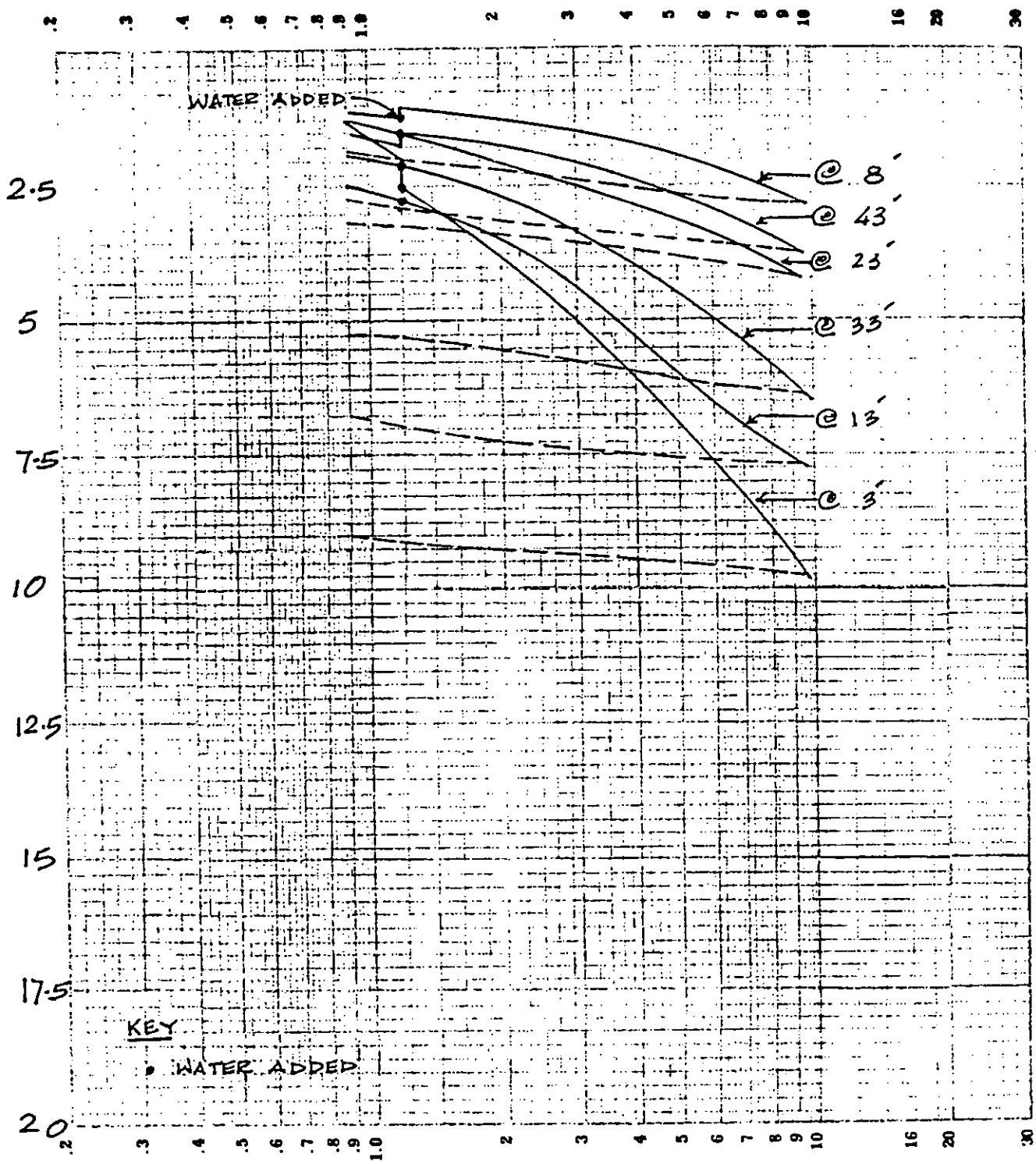
LAB NO. M1-20608

PLOTTED BY JOHN

SAMPLE NO. B-14

CHECKED BY _____

DATE _____



PERCENT CONSOLIDATION

Load - Kips/Sq. Ft.

PLATE L-13

...AKI... ENGINEERING ... 1912 Riverside ... SUITE ... SAN ... SPRINGS, CA ... (909) ...

GRAIN-SIZE DISTRIBUTION CHART

JOB LOCATION ARARAT HOME

SAMPLE NO. B-6 @ 15' DATE DEC. 83 JOB NO. MI-20608

PERCENT OF SIZE: CLAY & SILT 63 % SILT ____ SAND 37 % GRAVEL ____

CLASSIFICATION SILT, SANDY & CLAYEY PLOTTED BY ____ CHECKED BY ____

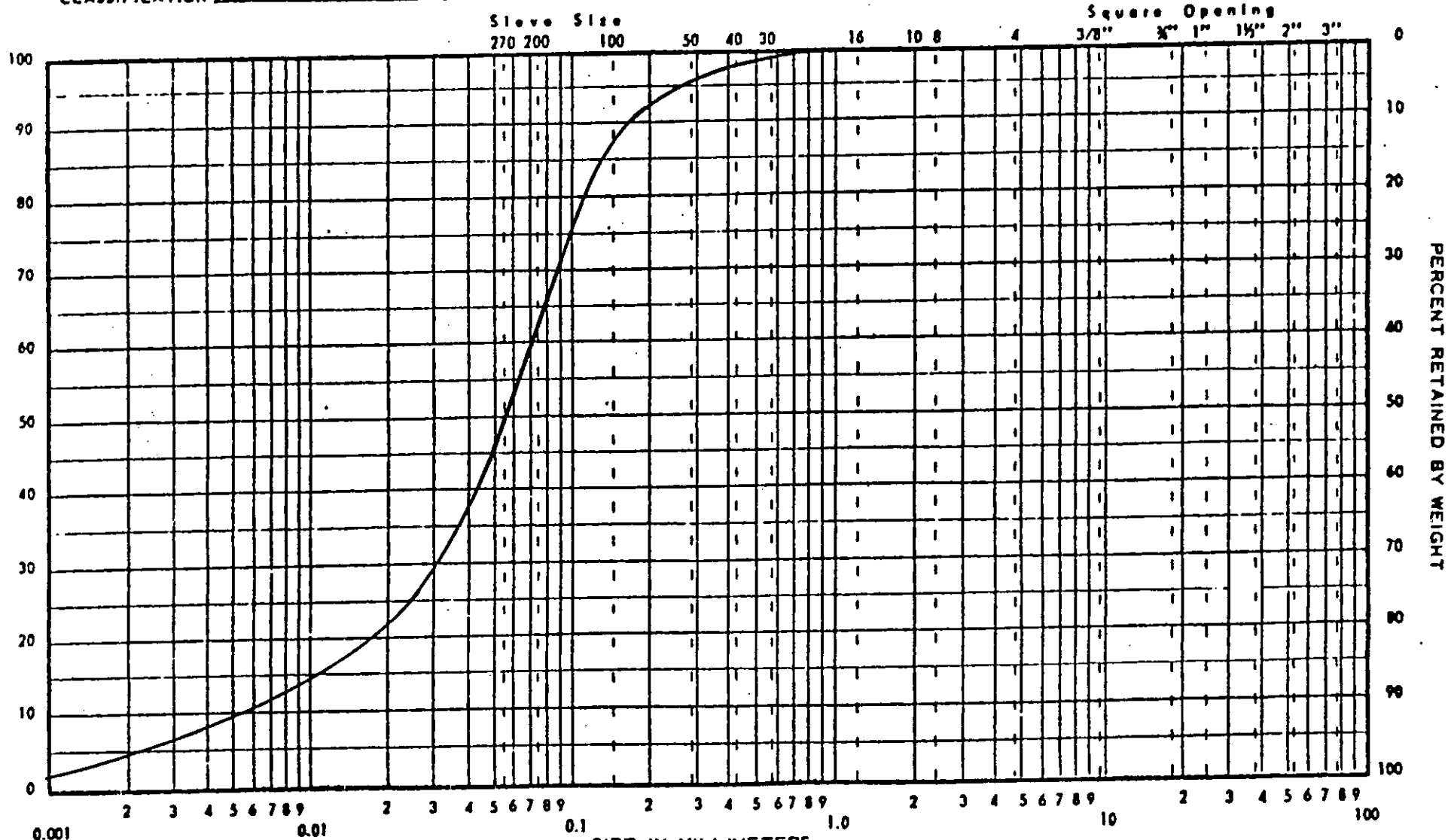


PLATE L-14

HAKI... ENGINEERING ... 1948

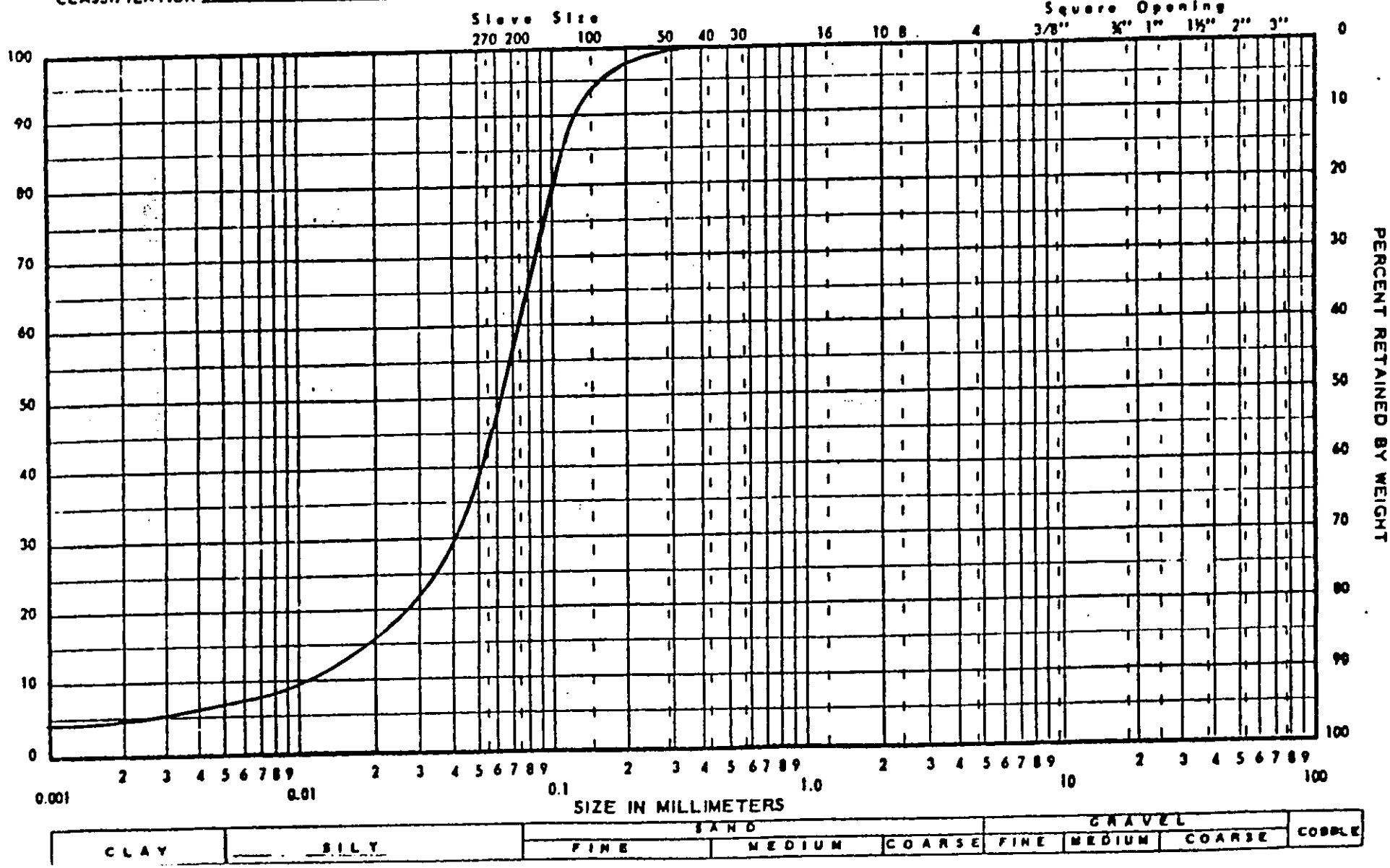
GRAIN-SIZE DISTRIBUTION CHART

JOB LOCATION ARARAT HOME

SAMPLE NO. B-6 @ 25' DATE DEC. 83 JOB NO. MI-20806

PERCENT OF SIZE: CLAY _____ SILT & CLAY 57% SAND 43% GRAVEL _____

CLASSIFICATION SILT, SANDY & CLAYEY PLOTTED BY _____ CHECKED BY _____



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GRAIN-SIZE DISTRIBUTION CHART

JOB LOCATION ARARAT HOME

SAMPLE NO. B-15@19' DATE DEC. 83 JOB NO. MI-20608

PERCENT OF SIZE: CLAY _____ SILT & CLAY 40% SAND 60% GRAVEL _____

CLASSIFICATION SAND, SILTY & CLAYEY PLOTTED BY _____ CHECKED BY _____

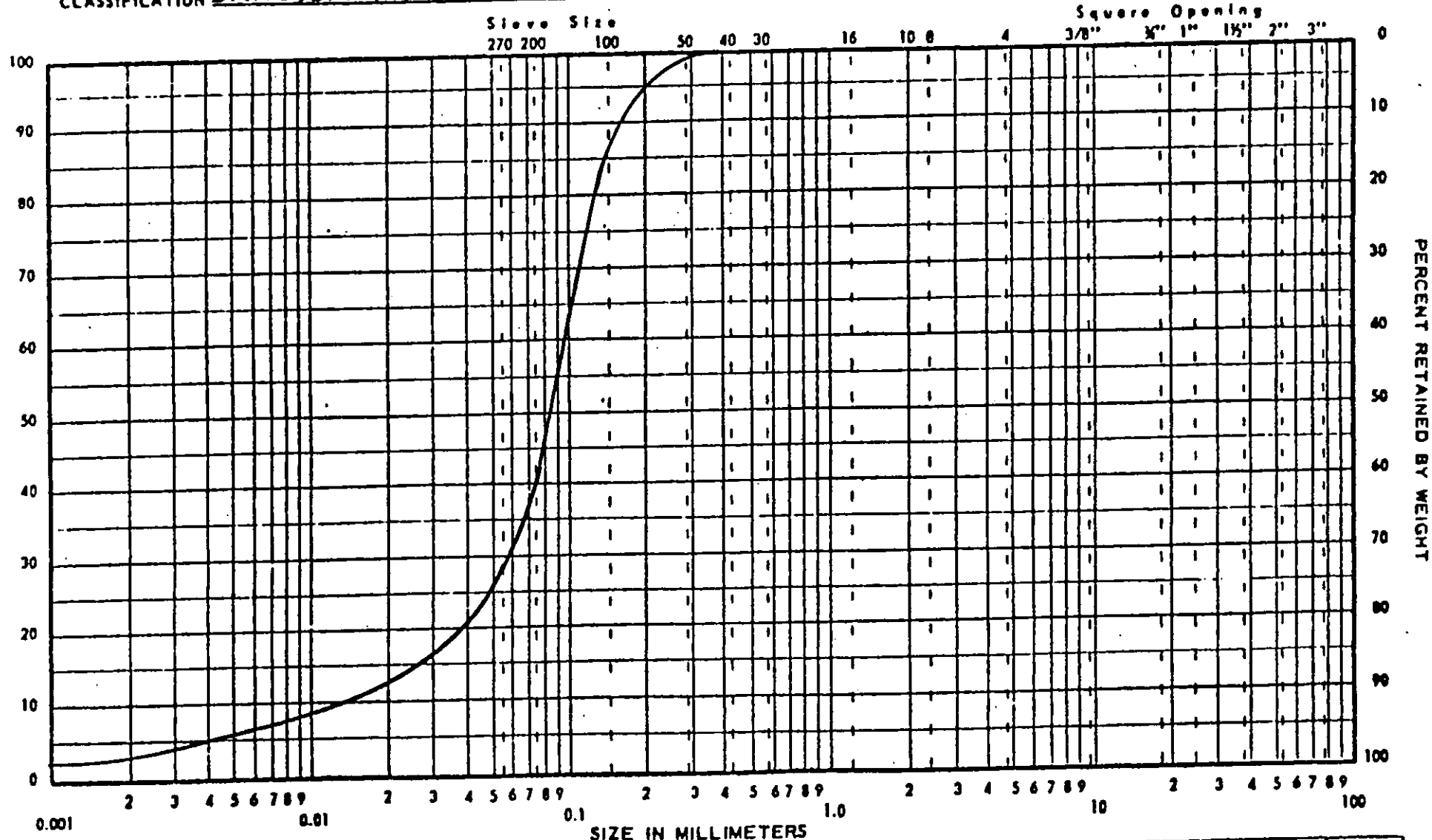


PLATE L-12

HARDING ENGINEERING [illegible] SPRINGS, CA [illegible]

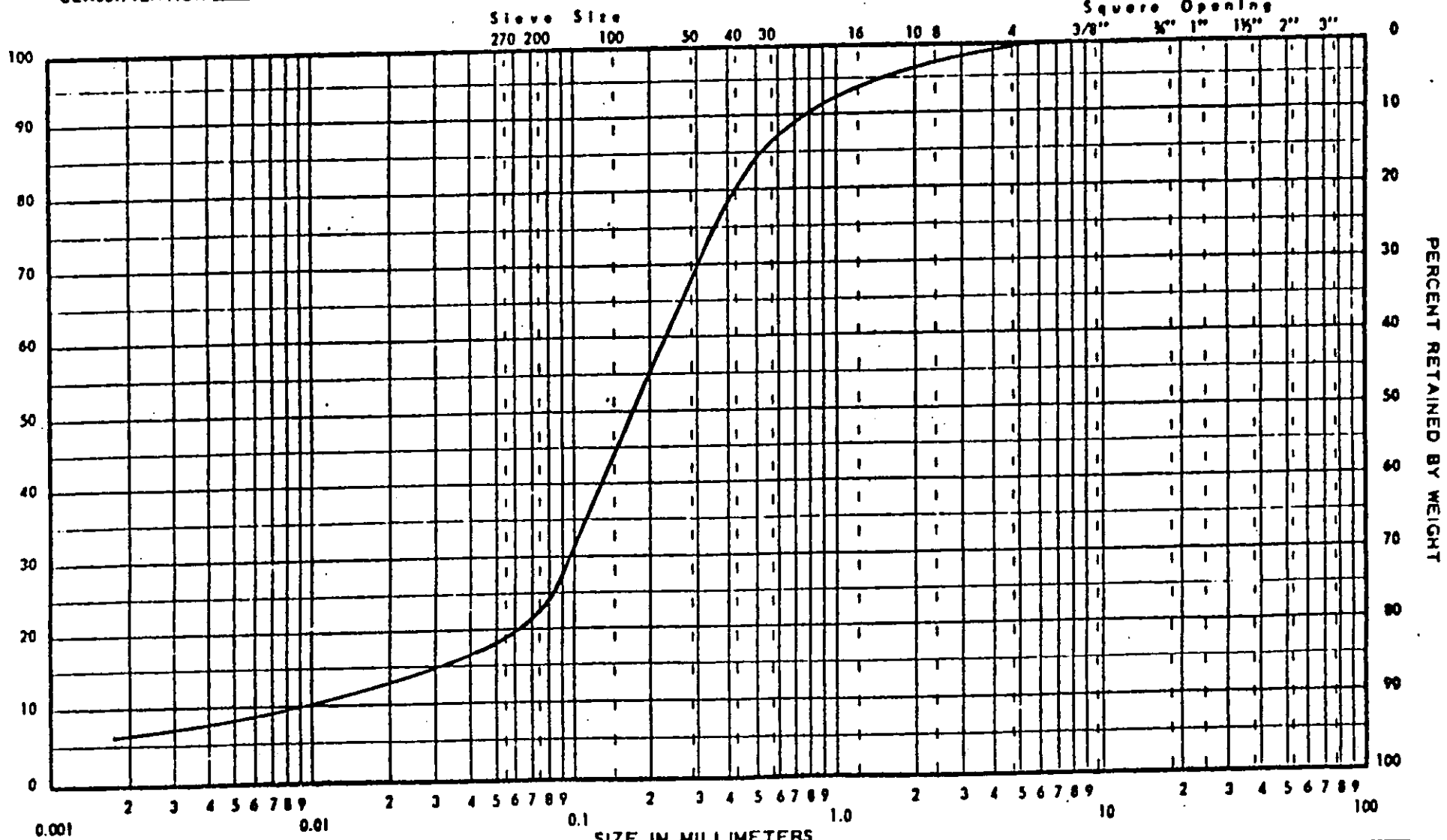
GRAIN-SIZE DISTRIBUTION CHART

JOB LOCATION ARARAT HOME

SAMPLE NO. B-15@28'-34' DATE DEC. 83 JOB NO. MI-20608

PERCENT OF SIZE: CLAY & SILT 21% SILT _____ SAND 79% GRAVEL _____

CLASSIFICATION SAND, SILTY & CLAYEY PLOTTED BY _____ CHECKED BY _____



CLAY	SILT	SAND			GRAVEL			COBBLE
		FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	

PLATE L-17

APPENDIX C

HAKIMIAN ENGINEERING INC.

STANDARD GRADING SPECIFICATIONS

These specifications present the usual and minimum requirements for grading operations performed under the control of HAKIMIAN ENGINEERING INC.

No deviation from these specifications will be allowed, except where specifically superseded in the preliminary geology and soils report, or in other written communication signed by the Soils Engineer or Engineering Geologist.

I. GENERAL

A. The Soils Engineer and Engineering Geologist are the Owner's or Builder's representative on the Project. For the purpose of these specifications, supervision by any person or persons employed by, and responsible tp, the licensed Civil Engineer signing the soils report.

B. All clearing, site preparation, or earthwork performed on the project shall be conducted by the Contractor under the supervision of the Soils Engineer.

C. It is the Contractor's responsibility to prepare the ground surface to receive the fills to the satisfaction of the Soils Engineer and to place, spread, mix, water, and compact the fill in accordance with the specifications of the Soils Engineer. The Contractor shall also remove all material considered unsatisfactory by the Soils Engineer.

D. It is also the Contractor's responsibility to have suitable and sufficient compaction equipment on the job site to handle the amount of fill being placed. If necessary, excavation equipment will be shut down to permit completion of compaction. Sufficient watering apparatus will also be provided by the Contractor, with due consideration for the fill material, rate of placement, and time of year.

E. A final report shall be issued by the Soils Engineer or Engineering Geologist attesting to the Contractor's conformance with these Specifications.

II. SITE PREPARATION

A. All vegetation and deleterious material such as rubbish shall be disposed of offsite. This removal shall be concluded prior to placing fill.

B. Soil, álluvium, colluvium, or bedrock materials determined by the Soils Engineer as being unsuitable for placement in compacted fills shall be removed and wasted from the site. Any material incorporated as a part of a compacted fill must be approved by the Soils Engineer.

C. After the ground surface to receive fill has been cleared, it shall be scarified, disced, or bladed by the Contractor until it is uniform and free from ruts, hollows, hummocks, or other uneven features which may prevent uniform compaction.

The scarified ground surface shall then be brought to optimum moisture, mixed as required, and compacted as specified. If the scarified zone is greater than twelve inches in depth, the excess shall be removed and placed in lifts restricted to eight inches.

