Attachment 4

UPDATE OF

GEOTECHNICAL ENGINEERING REPORT

GOLETA ENERGY STORAGE

6864 AND 6868 CORTONA DRIVE

GOLETA, CALIFORNIA

PROJECT NO.: 303556-001

NOVEMBER 19, 2019

PREPARED FOR

ALTAGAS POWER HOLDINGS (U.S.) INC.

BY

EARTH SYSTEMS PACIFIC

1731-A WALTER STREET

VENTURA, CALIFORNIA 93003

Earth Systems
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November 19, 2019

Project No.: 303556-001
Report No.: 19-11-45

AltaGas Power Holdings (U.S.) Inc.
Attn: Peter Ledig
8614 Westwood Center Drive
Vienna, VA 22182

Project: Goleta Energy Storage
6864 and 6868 Cortona Drive
Goleta, California
Subject: Update of Geotechnical Engineering Report
Reference: Earth Systems Pacific, 2017, Geotechnical Engineering Report, Dakota Pacific Commercial Building, 6864 Cortona Drive, Goleta, California.

Introduction

As authorized, Earth Systems Pacific (Earth Systems) has prepared an Update of Geotechnical Engineering Report for the proposed construction at the adjacent parcels known as 6864 and 6868 Cortona Drive in Goleta, California. On 6864 Cortona Drive, the proposed construction includes: a new 26,150 square-foot storage building (battery banks), exterior power converters surrounded on three sides by a 10-foot high sound barrier wall, a substation, and hardscape/landscape. On 6868 Cortona Drive, the proposed construction includes an access easement to 6864 Cortona Drive. This Update of Geotechnical Engineering Report completes Phase 1 of the scope of services described within our Proposal SBA-19-08-001 dated October 30, 2019.

On August 30, 2017, Earth Systems prepared the referenced Geotechnical Engineering Report for a proposed commercial building and parking lot. Earth Systems understands that the previously proposed construction was not initiated and the currently proposed project is as described above. The referenced report is attached to this report.

On November 14, 2019, a representative of this firm visited the site to verify its current conditions and compared them to those encountered in 2017. It appears that the current site conditions are similar to those described in the referenced report.

Seismic Design Parameters

Earth Systems reviewed the seismic design parameters of the project site and it appears that the seismic design parameters included in the referenced report remain applicable.

Infiltration Testing

Infiltration testing should be re-evaluated for the proposed depths and locations of any new planned BMPs prior to construction of the BMPs.

Geotechnical Discussion

Based on review of the data provided in the referenced report and our observations of the current site conditions, it appears that the geotechnical data, seismic design parameters, conclusions, and recommendations previously provided will remain applicable for the proposed new house.

Please call if you have any questions, or if we can be of further service.

Respectfully submitted,

EARTH SYSTEMS PACIFIC

PROFESSIONAL GEOLOGIST
TODD J. TRANBY
No. 2078
CERTIFIED
ENGINEERING
GEOLOGIST
STATE OF CALIFORNIA

Todd J. Tranby
Engineering Geologist

Reviewed and Approved

Richard M. Beard
Geotechnical Engineer

REGISTERED PROFESSIONAL ENGINEER
RICHARD MICHAEL BEARD
GE 128
Exp. 12-31-19
GEOTECHNICAL
STATE OF CALIFORNIA

19 Nov. 2019

Attachments: Referenced Report

Copies: 4 - Client (3 hardcopies, 1 email)
1 - Project File

GEOTECHNICAL ENGINEERING REPORT
DAKETTA PACIFIC COMMERCIAL BUILDING
6864 CORTONA DRIVE
GOLETA, CALIFORNIA

September 29, 2017

Prepared for

Mr. Sep Wolf
Cortona Investors, LLC

Prepared by

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September 29, 2017

FILE NO.: SL-18142-SA

Mr. Sep Wolf
Cortona Investors, LLC
201 East Figueroa Street
Santa Barbara, California 93101

PROJECT: DAKETTA PACIFIC COMMERCIAL BUILDING
6864 CORTONA DRIVE, GOLETA, CALIFORNIA

SUBJECT: Geotechnical Engineering Report

REF: Proposal for a Geotechnical Engineering Report with Options for Infiltration Testing and a Soil Corrosivity Evaluation, Daketta Pacific Commercial Building, 6864 Cortona Drive, Goleta, California, by Earth Systems Pacific, dated July 21, 2017, Doc. No. 1707-045. PRP.

Dear Mr. Wolf:

In accordance with your authorization of the above-referenced proposal, this geotechnical engineering report has been prepared for use in the development of plans and specifications for the Daketta Pacific Commercial Building project. The project is located at 6864 Cortona Drive in the City of Goleta, California. Preliminary geotechnical recommendations for site preparation, grading, utility trenches, foundations, retaining walls, slabs-on-grade and exterior flatwork, pavement sections, drainage and maintenance, and construction observation and testing are presented herein. Also included are the results of the infiltration tests performed in the areas designated by the client. Two bound copies and an electronic copy of this report are being furnished for your use.

We appreciate the opportunity to have provided services for this project and look forward to working with you again in the future. If there are any questions concerning this report, please do not hesitate to contact me.

Sincerely,
Earth Systems Pacific

Doug Dunham

Doug Dunham, GE
Associate Engineer

REGISTERED PROFESSIONAL ENGINEER
DOUGLAS A. DUNHAM
No. 2586
Exp. 12-31-17
GEOTECHNICAL
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E-copy to: Flowers and Associates, Inc., Mr. Robert Schmidt
Doc. No. 1709-085.SER/ln

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Appendices

1.0 INTRODUCTION

The Daketta Pacific Commercial Building project will be developed on a property located at 6864 Cortona Drive in the City of Goleta, California. This property is referred to herein as "the site," and the site is shown on the Exploration Location Map presented in Appendix B.

We understand the project will generally consist of constructing a 23,136 square foot commercial building and associated surface and subsurface improvements. We have assumed the building will be one story, will be of wood and steel frame construction, and will utilize a Portland cement concrete (PCC) slab-on-grade. Masonry retaining walls less than 6 feet in height may also be constructed. For the purposes of this report, maximum line loads and point loads of approximately 2 kips per foot and 20 kips, respectively, were assumed.

Surface and subsurface improvements will also be constructed at the site. We have assumed that surface improvements will consist of hot mix asphalt (HMA) and/or PCC pavement placed over aggregate base (AB) for vehicle use, and PCC flatwork for pedestrian use. Subsurface improvements will be the underground municipal utilities that will provide the sewer, water, power, and communication services. We understand that Low Impact Development (LID) drainage improvements will be incorporated into the project; however, no on-site effluent disposal systems are planned. Accordingly, on-site effluent disposal systems are not in our scope of work and are not addressed in this report.

We have assumed that grading cuts and fills to develop the building and surface improvement areas, to improve access, and to improve drainage will be on the order of 5 feet or less. An archaeological area is depicted on the preliminary plans; however, other archaeological areas may be identified in the future. Where these areas exist, special grading techniques will be required.

2.0 SCOPE OF SERVICES

The scope of work for the geotechnical engineering report included a general site reconnaissance, subsurface investigation, infiltration testing, laboratory testing of selected soil samples, and preparation of this report. The analysis and subsequent recommendations were based, in part, upon information provided by the client.

This report and preliminary geotechnical recommendations are intended to comply with the considerations of California Building Code (CBC) Sections 1803.1 through 1803.6, J104.3 and J104.4 (CBSC, 2016), as applicable, and common geotechnical engineering practice in this area under similar conditions at this time. The test procedures were accomplished in general conformance with the standards noted, as modified by common geotechnical engineering practice in this area under similar conditions at this time.

Preliminary geotechnical recommendations for site preparation, grading, utility trenches, foundations, retaining walls, slabs-on-grade and exterior flatwork, pavement sections, drainage and maintenance, and construction observation and testing are presented to guide the development of project plans and specifications. It is our intent that this report be used exclusively by the client to form the geotechnical basis of the design of the project and in the preparation of plans and specifications. Application beyond this intent is strictly at the user's risk. If future parties wish to use this report, such use may be allowed to the extent the report is applicable, only if the user agrees to be bound by the same contractual conditions as the original client, or contractual conditions that may be applicable at the time of the report use.

This report does not address issues in the domain of contractors such as, but not limited to, site safety, loss of volume due to stripping of the site, shrinkage of soils during compaction, dewatering, shoring, temporary slope angles, construction means and methods, etc. Analyses of the soil for asbestos (either man-made or naturally occurring), radioisotopes, mold or other microbial content, hydrocarbons, lead, and/or other chemical properties (except for geotechnical corrosivity) are beyond the scope of this report. Ancillary features such as temporary access roads, fencing, flag and light poles, signage, drainage disposal systems, effluent disposal systems, and nonstructural fills are not within our scope and are also not addressed in this report.

As there may be unresolved geotechnical issues with respect to this project, the geotechnical engineer should be retained to provide consultation as the design progresses, and to review project plans as they near completion to assist in verifying that pertinent geotechnical issues have been addressed and to aid in conformance with the intent of this report. In the event that there are any changes in the nature, design, or location of the improvements, or if any assumptions used in the preparation of this report prove to be incorrect, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are verified or modified by the geotechnical engineer in writing. The criteria presented in this report are considered preliminary until such time as any peer review or review by any jurisdiction has been completed, conditions are observed by the geotechnical engineer in the field during construction, and the recommendations have been verified as appropriate or are modified by the geotechnical engineer in writing.

3.0 SITE SETTING

The irregular shaped site is located southeast of US Highway 101 and Storke Road at 6864 Cortona Drive which is in the west-central sector of the City of Goleta, California. Cortona Drive will provide the only vehicle access to this project. The approximate central site coordinates and elevation from the Google Earth website (Europa Technologies, 2017) are latitude 34.4330 degrees north and longitude 119.8694 degrees west, and 46 feet.

The site is bounded to the west by an embankment fill associated with Storke Road, to the north/northeast by undeveloped property, and to the south/southeast by existing commercial properties. The site currently supports an existing warehouse building, a fenced nursery area with stockpiles of gravel and boulders, a HMA parking area associated with the surrounding commercial properties, landscape improvements, and subsurface improvements. Beyond these existing structures and improvements, the undeveloped areas of the site are covered with a sparse to moderate growth of weeds, annual grass, brush, and trees. Beyond the embankment fill slope associated with Storke Road, the site topography generally ranges from relatively flat to gently sloping. Surface drainage is by sheet flow.

4.0 FIELD INVESTIGATION AND LABORATORY ANALYSIS

On August 23, 2017, six borings were drilled at the site to depths ranging from approximately 5 to 51.5 feet below the existing ground surface. Two of the borings (Borings 1 and 2) were drilled for exploration and soil sample acquisition purposes, and the other four borings (Infiltration Tests A through D) were drilled for the infiltration testing. The approximate locations of the borings and infiltration tests are shown on the Exploration Location Map presented in Appendix A.

All the borings were drilled with a Mobile Model B-53 drill rig equipped with a 6-inch outside diameter hollow stem auger and an automatic trip hammer for sampling. As the exploratory borings were drilled, soil samples were taken using a ring-lined barrel sampler (ASTM D3550-01/07, with shoe similar to D2937-10) and Standard Penetration Tests (SPT) were conducted at selected depths within the borings (ASTM D1586-11). Bulk soil samples were also obtained from the auger cuttings.

Soils encountered in the exploratory borings were logged and categorized in general accordance with the Unified Soil Classification System and ASTM D2488-09a. Copies of the boring logs can also be found in Appendix A along with a boring log legend. In reviewing the boring and sample logs and legend, the reader should recognize that the legend is intended as a guideline only, and there are a number of conditions that may influence the characteristics observed during drilling. These include, but are not limited to, the presence of cobbles or boulders, organics, cementation, variations in soil moisture, presence of groundwater, and other factors. Consequently, the logger must exercise judgment in interpreting soil characteristics, possibly resulting in soil descriptions that vary from the legend.

Ring samples were tested for bulk density (ASTM D2937-17, as modified for ring liners). One bulk sample was tested for maximum density and optimum moisture content (ASTM D1557-12), and a direct shear test (ASTM D3080/D3080M-11) was conducted on the same bulk sample after it was remolded to approximately 90 percent of maximum dry density. A ring sample was tested for particle size (ASTM D422-63/07 and D1140-17). A one-dimensional consolidation test (ASTM D2435/D2435M-11) was performed on another ring sample. Two bulk samples were also sent to Cerco Analytical of Concord, California for use in preparing a corrosion evaluation report. The evaluation and associated test results are for use by the architect/engineer in determining appropriate corrosion mitigation measures. The laboratory test results and the corrosion evaluation report prepared by Cerco Analytical are presented in Appendices B and C, respectively.

