Appendix F

Geotechnical Investigation

Pacific Coast Testing, Inc.

GEOTECHNICAL INVESTIGATION
PROPOSED COOLING FACILITY
ARCTIC COLD - E. BETTERAVIA ROAD
SANTA MARIA, CALIFORNIA

April 22, 2020
PROJECT
20-9131

FOR
FISHER CONSTRUCTION GROUP INC
625 FISHER LANE
BURLINGTON, WA 98233

Pacific Coast Testing, Inc.

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April 22, 2020
Project 20-9131

Clayton Dragoo
Fisher Construction Group
625 Fisher Drive
Burlington, WA 98233

Subject: Geotechnical Investigation, Proposed Arctic Cold - Cooling Facility, East Betteravia Road, Santa Maria, California

Dear Clayton:

Pacific Coast Testing (PCT) is pleased to submit this Geotechnical Investigation Report for the proposed Cooling Facility on East Betteravia Road in Santa Maria, California. This report was prepared in accordance with the scope of services presented in our proposal. The report provides geotechnical recommendations for site preparation, foundations, slabs-on-grade, retaining walls, pavement sections etc.

As discussed in the report, the primary concerns from a geotechnical standpoint are the presence of variable depths of compacted fill (oil sump locations), loose native soils, and the potential for differential settlements. It is therefore important that the building pad areas be overexcavated to a minimum depth of 6 feet below lowest existing grades or finish pad grade and that all of the foundations for the proposed buildings bear in compacted non-expansive soils.

Please contact the undersigned if you have any questions concerning the findings or conclusions provided in this report.

Sincerely,

PACIFIC COAST TESTING INC.

Ron J. Church
GE #2184

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GEOTECHNICAL INVESTIGATION
PROPOSED COOLING FACILITY
ARCTIC COLD - EAST BETTERAVIA ROAD
SANTA MARIA, CALIFORNIA

PROJECT 20-9131

1.0 INTRODUCTION

This report presents the results of our geotechnical investigation for the proposed cooling facility to be located on East Betteravia Road (APN 128-097-001/002) in Santa Maria, California. A site location map is presented in Figure 1.

The property is located south of East Betteravia Road and east of Rosemary Road, approximately 1.2 miles east of Highway 101. This area of Santa Maria contains primarily agricultural and commercial/industrial properties. Topographically, the terrain is relatively level at around 300 feet above mean sea level (MSL). At the time of our field investigation the property was planted with spinach. Several oil production wells were located on the properties (GeoTracker – Unocal Vincent B Lease) with associated sumps. Based on available reports the sumps were excavated and backfilled with native overburden and approved borrow sources (Elks Rodeo/Santa Maria River).

It is our understanding that the facility will include a 260,116 square foot (sf) freezer, coolers, processing and storage buildings. A stormwater retention pond will be located on the westside of the facility with a process waste water basin and on-site septic system on the eastside. The buildings are anticipated to be of steel-framed construction with concrete slab-on-grade floors. Footing loads for the structures are presently unavailable. For the purpose of this report, maximum loads on the order of 50 kips (columns) and 2.0 kips per lineal foot (continuous) have been estimated.

The project description is based on a site reconnaissance performed by a Pacific Coast Testing, Inc., engineer and information provided by Fisher Construction. The site plan provided forms the basis for the "Site Plan", Figure 2.

In the event that there is change in the nature, design or location of improvements, or if the assumed loads are not consistent with actual design loads, the conclusions and recommendations contained in this report should be reviewed and modified, if required. Evaluations of the soils for hydrocarbons or other chemical properties are beyond the scope of the investigation.

2.0 PURPOSE AND SCOPE

The purpose of this study was to explore and evaluate the surface and subsurface soil conditions at the site and to develop geotechnical information and design criteria for the proposed project. The scope of this study included the following items.

1. A review of available soil and geologic information for this area of Santa Maria.

2. A field study consisting of a site reconnaissance and an exploratory boring program to formulate a description of the subsurface conditions.

3. A laboratory testing program performed on representative soil samples collected during our field study.

4. Engineering analysis of the data gathered during our field study, laboratory testing, and literature review. Development of recommendations for site preparation and grading, and geotechnical design criteria for foundations, slab-on-grade construction, retaining walls, pavement design and underground facilities.

5. Preparation of this report summarizing our findings, conclusions, and recommendations regarding the geotechnical aspects of the project site.

3.0 SUBSURFACE SOIL CONDITIONS

The near surface materials to a depth of 4 to 6 consist of clayey sands, silty sands and sands. These soils were encountered in a moist to very moist state and in a loose to medium dense condition. In boring B-3 a layer of sandy silts in a firm to stiff condition were encountered. The near surface materials were generally underlain by sands and silty sands to a depth of 40 feet. These materials were encountered in a moist state and in a medium dense to dense condition.

The near surface clayey sands and silty sands have low and very low expansivity, respectively. No free ground water was encountered during our field exploration. Based on previous borings, and information from GeoTracker, groundwater depths are greater than 70 feet below existing grades.

A more detailed description of the soils encountered is presented graphically on the "Exploratory Boring Logs," B-1 through B-5, Appendix A. An explanation of the symbols and descriptions used on these logs are presented on the "Soil Classification Chart.

The soil profile described above is generalized; therefore, the reader is advised to consult the boring logs (Appendix A) for soil conditions at specific locations. Care should be exercised in interpolating or extrapolating subsurface conditions between or beyond and borings. On the boring logs we have indicated the soil type, moisture content, grain size, dry density, and the applicable Unified Soil Classification System Symbol.

The locations of our exploratory borings, shown on Site Plan, Figure 2, were approximately determined from features at the site. Hence, accuracy can be implied only to the degree that this method warrants. Surface elevations at boring locations were not determined.

4.0 SEISMIC CONSIDERATIONS

4.1 Seismic Coefficients

Structures should be designed to resist the lateral forces generated by earthquake shaking in accordance with the building code and local design practice. This section presents seismic design parameters for use with the California Building Code (CBC) and ASCE 7-16. The site coordinates and ASCE 7 Hazard Tool were used to obtain the seismic design criteria. The peak ground acceleration was estimated for a 2 percent probability of occurrence in 50 years using the USGS online deaggregation tool.

Seismic Data

California Building Code Seismic Parameter	Values for Site Class D
Latitude, degrees	34.921500
Longitude, degrees	-120.396700
S_s Seismic Factor	1.007
S_1 Seismic Factor	0.372
Site Class	Sd, Stiff Soil
F_a, Short-Period Site Coefficient (@ 0.2-s Period)	1.200
F_v, Long-Period Site Coefficient (@ 1.0-s Period)	1.928*
S_{MS}, Site Specific Response Parameter for Site Class at 0.2 sec	1.208
S_{M1}, Site Specific Response Parameter for Site Class at 1 sec	0.717
S_{DS} = 2/3 S_{MS}	0.810
S_{D1} = 2/3 S_{M1}	0.481
Peak Ground Acceleration (2% probability in 50 years)	0.513
Likely Magnitude (M)	6.8
*Fv is based on Table 11.4.2 of ASCE 7-16 assuming the fundamental period (T) for the proposed structure is taken to be less than or equal to Ts (S_{D1}/S_{DS}) and Cs is determined by Eq. 12.8.2 (Exception 2 of 11.4.8). If the structure does not meet with this exception, updated values or a design response spectrum can be prepared, upon request.	