Prior to placing fill, the ground surface to receive fill shall be inspected, tested, and approved by the Soils Engineer.

D. Any underground structures such as cesspools, cisterns, mining shafts, tunnels, septic tanks, wells, pipe lines, or others are to be removed or treated in a manner prescribed by the Soils Engineer.

III. COMPACTED FILLS

A. Any material imported or excavated on the property may be utilized in the fill, provided each material has been determined to be suitable by the Soils Engineer. Roots, tree branches, and other matter missed during clearing shall be removed from the fill as directed by the Soils Engineer.

B. Rock fragments less than six inches in diameter may be utilized in the fill provided:

1. They are not placed in concentrated pockets.

2. There is sufficient percentage of the fine grained material to surround the rocks.

3. The distribution of rocks is supervised by the Soils Engineer.

C. Rocks greater than six inches in diameter shall be taken offsite, or placed in accordance with the recommendations of the Soils Engineer in areas designated as suitable for rock disposal.

D. Material that is spongy, subject to decay, or otherwise considered unsuitable shall not be used in the compacted fill.

E. Representative samples of materials to be utilized as compacted fill shall be analyzed by the laboratory of the Soils Engineer to determine their physical properties. If any material other than that previously tested is encountered during grading, the appropriate analysis of this material shall be conducted by the Soils Engineer as soon as possible.

F. Material used in the compacting process shall be spread, watered, processed, and compacted in thin lifts not to exceed six inches in thickness to obtain a uniformly dense layer. The fill shall be placed and compacted on a horizontal plane, unless otherwise approved by the Soils Engineer.

G. If the moisture content or relative density varies from that required by the Soils Engineer, the Contractor shall rework the fill until it is approved by the Soils Engineer.

H. Each layer shall be compacted to 90 percent of the maximum density in compliance with the testing method specified by the controlling governmental agency. (In general, ASTM D1557-70 will be used, either with a 5 layer or 3 layer curve.

If compaction to a lesser percentage is authorized by the controlling governmental agency because of a specific land use or expansive soil condition, the area to receive fill compacted less than 90 percent shall either be delineated on the grading plan or appropriate reference made to the area in the soils report.

I. All fill shall be keyed and benched through all topsoil, colluvium, alluvium, or creep material, into sound bedrock or firm material where the slope receiving fill exceeds a ratio of five horizontal to one vertical, in accordance with the recommendations of the Soils Engineer.

J. The key for side hill fills shall be a minimum of 15 feet within bedrock or firm materials, unless otherwise specified in the soils report. (See detail on Plate G-7).

K. Subdrainage devices shall be constructed in compliance with the ordinances of the controlling governmental agency, or with the recommendations of the Soils Engineer or Engineering Geologist.

B. Upon completion of grading and termination of inspections by the Soils Engineer, no further filling or excavating, including that necessary for footings, foundations, large tree wells, retaining walls, or other features shall be performed without the approval of the Soils Engineer or Engineering Geologist.

C. Care shall be taken by the Contractor during initial grading to preserve any berms, drainage terraces, interceptor swales, or other devices of permanent nature on or adjacent to the property.

HE. HAKIMIAN ENGINEERING 11912 RIVERA ROAD, SUITE I • SANTA FE SPRINGS, CA 90670 • (213) 945-3026

APPENDIX D

29658

ENGINEERING GEOLOGIC/SEISMIC INVESTIGATION AND GEOTECHNICAL EVALUATION

Portion of Sec. #4, T2N, R15W and Lot 3,
Tract 3660, M.B. 38, Pages 96-97
Armenian Ararat Institutions
15103-15105 Mission Hills Road
Mission Hills, CA
(Hakimian W.O. GT 20608)

Job No.: 2159-00
Log No.: 7055
February 21, 1984

Prepared For:

Hakimian Engineering
11912 Rivera Road
Santa Fe Springs, CA 90670

Attention: Krikor D. Hakimian

Robert Stone & Associates

Robert Stone & Associates, Inc.
Engineering Geology • Soil Engineering • Material Testing
8020 Deering Avenue, Canoga Park, California 91304 (213) 346-0565
Since 1956

February 21, 1984

Job No.: 2159-00
Log No.: 7055

Hakimian Engineering
11912 Rivera Road
Santa Fe Springs, CA 90670

Attention: Krikor D. Hakimian

Subject: ENGINEERING GEOLOGIC/SEISMIC INVESTIGATION
AND GEOTECHNICAL EVALUATION
Portion of Sec. #4, T2N, R15W and Lot 3,
Tract 3660, M.B. 38, Pages 96-97
Armenian Ararat Institutions
15103-15105 Mission Hills Road
Mission Hills, CA
(Hakimian W.O. GT 20608)

INTRODUCTION

SCOPE

In accordance with your request, an engineering geologic/seismic study and geotechnical evaluation of the subject property has been conducted to determine geologic safety and stability for construction of the Ararat Center. A geologic map, at a scale of 1"=40' with a two-foot contour interval is included in this report.

This investigation was based upon:

1. Geologic field reconnaissance and detailed geologic mapping conducted February 7 through 14, 1984, in conjunction with backhoe exavated pits and testing by Hakimian Engineering, of Santa Fe Springs, California.

2. Review of pertinent reports and geologic maps of adjacent areas prepared by this office and others.

3. Review of Reconnaissance Geotechnical Evaluation by Hakimian Engineering, WO-M120608, July 12, 1982.

4. Review of Weber, Jr., F. Harold, "Geology and Surface Features Related to Character and Recency of Movement Along Faults, North-Central Los Angeles Area, L.A. County, CA.", Chapter D, U.S.G.S. - C.D.M.G. Open File Report 79-16LA.

5. Review of publications listed in the Bibliography of Seismic References.

6. Review of site topographic survey map by Hakimian Engineering dated 11/1/83, at a scale of 1"=40' and a contour interval of two feet.

ACCOMPANYING ILLUSTRATIONS

Location Map (CDMG Bulletin 196, 1974)	Page	5
Lines of Equal Precipitation (85 year mean) State Water Rights Board, 1960	Page	7
Groundwater Contours, 1975 (LACDCD Hyrology Report)	Page	12
Change in Water Elevation-1931-1958, State State Water Rights Board, 1960	Page	13
Water Levels-1983, Courtesy of Dept. of Water & Power, January 1984	Page	14
(CDMG Special Study Zones, 1/1/79)	Page	19
Portion of Maps of Faults and Ruptures, Van Norman Reservoir Area (USGS Map MF549, 1973)	Page	20
1971 Fault Ruptures, (USGS PP773, 1971)	Page	21
Vertical Displacements of Surface Breaks During the 1971 San Fernando Earthquake (City of L.A. Bureau of Engineering, Sept'72	Page	22

Ground Rupture Breaks-1971 San Fernando Earthquake (City of L.A. Bureau of Engineering, Sept. 1972)	Page	23
Liquefaction Potential Map of San Fernando Valley (USGS Circular 807, 1979)	Page	24
Seismic Index Map	Page	25
Table I - Seismic Parameters	Page	27
Table II - Maximum Probable Earthquake	Page	28
Table III - Maximum Credible Earthquake	Page	29
Table IV - Earthquake Recurrence Intervals	Page	30
Site Geologic Map	Appendix	

PRINCIPALS

Owner and Developer:

Ararat Home
3730 East 27th St.
Los Angeles, CA 90018
PHONE: (213)

Engineering Geologist:

Michael Scullin, E.G. 170
Robert Stone & Associates, Inc.
8020 Deering Ave.
Canoga Park, CA 91304
PHONE: (213)873-4485
(818)346-0565

Design Engineer and
Soil Engineer:

Hakimian Engineering
11912 Rivera Road
Santa Fe Springs, CA 90670
PHONE: (213) 445-3028

PROPOSED DEVELOPMENT

Lot Size: 10.5±

Number of Lots: 2 Parcels

Type of Development: Armenian Ararat Center

Adjoining the Site:

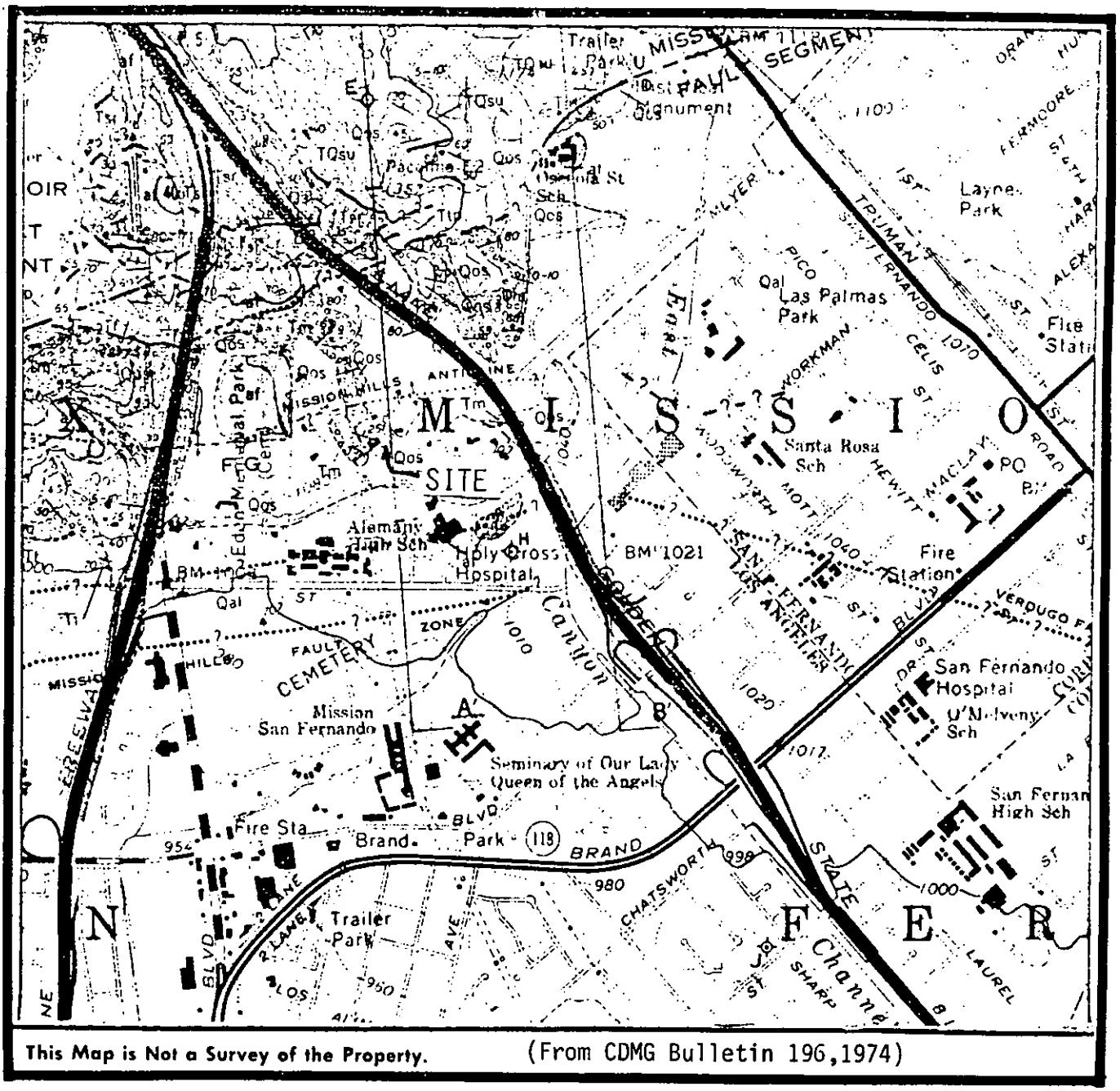
N'ly - Range and agriculture
E'ly - Range and residences
S'ly - Alemany High School & Holy Cross Hospital
W'ly - Range and Residences

Existing Condition of Site:	Existing inhabited residence and abandoned residence and pool, citrus and range.
Sewage Disposal:	Sanitary Sewers
Access to Development:	Rinaldi St. to Memory Park Ave. or Indian Hills Rd., N'ly to Mission Hills Road
Highest Site Elevation:	1103'±
Lowest Site Elevation:	1042'±
Maximum Relief within Site:	61'±
Maximum Cut Slope Angle:	2:1 to 10:1±
Maximum Height of Existing Cut Slope:	5'±
Maximum Thickness of Fill:	10'±

PHYSIOGRAPHIC SETTING

Geomorphic Province:	Transverse Range
Landform:	S'ly draining canyon with S'ly SW, and NE'ly facing side slopes
Drainage:	S'ly concentrated in W'ly gulley draining into Mission Hills Road
Rainfall:	16½ annual (State Water Rights Board, San Fernando Valley References, December, 1960, 85-year mean)
Climate:	Mediterranean
Temperature:	62.3°F mean (1940-49) Maximum - 114°F Minimum - 22°F (States Water Rights Board, San Fernando Valley References, December, 1960.)
Vegetation:	Rye Grasses, mustard, wild sage greasewood, wild flowers, melba weed, caster bean, sunflower, bamboo, sumac, toyan, trees - citrus, avacado, eucalyptus, rubber, sycamore

LOCATION MAP



This Map is Not a Survey of the Property. (From CDMG Bulletin 196,1974)

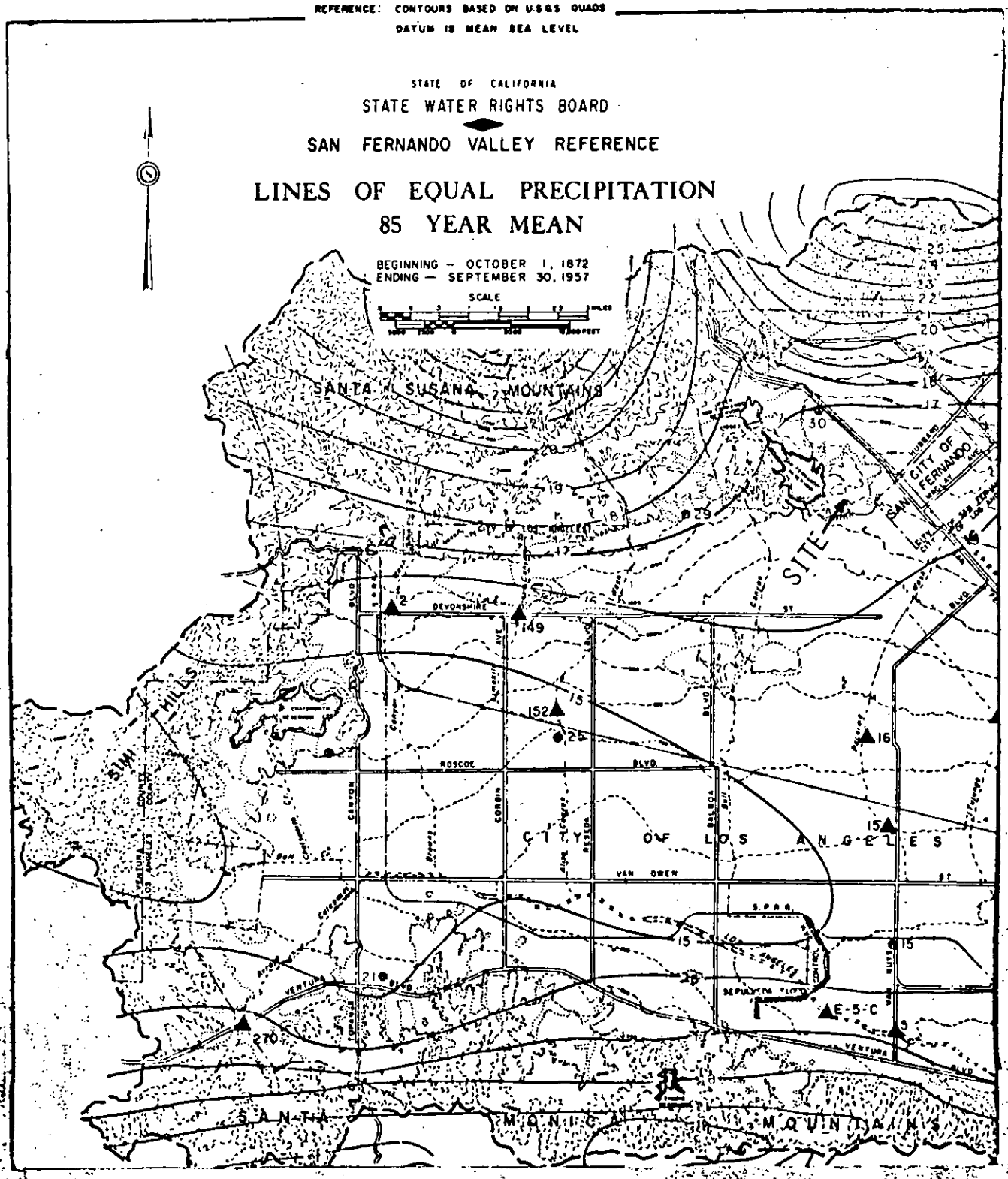
Robert Stone & Associates, Inc.



From Hakimian Engineering

ROBERT STONE & ASSOCIATES
ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES

JOB NUMBER: 2159-00		DATE: 2/21/84	
SCALE:	APPROVED BY: MS	DRAWN BY:	
		REVISED:	



(From San Fernando Valley Reference, 1960)

ROBERT STONE & ASSOCIATES ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES		
JOB NUMBER: 2159-00		DATE: 2/21/84
SCALE:	APPROVED BY: MS	DRAWN BY: REVISED:

Infiltration: Poor to Average

Erosion Hazard: Slight to moderate, high where water is concentrated

ENGINEERING GEOLOGY

GENERAL SETTING

The subject site is located in the southeasterly foothills of the Santa Susana Mountains facing southerly toward San Fernando. It is part of a northwesterly trending spur ridge extending outward from a larger northerly trending ridge just easterly of the lower Van Norman Dam. It is located between I5 and I405 and northerly of Mission Hills Road.

The site drainage sheet flows east and west toward southerly draining ravines.

ACKNOWLEDGEMENT

The City of Los Angeles Department of Water and Power has a 150' wide electric power easement through the westerly and northwesterly portion of the property. We received permission to trench in their right-of-way in our fault investigation and thank them for their cooperation. We also thank Mr. Henry Mayada geologist, Department of Water and Power for groundwater data relative to the Verdugo Fault barrier within and adjacent to the site. We thank Mark Oborne, geologist with Hakimian Engineering, for his assistance in trench logging and mapping.

EARTH MATERIALS

The subject site is underlain by artificial fill (Af), topsoil (ts), Recent alluvium, older alluvium and the Modelo Formation of Middle to Late Miocene Age.

ARTIFICIAL FILL (Af)

Artificial fill is a thin mantle along the access driveway and a thick earth berm located along the northerly property line. Fill is also located around the periphery of the abandoned residence. All fill materials are derived from the bedrock, alluvium, and the road grading. It is composed of clayey fine to coarse sand, sandy silt and silty sand. It is dark to medium brown, moist, massive, and soft to loose. These fills appear to be unengineered.

TOPSOIL (Ts)

A thick topsoil mantle covers the site. It is comprised of sandy silt, sandy and clayey sand matrix with gravel size fragments of bedrock. It is dry to moist, dessicated and loose to firm, massive porous and contains roots, worm borings and gopher burrows.

ALLUVIUM (Qal)

Recent alluvium mantles the drainage areas. The alluvium is composed of sandy clayey silt, silty sand and silt. It is dark brown to rust red brown, massive, moist, porous, contains caliche mottling and minor pebbles and roots.

OLDER FLOOD PLAIN DEPOSITS (Qos)

The older alluvium underlies the younger alluvium in the northeasterly portion of the site and underlies the topsoil in the southerly and southeasterly sectors. There are several distinct units in the site area and they are dipping primarily to the north at about 15° plus.

Unit (1): A thick conglomerate sand underlies most of the easterly portion of the site. It is reddish brown coarse grained sand matrix with cobbles and boulders up to 3' to 4' diameter. There are interbeds of fine sand and clayey silt and gravel layers.

Unit (2): Overlying the conglomerate is a mottled rust-red fine silty sand.

Unit (3): The upper unit is an olive gray fine silty sand and silt, porous, wet, massive with some cross-bedding and caliche.

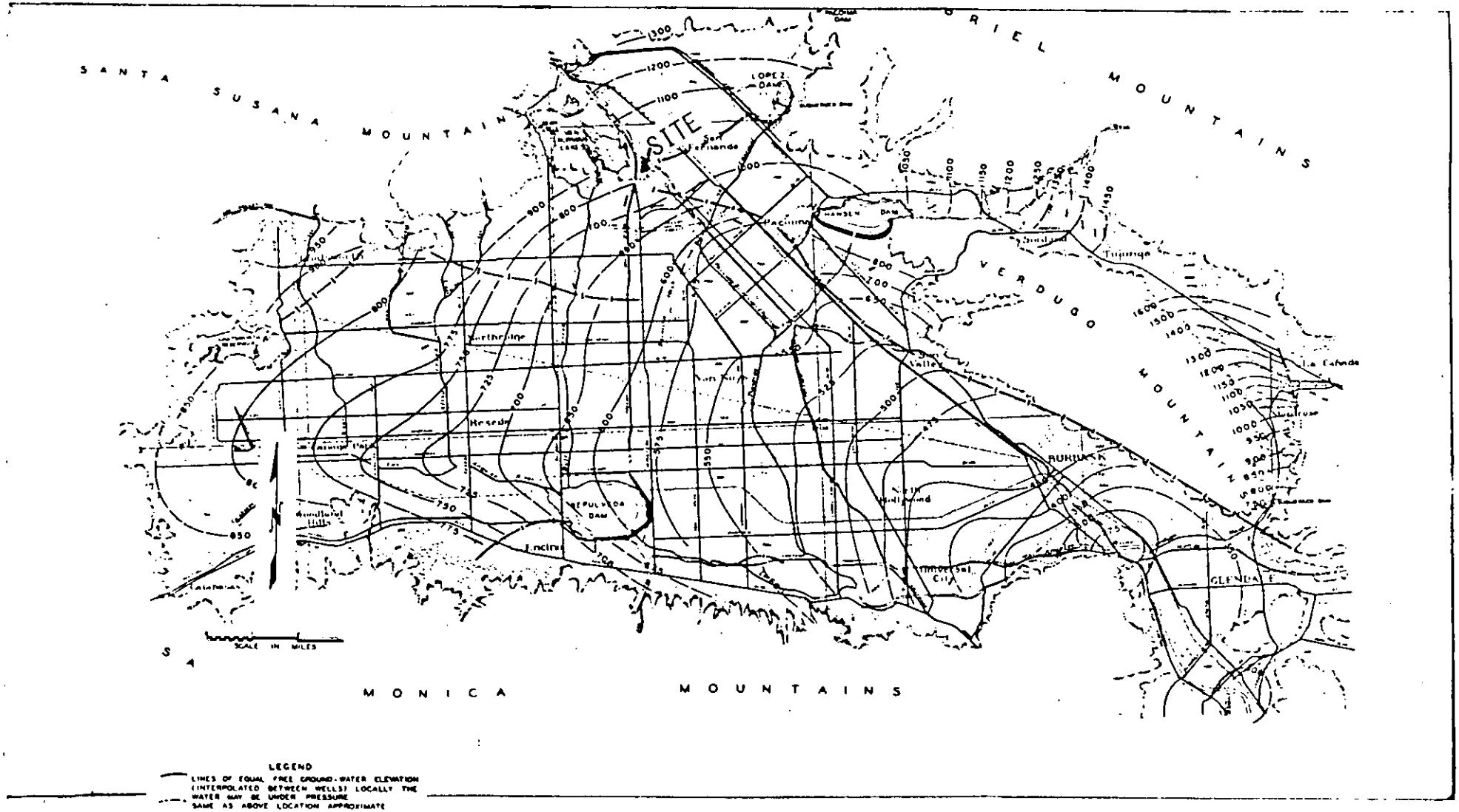
BEDROCK

The bedrock underlying the westerly portion of the site belongs to the Modelo Formation (Tm) of Middle to Late Miocene Age. It consists primarily of siltstone, diatomaceous shale, silty sandstone and massive pebble and gravel conglomerate with a fine to coarse grained sand matrix. The massive conglomerate is rust to light brown and rust gray; friable and porous on the surface, moist and contains sand and gravel lenses. Conglomerate is prevalent along the westerly power alignment and gulley area. The conglomerate is overlain by silty sandstone, sand and siltstone; gray and rust; slightly bedded to massive and steeply jointed. The joints are calcium filled.