5.0 GENERAL SUBSURFACE PROFILE

The general subsurface profile encountered in the borings consisted of layered sand soils with the exception of a thin layer of clay soil that was observed between the sand soil layers in Boring 2. The sands were in a dry to wet condition with a loose to very dense consistency; the clay was moist and stiff. Subsurface water was initially encountered during drilling at an approximate depth of 48 feet below the existing ground surface in Boring 1; however, after removing the drill auger, the subsurface water level rose and stabilized at an approximate depth of 40 feet. Please refer to the boring logs for a more complete description of the subsurface conditions. Based on the subsurface profile described above, the Site Class per Chapter 20 Table 20.3-1 (ASCE, 2013) is "D", a "Stiff Soil Profile".

6.0 INFILTRATION TESTING

Infiltration Test Procedures

The infiltration test procedures were generally intended to conform to the City of Santa Barbara Storm Water BMP Guidance Manual (July, 2013). The exploratory borings drilled as part of this investigation were used as the profile borings, and the general subsurface profile observed from the borings is described in the previous section of this report.

On August 23, 2017, four infiltration test borings (designated as A, B, C, and D) were drilled with a Mobile Model B-53 Drill rig, equipped with a 6-inch diameter hollow stem auger at the locations designated by the client. The four infiltration test borings were drilled to a depth of approximately 5 feet below the existing ground surface at the approximate locations shown on the Exploration Location Map presented in Appendix A.

After the infiltration test borings were drilled, a 2-inch diameter perforated polyvinyl chloride (PVC) pipe was installed in the center of each of the borings. The bottom 2 inches of the borings and the annular spaces around the outside of the PVC pipes were filled with gravel to reduce caving of the areas to be tested. The infiltration test borings were then completely filled with water and allowed to drain. Since the water drained away in less than an hour, the infiltration testing was initiated. The falling head rate of infiltration was subsequently monitored over a 4-hour period or until the infiltration tests had run empty at least four times. Following the infiltration testing, the PVC pipes were removed and the borings were backfilled with auger cuttings.

Infiltration Test Results

The Infiltration Test Results are presented in Appendix D. The infiltration rates varied between 4 and 600 inches/hour during testing depending on the water's head or elevation, and the soil's hydraulic conductivity that existed in any specific infiltration test boring.

These infiltration test results only indicate the measured rate at the specific location and under specific conditions. Sound engineering judgment should be exercised in extrapolating the test results for other conditions or locations. Technical design references vary in methods they present for using these types of test results. However, the majority of references include reduction or correction factors for several parameters including, but not limited to, degree of processing and compaction after testing, size of the LID drainage system relative to the test volume, number of tests conducted, variability in the soil profile, anticipated silt loading, anticipated biological buildup, anticipated long-term maintenance, and other factors. Typically, in aggregate these factors range from about 2.5 to 18 depending upon the method used; the final determination of the means by which these data are used is left to the design engineer.

7.0 CONCLUSIONS

In our opinion, the site is suitable, from a geotechnical engineering standpoint, for the planned development as described in the "Introduction" section of this report, provided the recommendations contained herein are implemented in the design and construction. This opinion does not extend to the suitability of the site for LID drainage improvements as this is the responsibility of other engineers. The upper site soils were judged to be generally nonexpansive; therefore, no special measures with respect to expansive soils are considered necessary. Assuming the site is prepared in accordance with the "Preliminary Geotechnical Recommendations" section of this report, shallow conventional continuous and spread (pad) footings may be used to support the planned structures.

The primary geotechnical engineering issues at this site are the archeological area grading, the potential for settlement, the excavation characteristics of the soils, the suitability of the soils for use as fill and backfill, the stability of the soils during grading, the corrosive nature of the soils, the erodible nature of the soils, and the potential for liquefaction and seismically induced settlement of dry sand.

Archaeological Area Grading

An archaeological area exists at the site as shown on the Exploration Location Map presented in Appendix A. Special grading techniques will need to be implemented to minimize the impact of site development the archaeological area. In lieu of the normal soil disturbance that would occur during mass grading of the native soils under the building and the surface improvement areas, the placement of a triaxial geogrid on the surface of the native soils after removing the vegetation and any existing fill or import fill soils is planned prior to placing the compacted fills to develop final grades. This geogrid is intended to reduce the potential for settlement in the archaeological area only; normal mass grading techniques will need to be used in all other building and surface improvement areas of the site. Recommendations for the archaeological area are presented in the "Site Preparation" and "Grading" sections of this report.

Settlement Potential

Settlement (total and differential) can occur when foundations and surface improvements span materials having variable consolidation, moisture, and density characteristics, such as the soils on this site. Such a situation can stress and possibly damage foundations and surface improvements, often resulting in severe cracks and displacement. To reduce this settlement potential, it is necessary for all foundations and surface improvements to bear on material that is as uniform as practicable. A program of overexcavation, scarification, moisture conditioning, and compaction of the upper soils in the building and the surface improvement areas is recommended to provide more uniform soil moisture and density and appropriate support.

Another concern with respect to settlement is the potential for hydroconsolidation. Hydroconsolidation is the tendency of soils to settle upon saturation, even without being subjected to increased loads. The consolidation data indicate that the upper soils on this site have a slight potential to collapse when saturated. The recommended earthwork program and the installation and maintenance of drainage improvements will reduce the potential for hydroconsolidation to affect the building and surface improvements.

Excavation Characteristics

The soils are anticipated to be excavatable with conventional earthmoving equipment; however, the stability of excavations is a concern. Based on our preliminary testing, the soils are considered to be "Type C" per the 2007 Cal/OSHA classification system. This classification should be verified by the contractor's "Competent Person" at the time of construction. Excavation sloping and shoring will be needed to safely work in, and to restrict the size of, the excavations. As with all construction safety issues, the methods of excavation stabilization, sloping, and/or shoring are ultimately the responsibility of the contractor.

Suitability of the Soils for Use as Fill and Backfill

We anticipate that the majority, if not all, of the soils excavated at the site will be acceptable from a geotechnical viewpoint for reuse as compacted fill and backfill. However, special requirements for utility trench bedding and shading per the specifications of the City of Goleta, the conduit manufacturer, and the utility companies should be anticipated.

Stability of Soils During Grading

The soils may be susceptible to temporary high soil moisture contents, especially during or soon after the rainy season. Attempting to compact the soils in an overly moist condition may create unstable conditions in the form of pumping, yielding, shearing, and/or rutting. These conditions will not allow proper compaction and are inappropriate for continued fill placement. Therefore, the construction schedule should allow adequate time during grading for aerating and drying the soils to near optimum moisture content prior to compaction. If unstable conditions occur, the geotechnical engineer should be consulted to provide recommendations for correction of the conditions.

Corrosive Soils

Based on the testing performed by Cerco Analytical, the upper site soils were classified as "moderately corrosive to corrosive" to certain construction materials that will be in contact with the soils. The architect/engineer should refer to the Cerco Analytical report presented in Appendix C for use in determining appropriate mitigation measures for soil corrosivity.

Soil Erosion

The soils are considered to be highly erodible. Stabilization of the surface soils, particularly those disturbed during construction, by vegetation or other means *during* and *following* construction is essential to reduce the potential of erosion damage. Care should be taken to establish and maintain proper drainage around the structure and improvements.

Liquefaction and Seismically Induced Settlement of Dry sand

Liquefaction is the loss of soil strength caused by a significant seismic event. It occurs primarily in loose, fine to medium-grained sands, and in very soft to medium stiff silts that are saturated by groundwater. During a major earthquake, the saturated sands and silts tend to compress and the void spaces between the soil particles that are filled with water decrease in volume. This causes the pore water pressure to build up in the soils. Then if the water does drain away rapidly, the soils may lose their strength and transition into a liquefied state. Seismically induced settlement of dry sand is also caused by a significant seismic event, and may occur in lower density and sand and silt soils that are not saturated by groundwater. During a major earthquake, the void spaces between the unsaturated soil particles that are filled with air tend to compress which translates to a decrease in volume or settlement.

In order to estimate the potential for liquefaction and seismically induced settlement of dry sand and their relative effects on the site, we reviewed the boring data and utilized methods suggested by the Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117a (CDMG, 2008). Considering the soil types, soil density, and the groundwater conditions encountered at the site, there is a potential for both liquefaction and seismically induced settlement to occur.

If liquefaction were to occur at the site, it is our opinion that the repercussions would be in the form of dynamic settlement; loss of soil bearing strength and lateral spreading are not anticipated for the following reasons. The assessment for loss of soil bearing strength was developed by comparing the thickness (approximately 40 feet from final grades) of the overlying non liquefiable soils with respect to the depth of the potentially liquefiable soils. The assessment for lateral spreading was developed by considering the depth of the potentially liquefiable soils with respect to the site topography. Lateral spreading can only occur when a soil mass either slides laterally on liquefied soil layers towards a free slope face, or when a soil mass moves downslope on gently sloping ground, and those topographic conditions are not present at this site.

To further understand the effects of liquefaction, we performed an analysis of selected boring data using the PGA_M of 1.170g (from the "Foundations" section of this report), a mean earthquake magnitude from all sources of 6.84 (USGS, 2017), and an assumed groundwater depth of approximately 40 feet below the existing ground surface. Based on the analyses, the very low potential for liquefaction to occur at the site. As part of the liquefaction analysis, seismically induced settlement of dry sand was also estimated using the same earthquake mean magnitude and a factor reduced PGA_M of 2/3(1.170g) = 0.78g. Based on that part of the analyses, total and differential seismically induced settlement of dry sand may approach approximately 0.75 inches and 0.375 inches, respectively.

In summary, the potential for liquefication is very low, and total and differential settlement attributed to seismically induced settlement of dry sand could reach 0.75 inches and 0.375 inches, respectively. Other than utilizing steel reinforcement within the PCC foundation elements and connecting all spread footings with grade beams so the foundation system acts as an integral unit, no special measures with respect to seismically induced settlement are considered necessary for this project.

8.0 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The following recommendations are applicable to the structures and improvements as described in the "Introduction" section of this report and assume that all floors will be above grade. If additional stories, basements, cellars, sunken rooms, subterranean rooms, retaining walls taller than 6 feet, stacked retaining walls, or other such features are incorporated into site development, the geotechnical engineer should be contacted for individual assessment.

Definitions

Unless otherwise noted, the following definitions are used in these recommendations. Where specific terms are not defined, common definitions used in the construction industry are intended.

- **Grading Area:** The entire site area to be graded including all the building and surface improvement areas, and the areas where LID drainage improvements are planned.

- **Archeological Area:** The area within the archeological area and including any archeological area buffer zones.

- **Building Area:** The area within and extending a minimum of 5 feet beyond the foundation perimeter of the foundations for a structure. The building area also includes the foundation area (plus 5 feet to each side) of any ancillary structure that will be rigidly attached to the main structure and is expected to perform in the same manner as the main structure. Such ancillary structures could include covered walkways, covered patios, arbors, etc.

- **Surface Improvement Area:** The area within and extending a minimum of 2 feet beyond the perimeter of the surface improvement.

- **Scarified:** Ripping the exposed soil surface in two orthogonal directions to a minimum depth of 12 inches.

- **Moisture Conditioning:** Adjusting the soil moisture to optimum moisture content or slightly above, prior to the application of compaction effort.

- **Compacted or Recompacted:** Soils placed in level lifts not exceeding 8 inches in loose thickness, and compacted to a minimum of 90 percent of maximum dry density. A minimum of 95 percent will be required in the upper 1-foot of subgrade below vehicle pavement and in all AB. The standard tests used to define maximum dry density and field density should be ASTM D1557-12 and ASTM D6938-17, respectively, or by other methods acceptable to the geotechnical engineer and the governing jurisdiction.

Site Preparation

<u>The Areas Outside of the Archaeological Area</u>

1. The existing ground surface in the grading area outside of the archaeological area should be prepared for construction by removing existing structures, improvements, vegetation, tree stumps, large roots, debris, and other deleterious material. All existing fill soils should be completely removed down to the native soil surface. Any existing utilities that will not be serving the site should be removed or properly abandoned. The appropriate method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary.

2. Voids created by the removal of materials or utilities, and extending below the recommended overexcavation depth, should be immediately called to the attention

of the geotechnical engineer. No fill should be placed unless the geotechnical engineer has observed the underlying soil.

The Areas Inside of the Archaeological Area

3. The existing ground surface in the grading area within the archaeological area should be prepared for construction by removing all existing fill soil down to the native soil surface. Then all vegetation, debris, and other deleterious material should be removed. All vegetation that exists on the surface of the native soil surface should be removed by hand (which can include brushing, raking, or the use of a power blower) from the native soil surface. All vegetation shall be removed at the ground surface such that no soil disturbance occurs. Use of motorized vehicles for vegetation removal is prohibited. Remaining root balls masses in the ground after hand removal of vegetation stems/trunks shall be sprayed with topical pesticide per manufacturer's specifications to ensure no further growth and death of the remaining vegetation. The resulting root ball masses shall be left in place to die. Any existing utilities below the native soils surface that will not be serving the site should be properly abandoned. The appropriate method of utility abandonment will depend upon the type and depth of the utility. Recommendations for abandonment can be made as necessary. Any existing utilities that are above the native soils surface that will not be serving the site should be removed.