4.2 Liquefaction Analysis

Liquefaction is described as the sudden loss of soil shear strength due to a rapid increase of pore water pressures caused by cyclic loading from a seismic event. In simple terms, it means that the soil acts more like a fluid than a solid in a liquefiable event. In order for liquefaction to occur, the following are generally needed; granular soils (sand, silty sand and sandy silt), groundwater and low density (very loose to medium dense) conditions. A liquefaction study was not part of our scope for this project; however, an opinion can be provided based on the results of our soil borings and experience in this area of Santa Maria. In general, medium dense to dense sands were found from 5 feet to 40 feet below existing grades. Based on our experience and available well installations groundwater is typically encountered at depths exceeding 70 feet below existing grades. It is therefore our opinion that the potential for liquefaction would be in the negligible category.

4.3 Lateral Spreading

Due to the near level terrain and the lack of liquefiable soil zones, the potential for lateral spreading displacements in the building pad areas would be negligible.

4.4 Slope Stability

The building pad areas are located in near level terrain with gradients of less than five (5) percent. There was no visual evidence of overall instability at the site, although, shallow erosion of the non-cohesive sands and silty sands could occur if over-saturated conditions were to occur. However, the potential for movement to influence the proposed construction would be low to negligible.

4.5 Faulting

There are no active or potentially active faults in the direct vicinity of the building pad areas. The nearest known active fault (Los Alamos-Baseline Fault) is located south of the site. The site is not within a State of California Fault Hazards Zone (Alquist-Priolo). It is our opinion that there is a negligible potential for fault rupture to impact the structures based on review of the published maps.

5.0 CONCLUSIONS AND RECOMMENDATIONS

1. The site is suitable from a geotechnical standpoint for the proposed construction provided the recommendations presented in this report are incorporated into the project plans and specifications.

2. The primary concerns from a geotechnical standpoint are the presence of backfill materials in the sump areas, the loose and disturbed condition of the near surface soils and the potential for differential movements. GSI Soils provided intermittent compaction testing during backfilling of the sumps and in general the soils were compacted to 90 percent of ASTM D1557-02. However, the sump depths varied form ~5 feet to ~15 feet deep. Due to the increased potential for differential settlements the pad areas for the proposed buildings should be overexcavated and re-compacted to a depth of at least 6 to 7 feet.

3. All grading and foundation plans should be reviewed by Pacific Coast Testing Inc., hereinafter described as the Geotechnical Engineer, prior to contract bidding. This review should be performed to determine whether the recommendations contained within this report are incorporated into the project plans and specifications.

4. The Geotechnical Engineer should be notified at least two (2) working days before site clearing or grading operations commence and should be present to observe the stripping of deleterious material and provide consultation to the Grading Contractor in the field.

5. Field observation and testing during the grading operations should be provided by the Geotechnical Engineer so that a decision can be formed regarding the adequacy of the site preparation, the acceptability of fill materials, and the extent to which the earthwork construction and the degree of compaction comply with the project geotechnical specifications. Any work related to grading performed without the full knowledge of, and under direct observation of the Geotechnical Engineer, may render the recommendations of this report invalid.

5.1 Clearing and Stripping

1. All surface and subsurface deleterious materials should be removed from the proposed building and driveway areas and disposed of off-site. This includes, but is not limited to any buried utility lines, loose fills, septic systems, debris, building materials, and any other surface and subsurface structures within proposed building areas. Voids left from site clearing, should be cleaned and backfilled as recommended for structural fill.

2. Once the site has been cleared, the exposed ground surface should be stripped to remove surface vegetation and organic soil. The surface may be disced, rather than stripped, if the organic content of the soil is not more than three percent by weight. If stripping is required, depths should be determined by a member of our staff in the field at the time of stripping. Strippings may be either

disposed of off-site or stockpiled for future use in landscape areas if approved by the landscape architect.

5.2 Preparation of Building Pads

1. The intent of these recommendations is to overexcavate and re-compact the soils in the upper 6 feet and support the buildings on conventional foundations.

2. The building pad areas should be overexcavated to a depth of six (6) feet below lowest existing grade or finish pad grade or four (4) feet below the bottom of the deepest footing, whichever is greater. After approval of the excavation bottom by the geotechnical engineer, the exposed surface should then be scarified to a depth of 12 inches, moisture conditioned to near optimum and compacted to at least ninety (90) percent of maximum dry density (ASTM D1557-02). The removed sand and silty sand soils can then be replaced and similarly compacted. The lateral limits of overexcavation, scarification and fill placement should be at least 5 feet beyond the perimeter building lines. If clayey soils or deleterious materials are encountered during grading they should be removed from the site or used in landscape areas. Fill and cut slopes should be constructed at a maximum slope of 2:1 (horizontal to vertical).

3. If loose or unstable soils are encountered at the bottom of the excavations, these areas should be excavated a further 18 inches (min) and a layer of stabilization fabric (Mirafi HP570 or equivalent) and Class II/III Base placed prior to placing fill. The base should be compacted to 90% of ASTM D1557-02

4. In order to help minimize potential settlement problems associated with structures supported on non-uniform materials, the soils engineer should be consulted for specific site recommendations during site excavation and grading. In general, all proposed construction should be supported on a uniform thickness of compacted soil.

5. The above grading is based on the strength characteristics of the materials under conditions of normal moisture that would result from rain water and do not take

into consideration the additional activating forces applied by seepage from springs or subsurface water. Areas of observed seepage should be provided with subsurface drains to release the hydrostatic pressures.

6. The near-surface soils may become partially or completely saturated during the rainy season. Grading operations during this time period may be difficult since the saturated materials may not be compactable, and they may not support construction equipment. Consideration should be given to the seasonal limit of the grading operations on the site.

7. All final grades should be provided with a positive drainage gradient away from foundations. Final grades should provide for rapid removal of surface water runoff. Ponding of water should not be allowed on building pads or adjacent to foundations.

5.3 Preparation of Paved Areas

1. After clearing and grubbing, the existing soils should be removed to a depth of at least 2 feet below the existing ground surface or 1 foot below the proposed structural section, whichever is deeper. The bottom of the excavation should then be scarified, moisture-conditioned and compacted to at least 90 percent. Native fill materials can then be placed and similarly compacted.

2. The upper 12 inches of subgrade beneath all paved areas should be compacted to at least 95 percent relative compaction. Subgrade soils should not be allowed to dry out or have excessive construction traffic between the time of water conditioning and compaction, and the time of placement of the pavement structural section.

5.4 Structural Fill

1. On-site sand and silty sand soils free of organic and deleteriouse material are suitable for use as structural fill. Structural fill should not contain rocks larger

than 3 inches in greatest dimension and should have no more than 15 percent larger than 1.5 inches in greatest dimension.

2. Select import (decomposed granite or Class II/III Base) should be free of organic and other deleterious material and should be non-expansive with a plasticity index of 10 or less and a sand equivalent of at least 30. Before delivery to the site, a sample of the proposed import should be tested in our laboratory to determine its suitability for use as structural fill.

3. Structural fill using on-site inorganic soil or approved import should be placed in layers, each not exceeding eight inches in thickness before compaction. On-site inorganic or imported soil should be conditioned with water, or allowed to dry, to produce a soil water content at approximately optimum value and should be compacted to at least 90 percent relative compaction based on ASTM D1557-02.

5.5 Foundations

1. Conventional continuous footings and spread footings may be used for support of the proposed buildings. All of the foundation materials should be competent after preparation in accordance with the grading section of this report.