Underlying the conglomerate is diatomaceous shale and siltstone claystone and fine grained sandstone. It is olive gray and green with white caliche and rust staining. It is thin bedded, vertically fractured, moist to wet and firm.

GROUNDWATER

Water levels have historically changed drastically from the north to the south side of the Verdugo Fault. This was investigated in the 1960 San Fernando Valley Reference. They indicated a 10' or less change in water levels between 1931 and 1958. Mr. Hank Mayeda Groundwater Geologist with the D.W.P. provided us with the 1983 water levels adjacent to the site. It shows a groundwater cascade across the Verdugo Fault with water level drops of 240.8' to 303.5' along the south side of the fault near the site area. Within the site area, the water levels range from 9' to 13' northerly of the fault and 24' to 40'+ southerly of the fault.



LEGEND

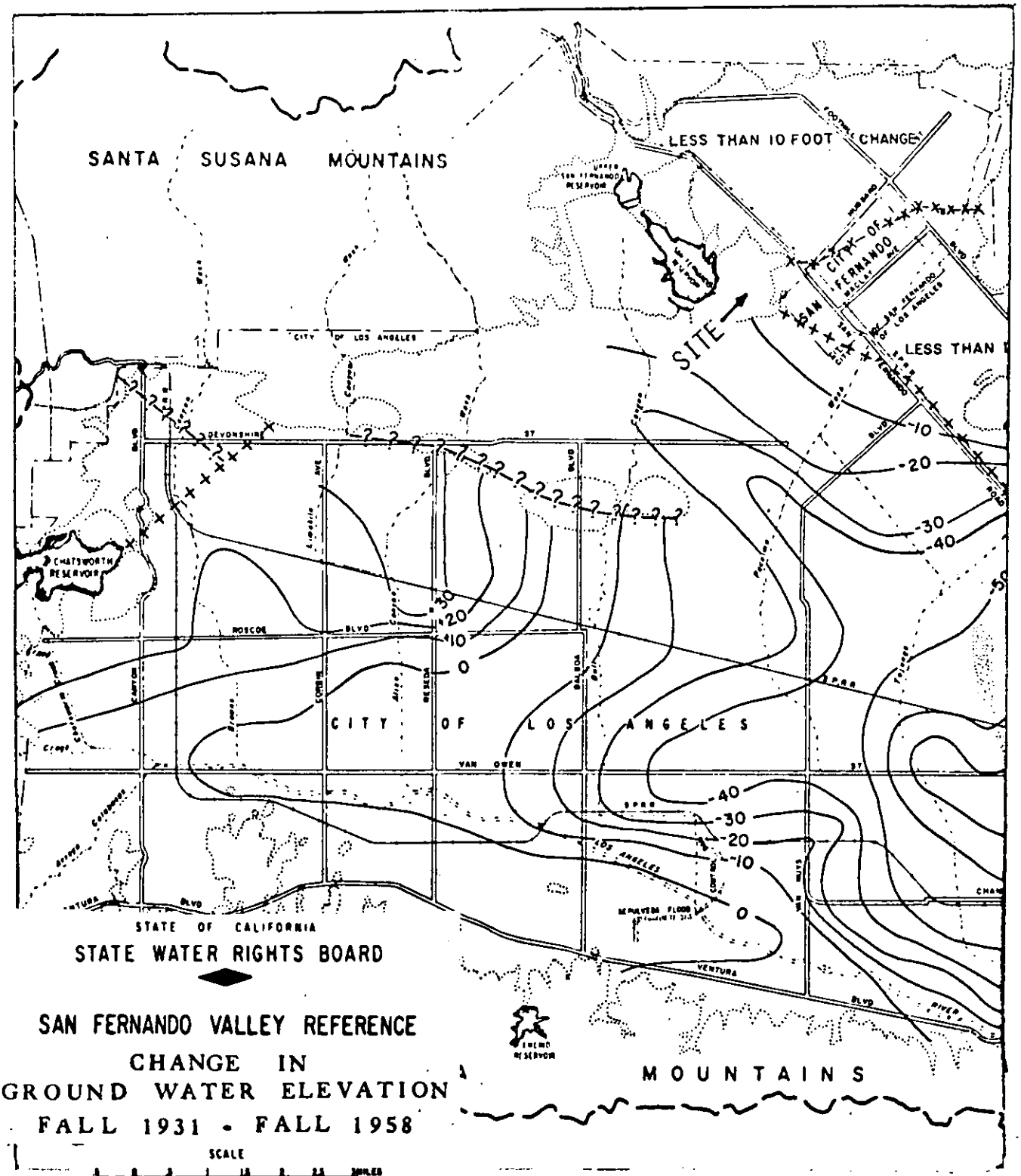
- LINES OF EQUAL FREE GROUND-WATER ELEVATION (INTERPOLATED BETWEEN WELLS) LOCALLY THE WATER MAY BE UNDER PRESSURE
- SAME AS ABOVE LOCATION APPROXIMATE
- RESTRICTIONS OR BARRIERS TO GROUND-WATER MOVEMENT (GEOLOGIC AND/OR HYDROLOGIC)
- GROUND SURFACE CONTOURS
- SPREADING GROUNDS
- FLOWING WELL
- REACH OF RISING WATER
- CHANNEL, IMPERVIOUS LINING, SIDES AND BOTTOM
- CHANNEL WITH BOTTOM OPEN; SIDES IMPROVED
- NATURAL STREAMBED

SAN FERNANDO VALLEY
GROUNDWATER CONTOURS
FALL 1975

(From LACFCD Hydrodogic Report 1975-76)

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STATE OF CALIFORNIA

STATE WATER RIGHTS BOARD

SAN FERNANDO VALLEY REFERENCE

CHANGE IN GROUND WATER ELEVATION

FALL 1931 - FALL 1958

SCALE

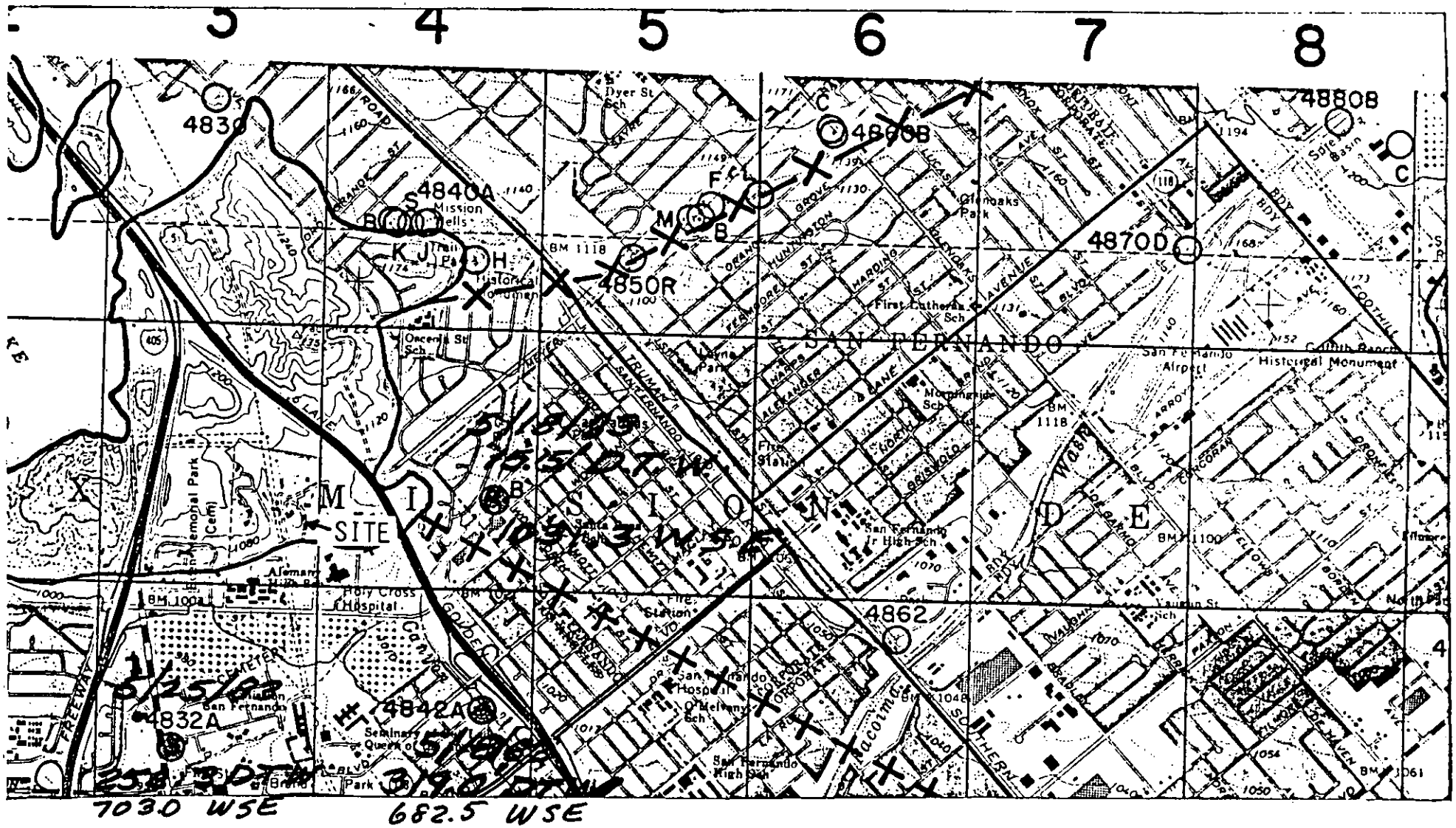
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ROBERT STONE & ASSOCIATES

ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES

JOB NUMBER: 2159-00		DATE: 2/21/84	
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Water Levels each side of the Verdugo Fault

Courtesy of
Mr. Hank Mayeda
City of L.A. DWP

ROBERT STONE & ASSOCIATES, INC.
ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES

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STRUCTURAL GEOLOGY

Considerable faulting occurred throughout the development of the Santa Susana and San Gabriel Mountains and foothills. Small faults and shears are numerous throughout adjacent areas. The main structural feature within the site area is the Mission Wells Fault Segment northerly of the site and the Mission Hills Fault Zone southerly of the site that is associated with the Sierra Madre Fault Zone. The Verdugo Fault or a splay fault related to the Verdugo Fault, passes through the northeast portion of the site. The Mission Hills Anticline is inferred northerly of the site. We infer an Anticline through the D.W.P. electrical towers northwesterly of the residence and pool.

Bedding planes in the Modelo Formation and within the older alluvium are oriented near east-west to N50W and dip 10° to 42° northerly. The general dip is 10° to 17° north. Bedding planes along and adjacent to the fault north-northwest of the site are oriented N50°W. Jointing in the siltstone and silty sandstone are steep, 60° to vertical.

Bedding planes southerly of the anticlinal fold in the D.W.P. road are oriented N50-60E and dip 40° to 70° southeasterly.

The fault measured in Trenches T-4 through T-6 was oriented primarily N50W with dips of 68° to 75° southwesterly. The upper few feet of the fault flattens to 45° to 55°. The fault was not found in Trenches T-7 through T-12 in the northeasterly portion of the site. However, we infer it along a projection of N60° to 70°W at locations of high water (9' to 13' depth in the northerly ends of Trenches T-7, T-8, T-9, T-11 and T-12.

SEISMICITY

The Verdugo Fault or splay fault related to the Verdugo Fault passes within the northeasterly portion or immediately adjacent to the subject site. Historical records of earthquakes indicate moderate seismic activity adjacent to the immediate area of the site. The Seismic Index Map of the Los Angeles Basin shows epicenters for earthquakes greater than 4.0 magnitude, occurring between 1934 and March 1973. Many of these, depending on their distance, were large enough to be felt at the subject site (See the Seismic Index Map). Ground rupture and liquefaction during the 1971 San Fernando earthquake were located less than ½ mile northerly of the site.

The most probable major earthquake sources of significance for the subject site are the San Andreas Fault Zone located about 25 miles to the northeast and the Sierra Madre and Newport-Inglewood Fault Zones which lie 0-3 miles and 18 miles, to the north and southwest, respectively. These faults will most likely be associated with future moderate to major earthquakes and are considered the controlling faults relative to the seismic design of the subject site. (See Table I and Table II for their Maximum Probable Earthquake Parameters and Table III for their Maximum Credible Earthquake Parameters.)

The performance during earthquakes, of well-designed and constructed one and two-story wood frame structures that are founded on dense rock materials has generally proven to be satisfactory.

The acceleration of 0.60g probable and 0.68g credible noted in Tables II and III summary are a peak ground acceleration anticipated during an anticipated magnitude 6.3 and 6.7 (Richter) earthquake

epicentered 0-3 miles from the site. Most available data are located 20 miles or more from the epicenter or fault. Few records are available within 0 to 10 miles of the causative faults. Therefore, these procedures may be even less reliable in the predication of ground motions immediately adjacent to the causative fault than that of greater epicentral distances.

Slosson and Ploessel (1974) are in concurrence with Page and others (1972) that have noted that a single peak of intense motion (maximum or peak acceleration) may contribute less to the cumulative damage potential than several cycles of less intense shaking. Therefore, repeated high-ground acceleration should be of greater concern in structure design than the single peak of maximum accelerations. Their results indicate that the repeatable high-ground acceleration average 65 percent of the maximum (peak) acceleration.

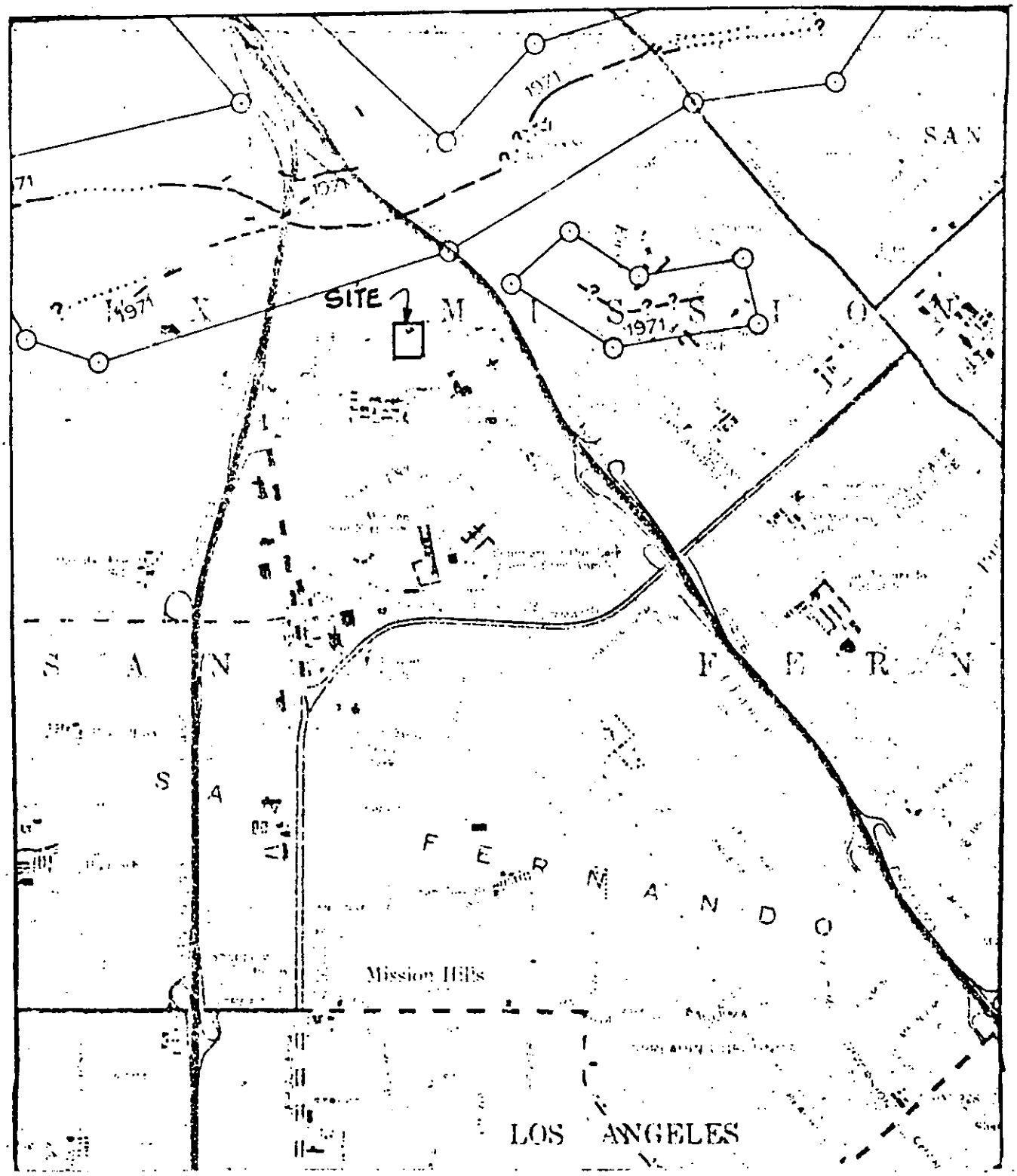
The (0.39g to 0.44g) repeatable high-ground acceleration for design consideration is a scientific parameter and is not directly related to or equal in value to the equivalent lateral forces specified for seismic design in the building code. Moderate to high ground shaking is anticipated during the lifetime of the proposed structures. It is our understanding that the average wood-frame structure, built according to current building codes, can generally withstand ground motions up to 0.30g$\pm$ for short durations of shaking without showing major stress. Your structural designer should be made aware of the above data and should use whatever design criteria assures of an acceptable risk for the proposed development. Moderate to high ground shaking is anticipated at the site during the lifetime of the site structures and maximum code values should be utilized in your structural design.

GROUND RUPTURE POTENTIAL

The site is located outside the Alquist-Priolo Special Study Zone. The ground rupture potential is most likely moderate to high in the northeast portion due to the silty sand and high water table adjacent to and within the fault and due to the potential seismicity of the western segments of the Sierra Madre Fault Complex. Evidence of recent ground rupture was found within the site and on adjacent sites as shown on the City Engineers maps of the San Fernando Earthquake ground rupture.

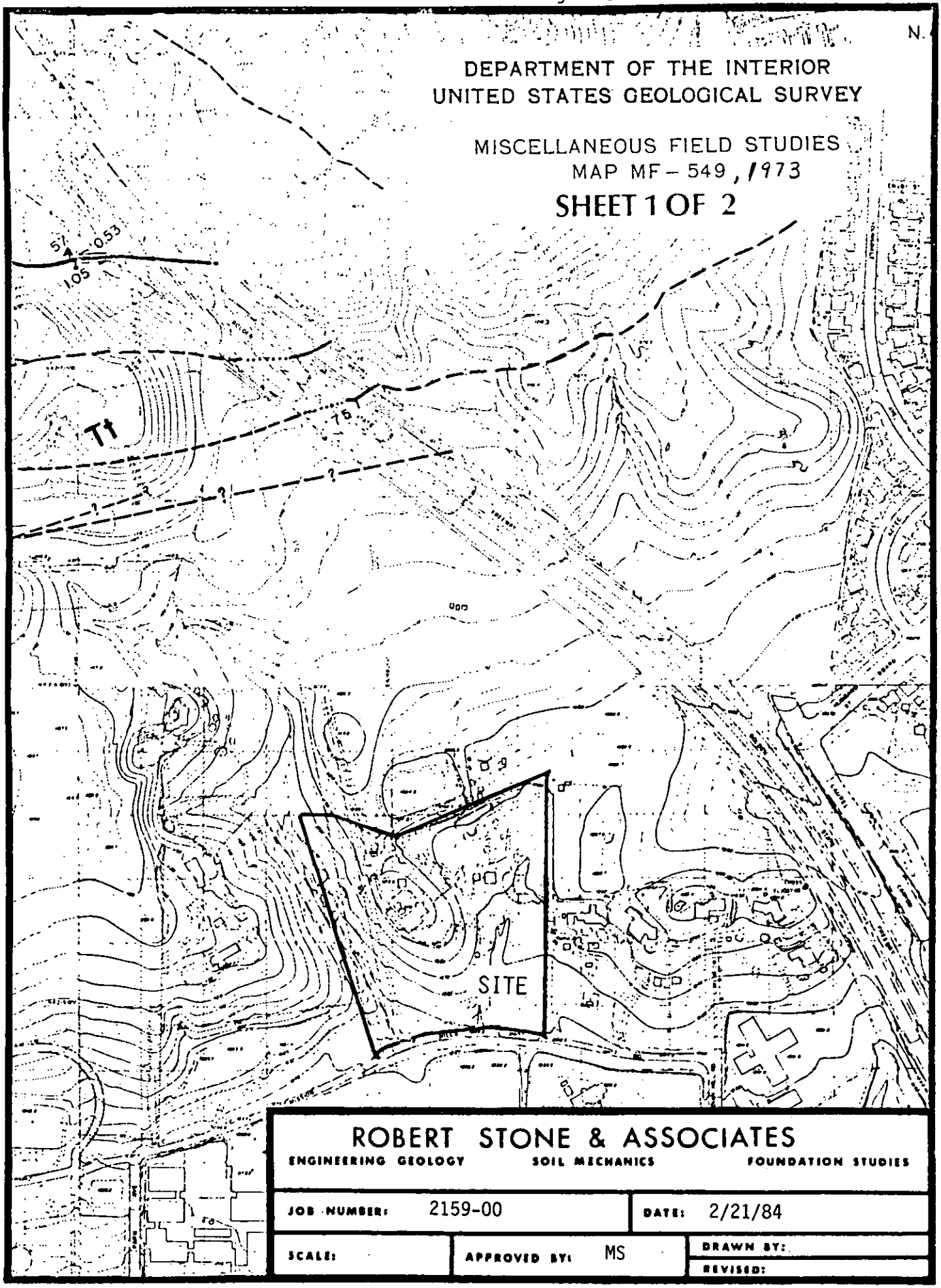
LIQUEFACTION

The Liquefaction Potential Map of the San Fernando Valley by T.L. Youd and others shows the site area as having a very low potential. However, we feel that the area northely of the inferred fault trace has a potential for liquefaction due to the silty sand and high water table. Sand boils and liquefaction was prevalent adjacent to the Van Norman Reservoir during the 1971 earthquake and some surface breaks were noted by the city in the northeasterly portion of this site.