Grading

The Areas Outside of the Archaeological Area

1. Following site preparation, the soils in the building area should be removed to a level plane at a minimum depth of 3 feet below the bottom of the deepest footing or 5 feet below the existing ground surface, *whichever is deeper*. During construction, locally deeper removals may be recommended based on field conditions. The resulting soil

surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

2. Following site preparation, the soils in the surface improvement area should be removed to a level plane at a minimum depth of 1-foot below the proposed subgrade elevation or 5 feet below the existing ground surface, whichever is deeper. During construction, locally deeper removals may be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

3. Following site preparation, the soils in the fill areas beyond the building and surface improvement areas should be removed to a depth of 2 feet below the existing ground surface. During construction, locally deeper removals may be recommended based on field conditions. The resulting soil surface should then be scarified, moisture conditioned, and compacted prior to placing any fill soil.

4. Voids created by dislodging cobbles and/or debris during scarification should be backfilled and compacted, and the dislodged materials should be removed from the area of work.

The Areas Inside of the Archaeological Area

5. Complete surface vegetation removal and herbicide application as recommended in the "Site Preparation" section above must be accomplished prior to the geogrid placement. No remedial grading, subgrade preparation, or scarification shall occur prior to placement of the geogrid.

6. Following site preparation, the native soil surface in the grading area within the archaeological area and buffer zone should be covered with a tri-axial geogrid such as

Tensar TX 160, or an approved equivalent. The geogrid should be anchored and/or overlapped as recommended by the manufacturer.

7. The first 6 inches of fill placed on top of the geogrid shall be an approved AB material to provide a visual indication that future excavations are nearing the top of the geogrid.

8. Fill soils shall be placed and spread from the outside to the inside of the archeological area with rubber track earthmoving equipment such that the equipment shall only be working on the top of the fill soils. The fill soils shall be placed such that the earthmoving equipment does not come into contact with the archeological area native soils.

The Areas Inside and Outside of the Archeological Area

9. On-site material and approved import materials may be used as general fill. All imported soil should be nonexpansive. Nonexpansive material is defined as being a coarse grained soil (ASTM D2487-11) and having an expansion index of 10 or less (ASTM D4829-11). Proposed imported soils should be evaluated by the geotechnical engineer before being used, and on an intermittent basis during placement on the site.

10. All materials used as fill should be cleaned of any debris and rocks larger than 6 inches in diameter. No rocks larger than 3 inches in diameter should be used within the upper 3 feet of finish grade. When fill material includes rocks, the rocks should be placed in a sufficient soil matrix to ensure that voids caused by nesting of the rocks will not occur and that the fill can be properly compacted.

11. Fill slopes should be keyed and benched into competent soil as generally shown on the Typical Bench and Keyway Detail presented in Appendix E. The geotechnical engineer

should approve all keyways and benches. The keyway should be a minimum of 10 feet wide.

12. Slopes under normal conditions should be constructed at 2:1 (horizontal to vertical) or flatter inclinations. Slopes subject to inundation should be constructed at 3:1 or flatter inclinations.

13. Cut slopes and fill over cut sloes should be overexcavated and constructed as compacted fill slopes.

Utility Trenches

1. Unless otherwise recommended, utility trenches adjacent to foundations should not be excavated within the zone of foundation influence as shown on Typical Detail A presented in Appendix G.

2. Utilities that will pass beneath a foundation should be placed with properly compacted utility trench backfill, and the foundation should be designed to span the trench.

3. A select, noncorrosive, granular, easily compacted material should be used as bedding and shading immediately around utilities. Generally, the soil found at the site may be used for trench backfill above the select material.

4. Utility trench backfill should be moisture conditioned and compacted; however, the Engineering Design Standards (SBC, 2011) requires a minimum compaction of 95 percent of maximum dry density in trench backfill in existing or future public roadway areas. A minimum of 95 percent of maximum dry density should also be obtained where trench backfill comprises the upper 1-foot of subgrade beneath HMA or PCC

pavement, and in all AB. A minimum of 85 percent of maximum dry density will generally be sufficient where trench backfill is located in landscaped or other unimproved areas, where settlement of trench backfill would not be detrimental.

5. Jetting of trench backfill should generally not be allowed as a means of backfill densification. However, to aid in encasing utility conduits, particularly corrugated conduits and multiple closely spaced conduits in a single trench, jetting or flooding may be useful. Jetting or flooding should only be attempted with extreme caution, and any jetting or flooding operation should be subject to review by the geotechnical engineer.

6. The recommendations of this section are minimums only, and may be superseded by the architect/engineer based upon the soil corrosivity, or the requirements of the pipe manufacturer, the utility companies, or the governing jurisdiction.

Foundations

1. Conventional continuous and spread footings bearing entirely on soil compacted per the "Grading" section of this report may be used to support the building. Grade beams should be placed across all large entrances into the building. Footings and grade beams should have a minimum depth of 12 inches below lowest adjacent grade. Footings and grade beams should have a minimum width of 12 inches. Footing and grade beam dimensions should also conform to the requirements of CBC Section 1809 (CBSC, 2016). All spread footings should be a minimum of 2 feet square and should be connected on at least two sides by grade beams. Footings and grade beams near or on slopes should have a minimum embedment such that there is at least 10 feet of horizontal distance from the bottom of the footing to the face of the slope.

2. Footing and grade beam reinforcement should be in accordance with the requirements of the architect/engineer; minimum continuous footing and grade

beam reinforcement should consist of two No. 4 rebar, one near the top and one near the bottom of the footing or grade beam.

3. Footings should be designed using a maximum allowable bearing capacity of 1,500 psf dead plus live loads. The allowable bearing capacity may be increased by 150 psf for each additional 6 inches of embedment below a depth of 12 inches below lowest adjacent grade. The allowable bearing capacity should not exceed 2,500 psf dead plus live loads regardless of footing depth.

4. Using these criteria, total and differential static settlement is expected to be on the order of 0.75 inches and 0.25 inches in 40 feet, respectively. Due to the sandy conditions in the upper soils at the site, the majority of static settlement is expected to occur over a very short period of time after loads are applied; long term settlements are not anticipated to be significant. Foundations should also be designed to accommodate the total and differential seismically induced settlement of dry sand of 0.75 inches and 0.375-inches, respectively.

5. The allowable bearing capacity may be increased by one-third when transient loads such as wind or seismicity are included. The foundations should be designed using the following seismic parameters. Based on the subsurface conditions encountered in the borings, the Site Class should be "D", a "Stiff Soil Profile". Using the Earthquake Hazards Program website (USGS, 2017), the ASCE Standard 7-10 setting, Risk Category II per CBC Table 1604.5 (CBSC, 2016), and the site coordinates from the "Site Setting" section of this report, the following seismic parameters were determined.

2013 CBC Mapped Values		Site Class "D" Adjusted Values				Design Values	
Seismic Parameters	**Values (g)**	**Site Coefficients**	**Values**	**Seismic Parameters**	**Values (g)**	**Seismic Parameters**	**Values (g)**
S_S	2.883	F_a	1.00	S_{MS}	2.883	S_{DS}	1.922
S_1	1.019	F_v	1.50	S_{M1}	1.529	S_{D1}	1.019
Peak Mean Ground Acceleration (PGA_M) = 1.17g **Seismic Design Category = E**							

6. Lateral loads may be resisted by soil friction and by passive resistance of the soil acting on foundations. Lateral capacity is based on the assumption that backfill adjacent to foundations is properly compacted. Please refer to the "Retaining Walls" section of this report for values.

7. Foundation excavations should be observed by the geotechnical engineer prior to rebar and PCC placement. Footing excavations should be thoroughly moistened prior to PCC placement and no desiccation cracks should be present.

Retaining Walls

1. All retaining wall foundations should be founded in soil compacted as recommended in the "Grading" section of this report. Conventional foundations for retaining walls should have a minimum depth of 18 inches below lowest adjacent grade not including the keyway. It is assumed that retaining walls will not exceed 6 feet in height.

2. As we have assumed that retaining wall heights will not exceed a height of 6 feet, seismic design per CBC Section 1803.5.12.1 (CBSC, 2016) is not required. If retaining walls will retain more than 6 feet of soil, seismic design will be required by the geotechnical engineer.

3. Wall design should be based on the following parameters:

   Active equivalent fluid pressure (native soil) .... 45 pcf

Active equivalent fluid pressure (imported sand or gravel backfill) .... 35 pcf

At-rest equivalent fluid pressure (native soil) .... 65 pcf

At-rest equivalent fluid pressure (imported sand or gravel backfill) .... 50 pcf

Passive equivalent fluid pressure (compacted fill) .... 275 pcf

Maximum toe pressure (compacted fill) .... 1,500 psf

Coefficient of sliding friction (compacted fill) 0.30

4. No surcharges are taken into consideration in the above values. The maximum toe pressure is an *allowable* value to which a factor of safety has been applied. No factors of safety, load factors, and/or other factors have been applied to any of the remaining values.

5. The above pressures are applicable to a horizontal retained surface behind the wall. Walls having a retained surface that slopes upward from the wall should be designed for an additional equivalent fluid pressure of 1 pcf for the active case and 1.5 pcf for the at-rest case, for every two degrees of slope inclination.

6. The active and at-rest values presented above are for drained conditions. Consequently, retaining walls should be drained with rigid perforated pipe encased in a free draining gravel blanket. The pipe should be placed perforations downward and should discharge in a nonerosive manner away from foundations and other improvements. The gravel blanket should have a width of approximately 1-foot and should extend upward to approximately 1-foot from the top of the wall. The upper foot should be backfilled with on-site soil, except in areas where a slab or pavement will abut the top of the wall. In such cases, the gravel backfill should extend up to the material that supports the slab or pavement. To reduce infiltration of the soil into the gravel, a permeable synthetic fabric conforming to the Standard Specifications (Caltrans, 2015) Section 96-1.02B – Class "C," should be placed between the two.

Manufactured geocomposite wall drains conforming to the Standard Specifications (Caltrans, 2015) Section 96-1.02C are acceptable alternatives to the use of gravel, provided that they are installed in accordance with the recommendations of the manufacturer. Where drainage can be properly controlled, weep holes on maximum 4-foot centers may be used in lieu of perforated pipe. A filter fabric as described above should be placed between the weep holes and the drain gravel.

7. Retaining walls where moisture transmission through the wall would be undesirable should be *thoroughly* waterproofed in accordance with the specifications of the architect/engineer.

8. The architect/engineer should bear in mind that retaining walls by their nature are flexible structures, and that surface treatments on walls often crack. Where walls are to be plastered or otherwise have a finish applied, the flexibility should be considered in determining the suitability of the surfacing material, spacing of horizontal and vertical control joints, etc. The flexibility should also be considered where a retaining wall will abut or be connected to a rigid structure, and where the geometry of the wall is such that its flexibility will vary along its length.

Slabs-on-Grade and Exterior Flatwork

1. Conventional interior light-duty PCC slabs-on-grade and exterior flatwork should have a minimum thickness of 4 full inches; the thickness of heavy duty slabs and exterior flatwork should be specified by the architect/engineer. Interior slabs-on-grade should be doweled to footings and grade beams with dowels matching the size and spacing of the slab rebar.

2. Reinforcement size, placement, and dowels for light and heavy duty slabs-on-grade should be as directed by the architect/engineer. Light-duty exterior pedestrian

flatwork should be reinforced, at a minimum, with No. 3 rebar at 24 inches on-center each way. Heavy duty slabs and flatwork should have minimum rebar sizing and spacing that meets the criteria of American Concrete Institute (ACI) 318, Section 24.4 (ACE, 2014). A modulus of subgrade reaction (K_{30}) of 100 psi/inch may be used in the design of heavy duty slabs-on-grade founded on compacted native soil. The modulus of subgrade reaction (K_{30}) may be increased to 200 psi/inch if the slab is underlain with a minimum of 6 inches of compacted Class 2 AB (Caltrans, 2015), and to 300 psi/inch if the slab is underlain with a minimum of 12 inches of compacted Class 2 AB.

3. Due to the current use of impermeable floor coverings, water-soluble flooring adhesives, and the speed at which buildings are now constructed, moisture vapor transmission through slabs is a much more common problem than in past years. Where moisture vapor transmitted from the underlying soil would be undesirable, the slabs should be protected from subsurface moisture vapor. A number of options for vapor protection are discussed below; however, the means of vapor protection, including the type and thickness of the vapor retarder, if specified, are left to the discretion of the architect/engineer.