2. The perimeter footings should be at least 18 inches wide and embedded a minimum of 24 inches below pad grade or below adjacent finished grade, whichever is lower. Spread footing should be a minimum of 24 inches square and 24 inches deep and tied to perimeter footings with grade beams (min. 18" wide by 24" deep). The reinforcement for the footings should be designed by the structural engineer; however, a minimum of four (4) No. 5 bars should be provided, two (2) on the top and two (2) on the bottom for continuous footings and grade beams. Dowels (#4 rebar @ 18" o.c.) should also be provided to tie the footings and grade beams to the slab.

3. An allowable dead plus live load bearing pressure of 3,000 psf may be used for design. A total settlements on the order of 1-inch are anticipated with differential settlements being 50 percent of this value.

4. The above allowable pressures are for support of dead plus live loads and may be increased by one-third for short-term wind and seismic loads.

5. Lateral forces on structures may be resisted by passive pressure acting against the sides of shallow footings and/or friction between the soil and the bottom of the footing. For resistance to lateral loads, a friction factor of 0.35 may be utilized for sliding resistance at the base of the spread footings in undisturbed native materials or engineered fill. A passive resistance of 350 pcf equivalent fluid weight may be used against the side of shallow footings. If friction and passive pressures are combined, the lesser value should be reduced by 33 percent.

5.6 Slab-On-Grade Construction

1. Concrete slabs-on-grade and flatwork should not be placed directly on unprepared loose fill materials. Preparation of subgrade to receive concrete slabs-on-grade and flatwork should be processed as discussed in the preceding sections of this report.

2. Where floor dampness in not objectionable, concrete slabs may be cast on a minimum of 6 inches of select import (DG or Base) compacted to 90 percent. If it is desired to minimize floor dampness a section of capillary break material at least 4 inches thick and covered with a 15-mil Stego Type vapor barrier should be provided between the floor slab and compacted soil subgrade. All seams through the vapor barrier should be overlapped and sealed. Where pipes extend through the vapor barrier, the barrier should be sealed to the pipes. The capillary break should be a clean free-draining material such as clean gravel or permeable aggregate complying with Caltrans Standard Specifications 68, Class I, Type A or Type B, to service as a cushion and a capillary break. It is suggested that a 2-inch thick sand layer be placed on top of the membrane to assist in the curing of the concrete. The sand should be lightly moistened prior to placing concrete.

3. Concrete slabs-on-grade should be a minimum of 5 inches thick and should be reinforced with at least No. 4 reinforcing bars placed at 18 inches on-center both ways at or slightly above the center of the structural section. Reinforcing bars should have a minimum clear cover of 1.5 inches, and hot bars should be cooled prior to placing concrete. If heavy equipment and or forklifts are to be used in the buildings 6 to 8-inch slabs with No. 5 or 6 rebar at 18 inches on-center, each way should be anticipated. The final design should be performed by the structural engineer based on the actual floor and wheel loads.

4. All slabs should be poured at a maximum slump of less than 5 inches. Excessive water content is the major cause of concrete cracking. For design of concrete floors, a modulus of subgrade reaction of k = 150 psi per inch would be applicable to on-site engineered fill soils.

5.7 Retaining Walls

1. Retaining walls should be designed to resist lateral pressures from adjacent soils and surcharge loads applied behind the walls.

Lateral Pressure and Condition (Compacted Fill)		Equivalent Fluid Pressure, pcf	
		Unrestrained Wall	Rigidly Supported Wall
Active Case, Drained	**Level-native soils**	40	--
	Level-granular backfill	30	--
At-Rest Case, Drained	**Level-native soils**	--	60
	Level-sand backfill		45
Passive Case, Drained	**Level** **2:1 Sloping Down**	350 175	--
For sloping backfill add 1 pcf for every 2 deg. (Active case) and 1.5 pcf for every 2 deg. (At-rest case)			

2. Isolated retaining wall foundations should extend a minimum depth of 30 inches below lowest adjacent grade. An allowable toe pressure of 3,000 psf is

recommended for footings supported on at least 24 inches of compacted soil. A coefficient of friction of 0.35 may be used.

3. For retaining walls greater than 6 feet, as measured from the top of the foundation, a seismic horizontal surcharge of $10H^2$ (pounds per linear foot of wall) may be assumed to act on retaining walls. The surcharge will act at a height of 0.33H above the wall base (where H is the height of the wall in feet). This surcharge force shall be added to an active design equivalent fluid pressure of 40 pounds per square foot of depth for the seismic condition.

4. In addition to the lateral soil pressure given above, retaining walls should be designed to support any design live load, such as from vehicle and construction surcharges, etc., to be supported by the wall backfill. If construction vehicles are required to operate within 10 feet of a wall, supplemental pressures will be induced and should be taken into account through design.

5. The above-recommended pressures are based on the assumption that sufficient subsurface drainage will be provided behind the walls to prevent the build-up of hydrostatic pressure. To achieve this, we recommend that a filter material be placed behind all proposed walls. The blanket of filter material should be a minimum of 12 inches thick and should extend from the bottom of the wall to within 12 inches of the ground surface. The top 12 inches should consist of water conditioned, compacted native soil. A 4-inch diameter drain pipe should be installed near the bottom of the filter blanket with perforations facing down. The drain pipe should be underlain by at least 4 inches of filter type material. Adequate gradients should be provided to discharge water that collects behind the retaining wall to an adequately controlled discharge system with suitably projected outlets. The filter material should conform to Class I, Type B permeable material as specified in Section 68 of the California Department of Transportation Standard Specifications, current edition. A typical 1" x #4 concrete coarse aggregate mix approximates this specification.

6. For hydrostatic loading conditions (i.e. no free drainage behind walls), an additional loading of 45 pcf equivalent fluid weight should be added to the above soil pressures. If it is necessary to design retaining structures for submerged conditions, allowed bearing and passive pressures should be reduced by 50 percent. In addition, soil friction at the base of the footings should be neglected.

7. Precautions should be taken to ensure that heavy compaction equipment is not used immediately adjacent to walls, so as to prevent undue pressure against, and movement of, the walls.

5.8 Pavement Design

1. The following table provides recommended minimum asphalt concrete pavement sections based on an R-Value of 30 for the near surface silty sands encountered.

RECOMMENDED MINIMUM ASPHALT CONCRETE PAVEMENT SECTIONS DESIGN THICKNESS		
T.I.	**A.C.-in.**	**A.B.-in.**
4.5	2.5	6.0
5.0	2.5	6.5
5.5	3.0	7.0
6.0	3.0	8.5
7.0	3.5	10.5
8.0	4.5	11.5
9.0	6.0	13.0
10.0	7.0	14.0
T.I. = **A.C. =** **A.B. =**	**Traffic Index,** **Asphaltic Concrete - must meet specifications for Caltrans Type A Asphalt Concrete** **Aggregate Base - must meet specifications for Caltrans Class II Aggregate Base (R-Value = minimum 78)** ***Gravel and All-weather roads should conform to the requirements for ¾" maximum Class II Base with increased binder. The amount passing the #30 and #200 sieves should vary between 15 to 30 and 7 to 11 percent respectively.**	

2. Based on our experience a traffic index (T.I.) of 4.5 would be appropriate for employee parking of cars and light pick-up trucks. We would also suggest using a T.I. of 6.0 for driveway areas (to employee parking) not subjected to heavy trucks. For field trucks a T.I. of 7.0 to 8.0 should be considered. For long haul truck movement and parking a T.I. of 8.0 to 10.0 may be appropriate. The final T.I. selected should be based on the actual loading and determined by the project civil engineer.