(From CDMG Alguist-Priolo Special Study Zone Maps) 1/1/79

ROBERT STONE & ASSOCIATES		
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SCALE:	APPROVED BY: MS	DRAWN BY:
		REVISED:


N.
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY
MISCELLANEOUS FIELD STUDIES
MAP MF-549, 1973
SHEET 1 OF 2
57
053
105
Tt
75
SITE
ROBERT STONE & ASSOCIATES
ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES
JOB NUMBER: 2159-00
DATE: 2/21/84
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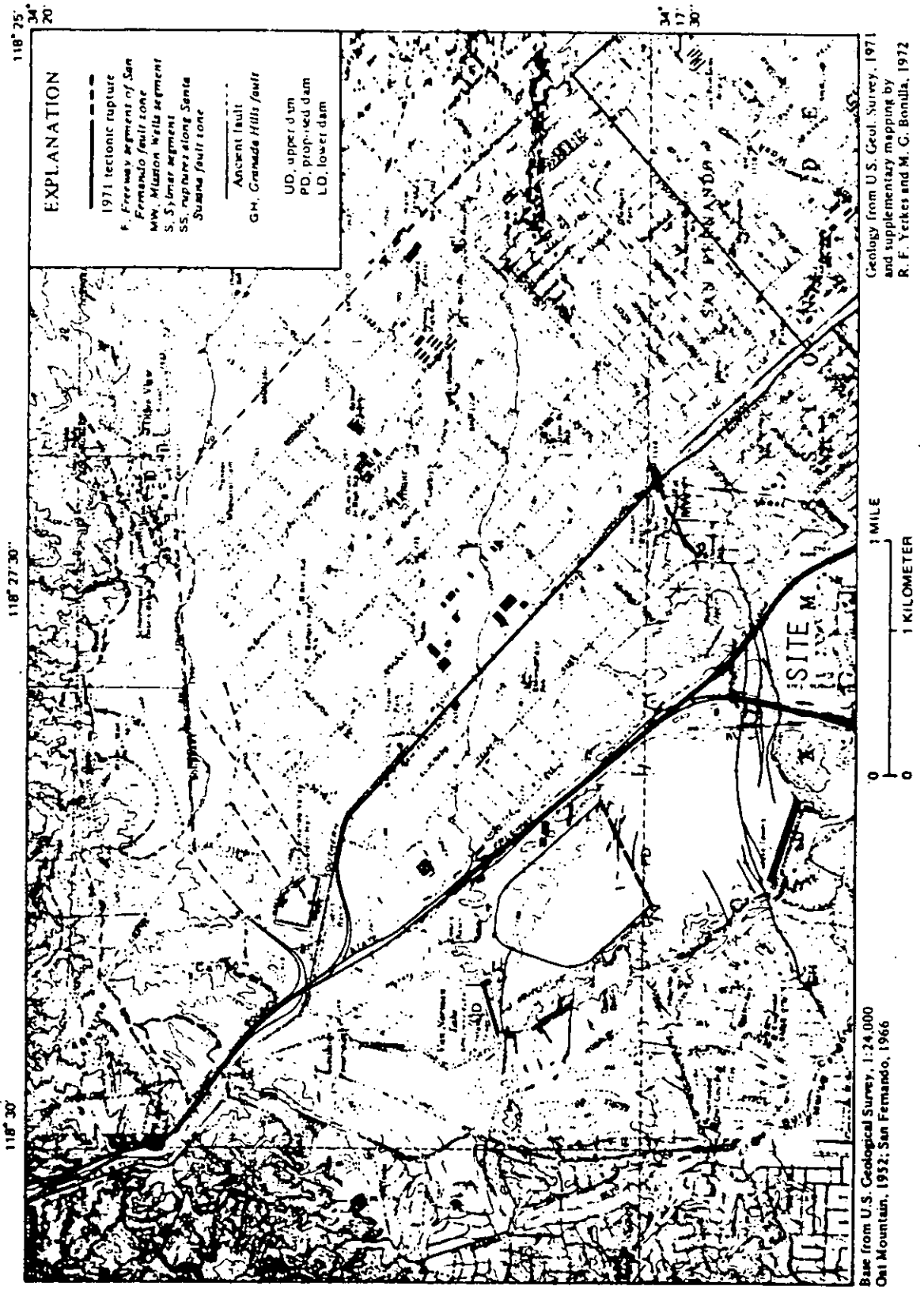
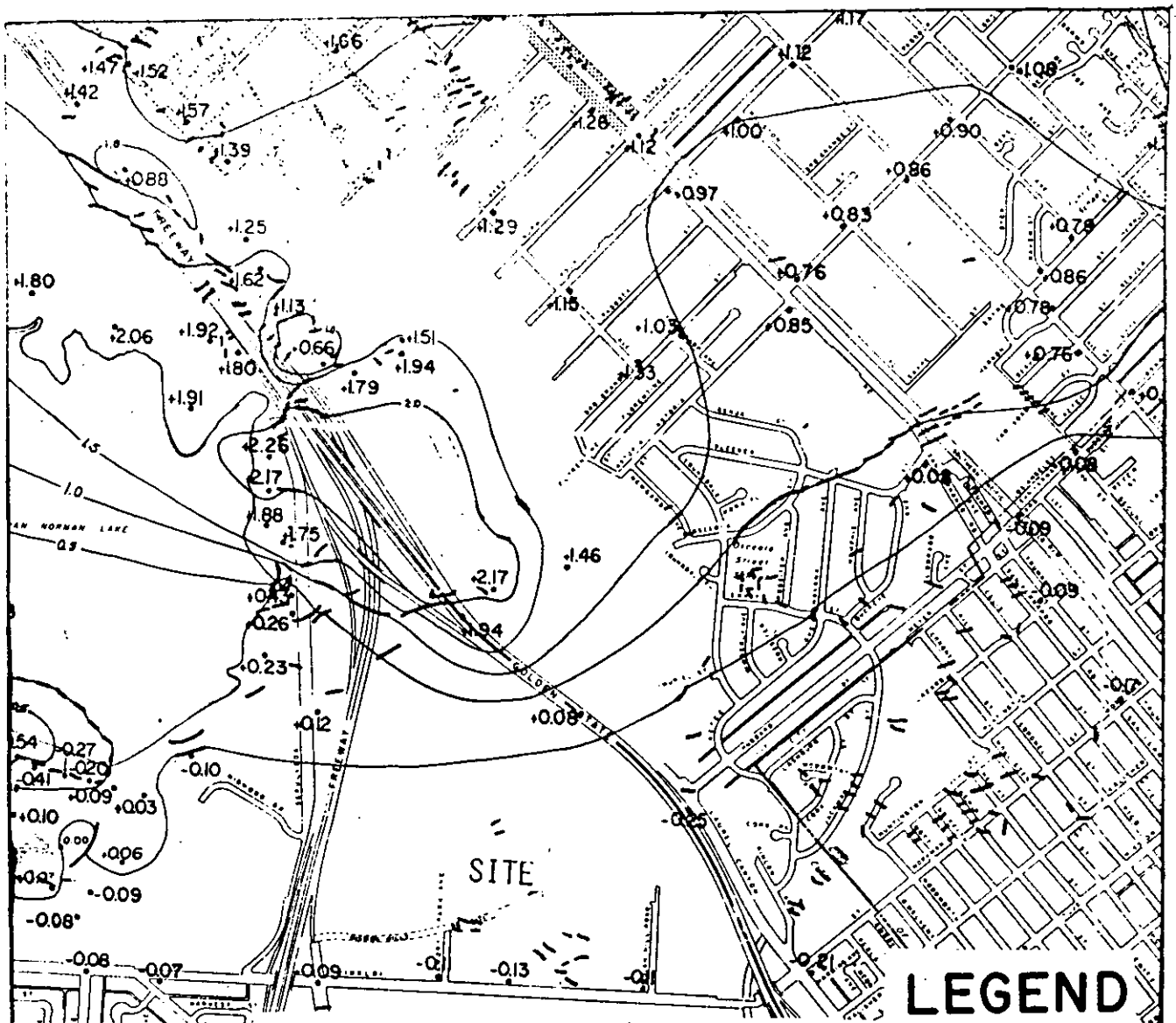


FIGURE 3.—Northern San Fernando Valley showing 1971 ruptures and ancient faults.

ROBERT STONE & ASSOCIATES
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LEGEND

Bench Marks with Vertical Displacement shown •x

Surface Breaks (dashed where poorly defined) ——— – –

Verticle Displacement Contour Lines ——xx——

Horizontal Displacements:

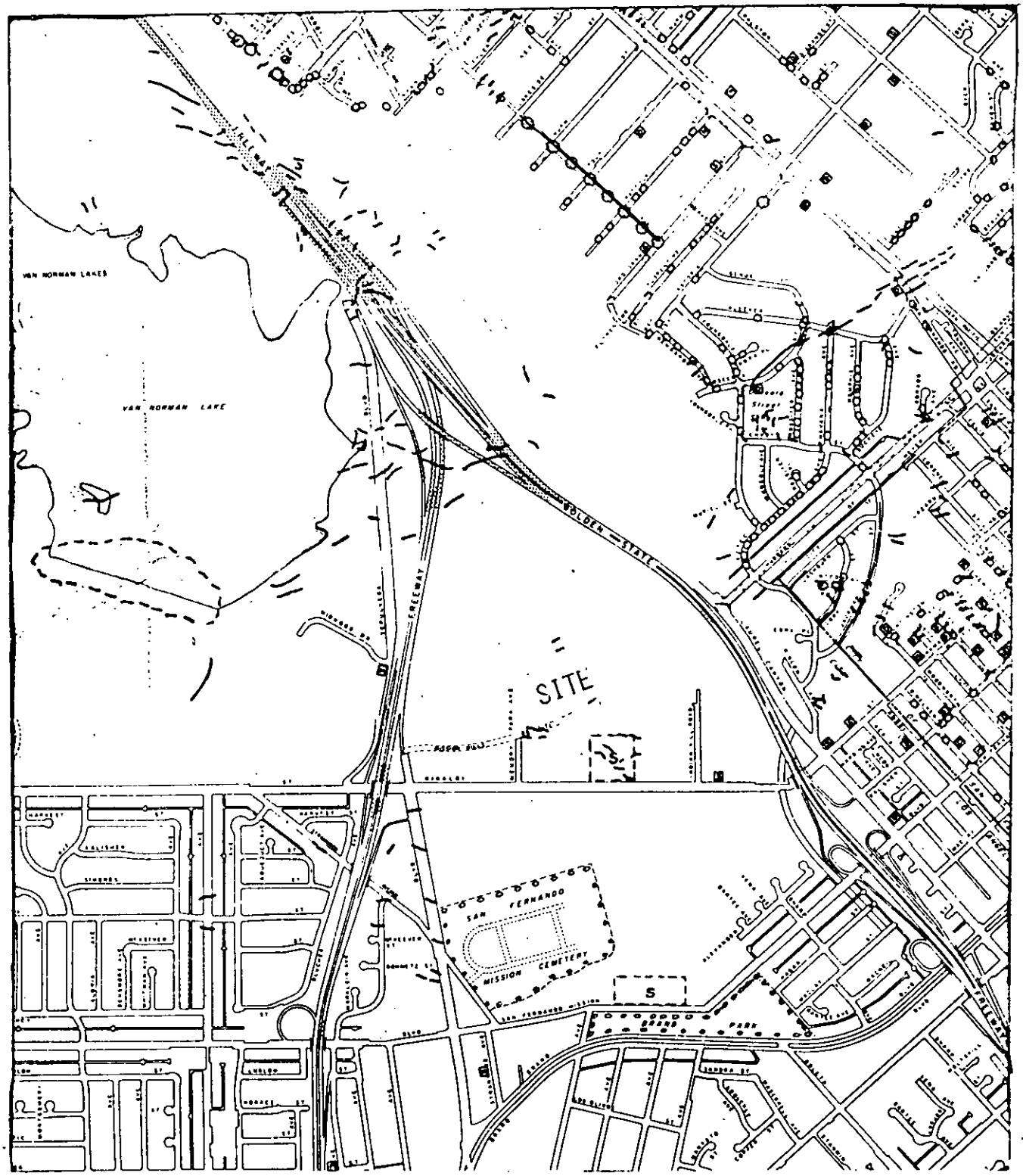
-6.0' to -5.0'	-1.0' to 0.0'
-5.0' to -4.0'	0.0' to +1.0'
-4.0' to -3.0'	+1.0 to +2.0'
-3.0' to -2.0'	+2.0 to +3.0'
-2.0' to -1.0'	

SCALE

1 inch = 1500 feet

(From City of L.A. Bureau of Engineering 1972)

1500 750 0 1500 3000 4500 6000



(From City of L.A. Bureau of Engineering, Sept. 1972)

Fault and Surface Breaks during 1971 San Fernando Earthquake

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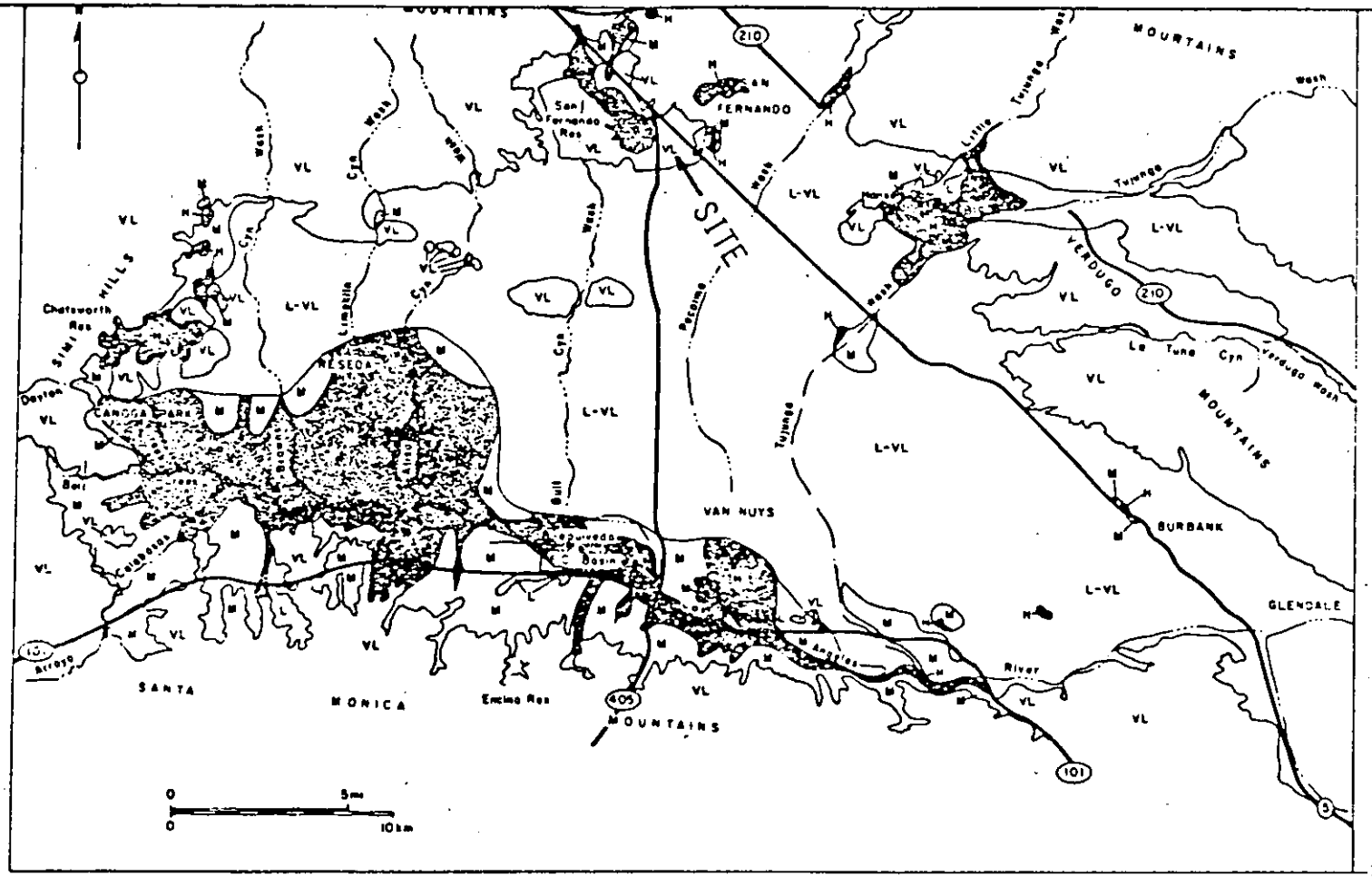


Fig. 3. Zonation map for the San Fernando Valley showing probable susceptibility to liquefaction. Site-specific geotechnical investigations are required to determine susceptibility at a given locality. This map is also a liquefaction potential map with a return period of 46 years for shaking strong enough to cause liquefaction

Liquefaction Potential Map of San Fernando Valley, California by T.L. Youd , J.C. Tinsley , D.M. Perkins , E.J. King and R.F. Preston

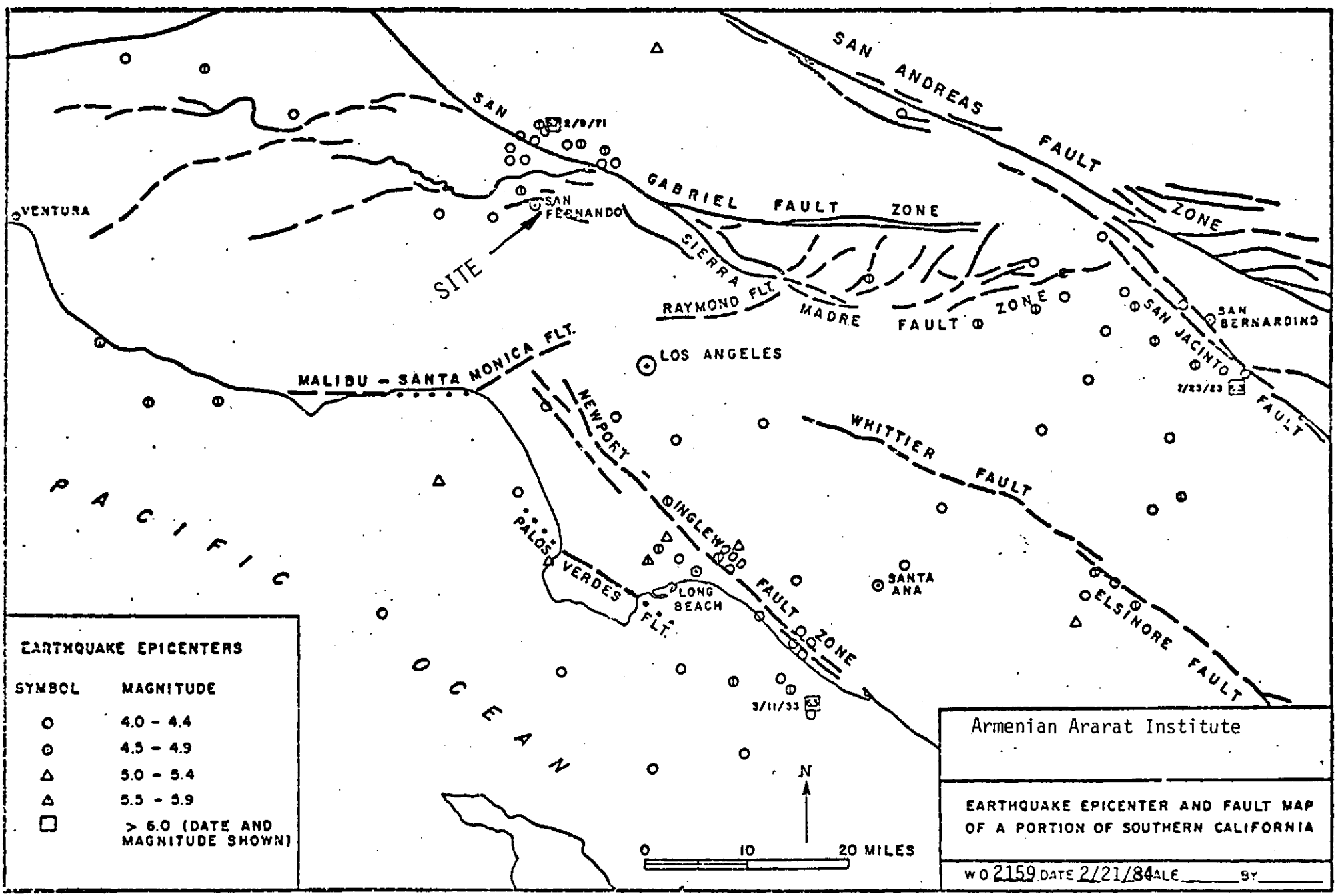
Progress on Seismic Zonation in the San Francisco Bay Region

1979

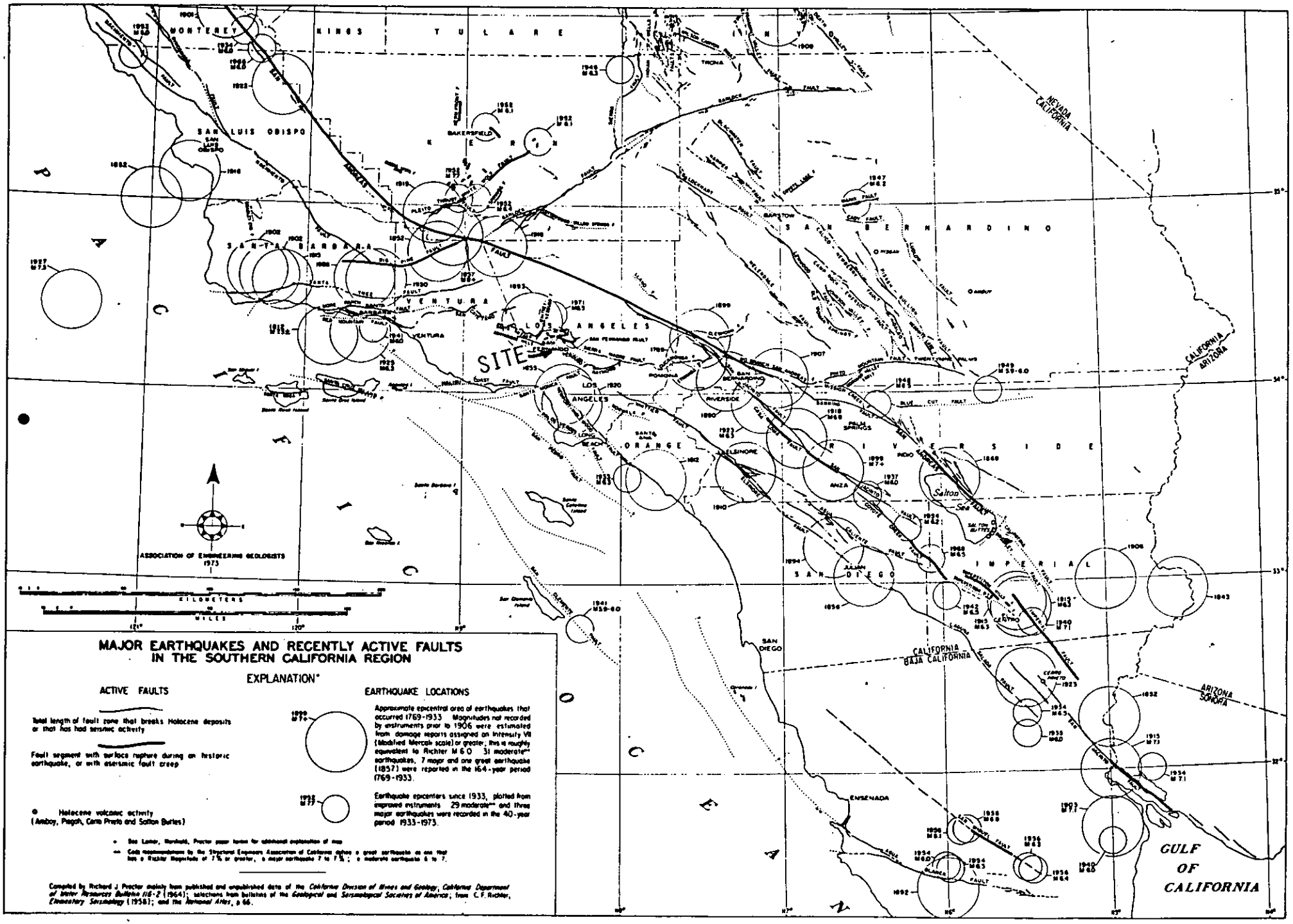
GEOLOGICAL SURVEY CIRCULAR 807

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Modified from Bulletin No. 116-2, Calif. Dept. Water Resources, 1964



MAJOR EARTHQUAKES AND RECENTLY ACTIVE FAULTS IN THE SOUTHERN CALIFORNIA REGION

EXPLANATION*

ACTIVE FAULTS

Total length of fault zone that breaks Holocene deposits or that has had tectonic activity

Fault segment with surface rupture during an historic earthquake, or with aseismic fault creep

Holocene volcanic activity (Amboy, Pisgah, Cerro Prieto and Salton Buttes)

EARTHQUAKE LOCATIONS

Approximate epicentral area of earthquakes that occurred 1769-1933. Magnitudes not recorded by instruments prior to 1906 were estimated from damage reports assigned an intensity VII (Modified Mercalli scale) or greater; this is roughly equivalent to Richter M 6.0. 31 moderate** earthquakes, 7 major and one great earthquake (1857) were reported in the 164-year period 1769-1933.