4. Several recent studies, including those of ACI Document 302.1R-15 (ACI, 2015), have concluded that excess water above the vapor retarder increases the potential for moisture damage to floor coverings and could increase the potential for mold growth or other microbial contamination. The studies also concluded that it is preferable to eliminate the typical sand layer beneath the slab and place the slab PCC in direct contact with a Class "A" vapor retarder, particularly during wet weather construction. However, placing the PCC directly on the vapor retarder requires special attention to using the proper vapor retarder, a very low water-cement ratio in the PCC mix, and special finishing and curing techniques.

5. Probably the next most effective option would be the use of vapor-inhibiting

admixtures in the slab PCC mix and/or application of a sealer to the surface of the slab. This would also require special PCC mixes and placement procedures, depending upon the recommendations of the admixture or sealer manufacturer.

6. Another option that may be a reasonable compromise between effectiveness and cost considerations is the use of a subslab vapor retarder protected by a sand layer. If a Class "A" vapor retarder is specified, the retarder can be placed directly on the compacted soil material. The retarder should be covered with a minimum 2 inches of *clean* sand. If a less durable vapor retarder is specified (Class "B" or "C"), a minimum of 4 inches of clean sand should be provided, and the retarder should be placed in the center of the clean sand layer. Clean sand is defined as a well or poorly graded sand (ASTM D2487-11) of which less than 3 percent passes the No. 200 sieve.

7. Where specified, vapor retarders should conform to ASTM Standard E1745-11. This standard specifies properties for three performance classes, Class "A", "B" and "C". The appropriate class should be selected based on the sensitivity of floor coverings to moisture intrusion and the potential for damage to the vapor retarder during placement of slab reinforcement and concrete.

8. Regardless of the underslab vapor retarder selected, proper installation of the retarder is critical for optimum performance. All seams must be properly lapped, and all seams and utility penetrations properly sealed in accordance with the vapor retarder manufacturer's recommendations.

9. If sand is used between the vapor retarder and the slab, it should be moistened only as necessary to promote concrete curing; saturation of the sand should be avoided, as the excess moisture would be on top of the vapor retarder, potentially resulting in vapor transmission through the slab for months or years.

10. In conventional construction, it is common to use 4 to 6 inches of sand beneath exterior flatwork. Another measure that can be taken to reduce the risk of movement of flatwork is to provide thickened edges or grade beams around the perimeters of the flatwork. The thickened edges or grade beams could be up to 12 inches deep, with the deeper edges or grade beams providing better protection. At a minimum, the thickened edge or grade beam should be reinforced by two No. 4 rebar, one near the top and one near the bottom.

11. Flatwork should be constructed with frequent joints to allow articulation as flatwork moves in response to seasonal moisture and/or temperature variations causing minor expansion and contraction of the soil, or variable bearing conditions. The soil in the subgrade should be moistened to at least optimum moisture content and no desiccation cracks should be present prior to casting the flatwork.

12. Where maintaining the elevation of the flatwork is desired, the flatwork should be doweled to the perimeter foundation as specified by the architect/engineer. In other areas, the flatwork may be doweled to the foundation or the flatwork may be allowed to “float free,” at the discretion of the architect/engineer. Flatwork that is intended to float free should be separated from foundations by a felt joint or other means.

13. To reduce shrinkage cracks in PCC, the PCC aggregates should be of appropriate size and proportion, the water/cement ratio should be low, the PCC should be properly placed and finished, contraction joints should be installed, and the PCC should be properly cured. PCC materials, placement, and curing specifications should be at the direction of the architect/engineer. The Guide for Concrete Floor and Slab Construction (ACI, 2015) is suggested as a resource for the architect/engineer in preparing such specifications.

Pavement Sections

The following preliminary pavement sections are based on an assumed R-value of 25, and should be used for cost estimating purposes only. Accordingly, the soil exposed at the access road/driveway subgrade should be tested during construction for R-value to verify that these preliminary pavement sections are appropriate, otherwise revised pavement sections should be prepared. Pavement design sections are provided for assumed Traffic Indices (TI) of 4.5, 5.0, 5.5, 6.0, 6.5, and 7.0. Determination of the appropriate TI for specific areas is left to others. The pavement sections were calculated in accordance with the Highway Design Manual (Caltrans, 2016). The calculated AB and HMA thickness are for compacted material. Normal Caltrans construction tolerances should apply.

R-value	TI	HMA (inches)	Class 2 AB (inches)
25	4.5	2.50	6.0
25	5.0	2.75	7.0
25	5.5	3.00	8.0
25	6.0	3.25	9.0
25	6.5	3.75	10.0
25	7.0	4.00	10.5

1. The upper 12 inches of subgrade and all AB should be compacted to a minimum of 95 percent of maximum dry density.

2. Subgrade and AB should be firm and unyielding when proof-rolled by heavy rubber-tired equipment prior to paving.

3. Where HMA will lie within 5 feet of landscape or LID drainage improvements, the HMA should be separated from these improvements by deepened curbs or other means that will reduce the potential for moisture fluctuations in the soils beneath the HMA and improve the stability of the curbs.

4. Finished HMA surfaces should slope toward drainage facilities such that rapid runoff will occur and no ponding is allowed on or adjacent to the HMA.

Drainage and Maintenance

1. Per CBC Section 1804.4 (CBSC, 2016), unpaved ground surfaces should be *finish graded* to direct surface runoff away from foundations and other improvements at a minimum 5 percent grade for a minimum distance of 10 feet. The site should be similarly sloped to drain away from foundations, slopes, and other improvements during construction. Where this is not practicable due to property lines, other improvements, etc., swales with improved surfaces, area drains, or other drainage facilities, should be used to collect and discharge runoff.

2. To reduce the potential for planter drainage from gaining access to subslab areas, any raised planter boxes adjacent to foundations should be installed with drains and sealed sides and bottoms. Drains should also be provided for areas adjacent to the foundations that would not otherwise freely drain.

3. The building should be fitted with roof gutters. Runoff from flatwork, roof gutters, downspouts, planter drains, area drains, etc. should discharge in a nonerosive manner away from foundations and other improvements in accordance with the requirements of the governing agencies.

4. The on-site soils are highly erodible; stabilization of soils disturbed during construction by vegetation or other means *during* and *following* construction, is essential to reduce erosion damage. Care should be taken to establish and maintain vegetation. The landscaping should be planned and installed to maintain the surface drainage recommended above. Surface drainage should also be maintained during construction.

5. To reduce migration of surface drainage into the subgrade, maintenance of pavement areas is critical. Any cracks that develop in the pavement should be promptly sealed.

6. The owner or site maintenance personnel should periodically observe the areas within and around the site for indications of rodent activity and soil instability. The owner or site maintenance personnel should also implement an aggressive program for controlling the rodent activity in the general area.

Construction Observation and Testing

1. It must be recognized that the recommendations contained in this report are based on a limited number of borings, and rely on continuity of the subsurface conditions encountered. It is assumed that the geotechnical engineer will be retained to provide consultation during the design phase, to review final plans once they are available, to interpret this report during construction, and to provide construction monitoring in the form of testing and observation.

2. At a minimum, the geotechnical engineer should be retained to provide:
    - Review of final grading, utility, and foundation plans
    - Professional observation during grading, foundation excavations, and trench backfill
    - Oversight of compaction testing during grading
    - Oversight of special inspection during grading

3. Special inspection of grading and backfill should be provided as per CBC Section 1705.6 and CBC Table 1705.6 (CBSC, 2016). The special inspector should be under the direction of the geotechnical engineer. It is our opinion that none of the grading construction is of a nature that should warrant continuous special inspection; periodic special inspection should suffice. Subject to approval by the Building Official, the

exception to continuous special inspection is described in CBC Section 1704.2 (CBSC, 2016) and should be specified by the architect/engineer and periodic special inspection of the following items should be provided by the special inspector.

- Stripping and clearing of vegetation
- Overexcavation to the recommended depths
- Scarification, moisture conditioning, and compaction of the soil
- Fill quality, placement, and compaction
- Utility trench backfill
- Retaining wall drains and backfill
- Foundation excavations
- Subgrade and AB compaction and proofrolling

4. A program of quality control should be developed prior to beginning grading. The contractor or project manager should determine any additional inspection items required by the architect/engineer or the governing jurisdiction.

5. Locations and frequency of compaction tests should be as per the recommendation of the geotechnical engineer at the time of construction. The recommended test location and frequency may be subject to modification by the geotechnical engineer, based upon soil and moisture conditions encountered, size and type of equipment used by the contractor, the general trend of the results of compaction tests, or other factors.

6. A preconstruction conference among the owner, the geotechnical engineer, the City of Goleta, the special inspector, the project inspector, the architect/engineer, and contractors is recommended to discuss planned construction procedures and quality control requirements.

7. The geotechnical engineer should be notified at least 48 hours prior to beginning construction operations. If Earth Systems Pacific is not retained to provide construction observation and testing services, it shall not be responsible for the interpretation of the information by others or any consequences arising therefrom.

9.0 CLOSURE

Our intent was to perform the investigation in a manner consistent with the level of care and skill ordinarily exercised by members of the profession currently practicing in the locality of this project under similar conditions. No representation, warranty, or guarantee is either expressed or implied. This report is intended for the exclusive use by the client as discussed in the "Scope of Services" section of this report. Application beyond the stated intent is strictly at the user's risk.

This report is valid for conditions as they exist at this time for the type of project described herein. The conclusions and recommendations contained in this report could be rendered invalid, either in whole or in part, due to changes in building codes, regulations, standards of geotechnical or construction practice, changes in physical conditions, or the broadening of knowledge.

If changes with respect to development type or location become necessary, if items not addressed in this report are incorporated into plans, or if any of the assumptions used in the preparation of this report are not correct, this firm shall be notified for modifications to this report. Any items not specifically addressed in this report shall comply with the CBC (CBSC, 2016) and the requirements of the governing jurisdiction.

The preliminary recommendations of this report are based upon the geotechnical conditions encountered at the site, and may be augmented by additional requirements of the architect/engineer, or by additional recommendations provided by this firm based on conditions exposed at the time of construction.

This document, the data, conclusions, and recommendations contained herein are the property of Earth Systems Pacific. This report shall be used in its entirety, with no individual sections reproduced or used out of context. Copies may be made only by Earth Systems Pacific, the client, and the client's authorized agents for use exclusively on the subject project. Any other use is subject to federal copyright laws and the written approval of Earth Systems Pacific.

Thank you for this opportunity to have been of service. If you have any questions, please feel free to contact this office at your convenience.

End of Text

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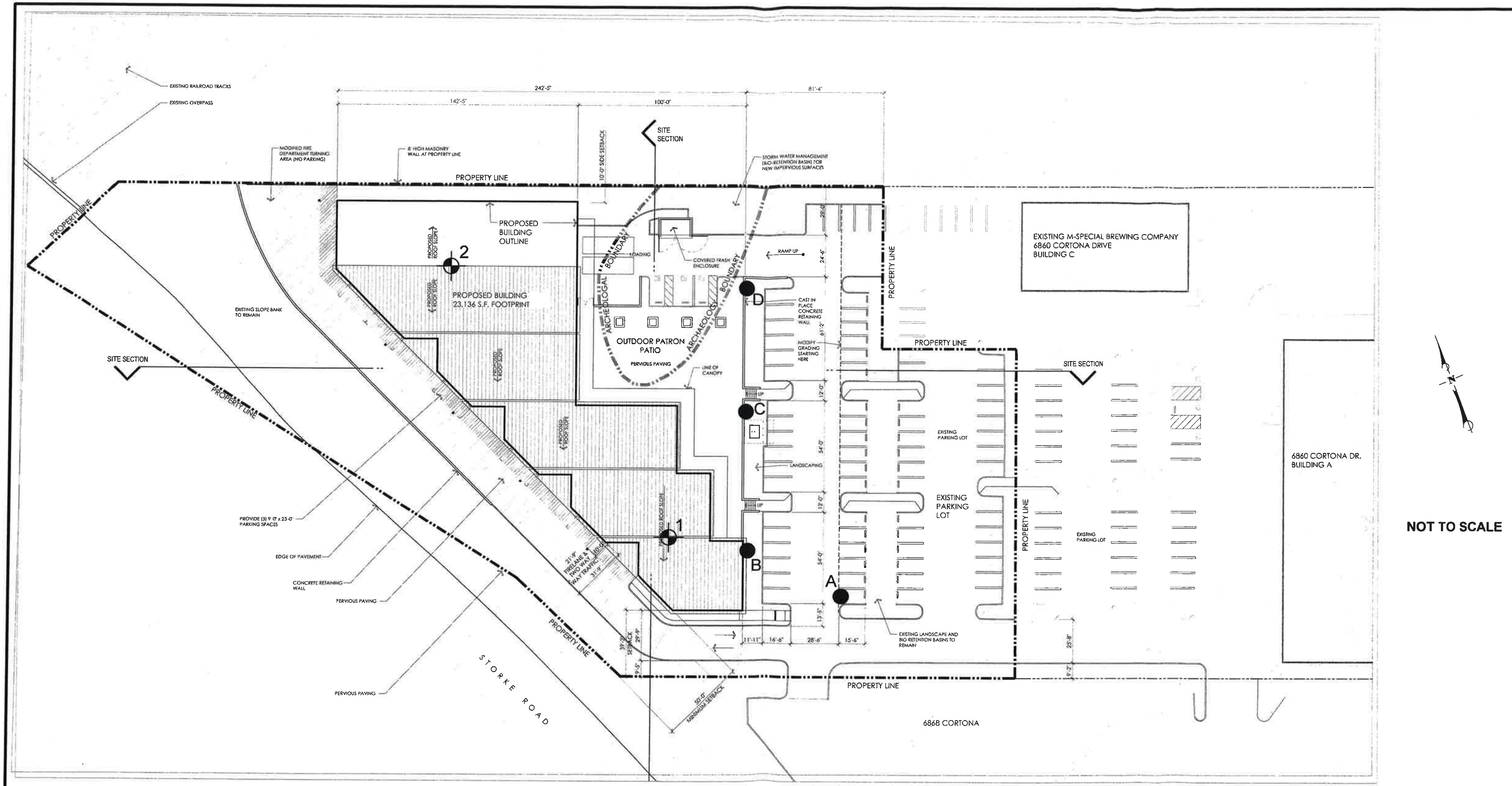
APPENDIX A

Exploration Location Map

Boring Log Legend

Boring Logs



LEGEND

2 Boring Location (Approx.)

D Infiltration Test Location (Approx.)