3. R-value samples should be obtained and tested at the completion of rough grading and the pavement sections confirmed or revised. Clay and silt soils should be removed from the upper 12 to 18 inches in pavement areas. The 18-inch depth would apply to areas with truck loading

4. All sections should be crowned for good drainage. Aggregate base should consist of imported material conforming to Caltrans Standard Specifications for Class II aggregate base, Section 26-1.02A. Class 3 aggregate manufactured from reclaimed materials can be used in lieu of Class II material, provided that Class 3 material meets the gradation and quality requirements for Class II aggregate base. All asphalt pavement construction should conform with Section 39 of the latest edition of the Standard Specifications, State of California, Department of Transportation. Aggregate bases and sub-bases should also be compacted to a minimum relative compaction of 95 percent based ASTM D1557-02.

5. Gravel roads (TI's up to 6.0) should have a minimum section of 12 inches of Class II Base with sufficient binder as indicated in the table above. The upper 24 inches of subgrade for gravel roads should be compacted to a minimum relative compaction of 95 percent based on ASTM D1557-02 and should be crowned for good drainage. A suitable geofabric such as Mirafi HP570 should be placed on the prepared subgrade prior to placement and compaction of the Class II Aggregate Base.

6. Using the R-Value of 30, a Modulus of Rupture for concrete of 550 psi (based on a minimum strength of 3,500 psi) minimum concrete pavement sections are presented in the following table for Traffic Indices (TI) of 4.5 to 10.0.

RECOMMENDED MINIMUM CONCRETE PAVEMENT SECTIONS

Traffic Index (T.I.)	Concrete inches (ft)	Caltrans Class II Aggregate Base inches* (ft)
4.5	5.5 (.46)	6.0 (.50)
5.0	6.0 (.50)	6.0 (.50)
6.0	6.5 (.54)	6.0 (.50)
7.0	7.5 (.58)	6.0 (.50)
8.0	8.0 (.66)	9.0 (.75)
9.0	8.5 (.71)	9.0 (.75)
10.0	9.0 (.75)	9.0 (.75)

7. Concrete pavement construction should generally comply with the requirements of Sections 40 and 90 of the latest edition of the Standard Specifications, State of California, Department of Transportation.

8. Recommendations for mix design, curing, joints and reinforcement should be as promulgated by the Portland Cement Association. Control and construction joints should be used to separate the pavements into approximately square shaped areas at a spacing of no more than 2 times the slab thickness in feet (i.e. 6” slab, joints at 12’ o.c.) or 15 feet on-center, each way, whichever is less. A concrete shrinkage of approximately 1/16-inch per 10 feet of length should be anticipated and joints should be designed accordingly.

9. It is recommended that all joints in and adjacent to the PCC pavement be sealed to preclude entry of water into the soils underlying paved areas.

10. As a guideline, for forklift trucks with a rated capacity of less than 2000 lbs. a minimum pavement section of 6 inches of PCC concrete (f'_c= 4000 psi) over 6 inches of Class II Base should be considered. For rated capacities up to 5000 lbs. a minimum pavement section of 8 inches over 6 inches of base should be considered. The final design thickness and reinforcement should be determined by the structural engineer based on the actual loads.

5.9 Underground Facilities Construction

1. The attention of contractors, particularly the underground contractors, should be drawn to the State of California Construction Safety Orders for "Excavations, Trenches, Earthwork". Trenches or excavations greater than 5 feet in depth should be shored or sloped back in accordance with OSHA Regulations prior to entry.

2. For purposes of this section of the report, bedding is defined as material placed in a trench up to 1 foot above a utility pipe and backfill is all material placed in the trench above the bedding. Unless concrete bedding is required around utility pipes, free-draining sand should be used as bedding. Sand proposed for use as bedding should be tested in our laboratory to verify its suitability and to measure its compaction characteristics. Sand bedding should be compacted by mechanical means to achieve at least 90 percent relative compaction based on ASTM Test D1557-02.

3. On-site inorganic soil, or approved import, may be used as utility trench backfill. Proper compaction of trench backfill will be necessary under and adjacent to structural fill, building foundations, concrete slabs and vehicle pavements. In these areas, backfill should be conditioned with water (or allowed to dry), to produce a soil water content of about 2 to 3 percent above the optimum value and placed in horizontal layers each not exceeding 8 inches in thickness before

compaction. Each layer should be compacted to at least 90 percent relative compaction based on ASTM Test D1557-02. The top lift of trench backfill under vehicle pavements should be compacted to the requirements given in report section 5.3 for vehicle pavement subgrades. Trench walls must be kept moist prior to and during backfill placement.

5.10 Surface and Subsurface Drainage

1. Concentrated surface water runoff within or immediately adjacent to the site should be conveyed in pipes or in lined channels to discharge areas that are relatively level or that are adequately protected against erosion.

2. Water from roof downspouts should be conveyed in pipes that discharge in areas a safe distance away from structures. Surface drainage gradients should be planned to prevent ponding and promote drainage of surface water away from building foundations, edges of pavements and sidewalks. For soil areas we recommend that a minimum of five (5) percent gradient be maintained.

3. Careful attention should be paid to erosion protection of soil surfaces adjacent to the edges of roads, curbs and sidewalks, and in other areas where "hard" edges of structures may cause concentrated flow of surface water runoff. Erosion resistant matting such as Miramat, or other similar products, may be considered for lining drainage channels.

4. Subdrains should be placed in established drainage courses and potential seepage areas. The location of subdrains should be determined during grading. The subdrain outlet should extend into a suitable protected area or could be connected to the proposed storm drain system. The outlet pipe should consist of an unperforated pipe the same diameter as the perforated pipe.

5.11 Percolation Testing

1. Percolation tests to a depth of 10 feet were performed for the storm water retention basin and waste water basin. In addition. three (3) shallow percolation

tests (5' deep) were performed at the proposed location for the on-site waste disposal field. The percolation tests were conducted in general conformance with U.S. Department of Health, Education and Welfare Manual of Septic Tank Practice Guidelines. The results are summarized in the following table.

Test No.	Depth (feet)	Soil Description	Percolation Rate
P-1	10	Clayey Sand (SC)	52 min/in
P-2	10	Clayey Sand (SC)	41 min/in
P-3	5	Silty Sand (SM-SP)	44 min/in
P-4	5	Silty Sand (SM-SP)	51 min/in
P-5	5	Silty Sand (SM-SP)	32 min/in

3. The results indicate that the percolation rates are relatively slow considering the soils types (clayey sands and silty sands). A factor in the slow rates may be related to the property being planted and receiving sprinkling on a regular basis (i.e. the upper soils were in a very moist condition to a depth of 5 feet).

5.12 Geotechnical Observation and Testing

1. Field exploration and site reconnaissance provides only a limited view of the geotechnical conditions of the site. Substantially more information will be revealed during the excavation and grading phases of the construction. Stripping & clearing of vegetation, overexcavation, scarification, fill and backfill placement and compaction should be reviewed by the geotechnical professional during construction to evaluate if the materials encountered during construction are consistent with those assumed for this report.

2. Special inspection of grading should be provided in accordance with California Building Code Section 1705.6 and Table 1705.6. The special inspector should be under the direction of the engineer.