Earthquake epicenters since 1933, plotted from improved instruments. 29 moderate** and three major earthquakes were recorded in the 40-year period 1933-1973.

* See Lamar, Marshall, Proctor paper herein for additional explanation of map

** Code recommendations by the Structural Engineers Association of California define a great earthquake as one that has a Richter Magnitude of 7½ or greater, a major earthquake 7 to 7½; a moderate earthquake 6 to 7.

Compiled by Richard J. Proctor mainly from published and unpublished data of the *California Division of Mines and Geology, California Department of Water Resources Bulletin 116-2* (1964); selections from bulletins of the *Geological and Seismological Societies of America*; from C.F. Richter, *Elementary Seismology* (1958); and the *National Atlas*, p 66.

TABLE I
SUMMARY OF ACTIVE & POTENTIALLY ACTIVE FAULTS
AND THEIR EARTHQUAKE PARAMETERS

CLASSIFICATION	FAULT	DISTANCE TO EPICENTER (Miles)	MAXIMUM HISTORICAL EARTHQUAKE MAGNITUDE (RICHTER)	ESTIMATED MAXIMUM EARTHQUAKES			
				MAX. CREDIBLE[1]		MAX. PROBABLE[2]	
				Magnitude (Richter)	Est. Recurr. Interval (Yrs)	Magnitude (Richter)	Est. Recurr. Interval (Yrs)
ACTIVE Controlling Seismic Events	San Andreas	25	8.0± 0.5 (1857) 6.5 (1948)	8.25	> 200	8.0	50-200[3]
	San Fernando-Sierra Madre	0-3	6.6 (1971)	6.7	> 200	6.3	50-200
	Newport-Inglewood	18	6.3 (1933)	7.3	> 300	6.7	50-150
	Malibu Coast-Santa Monica	18	6.0	6.8	> 500(?)	6.3	200(?)
POTENTIALLY ACTIVE Other Regional & Local Seismic Events	Santa Ynez	45	--	7.5	> 500(?)	7.0	300(?)
	San Gabriel	7	--	7.5	↓	7.0	↓
	Red Mt.-San Cayetano (4)	19	--	6.9	↓	6.4	↓
	Oak Ridge	20	--	6.8	↓	6.2	↓
	Simi-Northridge	3	--	6.7	↓	6.2	↓
	Santa Susana	9	--	6.5	↓	5.9	↓
	Sycamore Canyon (5)	25	--	6.4	↓	5.7	↓
	Boney Mtn. (5)	23	--	6.1	↓	5.5	↓
	Conejo (5)	25	--	5.8	↓	5.2	↓

(1) Based on 1/2 fault length; magnitudes after Bonilla.
(2) Bases on 1/5 fault length.
(3) Wallace, R.E. (4) Probably active by State criteria.
(5) Tentative classification.

TABLE II

MAXIMUM PROBABLE EARTHQUAKES

(To be Considered for Aseismic Design of Most Structures)

CAUSATIVE FAULT	DISTANCE FROM CAUSATIVE FAULT (Miles)	RICHTER MAGNITUDE	MAXIMUM BEDROCK ACCELERATION(1) (g)	PREDOMINANT PERIODS(2) (Seconds)	BRACKETED DURATION(3) (Seconds)
San Andreas Fault Zone	25	8.0	0.28	0.40	29
San Fernando-Siera Madre Fault Zone	0-3	6.3	0.60	0.27	8 - 13
Newport-Inglewood Fault Zone	18	6.7	0.21	0.30	17 - 19
Malibu Coast-Santa Monica	18	6.3	0.18	0.27	14 - 16

(1) Base Rock Motion (Schnabel & Seed, 1972)

(2) Seed, Idriss & Kiefer, 1969

(3) Leeds, 1973

TABLE III

MAXIMUM CREDIBLE EARTHQUAKES

(To be Considered for Aseismic Design of Most Structures)

CAUSATIVE FAULT	DISTANCE FROM CAUSATIVE FAULT (Miles)	RICHTER MAGNITUDE	MAXIMUM BEDROCK ACCELERATION(1) (g)	PREDOMINANT PERIODS(2) (Seconds)	BRACKETED DURATION(3) (Seconds)
San Andreas Fault Zone	25	8.25	0.31	0.43	29
San Fernando-Siera Madre Fault Zone	0-3	6.7	0.68	0.30	8 - 13
Newport-Inglewood Fault Zone	18	7.3	0.28	0.34	17 - 19
Malibu Coast-Santa Monica	18	6.8	0-22	0.30	14 - 16

(1) Base Rock Motion (Schnabel & Seed, 1972)

(2) Seed, Idriss & Kiefer, 1969

(3) Leeds, 1973

TABLE IV

Fault	Slip Rate (Cm/yr)	Length (Km)	Recurrance Intervals (yrs) at a Point on Fault (R_x)			Recurrence Intervals (yrs) over Length of Fault (R_t)		
			M 6	M 7	M 8	M 6	M 7	M 8
Northwest Trend Right-Slip								
San Andreas (southern segment)	3	500	10	40	200	3-1	3-10	40-100*
San Jacinto Fault System	0.3	440	100*	400*	2000	4-100*	40-100*	400-1000
Whittier-Elsinore-Agua Caliente-Laguna Salada	0.08	260	300	2000	6000	20-90	200-900	3000-9000
Northeast Trend Left-Slip								
Big Pine	0.2	95	100	600*	3000	20-100	300-1000*	3000-10,000
Garlock	0.8	250	30	200	600	2-10	30-90	300-900
Reverse and Thrust								
White Wolf	0.04	53	1000	2000*	4000	200-900	1000-5000*	8000-25,000
Sierra Madre Fault System	0.8	90	100*	300*	800	30-100*	100-600*	800-2000

*Most likely, based on historic record.

After Lamar, Merifield & Proctor "Earthquake Recurrance Intervals on Major Faults in Southern California" - AEG Special Publication, October 1973

CONCLUSIONS AND RECOMMENDATIONS

FAVORABLE ENGINEERING GEOLOGIC CONDITIONS

The subject site is considered geologically safe and feasible for development providing the soil engineering analysis is satisfactory.

1. No gross landslides are present within the site.
2. Bedrock bedding planes dip favorably into the existing slopes or are self supporting.
3. Bedrock is very hard and dense.
4. Groundwater problems are not in evidence in the southerly and westerly portions of the site.
5. Seismicity is tolerable for the development of wood frame structures.
6. Lot drainage may be properly provided for in design and construction.
7. No adverse geologic conditions preclude development of the site.

UNFAVORABLE ENGINEERING GEOLOGIC CONDITIONS

1. A branch of the Verdugo Fault passes through the northeast portion of the site.
2. Liquefaction potential exists in the northeasterly portion of the site.

GEOLOGIC GUIDELINES

The site is believed feasible for development as planned, providing the following guidelines and recommendations are considered and implemented as part of the design and construction.

1. All the existing artificial fill (Af), topsoil (ts) and Recent Alluvium (Qal) will be analyzed by the soil engineer relative to its competence, compressibility and stability.

2. The geologic structure is favorable relative to existing slopes and proposed structures.

3. Although there was no evidence of surface rupture potential along this portion of the Verdugo Fault, we feel that all habitable structures should be set back from the fault a minimum of 50' due to the fact that ground breaks did take place in the northeasterly site area during the 1971 earthquake. The northeasterly portion of the site could be used for parking lot, storage, part-time maintenance sheds, green belt or agricultural uses.

4. Liquefaction potential is considered high in the northeasterly sector. The rest of the site appears to have a very low liquefaction potential due to the coarse dense conglomeratic older alluvium and the siltstone, shale sandstone and conglomerate within the Modelo Formation as well as the lower water table conditions.

5. Trenches T-1 through T-6 in the D.W.P. right of way were compacted and tested by Hakimian Engineering. It took (2) days to compact with a hydraulic tamp. Trenches T-7 through T-13 were not compacted as tightly. If structures are planned in

the area of those trenches, the backfills should be removed and recompacted under the Soil Engineer's testing control.

6. Roof water and site drainage should be conducted to the drainage course in improved devices.

7. The structural design should consider the following aseismic parameters during a credible earthquake:

Acceleration	Period	Duration
0.68g	0.30 Seconds	13 Seconds

The repeatable high ground acceleration considered for purposes would average 65 percent of the (peak) acceleration. These are strong ground shaking parameters based upon a designed magnitude of 7.0 for a probable earthquake event located 3 miles from the site. They are scientific parameters and are in no way equal in value to or related to the equivalent lateral force specified for seismic design in the building code. The site will experience moderate to high ground shaking during the lifetime of the structures. Maximum code values for seismicity should be used in structural design.

8. Northerly facing cut slopes in the northerly portion of the site may intercept 15°± bedding plane conditions that may require stabilization. The steep 40°-70° southerly dips in the Modelo Formation in the southwesterly site area are self supporting in the area of proposed cuts.

9. Toe of fill's should be keyed into non-compressible materials to be determined by the soils engineer.

The geologic services that I rendered in this investigation were performed to the best of my ability, utilizing my best professional and ethical judgment at the time the work was performed. Conclusions and recommendations presented in this report are professional opinions, based upon current available data and do not constitute a warranty.

We appreciate being of service to you. If you have any questions, please do not hesitate to call.

Respectfully submitted,
ROBERT STONE & ASSOCIATES, INC.

Michael Scullin
Engineering Geologist, EG170

MS:cs

Encls. Log of Trenches T-1 thru T-12
Geologic Map
Bibliography and Seismic References
Air Photo Interpretation Sheet

Distribution: (7) Hakimian Engineering
(2) City of Los Angeles DWP

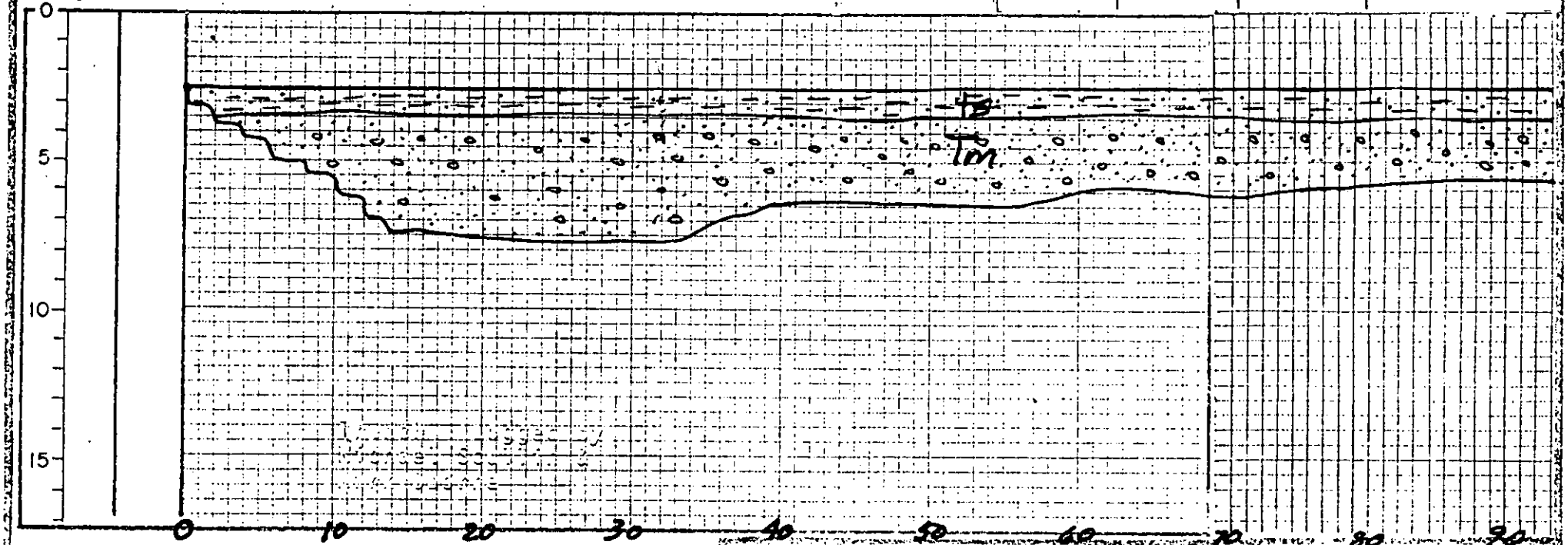
TEST PIT LOG T-1

0-2' Topsoil(ts): Sandy silt & Sandy clay; dessication cracks; dark brown; dry to moist, Massive; roots and minor cobbles.

2'-10' Bedrock: Modelo Formation(Tm); Medium grained sand with gravel and cobbles; rust brown; massive, moist, firm. Granitic cobbles.
Coarse sand and gravel, rust, moist, massive. Silty sand, rust gray, moist, caving characteristics.

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	
			No Apparent Structure

N 10° W



Trenches Logged by
Michael Scullin &
Mark Oborne

T-1

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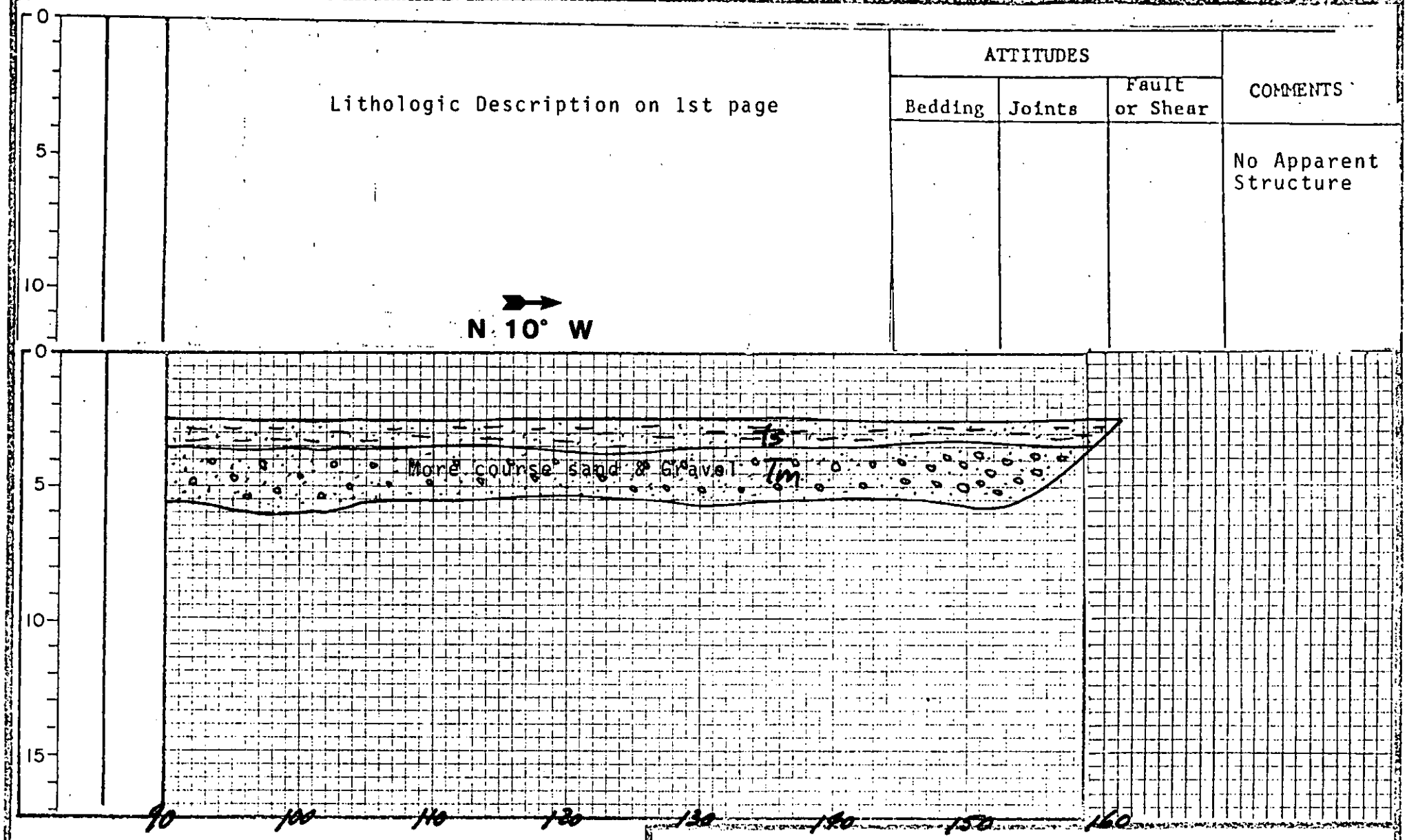
SCALE: 1"=10' M. Scullin&M. Oborne DRAWN BY: M. Oborne

REVISED:

TEST PIT LOG T-1 Cont.

Lithologic Description on 1st page

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	
			No Apparent Structure



Trenches Logged by
Michael Scullin &
Mark Oborne

T-1 Cont-

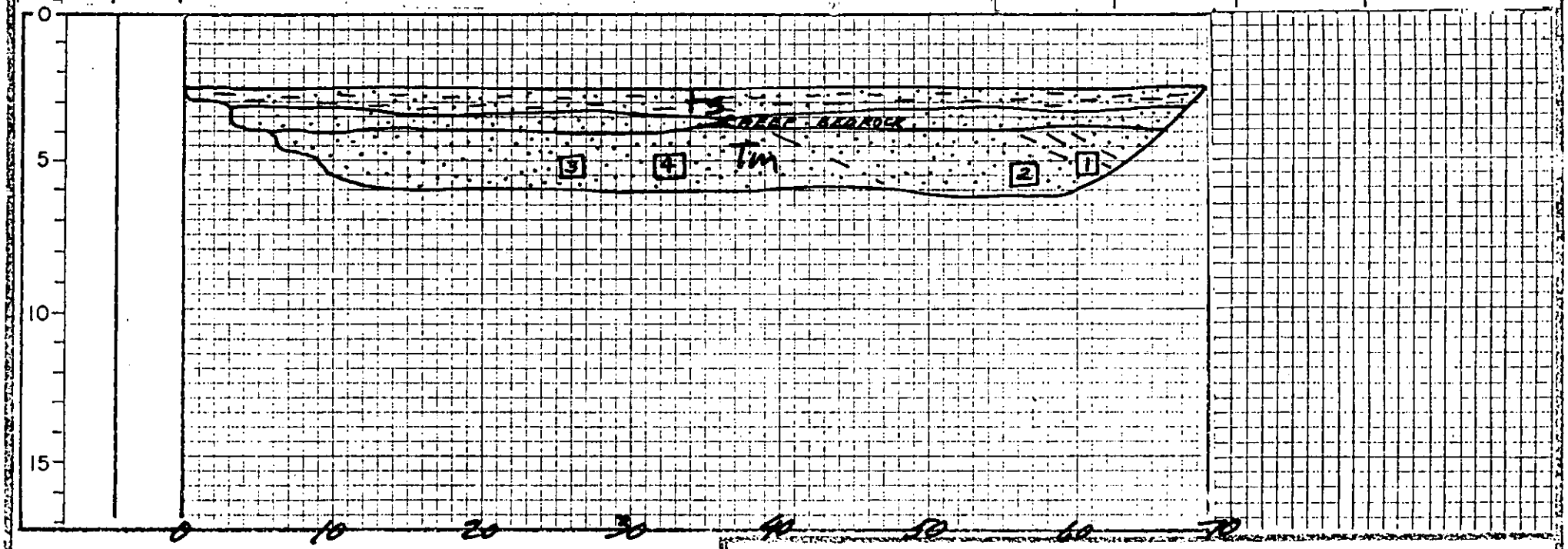
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SCALE: 1"=10'
M. Scullin&M. Oborne
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REVISED:

TEST PIT LOG T-2

		ATTITUDES			
		Bedding	Joints	Fault or Shear	COMMENTS
0-3'	Topsoil(ts): Silty Clayey sand; grayish brown; dessecation cracked; dry to slightly moist; massive; blocky.	1)N80W, 17N 2)N80E, 10NE 4)N50W, 10NE	3)N30W, 90		
3'-7'	Bedrock: Modelo Formation(Tm) silty sandstone, sand & siltstone; gray & rust; slightly bedded to massive; jointed.				