BASE MAP PROVIDED BY: THE CLIENT

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2049 Preisker Lane, Suite E, Santa Maria, CA 93454
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EXPLORATION LOCATION MAP
DAKETTA PACIFIC COMMERCIAL BUILDING
6864 Cortona Drive
Goleta, California

Date
August 23, 2017

Project No.
SL-18142-SA

Figure ?

Daketta Pacific Commercial Building ELM 8-23-2017.dwg

Earth Systems Pacific

BORING LOG LEGEND

SAMPLE / SUBSURFACE WATER SYMBOLS

SAMPLE / SUBSURFACE WATER SYMBOLS	GRAPH. SYMBOL
CALIFORNIA MODIFIED	
STANDARD PENETRATION TEST (SPT)	
SHELBY TUBE	
BULK	
SUBSURFACE WATER DURING DRILLING	
SUBSURFACE WATER AFTER DRILLING	

UNIFIED SOIL CLASSIFICATION SYSTEM (ASTM D 2487)

MAJOR DIVISIONS		GROUP SYMBOL	TYPICAL DESCRIPTIONS	GRAPH. SYMBOL
COARSE GRAINED SOILS	MORE THAN HALF OF MATERIAL IS LARGER THAN #200 SIEVE SIZE	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GP	POORLY GRADED GRAVELS, OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	
		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES, NON-PLASTIC FINES	
		GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES, PLASTIC FINES	
		SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	
		SP	POORLY GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES	
		SM	SILTY SANDS, SAND-SILT MIXTURES, NON-PLASTIC FINES	
		SC	CLAYEY SANDS, SAND-CLAY MIXTURES, PLASTIC FINES	
FINE GRAINED SOILS	HALF OR MORE OF MATERIAL IS SMALLER THAN #200 SIEVE SIZE	ML	INORGANIC SILTS AND VERY FINE SANDS, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	
		CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS	
		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY	
		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	
		PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	

OBSERVED MOISTURE CONDITION

DRY	SLIGHTLY MOIST	MOIST	VERY MOIST	WET (SATURATED)

CONSISTENCY

COARSE GRAINED SOILS

BLOWS/FOOT SPT	BLOWS/FOOT CA SAMPLER	DESCRIPTIVE TERM
0-10	0-16	LOOSE
11-30	17-50	MEDIUM DENSE
31-50	51-83	DENSE
OVER 50	OVER 83	VERY DENSE

FINE GRAINED SOILS

BLOWS/FOOT SPT	BLOWS/FOOT CA SAMPLER	DESCRIPTIVE TERM
0-2	0-3	VERY SOFT
3-4	4-7	SOFT
5-8	8-13	MEDIUM STIFF
9-15	14-25	STIFF
16-30	26-50	VERY STIFF
OVER 30	OVER 50	HARD

GRAIN SIZES

U.S. STANDARD SERIES SIEVE				CLEAR SQUARE SIEVE OPENING		
# 200	# 40	# 10	# 4	3/4"	3"	12"

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

TYPICAL BEDROCK HARDNESS

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
EXTREMELY HARD	CORE, FRAGMENT, OR EXPOSURE CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CAN ONLY BE CHIPPED WITH REPEATED HEAVY HAMMER BLOWS
VERY HARD	CANNOT BE SCRATCHED WITH KNIFE OR SHARP PICK; CORE OR FRAGMENT BREAKS WITH REPEATED HEAVY HAMMER BLOWS
HARD	CAN BE SCRATCHED WITH KNIFE OR SHARP PICK WITH DIFFICULTY (HEAVY PRESSURE); HEAVY HAMMER BLOW REQUIRED TO BREAK SPECIMEN
MODERATELY HARD	CAN BE GROOVED 1/16 INCH DEEP BY KNIFE OR SHARP PICK WITH MODERATE OR HEAVY PRESSURE; CORE OR FRAGMENT BREAKS WITH LIGHT HAMMER BLOW OR HEAVY MANUAL PRESSURE
SOFT	CAN BE GROOVED OR GOUGED EASILY BY KNIFE OR SHARP PICK WITH LIGHT PRESSURE, CAN BE SCRATCHED WITH FINGERNAIL; BREAKS WITH LIGHT TO MODERATE MANUAL PRESSURE
VERY SOFT	CAN BE READILY INDENTED, GROOVED OR GOUGED WITH FINGERNAIL, OR CARVED WITH KNIFE; BREAKS WITH LIGHT MANUAL PRESSURE

TYPICAL BEDROCK WEATHERING

MAJOR DIVISIONS	TYPICAL DESCRIPTIONS
FRESH	NO DISCOLORATION, NOT OXIDIZED
SLIGHTLY WEATHERED	DISCOLORATION OR OXIDATION IS LIMITED TO SURFACE OF, OR SHORT DISTANCE FROM, FRACTURES: SOME FELDSPAR CRYSTALS ARE DULL
MODERATELY WEATHERED	DISCOLORATION OR OXIDATION EXTENDS FROM FRACTURES, USUALLY THROUGHOUT; Fe-Mg MINERALS ARE "RUSTY", FELDSPAR CRYSTALS ARE "CLOUDY"
INTENSELY WEATHERED	DISCOLORATION OR OXIDATION THROUGHOUT; FELDSPAR AND Fe-Mg MINERALS ARE ALTERED TO CLAY TO SOME EXTENT, OR CHEMICAL ALTERATION PRODUCES IN SITU DISAGGREGATION
DECOMPOSED	DISCOLORATION OR OXIDATION THROUGHOUT, BUT RESISTANT MINERALS SUCH AS QUARTZ MAY BE UNALTERED; FELDSPAR AND Fe-Mg MINERALS ARE COMPLETELY ALTERED TO CLAY

drafting/masters/Boring Log Legend121714.dwg

Earth Systems Pacific

Boring No. 1
PAGE 1 OF 1
JOB NO.: SL-18142-SA
DATE: 08/23/2017

LOGGED BY: PWM
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

DAKETTA PACIFIC COMMERCIAL BUILDING
6864 Cortona Drive
Goleta, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM	SILTY SAND: brown, slightly moist, loose					
5			5.0-6.5	Ring Sample	95.5	4.7	4 5 6
10			10.0-11.5	Ring Sample	95.6	11.7	4 5 9
11	SC	CLAYEY SAND: brown, moist, medium dense					
14	SP-SM	POORLY GRADED SAND WITH SILT: brown, slightly moist, medium dense	15.0-16.5	Ring Sample	108.0	3.0	8 15 33
16.5	SP	POORLY GRADED SAND: light gray, slightly moist, dense					
20			20.0-21.5	SPT			5 15 21
21		orange staining					
25	SW	WELL GRADED SAND: light gray-brown, slightly moist, very dense	25.0-26.5	SPT			12 20 40
26.5		End of Boring @ 26.5' No Subsurface Water Encountered					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

Boring No. 2

PAGE 1 OF 2
JOB NO.: SL-18142-SA
DATE: 08/23/2017

LOGGED BY: PWM
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

DAKETTA PACIFIC COMMERCIAL BUILDING
6864 Cortona Drive
Goleta, California

DEPTH (feet)	USCS CLASS	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM	SILTY SAND: brown, dry, loose					
2		slightly moist	0-4	Grab Sample			
3	SC	CLAYEY SAND: brown, moist					
4	CL	SANDY LEAN CLAY: orange-brown, moist, stiff, thin clayey sand lenses	5.0-6.5	Ring Sample	113.2	16.1	4 8 13
			5-8	Grab Sample			
7	SC	CLAYEY SAND: orange-brown, moist, medium dense					
			10.0-11.5	Ring Sample	121.4	9.0	4 12 37
11	SP	POORLY GRADED SAND: light brown, moist, medium dense					
15		thin lenses of well graded sand and sandy lean clay	15.0-16.5	Ring Sample	105.4	13.0	7 12 30
20		light gray, dense	20.0-21.5	SPT			10 18 28

LEGEND: ■ Ring Sample ○ Grab Sample □ Shelby Tube Sample ● SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

Earth Systems Pacific

LOGGED BY: PWM
DRILL RIG: Mobile B-53
AUGER TYPE: 6" Hollow Stem

Boring No. 2

JOB NO.: SL-18142-SA
DATE: 08/23/2017

DAKETTA PACIFIC COMMERCIAL BUILDING
6864 Cortona Drive
Goleta, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP		POORLY GRADED SAND: as above					
30	SC		CLAYEY SAND: gray-brown mottled orange, moist, medium dense	30.0-31.5	SPT			3 6 8
40	SM		SILTY SAND: orange-brown, moist, medium dense	40.0-41.5	SPT			7 11 16
45			olive-brown, dense	45.0-46.5	SPT			13 21 26
48			wet					
50	SP-SM		POORLY GRADED SAND WITH SILT: olive brown, wet dense	50.0-51.5	SPT			12 8 30
51.5			End of Boring @ 51.5' Subsurface Water Encountered at 48.0', Rose to 40.0' After Pulling Auger					

LEGEND: Ring Sample, Grab Sample, Shelby Tube Sample, SPT

NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

APPENDIX B

Laboratory Test Results

Daketta Pacific Commercial Building SL-18142-SA

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

September 14, 2017

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
1	6.0 - 6.5	4.7	100.0	95.5
1	11.0 - 11.5	11.7	106.8	95.6
1	16.0 - 16.5	3.0	111.2	108.0
2	6.0 - 6.5	16.1	131.4	113.2
2	11.0 - 11.5	9.0	132.4	121.4
2	16.0 - 16.5	13.0	119.1	105.4

Daketta Pacific Commercial Building

SL-18142-SA

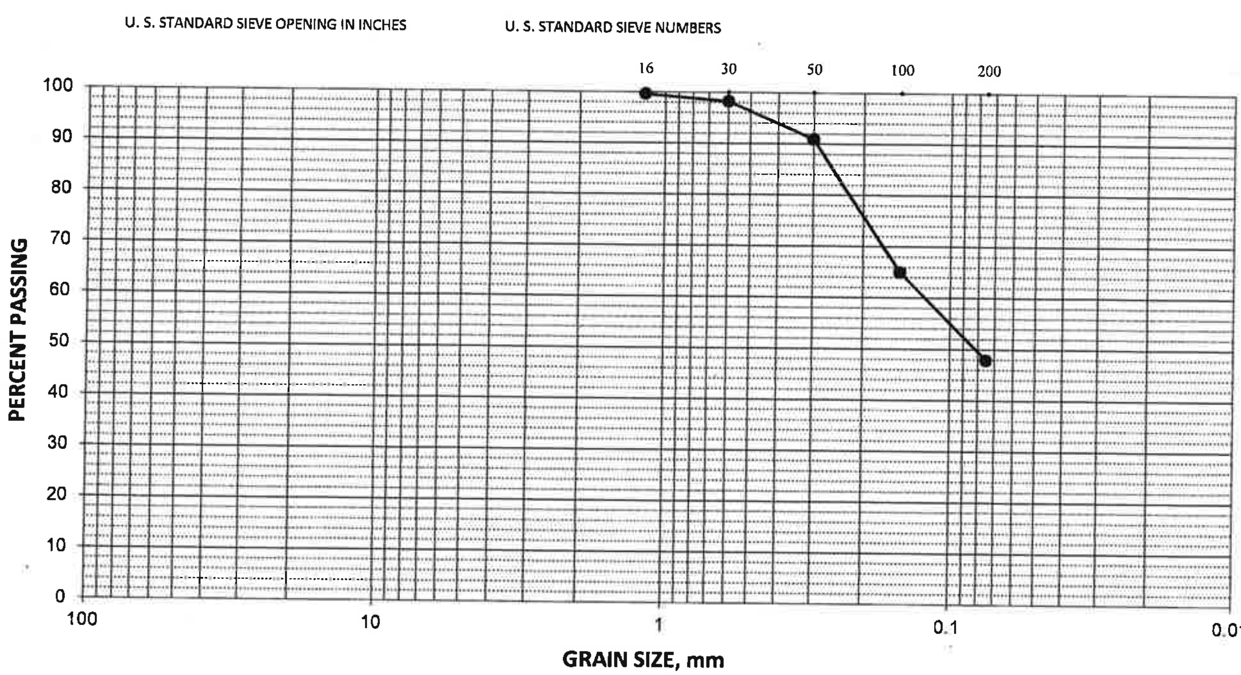
PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-17