CBC TABLE 1705.6 REQUIRED VERIFICATION AND INSPECTION OF SOILS		
VERIFICATION AND INSPECTION TASK	**CONTINUOUS DURING TASK LISTED**	**PERIODIC DURING TASK LISTED**
1. Verify materials below shallow foundations are adequate to achieve the design bearing capacity		X
2. Verify excavations are extended to proper depth and have reached proper material		X
3. Perform classification and testing of compacted fill		X
4. Verify use of proper materials, densities and lift thicknesses during placement and compaction of compacted fill	X	
5. Prior to placement of compacted fill, observe subgrade and verify that site has been prepared properly.		X

3. The validity of the recommendations contained in this report are also dependent upon a prescribed testing and observation program. Our firm assumes no responsibility for construction compliance with these design concepts and recommendations unless we have been retained to perform on-site testing and review during all phases of site preparation, grading, and foundation/slab construction. The Geotechnical Engineer should be notified at least two (2) working days before site clearing or grading operations commence to develop a program of quality control.

6.0 LIMITATIONS AND UNIFORMITY OF CONDITIONS

1. It should be noted that it is the responsibility of the owner or his/her representative to notify Pacific Coast Testing Inc. a minimum of 48 hours before any stripping, grading, or foundation excavations can commence at this site.

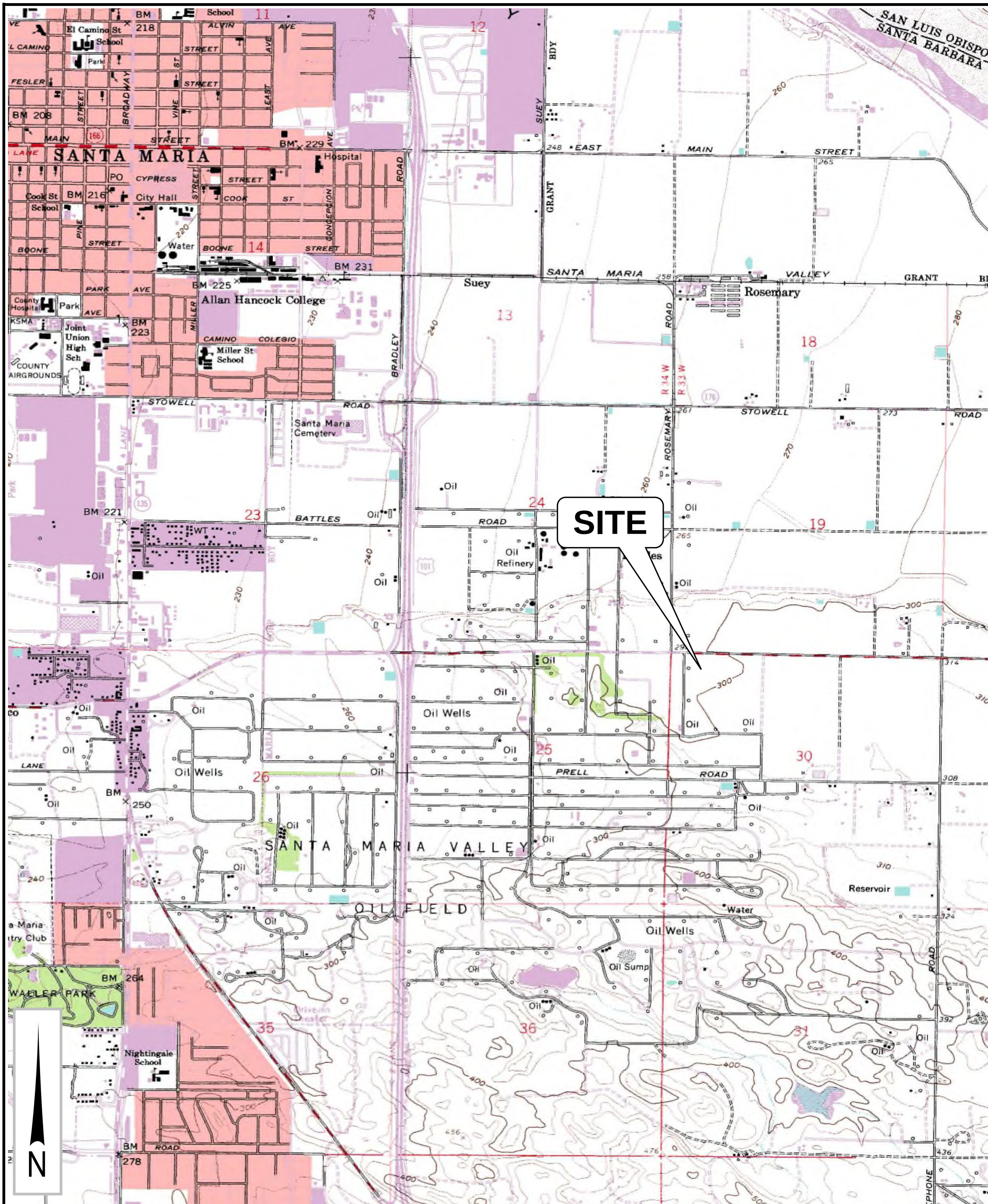
2. The recommendations of this report are based upon the assumption that the soil conditions do not deviate from those disclosed during our study. Should any variations or undesirable conditions be encountered during grading of the site, Pacific Coast Testing Inc. will provide supplemental recommendations as dictated by the field conditions.

3. This report is issued with the understanding that it is the responsibility of the owner or his/her representative to ensure that the information and recommendations contained herein are brought to the attention of the architect and engineer for the project and incorporated into the project plans and specifications. The owner or his/her representative is responsible for ensuring that the necessary steps are taken to see that the contractor and subcontractors carry out such recommendations in the field.