N 8° W



Trenches Logged by
Michael Scullin &
Mark Oborne

T-2

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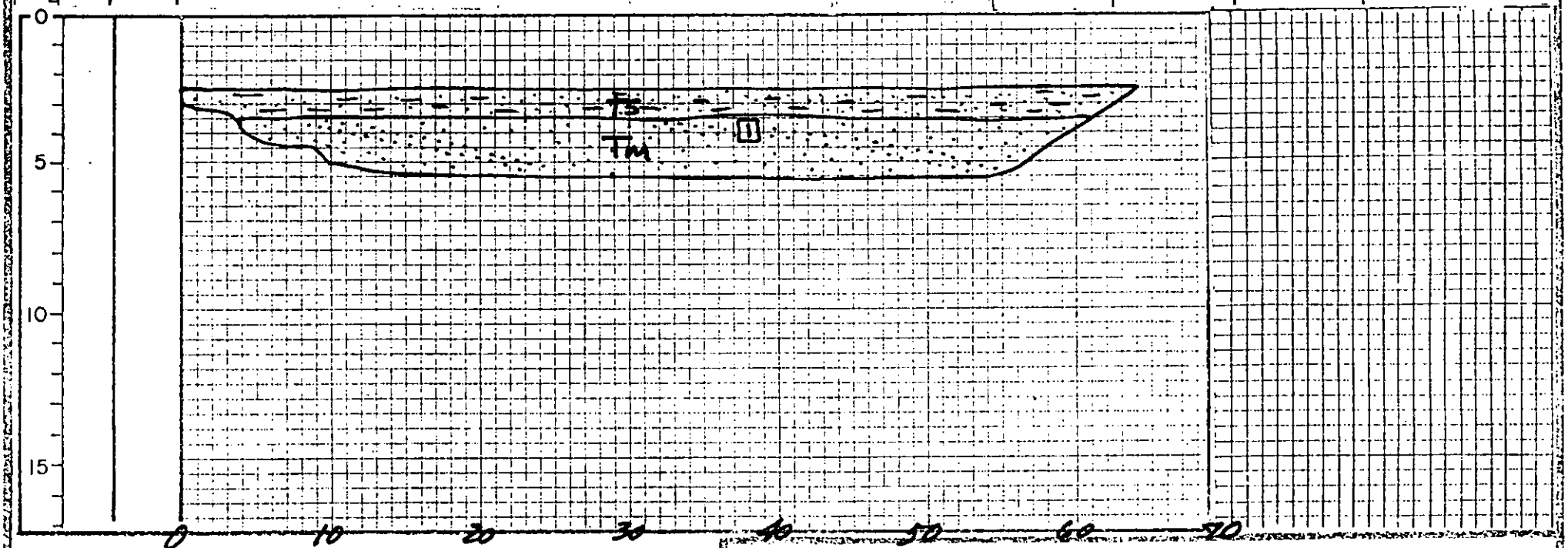
SCALE: 1"=10' M. Scullin&M. Oborne DRAWN BY: M. Oborne

REVISED:

TEST PIT LOG T-3

0-2'	Topsoil(ts); clayey sand; gray to dark brown; dessication cracks; dry to slightly moist, massive; roots.
2'-5'	Modelo Formation(Tm); Medium to coarse grained Sand with gravel; rust and beige; massive to slightly bedded; moist, firm.

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	
1)N80E, 3N			



T-3

Trenches Logged by
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Mark Oborne

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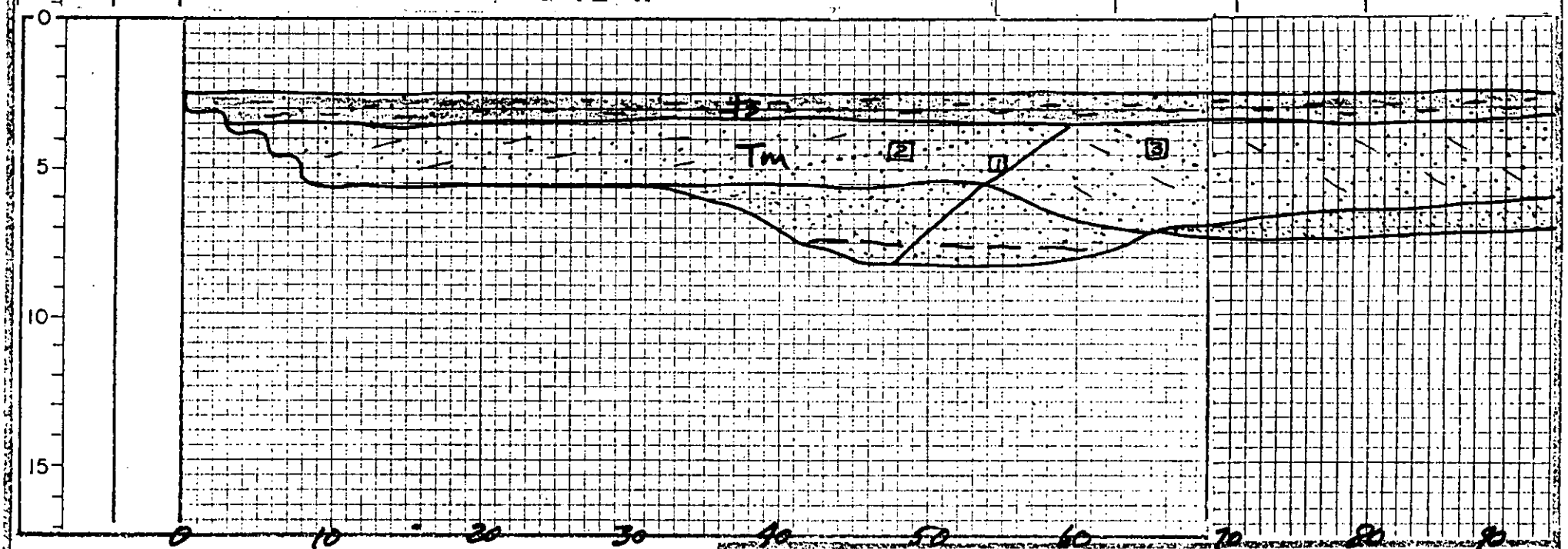
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SCALE: 1"=10' M. Scullin&M. Oborne DRAWN BY: M. Oborne

REVISED:

TEST PIT LOG T-4

		ATTITUDES			
		Bedding	Joints	Fault or Shear	COMMENTS
0-2'	Topsoil(ts): clayey sand & silty sand; graybrown; dry to slightly moist; dessication cracks; massive.				
2'-11'	Bedrock: Modelo Formation (Tm) silty sandstone with silt; olive gray with rust; massive to slightly bedded, slightly jointed; moist, firm-course sand and gravel; rust and gray, massive, moist, firm.	2)N50W, 30SW 3)N60W 25NE		1)N50W, 55°-75°	



T-4

Trenches Logged by:
Michael Scullin &
Mark Oborne

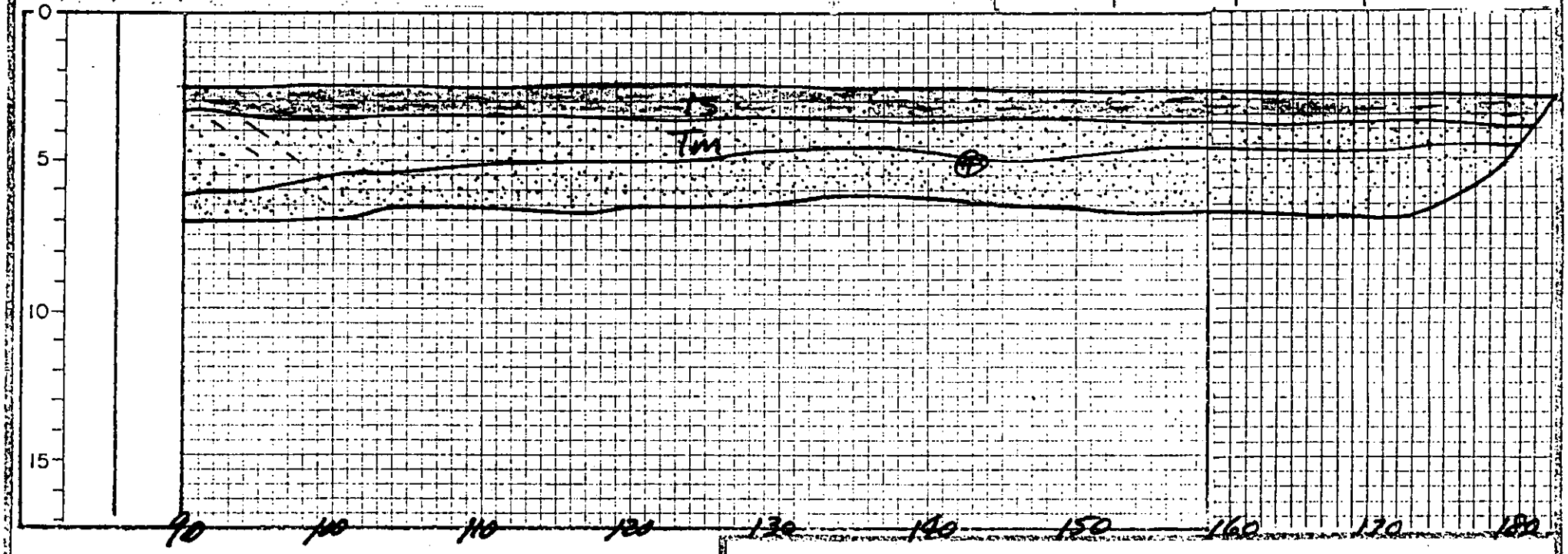
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DATE: 2/21/84
SCALE: 1" = 10'
M. Scullin&M. Oborne
DRAWN BY: M. Oborne
REVISED:

TEST PIT LOG T-4 Cont.

Silty sandstone & sandy siltstone; beige, gray & rust; massive, clay.
beige, gray & rust silty sand and rust coarse sand with gravel; moist, slightly bedded, caving characteristics when dry.

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	
4)N70W, 10-15NE			



Trenches Logged by
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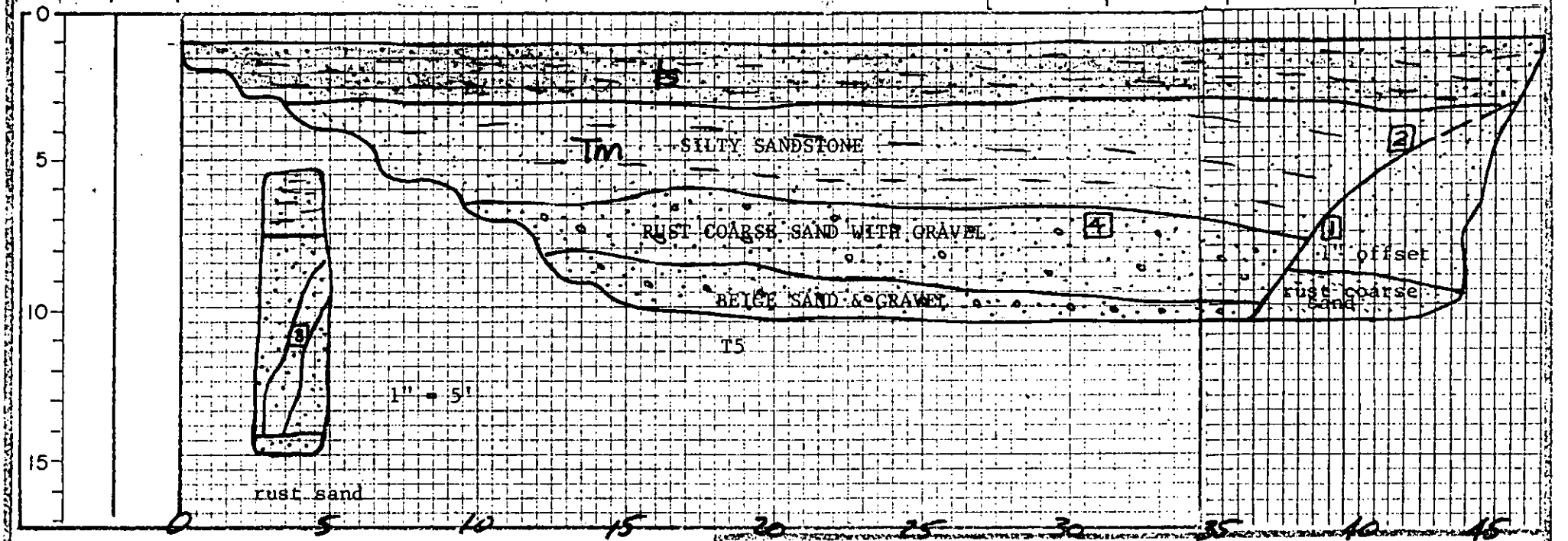
T-4 Cont.

TEST PIT LOG T-5

0-2' TOPSOIL (ts): Silty Clayey Sand; grayish brown, dessication cracks; dry to s/ moist, massive, blocky.

2'-9½' BEDROCK: MODELO FORMATION (TM)
Silty Sandstone; olive gray, massive, steeply jointed, tight. Rust coarse sand with gravel; massive, moist, firm. Beige sand and gravel; massive, dry, loose.

ATTITUDES			COMMENTS
Bedding	STRONG Joints	Fault or Shear	
(4) N80W, 10-15N	(calcium filled) (3) N50W, 60SW	(1) N50W, 77SW (2) N50W, 455W	



Trenches Logged by
Michael Scullin &
Mark Oborne

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SCALE: 1"=5' DRAWN BY: M. Oborne

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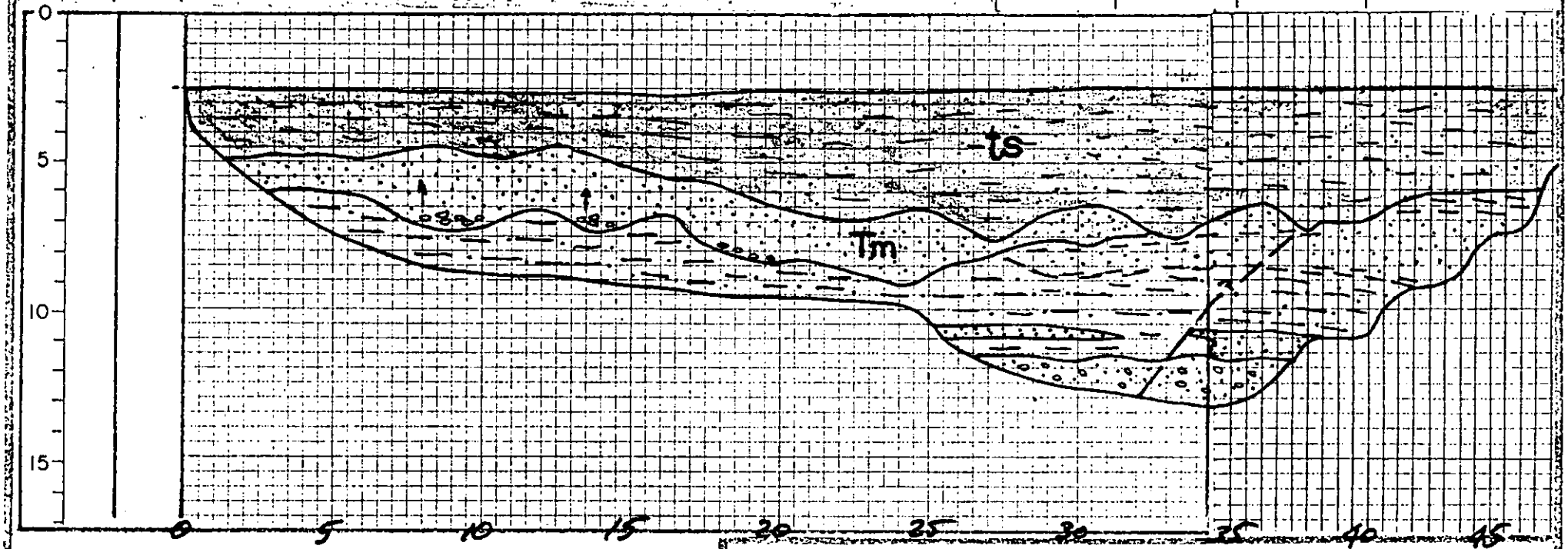
T-5

TEST PIT LOG T-6

TOPSOIL (ts): silty sand, loose, damp, porous, light greenish brown, sand is fine to coarse to coarse grained abundant rootlets, grades into bedrock.

BEDROCK (Modelo Fm) (Tm) interbedded fine to coarse sandstone, pebbly sandstone and siltstone; moderately hard, sandstone very friable; olive gray, rust and white; moderately bedded; steeply jointed, moist.

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	
(1) N59W, 29SW (2) N89W, 28N (3) N17E, 55E		(4) N42W, 63SW (5) N41W, 68SW	



Trenches logged by
Michael Scullin & Mark Oborne

T-6

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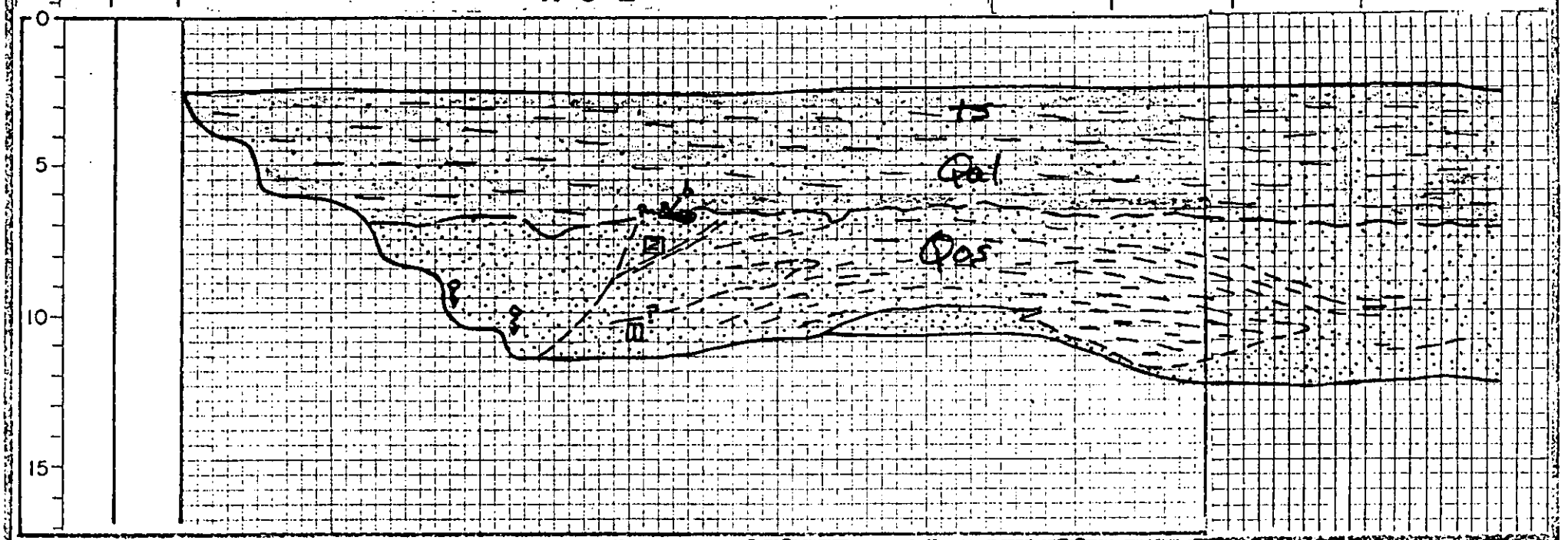
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TEST PIT LOG T-7

TOPSOIL (ts) and ALLUVIUM (Qal) undifferentiated
0-4½, upper 2' consists of dark brown, porous sandy silt with clay, contains roots, below 2' grades into red brown clayey sand with silt, there is a gradation into the underlying alluvium, caliche is concentrated along irregular discontinous fractures at the ts/Qal contact.

OLDER FLOOD PLAIN DEPOSITS (Qos)
4½'- 10', red brown fine to meduim grade sand and light greenish gray sandy silt, moderately dense, damp to wet. Predominant litologies grade into each other. Where recognizable contacts are present they are undulatory and discontinuos.

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	
(1) N53E, 27 NW (2) N61W, 42 NE N80W, 25NE			



T-7

Trenches Logged by Michael Scullin & Mark Oborne

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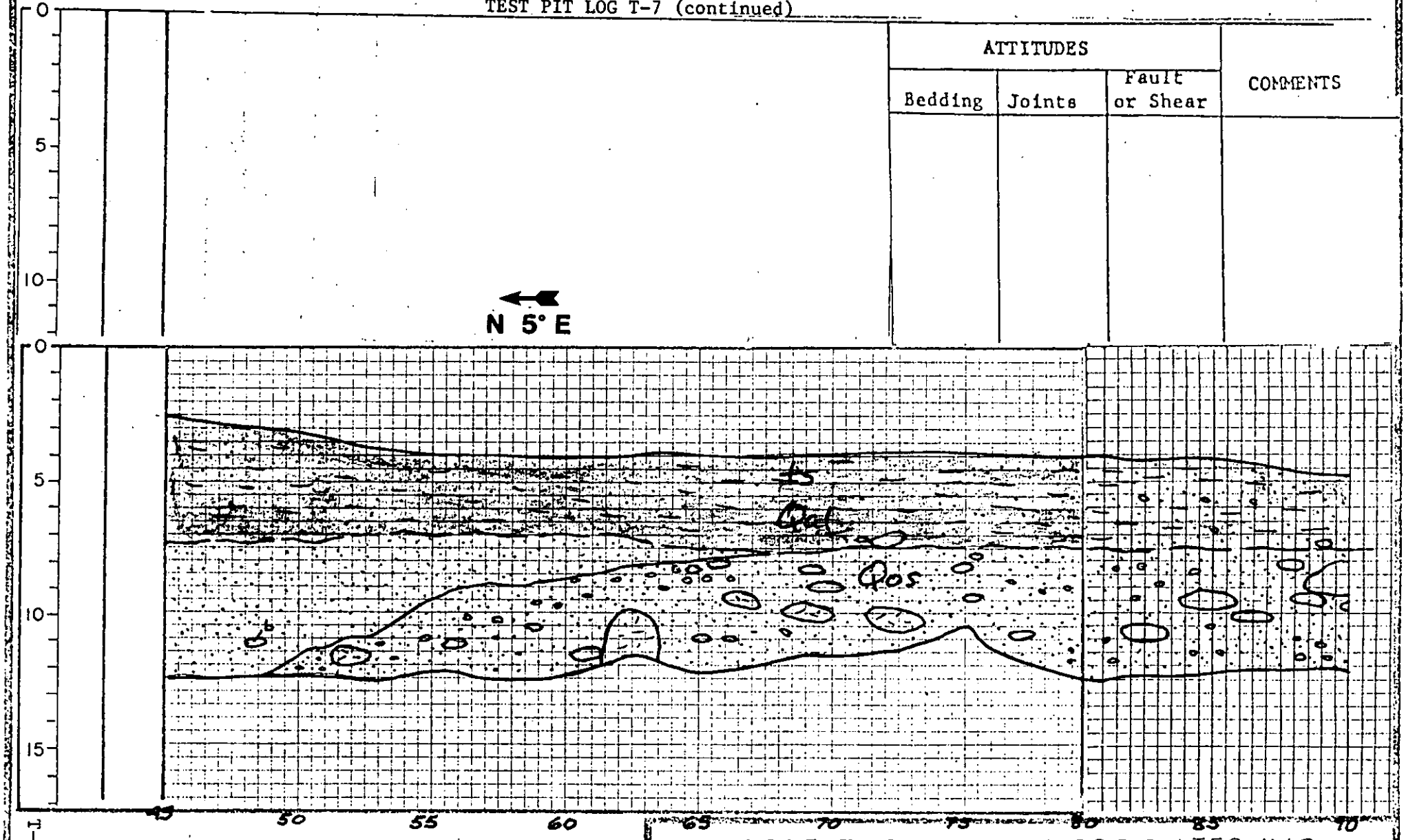
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SCALE: 1"= 5' DRAWN BY: M OBORNE

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TEST PIT LOG T-7 (continued)

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	



T-7 (cont.)