Boring #2 @ 6.0 - 6.5'
Clayey Sand (SC)

September 14, 2017

Sieve size	% Retained	% Passing
#16 (1.18-mm)	0	100
#30 (600-µm)	2	98
#50 (300-µm)	9	91
#100 (150-µm)	35	65
#200 (75-µm)	52	48



Daketta Pacific Commercial Building

SL-18142-SA

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

September 14, 2017

Boring #2 @ 0.0 - 4.0'

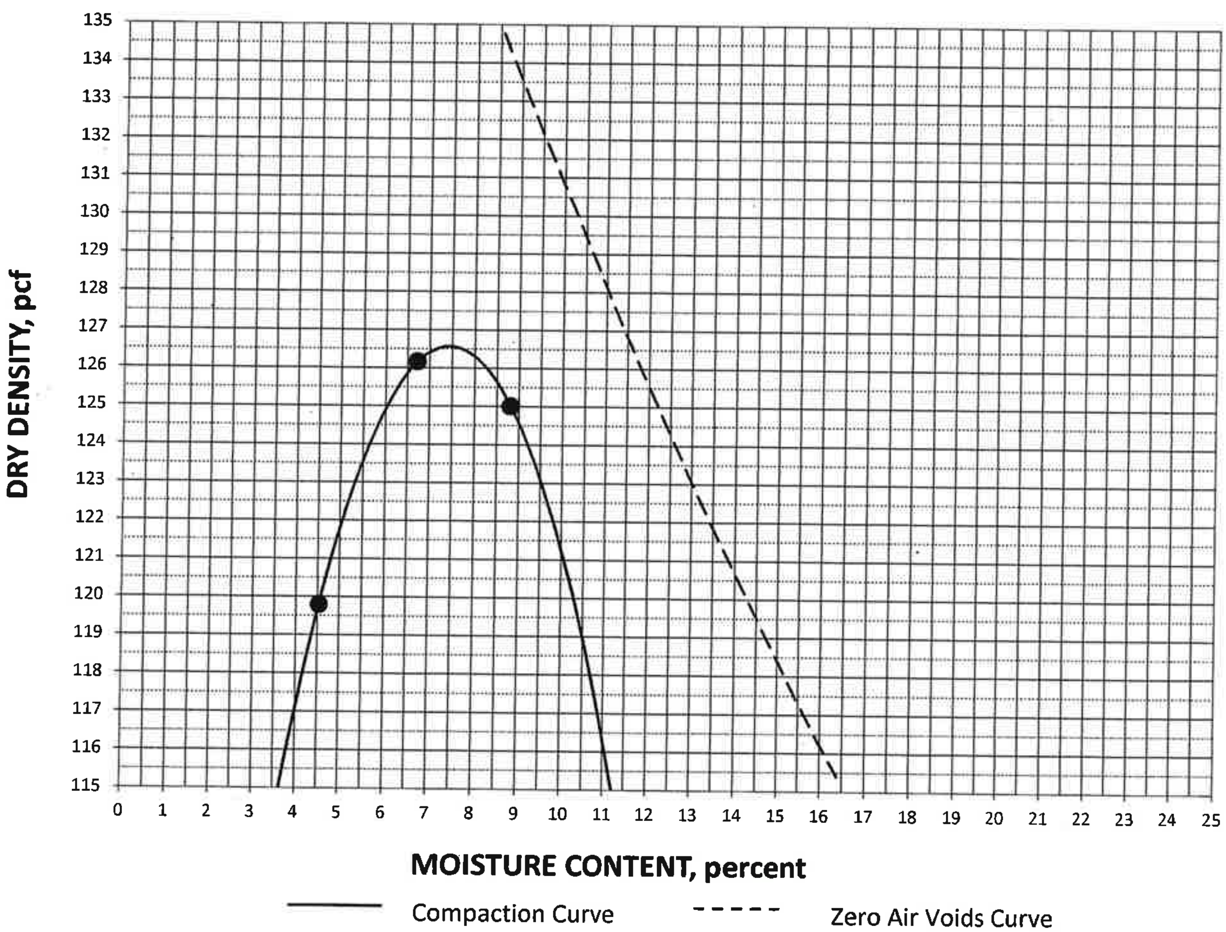
Brown Silty Sand (SM)

SIEVE DATA:

Sieve Size	% Retained (Cumulative)
3/4"	0
3/8"	0
#4	0

MAXIMUM DRY DENSITY: 126.6 pcf

OPTIMUM MOISTURE: 7.4%



DIRECT SHEAR

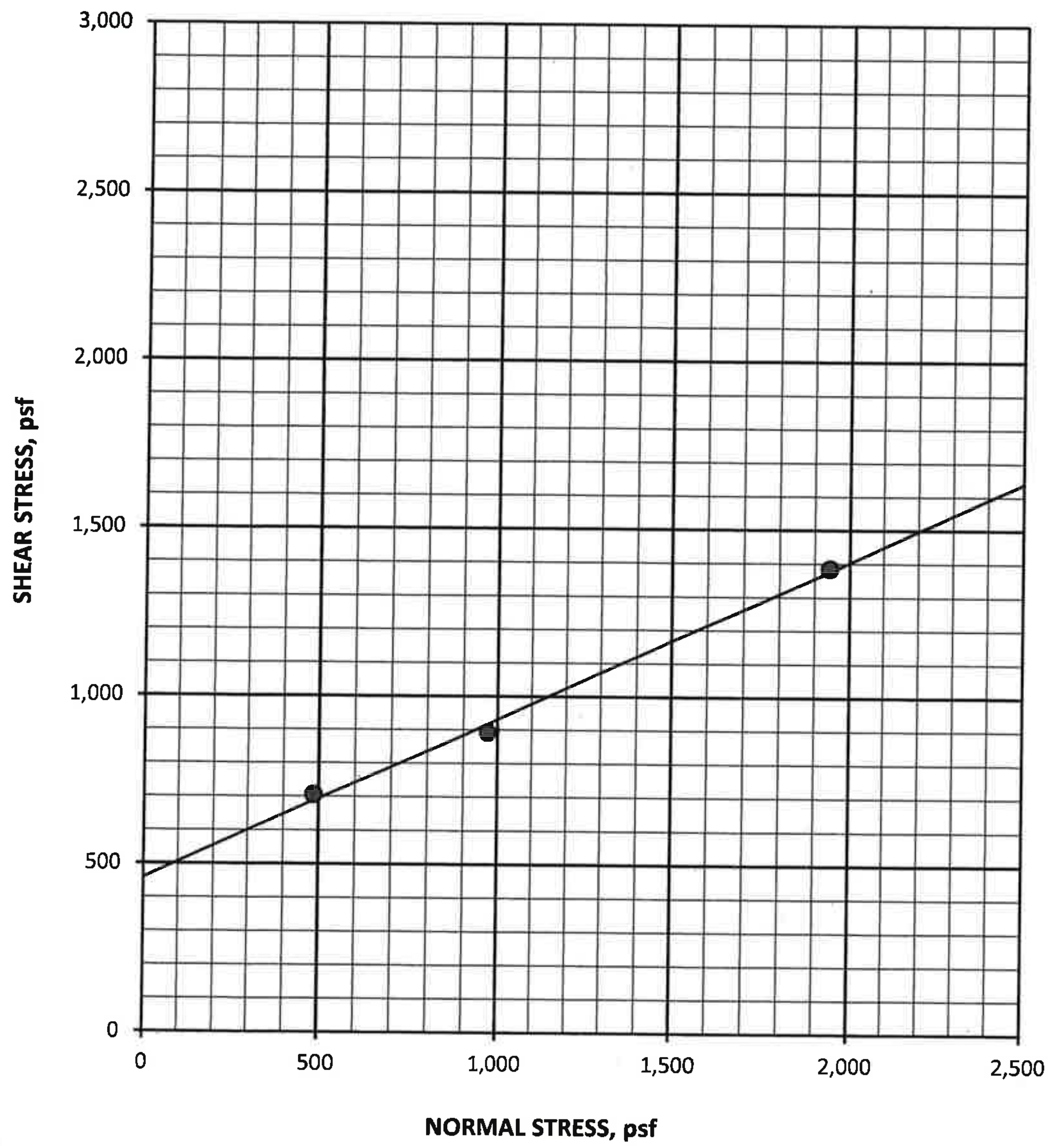
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

September 14, 2017

Boring #2 @ 0.0 - 4.0'
Silty Sand (SM)
Compacted to 90% RC, saturated

INITIAL DRY DENSITY: 113.9 pcf
INITIAL MOISTURE CONTENT: 7.4 %
PEAK SHEAR ANGLE (Ø): 25°
COHESION (C): 460 psf

SHEAR vs. NORMAL STRESS



DIRECT SHEAR continued

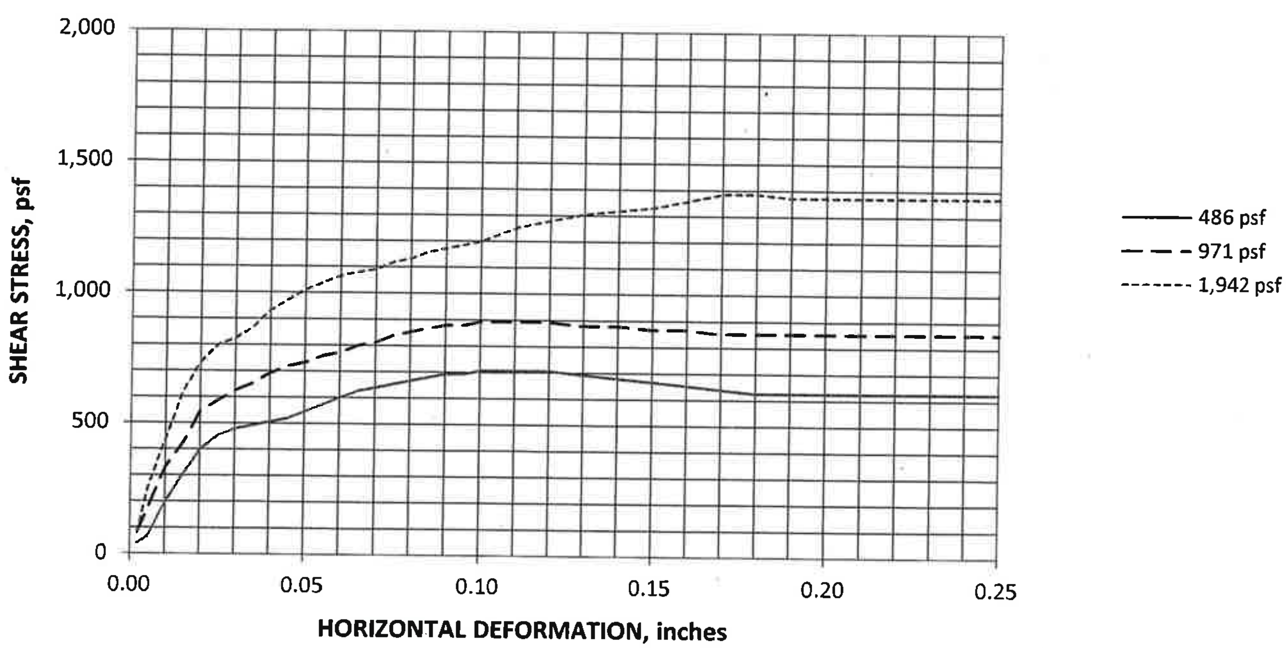
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #2 @ 0.0 - 4.0'
Silty Sand (SM)
Compacted to 90% RC, saturated

September 14, 2017

SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	7.4	7.4	7.4	7.4
DRY DENSITY, pcf	113.9	113.9	113.9	113.9
SATURATION, %	43.4	43.4	43.4	43.4
VOID RATIO	0.452	0.452	0.452	0.452
DIAMETER, inches	2.410	2.410	2.410	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	16.5	16.0	15.0	
DRY DENSITY, pcf	115.1	116.8	121.2	
SATURATION, %	100.0	100.0	100.0	
VOID RATIO	0.437	0.415	0.365	
HEIGHT, inches	0.99	0.98	0.94	