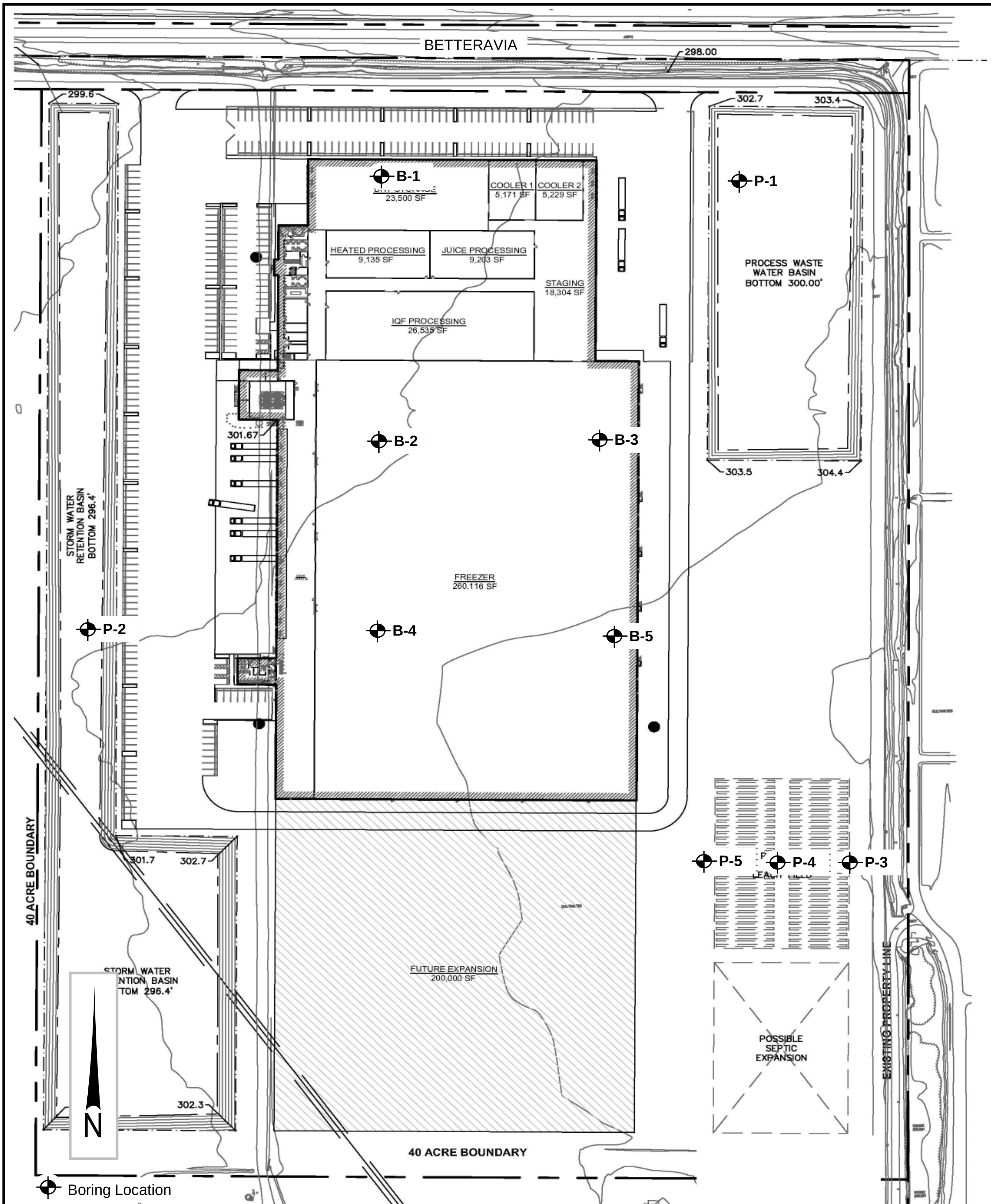
4. As of the present date, the findings of this report are valid for the property studied. With the passage of time, changes in the conditions of a property can occur whether they are due to natural processes or to the works of man on this or adjacent properties. Legislation or the broadening of knowledge may result in changes in applicable standards. Changes outside of our control may find this report to be invalid, wholly or partially. Therefore, this report should not be relied upon after a period of three (3) years without our review nor is it applicable for any properties other than those studied.

5. Validity of the recommendations contained in this report is also dependent upon the prescribed testing and observation program during the site preparation and construction phases. Our firm assumes no responsibility for construction compliance with these design concepts and recommendations unless we have been retained to perform continuous on-site testing and review during all phases of site preparation, grading, and foundation/slab construction.

FIGURES

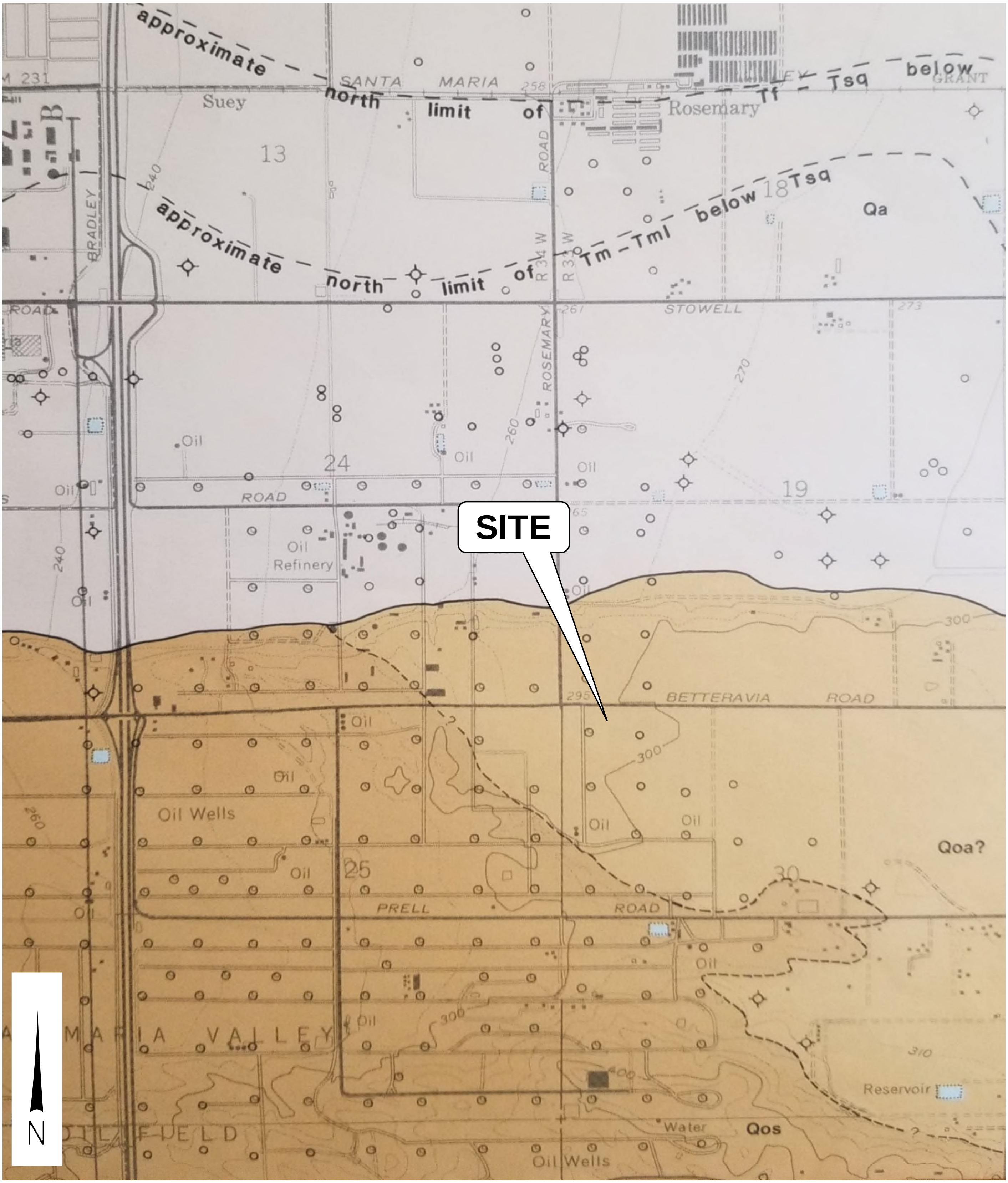


		Project No.	Figure No.
Pacific Coast Testing, Inc.	SITE MAP PROPOSED COOLING FACILITY ARCTIC COLD - E. BETTERAVIA ROAD SANTA MARIA, CALIFORNIA	20-9131	1