TRENCHES LOGGED BY MICHAEL SCULLIN & MARK OBORNE

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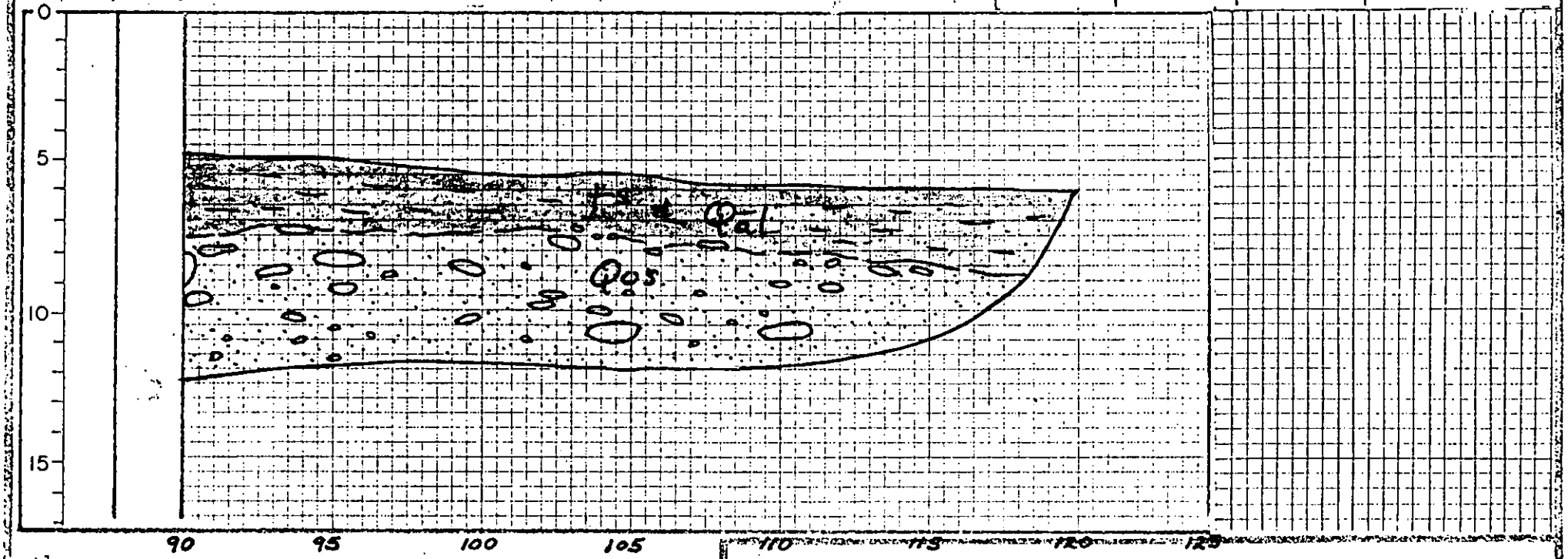
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SCALE: 1" = 5' DRAWN BY: M. Oborne

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TEST PIT LOG T-7 (continued)

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	



T-7 (cont.)

TRENCHES LOGGED BY MICHAEL SCULLIN & MARK OBORNE

ROBERT STONE & ASSOCIATES, INC.
ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES

JOB NUMBER: 2159-00 DATE: 2/21/84

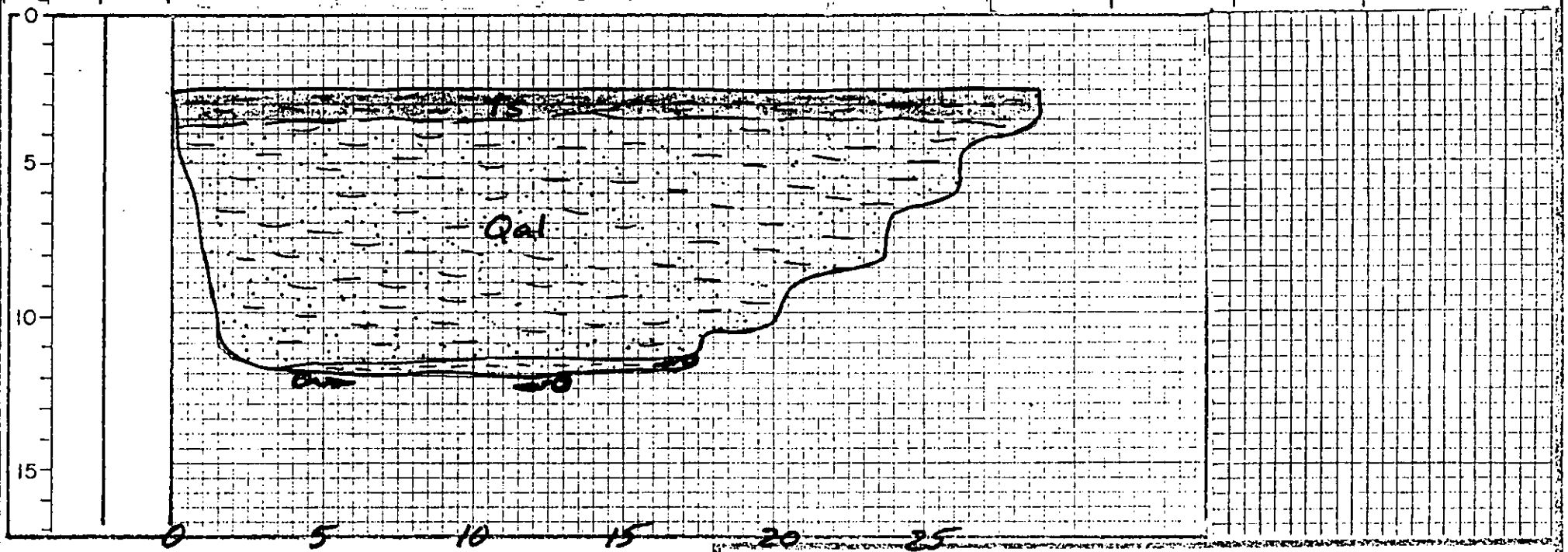
SCALE: 1" = 5" DRAWN BY: M. Oborne

REVISED:

TEST PIT LOG T-8

Topsoil(ts); Sandy Silt with clay and clayey sand
dark brown, massive, moist, with roots.

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	



Trenches Logged by
Michael Scullin &
Mark Oborne

T-8

ROBERT STONE & ASSOCIATES, INC.
ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES

JOB NUMBER: 2159-00 DATE: 2/21/84

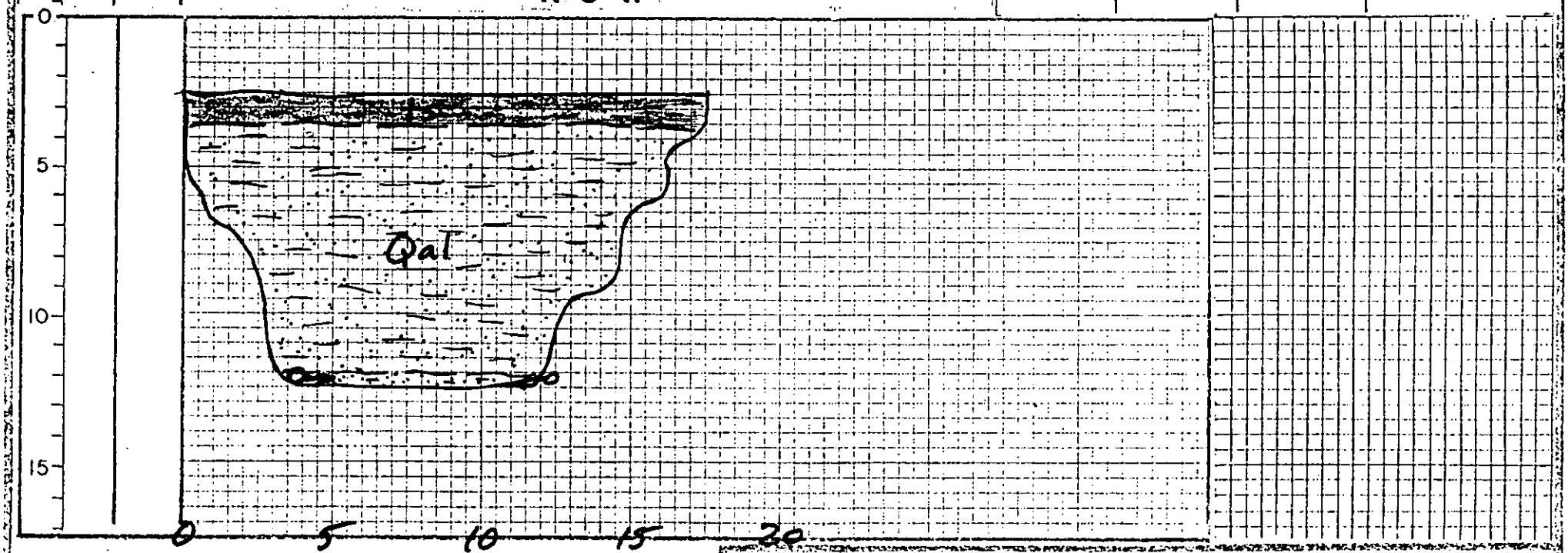
SCALE: 1"=5' DRAWN BY M. Oborne

REVISED:

TEST PIT LOG T-9

Alluvium(QAL); clayey silt and sandy silt; dark brown to olive gray; caliche mottling, massive, scattered roots, damp to moist.
Very fine sandy silt; light Olive grav; wet.

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	



T-9

Trenches Logged by
Michael Scullin & Mark Oborne

ROBERT STONE & ASSOCIATES, INC.
ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES

JOB NUMBER: 2159-00 DATE: 2/21/84

SCALE: 1"=5' M. Scullin&M.Oborne DRAWN BY: M. Oborne
REVISED:

TEST PIT LOG T10

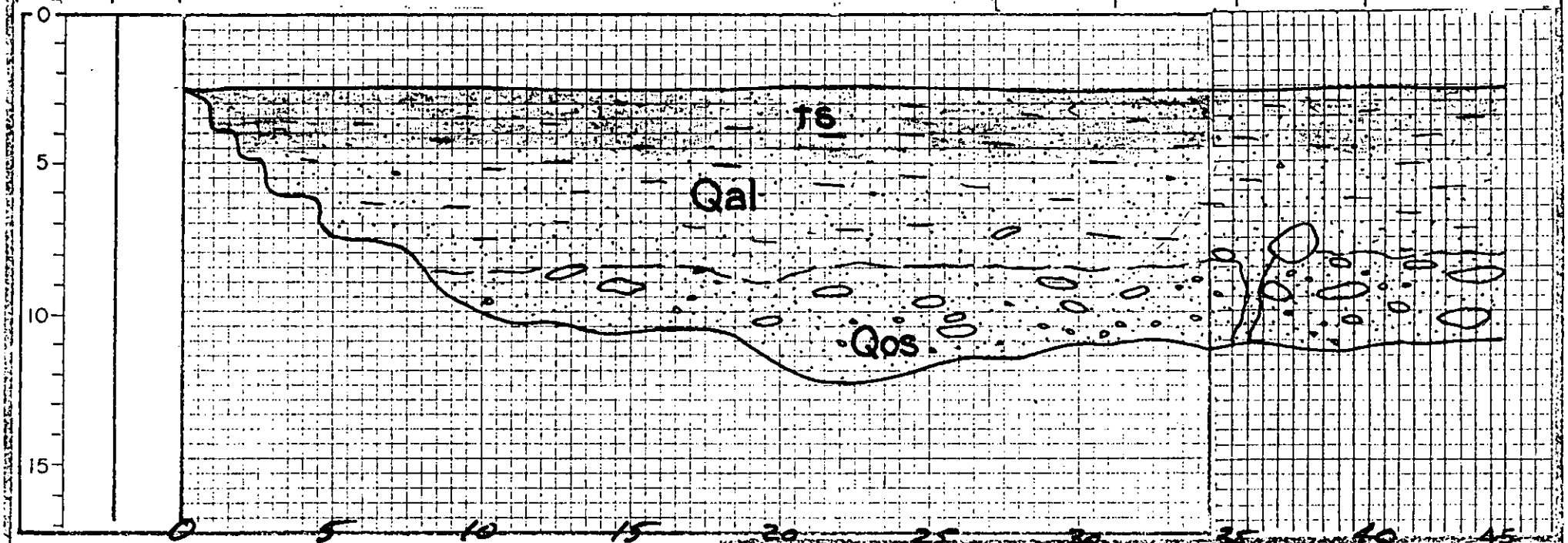
TOPSOIL (ts): Clayey sandy silt, mod dense, damp, red bra to medium brown, contains roots, sand fine to coarse, scattered pebbles. Grades into alluvium.

ALLUVUIM: (Qal) Clayey silty sand, red brown, damp, moderately dense and is fine to coarse, scattered pebbles.

OLDER FLOOD PLAIN DEPOSITS : (Qos) Clayey sandy conglomerate, dense, deep. Clasts to ½ ϕ. Rounded intrusive type clasts. Matrix to clast supported

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	

N 10° W



T10

Trenches Logged by
Michael Scullin & Mark Oborne

ROBERT STONE & ASSOCIATES, INC.
ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES

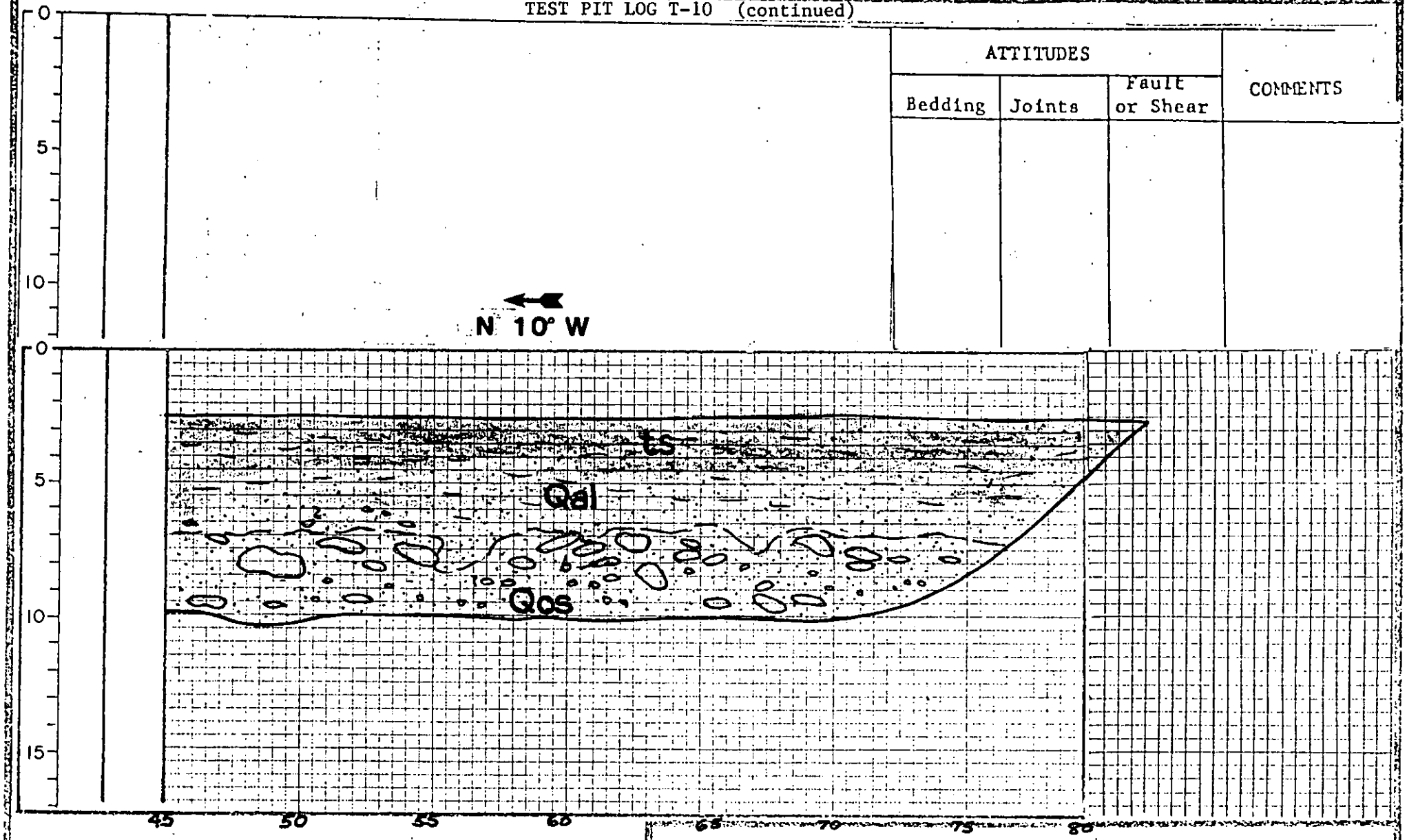
JOB NUMBER: 2159-00 DATE: 2/21/84

SCALE: 1"= 5' DRAWN BY: M. Oborne

REVISED:

TEST PIT LOG T-10 (continued)

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	



T10 Cont.

Trenches Logged by Michael Scullin & Mark Oborne

ROBERT STONE & ASSOCIATES, INC.
ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES

JOB NUMBER: 2159-00 DATE: 2/21/84

SCALE: 1"= 5' DRAWN BY: M. oborne

REVISED:

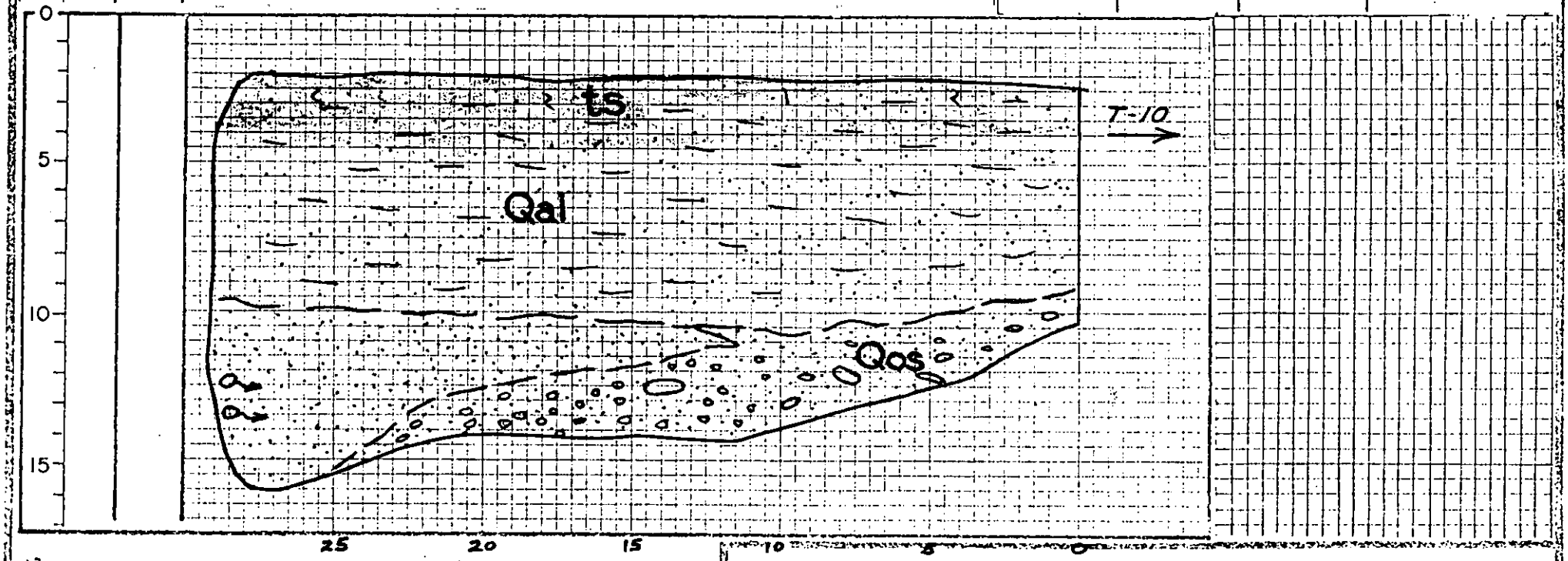
TEST PIT LOG T-11

TOPSOIL (ts); Clayey sandy silt; red brown to medium brown; moderately dense, damp, contains roots, fine to coarse sand, scattered pebbles.

ALLUVIUM (Qal); Clayey silty sand; rust brown; damp, moderately dense, fine to coarse snad & pebbles.

OLDER FLOOD PLAIN DEPOSITS (Qos):
Clayey sandy conglomerate, dense, damp, boulders to 1½' diameter, rounded igneous clast.

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	



T-11

Trenches Logged by
Michael Scullin & Mark Oborne

ROBERT STONE & ASSOCIATES, INC.
ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES

JOB NUMBER 2159-00		DATE: 2/21/84
SCALE: 1"= 5'	M. Scullin&M. Oborne	DRAWN BY: M. Oborne
		REVISED:

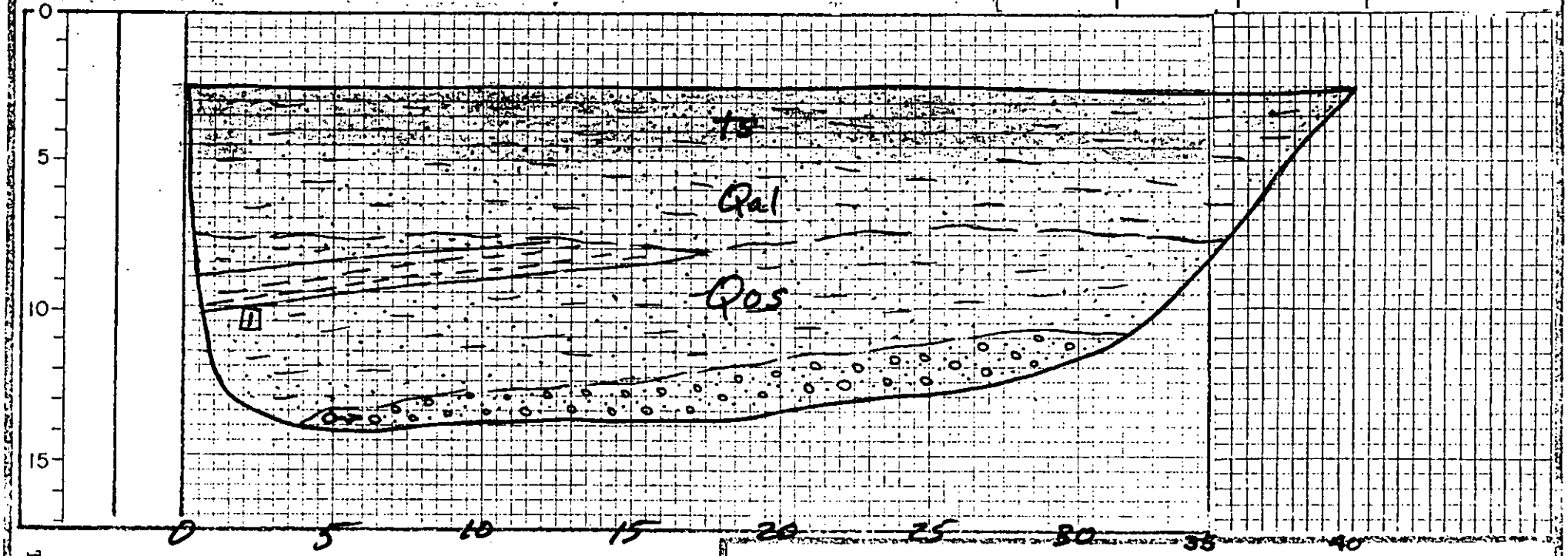
TRENCH LOG T-12

ATTITUDES			COMMENTS
Bedding	Joints	Fault or Shear	

TOPSOIL(ts); Clayey sandy silt; red brown to medium

TOPSOIL (ts); Clayey sandy silt; red brown to medium brown; moderately dense, damp, contains roots, fine to coarse sand, scattered pebbles.
ALLUVIUM (Qal); Clayey silty sand; rust brown; damp, moderately dense, fine to coarse sand & pebbles.
OLDER FLOOD PLAIN DEPOSITS (Qos):
Clayey sandy conglomerate, dense, damp, boulders to 1½' diameter, rounded igneous clast.