Daketta Pacific Commercial Building

SL-18142-SA

CONSOLIDATION TEST

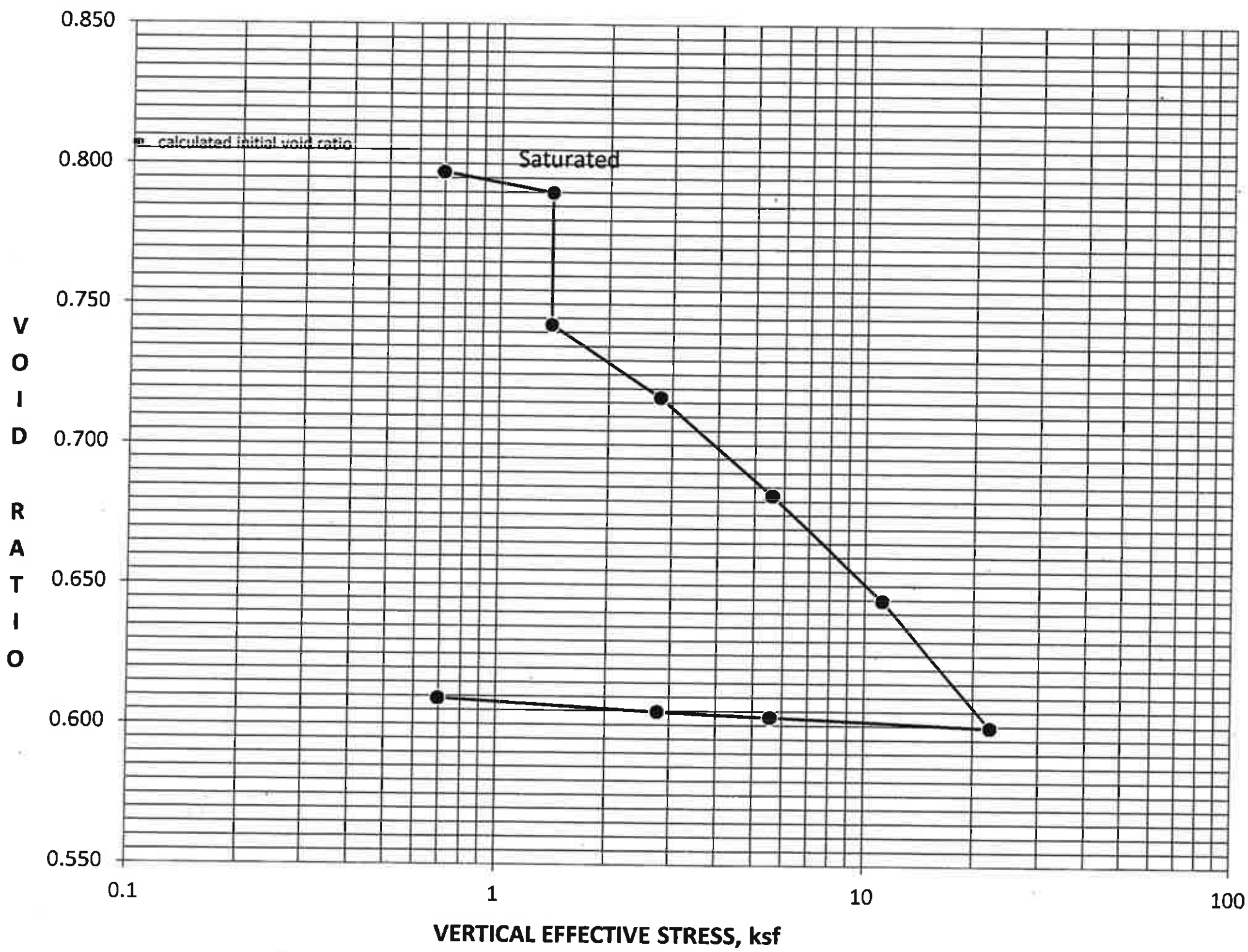
ASTM D 2435/D2435M-11

September 14, 2017

Boring #1 @ 6.0 - 6.5'
Silty Sand (SM)
Ring Sample

DRY DENSITY: 91.6 pcf
MOISTURE CONTENT: 4.7%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.807

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



APPENDIX C

Corrosion Evaluation Report
Prepared by Cerco Analytical

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

7 September, 2017

Job No. 1709003
Cust. No.12651

Mr. Phillip Madrid
Earth Systems Pacific
2049 Preisker Lane, Suite E
Santa Maria, CA 93454

Subject: Project No.: SL-18142-SA
Project Name: Daketta Pacific Commercial Building
Corrosivity Analysis – CalTrans Test Methods

Dear Mr. Madrid:

Pursuant to your request, CERCO Analytical has analyzed the soil sample submitted on September 05, 2017. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the minimum resistivity measurements, sample 001 is classified as "moderately corrosive" and sample 002 is classified as "corrosive". All buried iron, steel, cast iron, ductile iron, galvanized steel and dielectric coated steel or iron should be properly protected against corrosion depending upon the critical nature of the structure. All buried metallic pressure piping such as ductile iron firewater pipelines should be protected against corrosion.

The chloride ion concentrations are none detected with a detection limit of 15 mg/kg.

The sulfate ion concentrations are none detected with a detection limit of 15 mg/kg.

The pH of the soils range from 7.72 to 7.74 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

This corrosivity evaluation is based on general corrosion engineering standards and is non-specific in nature. For specific long-term corrosion control design recommendations or consultation, please call *JDH Corrosion Consultants, Inc. at (925) 927-6630.*

We appreciate the opportunity of working with you on this project. If you have any questions, or if you require further information, please do not hesitate to contact us.

Very truly yours,
CERCO ANALYTICAL, INC.

J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

California State Certified Laboratory No. 2153

CERCO analytical
1100 Willow Pass Court, Suite A
Concord, CA 94520-1006
925 462 2771 Fax. 925 462 2775
www.cercoanalytical.com

Client: Earth Systems Pacific
Client's Project No.: SL-18142-SA
Client's Project Name: Daketta Pacific Commercial Bldg.
Date Sampled: 23-Aug-17
Date Received: 5-Sep-17
Matrix: Soil
Authorization: Letter dated September 1, 2017

Date of Report: 7-Sep-2017

Job/Sample No.	Sample I.D.	Moisture (%)	pH	Min.Resistivity (ohms-cm)**	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
1709003-001	Boring No. 2 @ 0-4'	-	7.74	2,300	-	N.D.	N.D.
1709003-002	Boring No. 2 @ 5'-8'	-	7.72	1,100	-	N.D.	N.D.

Method:	CT 226 (a)	CT 643 (b)	CT 643 (b)	-	CT 422 (c)	CT 417 (c)
Reporting Limit:	-	-	-	50	15	15
Date Analyzed:	-	6-Sep-2017	6-Sep-2017	-	6-Sep-2017	6-Sep-2017

* Results Reported on an "As Received" Basis

(a) Rev. July 2010 (b) Rev. June 2007 (c) Rev. November 2006

N.D. - None Detected

Cheryl McMillen
Laboratory Director

Quality Control Summary - **All laboratory quality control parameters were found to be within established limits**

APPENDIX D

Infiltration Test Results

INFILTRATION TEST RESULTS

Infiltration Test: A
Date Drilled: August 23, 2017
Date Tested: August 23, 2017
Technician: CA

Test Hole Diameter: 6 inches
Test Hole Depth: 52 inches
Test Duration: 199 minutes

FALLING HEAD RESULTS

INTERVAL (minutes)	READING (inches)	INCREMENTAL FALL (inches)	INFILTRATION RATE (minutes / inch)	INFILTRATION RATE (inches / hour)
Begin	2.0	--	--	--
1	10.8	8.8	0.1	600
1	16.5	5.7	0.2	300
1	21.0	4.5	0.2	300
1	24.8	3.8	0.3	200
1	28.8	4.0	0.3	200
1	31.8	3.0	0.3	200
1	35.0	3.2	0.3	200
1	37.5	2.5	0.4	150
1	39.8	2.3	0.4	150
1	41.3	1.5	0.7	86
1	42.3	1.0	1.0	60
1	43.5	1.2	0.8	75
1	44.5	1.0	1.0	60
1	46.0	1.5	0.7	86
refill	1.3	--	--	--
1	4.3	3.0	0.3	200
1	7.3	3.0	0.3	200
1	9.8	2.5	0.4	150
1	12.3	2.5	0.4	150
1	15.0	2.7	0.4	150
5	24.0	9.0	0.6	100
5	32.0	8.0	0.6	100
5	38.5	6.5	0.8	75
5	42.3	3.8	1.3	46
5	44.8	2.5	2.0	30
5	46.0	1.2	4.2	14
refill	2.5	--	--	--
1	5.0	2.5	0.4	150
1	6.3	1.3	0.8	75
1	7.5	1.2	0.8	75
1	8.8	1.3	0.8	75
1	9.8	1.0	1.0	60
5	15.8	6.0	0.8	75
5	20.0	4.2	1.2	50
5	23.8	3.8	1.3	46

INFILTRATION TEST RESULTS

Infiltration Test: A
Date Drilled: August 23, 2017
Date Tested: August 23, 2017
Technician: CA

Test Hole Diameter: 6 inches
Test Hole Depth: 52 inches
Test Duration: 199 minutes

5	26.5	2.7	1.9	32
5	31.5	5.0	1.0	60
5	32.8	1.3	3.8	16
5	35.5	2.7	1.9	32
5	37.0	1.5	3.3	18
5	38.8	1.8	2.8	21
5	39.8	1.0	5.0	12
5	41.0	1.2	4.2	14
5	43.3	2.3	2.2	27
5	45.0	1.7	2.9	21
5	46.0	1.0	5.0	12
refill	2.5	--	--	--
5	9.5	7.0	0.7	86
5	15.0	5.5	0.9	67
5	19.3	4.3	1.2	50
5	23.0	3.7	1.4	43
5	25.8	2.8	1.8	33
5	30.5	4.7	1.1	55
5	32.8	2.3	2.2	27
5	34.8	2.0	2.5	24
5	36.5	1.7	2.9	21
5	38.5	2.0	2.5	24
5	40.3	1.8	2.8	21
5	42.0	1.7	2.9	21
5	43.5	1.5	3.3	18
5	45.0	1.5	3.3	18
5	46.0	1.0	5.0	12

INFILTRATION TEST RESULTS

Infiltration Test: B
Date Drilled: August 23, 2017
Date Tested: August 23, 2017
Technician: CA

Test Hole Diameter: 6 inches
Test Hole Depth: 54 inches
Test Duration: 178 minutes

FALLING HEAD RESULTS

INTERVAL (minutes)	READING (inches)	INCREMENTAL FALL (inches)	INFILTRATION RATE (minutes / inch)	INFILTRATION RATE (inches / hour)
Begin	4.5	--	--	--
1	23.3	18.8	0.1	600
1	32.3	9.0	0.1	600
1	37.8	5.5	0.2	300
1	40.8	3.0	0.3	200
1	43.5	2.7	0.4	150
1	46.0	2.5	0.4	150
1	47.8	1.8	0.6	100
1	49.0	1.2	0.8	75
1	50.3	1.3	0.8	75
1	51.5	1.2	0.8	75
1	52.0	0.5	2.0	30
1	52.8	0.8	1.3	46
1	53.5	0.7	1.4	43
1	54.0	0.5	2.0	30
1	54.8	0.8	1.3	46
1	55.0	0.2	5.0	12
1	55.5	0.5	2.0	30
1	55.8	0.3	3.3	18
1	56.0	0.2	5.0	12
refill	5.0	--	--	--
1	12.0	7.0	0.1	600
1	17.5	5.5	0.2	300
1	22.3	4.8	0.2	300
1	27.3	5.0	0.2	300
5	30.0	2.7	1.9	32
5	39.5	9.5	0.5	120
5	45.0	5.5	0.9	67
5	48.0	3.0	1.7	35
5	51.0	3.0	1.7	35
5	52.8	1.8	2.8	21
5	54.0	1.2	4.2	14
5	55.3	1.3	3.8	16
5	56.0	0.7	7.1	8
refill	6.0	--	--	--
1	12.3	6.3	0.2	300
1	16.5	4.2	0.2	300

INFILTRATION TEST RESULTS

Infiltration Test: B
Date Drilled: August 23, 2017
Date Tested: August 23, 2017
Technician: CA

Test Hole Diameter: 6 inches
Test Hole Depth: 54 inches
Test Duration: 178 minutes