N 5° E



T-12

TRENCHES LOGGED BY
MICHAEL SCULLIN & MARK OBORNE

ROBERT STONE & ASSOCIATES, INC.
ENGINEERING GEOLOGY SOIL MECHANICS FOUNDATION STUDIES

JOB NUMBER: 2159-00 DATE: 2/21/84

SCALE: 1" = 5' DRAWN BY:

REVISED:

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AIR PHOTO INTERPRETATION SHEET

Project No. 2159-00
Geologist M. Scullin
Date 2/15/84

Project 15103-105 Mission Hills Road

Date	Flight and Photo Nos.	(Changes to be shown principally after 1st photo)
	USDA 3K,145+146	
11/4/52	AXJ-147+148	**Man-made Features:** Farm house northerly of existing residence and location of the earth berm. Agricultural grove of trees on top of the weatherly hill and in the easterly portion of the site. DWP structures did not exist although the farm road was there. **Natural Features:** No fault alignment features.
	USDA	**Man-made Features:** Residence constructed on top of the westerly hill. Agricultural grove in the southeasterly portion of the site. Farm structure in northeasterly sector. Alemany High School built and Holy Cross Hospital under construction.
2/28/59	AXJ-16W, 58+70	**Natural Features:** No fault alignment features.
		Man-made Features:
		Natural Features:
		Man-made Features:
		Natural Features:

AVAIL. ☐

TRANSMITTAL AND INVOICE
FAIRCHILD AERIAL PHOTOGRAPHY COLLECTION

Department of Geology
Whittier College
Whittier, California 90608
(Telephone: 213-693-0771, Ext. 363)

whittier

TO: Hahnman
Attn: Mark Goethe

** DEPARTMENT JOB NUMBER [illegible] **

Date Due for Photographs and Payments 1-12-84

Date Sent: 12-12-83 (Viewed)

Compiled by: DH

945-3028

SEARCH AND TRANSMITTAL

Area Covered by Photographs: Mission Hills

Location References: LA Co. p. 2, C:6

Date flown	Flight number	Frame Numbers
1928	C-[illegible]	E: 259, F: 26-30; J: 217 NO NEGS
1950	C-15695	7: 7-8, 31-40 NO NEGS
1952	C-17727	2: 9-12 NO NEGS
1954	C-20897	3-5 NO NEGS
1930	C-1001	A: 319-~~320~~, ~~332-335~~ 319
1948	C-12720	1: 36-~~38~~ 37

Number of prints loaned: 0 Comments: Will come back to view photos, Did not choose them at this

X Mark Goethe

INVOICE

Search Fee: $10.00 Date Payment Received: _____

Loan Fee: $_____ Date Photos Returned: _____

Other: $_____ Late Fees: $_____

TOTAL $_____ Date Late Fees Paid: _____

NOTE: No other invoice will be sent. Please remit the total due on or before the due date given above.

CONDITIONS OF LOAN ARE GIVEN ON THE REVERSE SIDE OF THIS FORM

GEOLOGIC MAP

EXPLANATION:

af	ARTIFICIAL FILL
Qal	RECENT ALLUVIUM
Qos	OLDER FLOOD PLAIN DEPOSITS
Tm	MODELO FORMATION
15°	STRIKE AND DIP OF BEDDING
45° @ 12'	STRIKE AND DIP OF BEDDING MEASURED IN BORING WITH DEPTH OF MEASURED INDICATED
37°	STRIKE AND DIP OF JOINT
57°	STRIKE AND DIP OF SHEAR
	FAULT (DASHED WHERE INFERRED)
	ANTICLINAL FOLD
	STRIKE OF VERTICAL JOINT
B-1	APPROXIMATE LOCATION OF EXPLORATORY BORING (by Hakimian & Associates NOVEMBER 1983)
B-26	APPROXIMATE LOCATION OF EXPLORATORY BORING (by Hakimian & Associates JULY 1987)
HB-23	APPROXIMATE LOCATION OF EXPLORATORY BORING (by Robert Stone & Associates JULY 1987)
T-1	APPROXIMATE LOCATION OF EXPLORATORY TRENCH
	APPROXIMATE GEOLOGIC CONTACT
	SEEPAGE IN TRENCHES

Non-Structural Setback Line

POSSIBLE VERTICAL OFFSET ALONG FAULT

VALCON ENGINEERING, INC.
CONSULTING CIVIL ENGINEERS
72 MOODY COURT, THOUSAND OAKS, CALIFORNIA 91360
(818) 865-8302 (805) 495-5454

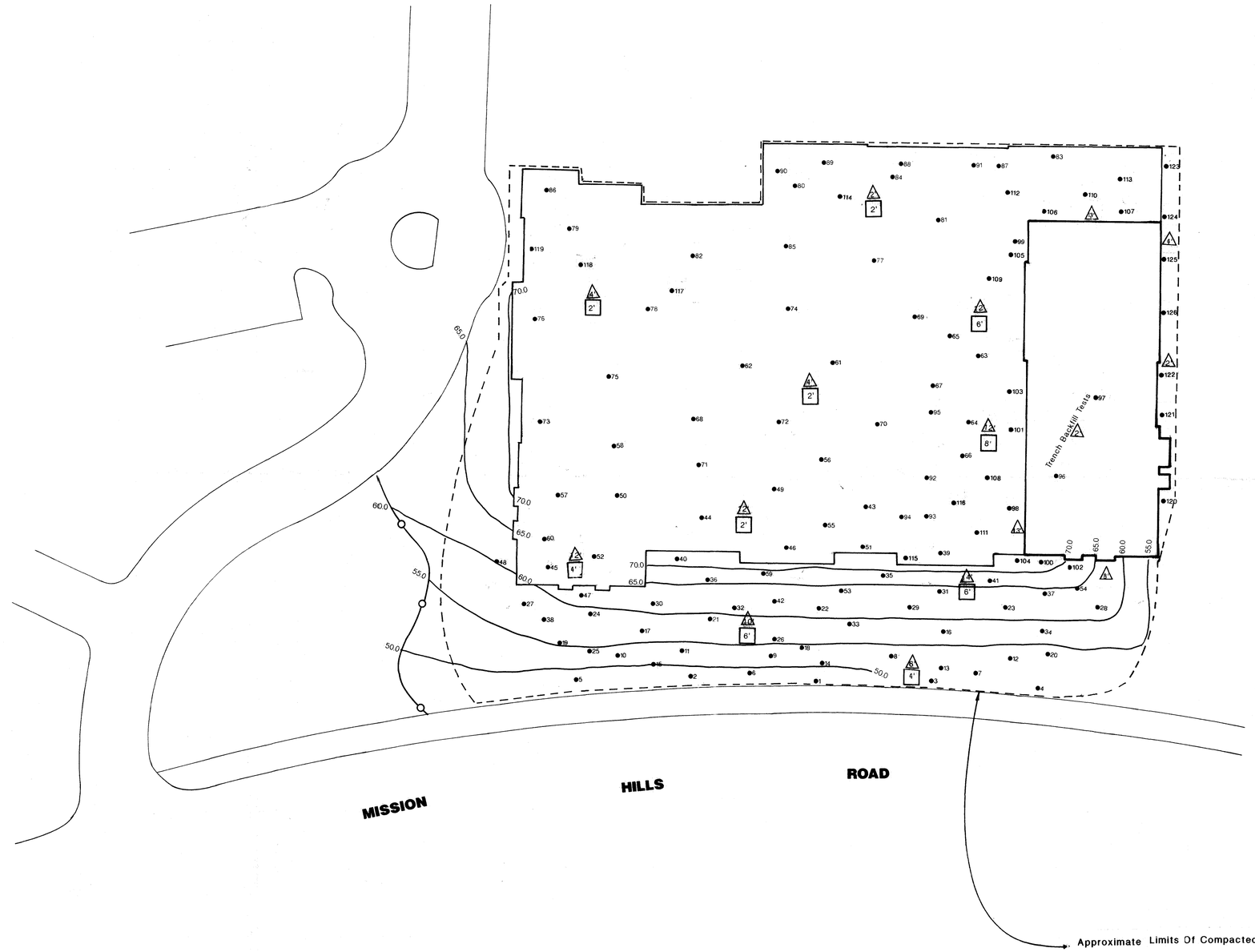
R.S.A.
Robert Stone & Associates, Inc.

JOB NUMBER 21-9-02 DATE 2/23/89
SCALE 1" = 30' REVISED
APPROVED BY DRAWN BY: AB

FOR:
ARARAT HOME OF LOS ANGELES
3330 WEST 27TH ST
LOS ANGELES, CA. 90018
(213) 735-1502

W.O. E 6124-AO
DATE NOVEMBER 1988
FIELD BOOK
PAGE
SHEET 2 OF 2

1988 - CIVIL/STAFF/6124 SOIL 15-Nov-88 03:30 PM 6124 ST
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REVISIONS	BY

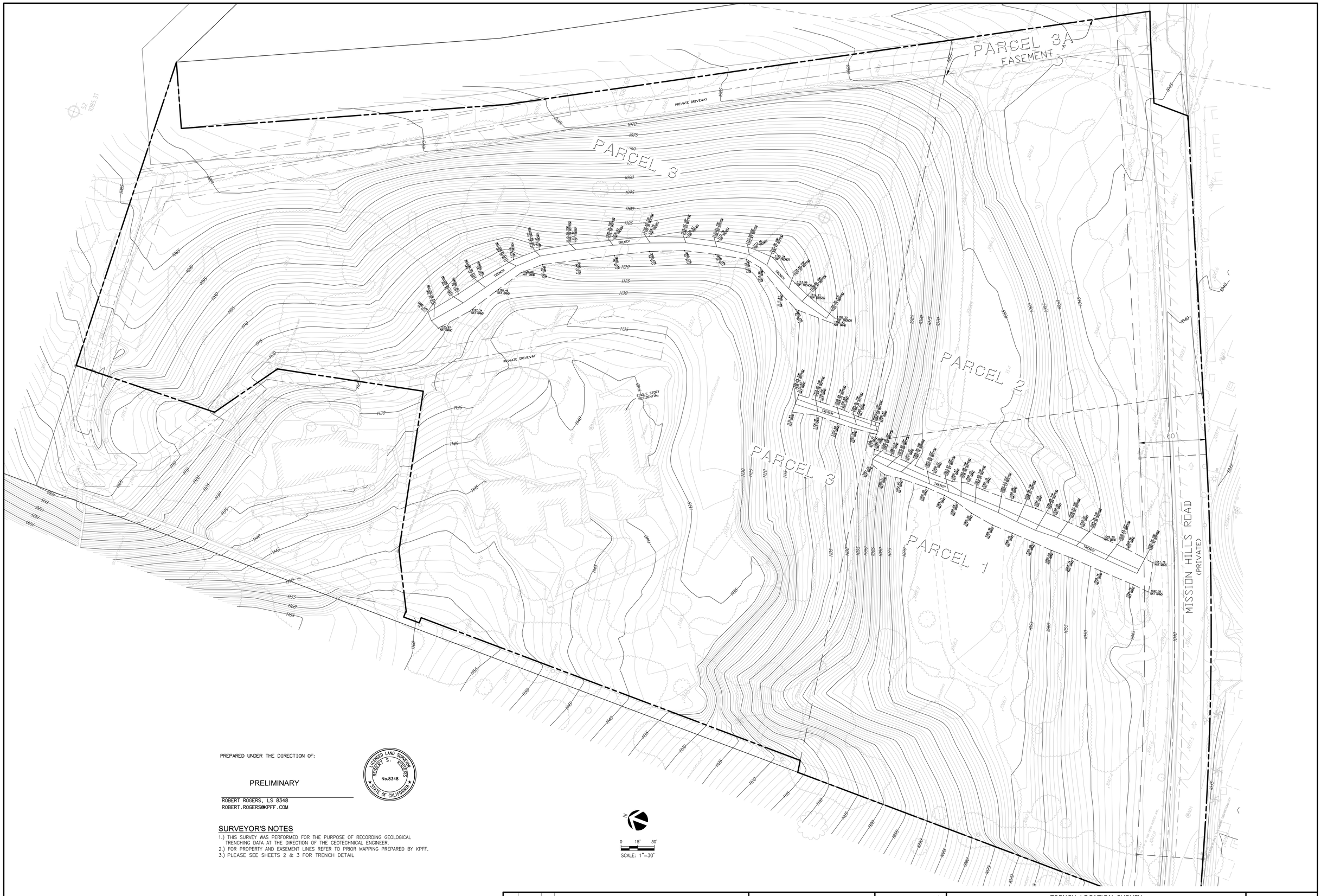
SITE PLAN
FOR: ARARAT HOME OF LOS ANGELES
15105 MISSION HILLS ROAD
MISSION HILLS , CALIFORNIA

APPLIED EARTH SCIENCES
GEOTECHNICAL ENGINEERING CONSULTANTS
731 N. HOLLYWOOD WAY, SUITE 103
BURBANK, CALIFORNIA 91505

DRAWN	
CHECKED	
DATE	11/19/97
SCALE	1"=20'
JOB NO.	95-525-02
SHEET	1
OF	SHEETS

PRINTED ON CLEARPRINT 1000H-8

APPENDIX VI- TRENCH LOCATION SURVEY, PRELIMINARY CONCEPTUAL PLANS (PDF ONLY)



PREPARED UNDER THE DIRECTION OF:

PRELIMINARY

ROBERT ROGERS, LS 8348
ROBERT.ROGERS@KPFF.COM

LICENSED LAND SURVEYOR
ROBERT S. ROGERS
No.8348
STATE OF CALIFORNIA

SURVEYOR'S NOTES

1.) THIS SURVEY WAS PERFORMED FOR THE PURPOSE OF RECORDING GEOLOGICAL TRENCHING DATA AT THE DIRECTION OF THE GEOTECHNICAL ENGINEER.
2.) FOR PROPERTY AND EASEMENT LINES REFER TO PRIOR MAPPING PREPARED BY KPFF.
3.) PLEASE SEE SHEETS 2 & 3 FOR TRENCH DETAIL

N

0 15' 30'
SCALE: 1"=30'

REV.	DATE	BY	DESCRIPTION

kpff
700 S. Flower Street, Suite 2100
Los Angeles, CA 90017
O: 213.418.0201
F: 213.266.5294
www.kpff.com

SURVEYED BY:	BI/CD
DRAWN BY:	XS
CHECKED BY:	RR
PROJECT NO.:	1700748

TRENCH LOCATION SURVEY

15151 MISSION HILLS ROAD

SINANIAN

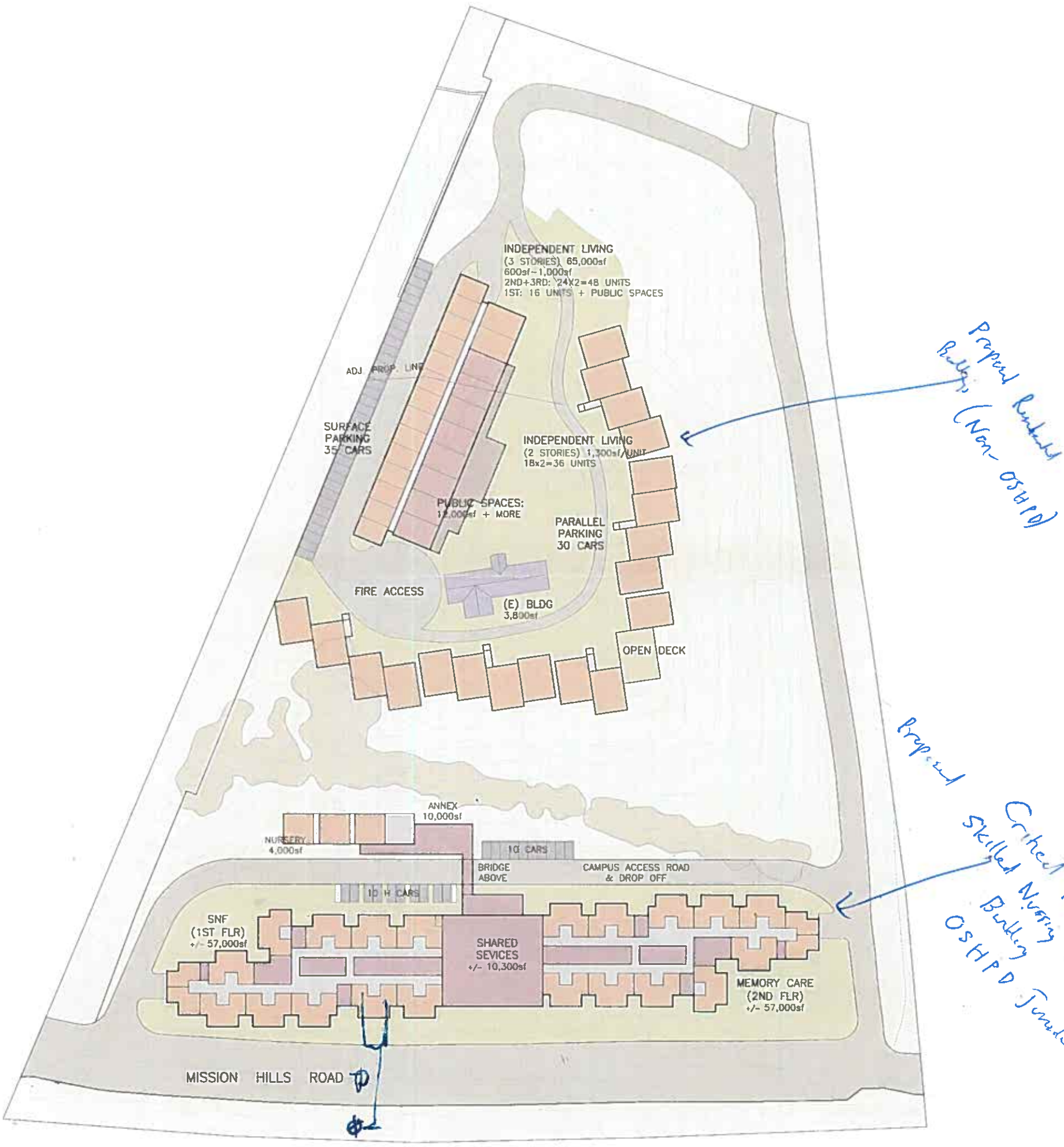
MISSION HILLS / LOS ANGELES / CALIFORNIA

DATE: 03-15-2018

SHEET NO.
1 OF 3

Use this

ARARAT HOME
MASTER PLAN



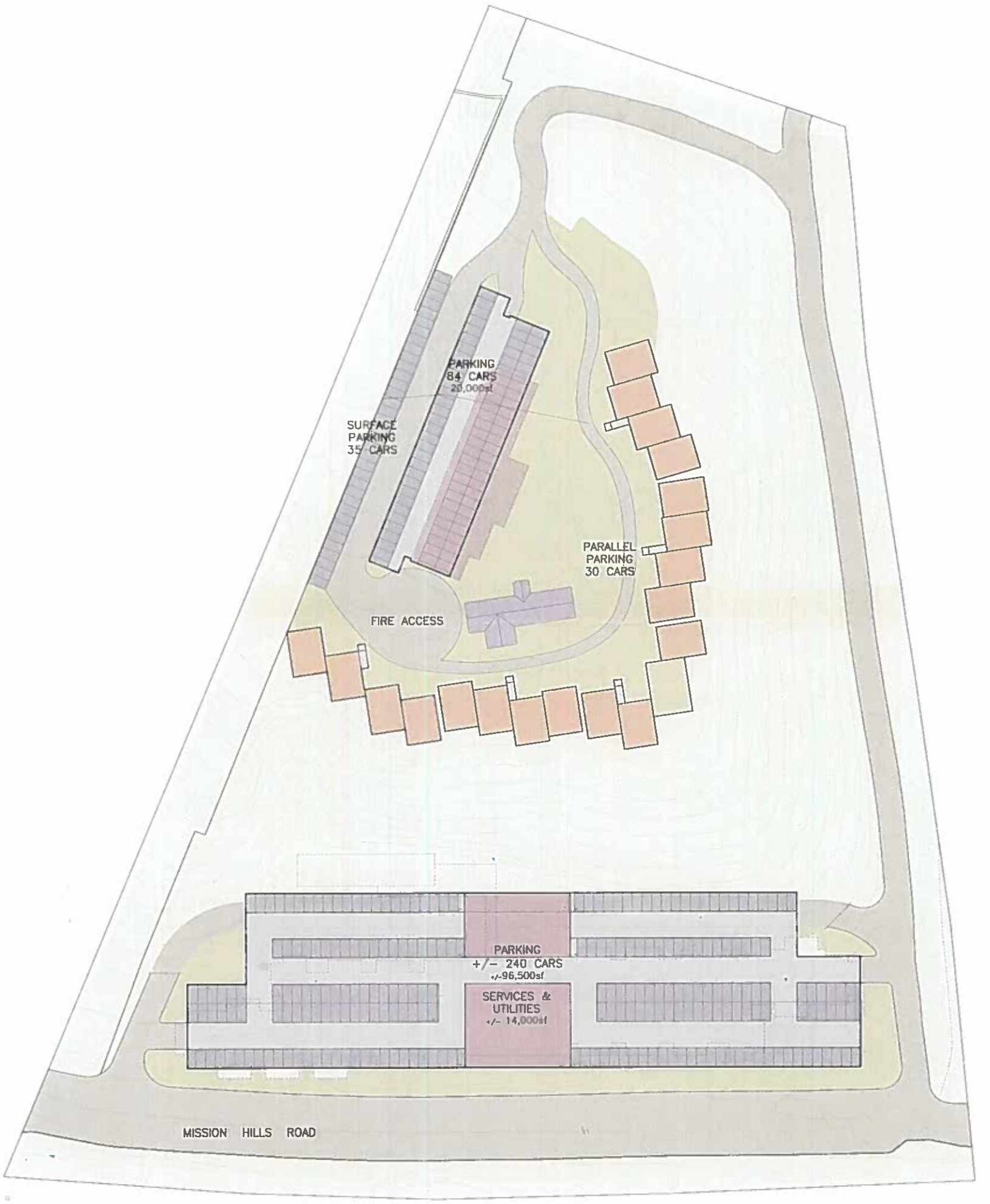


TYP CLUSTER OF ROOMS
+/- 300sf / ROOM

1ST & 2ND FLOOR PLANS
1/40"=1'-0"

N

ARARAT HOME
MASTER PLAN



BASEMENT - PARKING PLANS

1/40"=1'-0"

N