1	19.5	3.0	0.3	200
1	22.3	2.8	0.4	150
1	25.3	3.0	0.3	200
5	35.3	10.0	0.5	120
5	41.0	5.7	0.9	67
5	46.3	5.3	0.9	67
5	49.0	2.7	1.9	32
5	52.3	3.3	1.5	40
5	53.3	1.0	5.0	12
5	54.8	1.5	3.3	18
5	56.0	1.2	4.2	14
refill	6.5	--	--	--
5	20.0	13.5	0.4	150
5	29.0	9.0	0.6	100
5	34.3	5.3	0.9	67
5	39.3	5.0	1.0	60
5	43.0	3.7	1.4	43
5	45.5	2.5	2.0	30
5	47.5	2.0	2.5	24
5	49.0	1.5	3.3	18
5	50.8	1.8	2.8	21
5	52.5	1.7	2.9	21
5	53.8	1.3	3.8	16
5	54.8	1.0	5.0	12
5	56.0	1.2	4.2	14

INFILTRATION TEST RESULTS

Infiltration Test: C
Date Drilled: August 23, 2017
Date Tested: August 23, 2017
Technician: CA

Test Hole Diameter: 6 inches
Test Hole Depth: 55 inches
Test Duration: 240 minutes

FALLING HEAD RESULTS

INTERVAL (minutes)	READING (inches)	INCREMENTAL FALL (inches)	INFILTRATION RATE (minutes / inch)	INFILTRATION RATE (inches / hour)
Begin	3.0	--	--	--
1	8.5	5.5	0.2	300
1	12.5	4.0	0.3	200
1	15.0	2.5	0.4	150
1	16.8	1.8	0.6	100
1	18.5	1.7	0.6	100
1	20.8	2.3	0.4	150
1	22.5	1.7	0.6	100
1	23.5	1.0	1.0	60
1	25.0	1.5	0.7	86
1	26.0	1.0	1.0	60
5	32.0	6.0	0.8	75
5	35.8	3.8	1.3	46
5	38.3	2.5	2.0	30
5	40.5	2.2	2.3	26
10	43.5	3.0	3.3	18
10	45.8	2.3	4.3	14
10	48.0	2.2	4.5	13
10	49.3	1.3	7.7	8
10	50.5	1.2	8.3	7
10	51.8	1.3	7.7	8
10	53.0	1.2	8.3	7
10	53.8	0.8	12.5	5
Refill	3.0	--	--	--
10	9.5	6.5	1.5	40
10	18.0	8.5	1.2	50
10	23.0	5.0	2.0	30
10	28.5	5.5	1.8	33
10	33.0	4.5	2.2	27
10	36.3	3.3	3.0	20
10	38.5	2.2	4.5	13
10	40.5	2.0	5.0	12
10	42.5	2.0	5.0	12
10	44.3	1.8	5.6	11
10	46.0	1.7	5.9	10
10	47.5	1.5	6.7	9
10	48.8	1.3	7.7	8

INFILTRATION TEST RESULTS

Infiltration Test: D
Date Drilled: August 23, 2017
Date Tested: August 23, 2017
Technician: CA

Test Hole Diameter: 6 inches
Test Hole Depth: 54 inches
Test Duration: 245 minutes

FALLING HEAD RESULTS

INTERVAL (minutes)	READING (inches)	INCREMENTAL FALL (inches)	INFILTRATION RATE (minutes / inch)	INFILTRATION RATE (inches / hour)
Begin	3.0	--	--	--
1	11.5	8.5	0.1	600
1	14.0	2.5	0.4	150
1	15.0	1.0	1.0	60
1	16.5	1.5	0.7	86
1	17.5	1.0	1.0	60
1	17.8	0.3	3.3	18
1	18.5	0.7	1.4	43
1	19.3	0.8	1.3	46
1	20.0	0.7	1.4	43
1	20.5	0.5	2.0	30
5	24.8	4.3	1.2	50
5	27.8	3.0	1.7	35
5	32.0	4.2	1.2	50
10	35.0	3.0	3.3	18
10	37.5	2.5	4.0	15
10	39.5	2.0	5.0	12
10	40.8	1.3	7.7	8
10	42.0	1.2	8.3	7
10	43.3	1.3	7.7	8
10	44.3	1.0	10	6
10	45.0	0.7	14	4
10	46.0	1.0	10	6
10	46.8	0.8	13	5
10	47.5	0.7	14	4
10	48.5	1.0	10	6
10	49.3	0.8	13	5
Refill	3.0	--	--	--
10	10.3	7.3	1.4	43
10	15.8	5.5	1.8	33
10	18.8	3.0	3.3	18
10	21.5	2.7	3.7	16
10	26.3	4.8	2.1	29
10	30.3	4.0	2.5	24
10	33.5	3.2	3.1	19
10	36.8	3.3	3.0	20
10	39.5	2.7	3.7	16

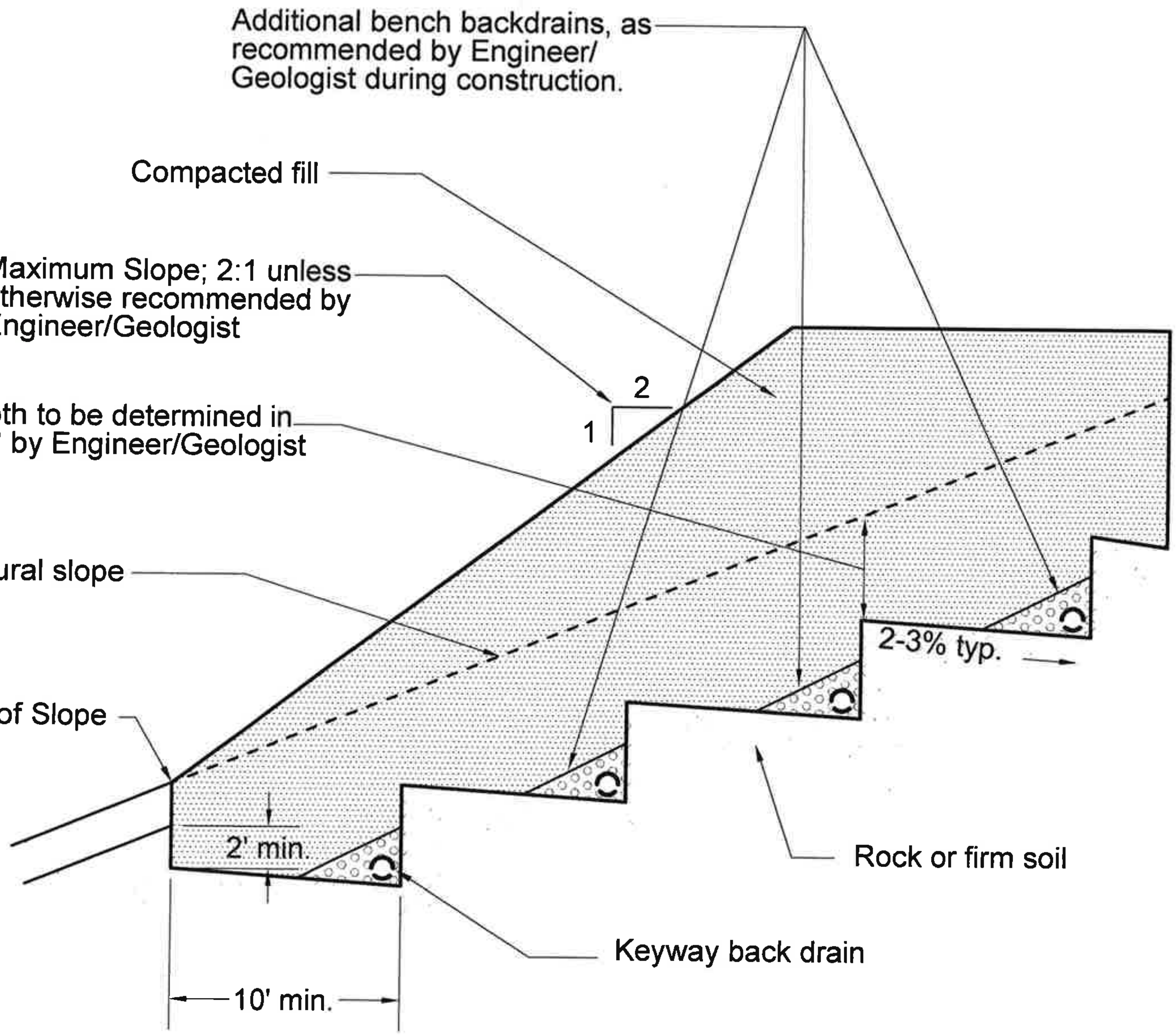
APPENDIX E

Typical Bench and Keyway Detail

BENCH and KEYWAY DETAIL (Typical)

DAKETTA PACIFIC COMMERCIAL BUILDING

6864 Cortona Drive
Goleta, California



SCHEMATIC ONLY
NOT TO SCALE

Earth Systems Pacific

2049 Preisker Lane, Suite E
Santa Maria, California, 93454

(805) 928-2991 • FAX (805) 928-9253
E-mail: esc@earthsystems.com

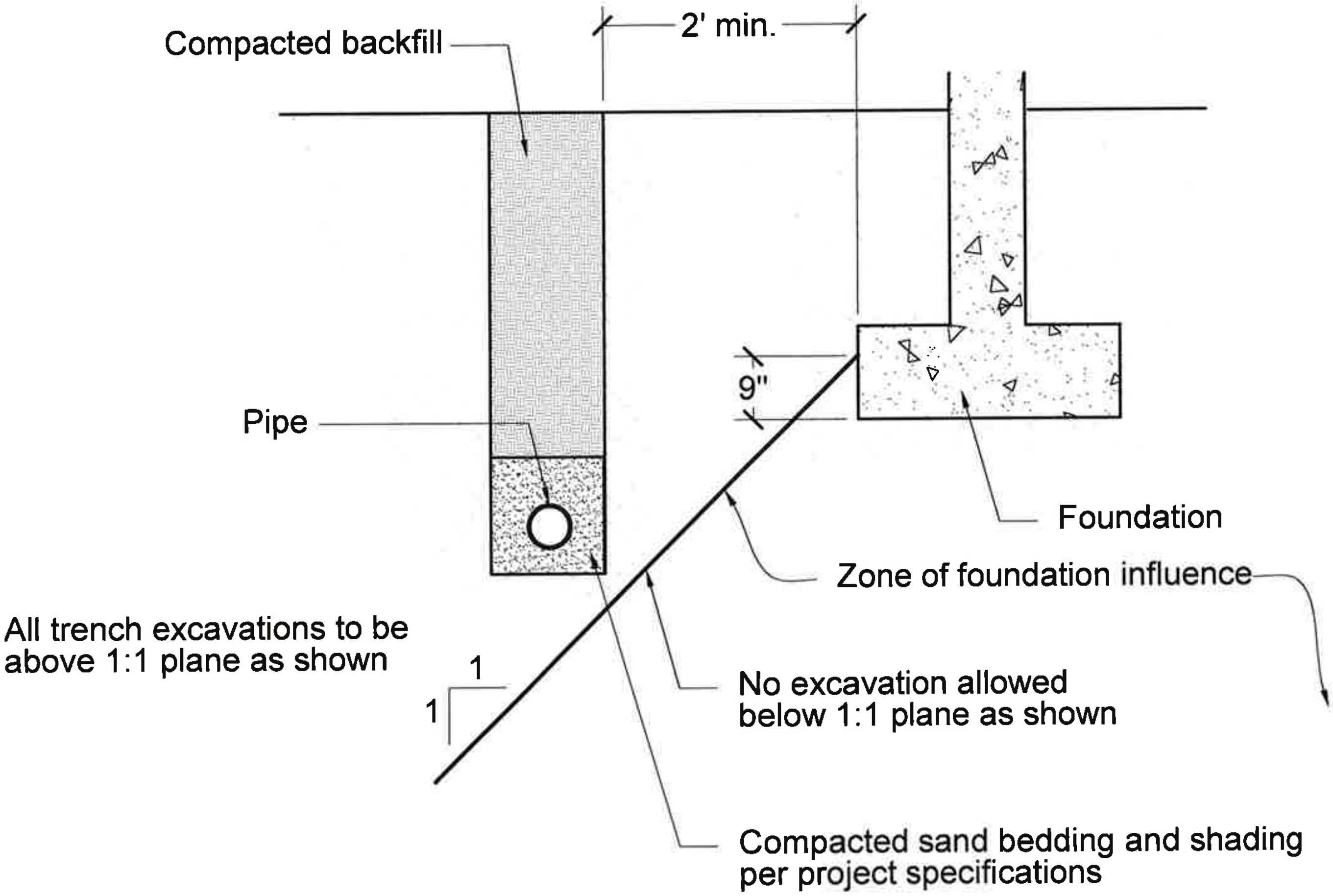
September 29, 2017 **SMK** **SL-18142-SA**
BENCH-D01-V03.dwg

APPENDIX F

Typical Detail A: Pipe Placed Parallel to Foundations

TYPICAL DETAIL A:
PIPE PLACED PARALLEL TO FOUNDATIONS

DAKETTA PACIFIC COMMERCIAL BUILDING
6864 Cortona Drive
Goleta, California



SCHEMATIC ONLY
NOT TO SCALE

Earth Systems Pacific

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