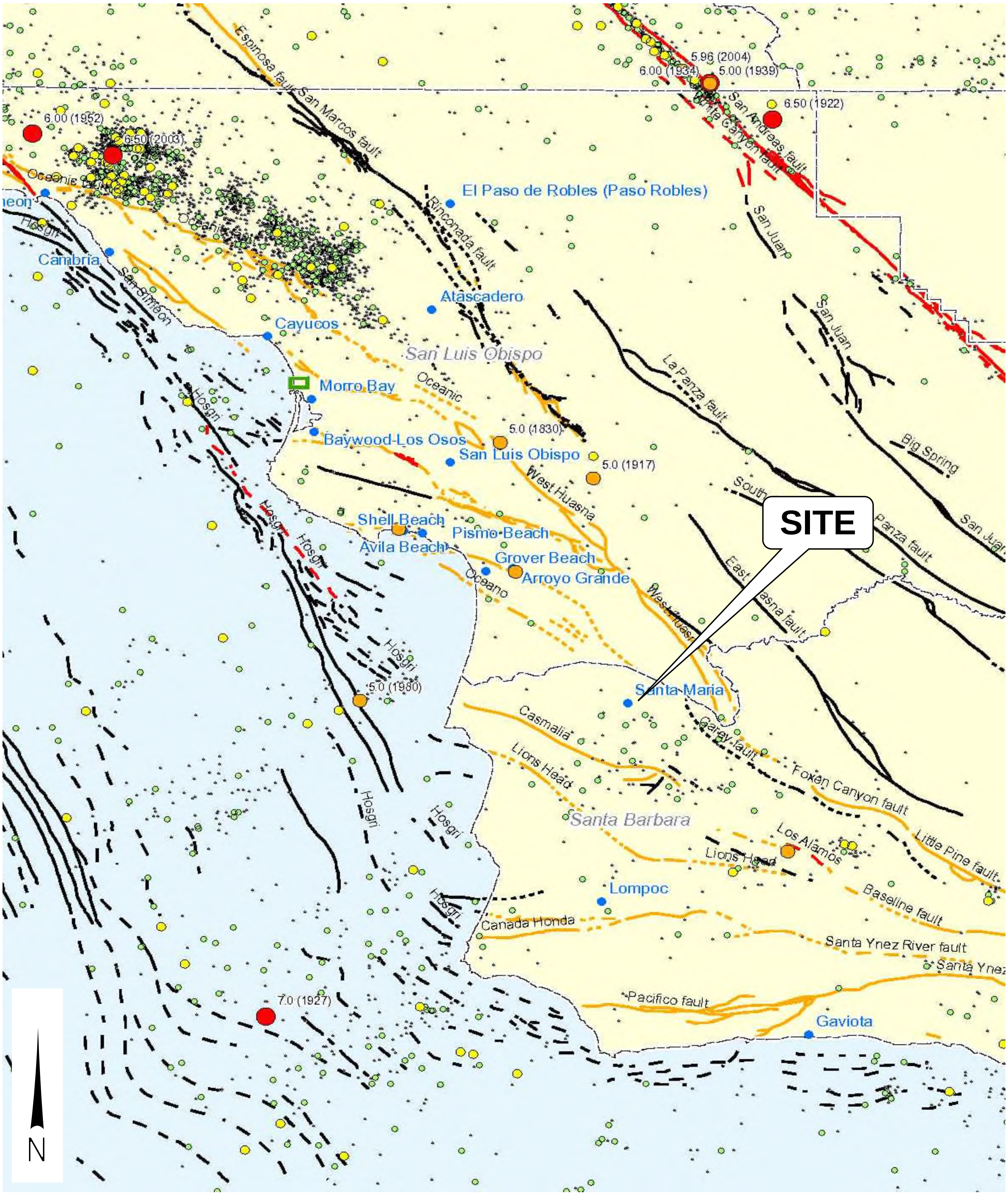
Pacific Coast Testing, Inc.

SITE PLAN PROPOSED COOLING FACILITY ARCTIC COLD - E. BETTERAVIA ROAD SANTA MARIA, CALIFORNIA	Project No.	Figure No.
	20-9131	2



Reference - Geologic Map of Santa Maria & Twitchell Dam Quadrangles, Dibblee 1994, Qa - Alluvial Deposits, Qo - Orcutt Sand, Qos - Older Surficial Sediments,

Pacific Coast Testing, Inc.	GEOLOGIC MAP PROPOSED RESIDENCE ARCTIC COLD - E. BETTERAVIA ROAD SANTA MARIA, CALIFORNIA	Project No.	Figure No.
		20-9156	3



Base Map Source: Seismotectonics of Central Coast of California (Geologic Society Special Paper)

Pacific Coast Testing, Inc.	HISTORIC SEISMICITY MAP PROPOSED RESIDENCE ARCTIC COLD - E. BETTERAVIA ROAD SANTA MARIA, CALIFORNIA	Project No.	Figure No.
		20-9156	4

APPENDIX A

Field Investigation
Key to Boring Logs
Boring Logs

FIELD INVESTIGATION

Test Hole Drilling

The field investigation was conducted on April 2 and 3, 2020. Five (5) exploratory borings and five (5) percolation borings were drilled at the approximate locations indicated on the Site Plan, Figure 2. The locations of these borings were approximated in the field.

Undisturbed and bulk samples were obtained at various depths during test hole drilling. The undisturbed samples were obtained by driving a 2.4-inch inside diameter sampler into soils. Bulk samples were also obtained during drilling.

Logs of Boring

A continuous log of soils, as encountered in the borings was recorded at the time of the field investigation, by a Staff Engineer. The Exploration Boring Logs are attached.

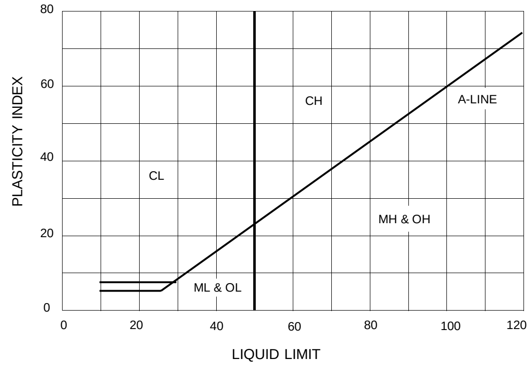
Locations and depth of sampling, in-situ soil dry densities and moisture contents are tabulated in the Boring Logs.

UNIFIED SOIL CLASSIFICATION SYSTEMS

MAJOR DIVISION			SYMBOLS	TYPICAL NAMES
COARSE GRAINED SOILS Over 50% > #200 sieve	GRAVELS Over 50% > #4 sieve	CLEAN GRAVELS WITH LITTLE OR NO FINES	GW	WELL GRADED GRAVELS, GRAVEL-SAND MIXTURES
			GP	POORLY GRADED GRAVELS, GRAVEL-SAND MIXTURES
		GRAVELS WITH OVER 12% FINES	GM	SILTY GRAVELS, POORLY GRADED GRAVEL-SAND-SILT MIXTURES
			GC	CLAYEY GRAVELS, POORLY GRADED GRAVEL-SAND-CLAY MIXTURES
	SANDS Over 50% < #4 sieve	CLEAN SANDS WITH LITTLE OR NO FINES	SW	WELL GRADED SANDS, GRAVELLY SANDS
			SP	POORLY GRADED SANDS, GRAVELLY SANDS
		SANDS WITH OVER 12% FINES	SM	SILTY SANDS, POORLY GRADED SAND-SILT MIXTURES
			SC	CLAYEY SANDS, POORLY GRADED SAND-CLAY MIXTURES
FINE GRAINED SOILS Over 50% < #200 sieve	SILTS AND CLAYS Liquid limit < 50		ML	INORGANIC SILTS, SILTY OR CLAYEY FINE SANDS, OR CLAYEY SILTS WITH SLIGHT PLASTICITY
			CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS
			OL	ORGANIC CLAYS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY
	SILTS AND CLAYS Liquid limit > 50		MH	INORGANIC SILTS , MICACEOUS OR DIATOMACIOUS 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 CLAYS			Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS

PLASTICITY CHART

USED FOR CLASSIFICATION OF FINE GRAINED SOILS



SOIL GRAIN SIZE

U.S. STANDARD SIEVE

6"		3"	3/4"	4	10	40	200		
BOULDERS	COBBLES	GRAVEL		SAND			SILT	CLAY	
		COARSE	FINE	COARSE	MEDIUM	FINE			
150		75	19	4.75	2.0	0.425	0.075	0.002	

SOIL GRAIN SIZE IN MILLIMETERS

SAMPLE DRIVING RECORD

BLOWS PER FOOT	DESCRIPTION
25	25 BLOWS DROVE SAMPLER 12 INCHES, AFTER INITIAL 6 INCHES OF SEATING
50/7"	50 BLOWS DROVE SAMPLER 7 INCHES, AFTER INITIAL 6 INCHES OF SEATING
Ref/3"	50 BLOWS DROVE SAMPLER 3 INCHES DURING OR AFTER INITIAL 6 INCHES OF SEATING

NOTE: TO AVOID DAMAGE TO SAMPLING TOOLS, DRIVING IS LIMITED TO 50 BLOWS PER 6 INCHES DURING OR AFTER SEATING INTERVAL

KEY TO TEST DATA

B	Bag Sample	CONS	Consolidation (ASTM D2435)
	Drive, No Sample Collected	DS	Cons. Drained Direct Shear (ASTM D3080)
	2 1/2" O.D. Mod. California Sampler, Not Tested	PP	Pocket Penetrometer
	2 1/2" O.D. Mod. California Sampler, Tested	GSD	Grain Size Distribution (ASTM D422)
	Standard Penetration Test	CP	Compaction Test (ASTM D1557)
	Sample Attempted with No Recovery	EI	Expansion Index (ASTM D4829)
	Water Level at Time of Drilling	LL	Liquid Limit (in percent)
	Water Level after Drilling	PI	Plasticity Index

RELATIVE DENSITY

SANDS, GRAVELS, AND NON PLASTIC SILTS	BLOWS/FOOT
VERY LOOSE	0 - 4
LOOSE	4 - 10
MEDIUM DENSE	10 - 30
DENSE	30 - 50
VERY DENSE	OVER 50

RELATIVE DENSITY

CLAYS AND PLASTIC SILTS	STRENGTH	BLOWS/FOOT
VERY SOFT	0 - 1/4	0 - 2
SOFT	1/4 - 1/2	2 - 4
FIRM	1/2 - 1	4 - 8
STIFF	1 - 2	8 - 16
VERY STIFF	2 - 4	16 - 32
HARD	OVER 4	OVER 32

Pacific Coast Testing, Inc.

PROJECT NO.:	20-9131	SOIL CLASSIFICATION CHART AND BORING LOG LEGEND
DATE DRILLED:	4/2/2020	
PROPOSED COOLING FACILITY SANTA MARIA, CALIFORNIA		FIGURE NO. A-1

LOGGED BY: **JM** DRILL RIG: **Simco 2400** BORING NO.: **B-1**

ELEVATION: **300'** BORING DIAMETER (INCH): **5** DATE DRILLED: **2 April 2020**

GROUNDWATER DEPTH (FT):

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
			Clayey Sand: brown, moist, fine with trace medium grained, some silt, loose	SC-CL								
299	1											
298	2				B							EI = 22
297	3					9	13.7					
296	4		medium dense									
295	5											
294	6		Silty Sand: yellowish brown, moist, fine to medium grained, medium dense	SM								
293	7				B							
292	8											
291	9					19	12.6					
290	10		Sand: yellowish brown, moist, fine to coarse grained, trace silt, medium dense	SP								
289	11											
288	12				B							
287	13											
286	14					26	8.6					
285	15											
284	16											
283	17											
282	18		dense, some silt, trace clay									
281	19				B		9.5					
280	20											

EXPLORATORY BORING LOGS

Pacific Coast Testing, Inc.

PROPOSED COOLING FACILITY
ARCTIC COLD - E. BETTERAVIA ROAD

PROJECT NO.	DATE	FIGURE NO.
20-9131	**April-20**	**A-2**

LOGGED BY: **JM** DRILL RIG: **Simco 2400** BORING NO.: **B-1 cont'd**

ELEVATION: **300'** BORING DIAMETER (INCH): **5** DATE DRILLED: **2 April 2020**

GROUNDWATER DEPTH (FT):

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
			Sand: light yellowish brown, moist, fine to coarse grained, trace to some silt, medium dense to dense	SP								
279	21											
278	22				B		8.9					
277	23											
276	24											
275	25											
274	26											
273	27				B							
272	28											
271	29											
270	30											
269	31											
268	32				B		10.3					
267	33											
266	34											
265	35											
264	36											
263	37											
262	38											
261	39				B							
260	40		Boring terminated at 40 feet									

EXPLORATORY BORING LOGS

Pacific Coast Testing, Inc.

PROPOSED COOLING FACILITY
ARCTIC COLD - E. BETTERAVIA ROAD

PROJECT NO.	DATE	FIGURE NO.
20-9131	**April-20**	**A-3**

LOGGED BY: **JM**	DRILL RIG: **Simco 2400**	BORING NO.: **B-2**	
ELEVATION: **300'**	BORING DIAMETER (INCH): **5**	DATE DRILLED: **2 April 2020**	
GROUNDWATER DEPTH (FT):			

ELEVATION (FT)	DEPTH (FT)	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
		Silty Sand: brown to light brown, moist, fine with trace medium grained, trace clay, loose	SM								
299	1										
298	2			B		13.4					
297	3										
296	4				12	13.8					
295	5	Clayey Sand: brown, moist, fine with trace medium grained, some silt, loose	SC								
294	6										
293	7			B							
292	8										
291	9				18	14.2					
290	10	Sand: yellowish brown, moist, fine to coarse grained, trace silt, medium dense	SP								
289	11										
288	12										
287	13										
286	14			B		9.2					
285	15	Boring terminated at 15 feet									
284	16										
283	17										
282	18										
281	19										
280	20										

EXPLORATORY BORING LOGS

Pacific Coast Testing, Inc.

PROPOSED COOLING FACILITY
ARCTIC COLD - E. BETTERAVIA ROAD

PROJECT NO.	DATE	FIGURE NO.
20-9131	**April-20**	**A-4**

LOGGED BY: **JM**	DRILL RIG: **Simco 2400**	BORING NO.: **B-3**
ELEVATION: **300'**	BORING DIAMETER (INCH): **5**	DATE DRILLED: **2 April 2020**

GROUNDWATER DEPTH (FT):

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
			Sandy Silt: brown to light brown, moist, fine with trace medium grained, trace clay, firm	SM								
299	1											
298	2				B		13.9					
297	3											
296	4		stiff									
295	5		Silty Sand: yellowish brown, moist, fine to medium grained, medium dense	SM-SP		14	13.3					
294	6											
293	7											
292	8				B							
291	9											
290	10					19	11.8					
289	11		Sand: yellowish brown, moist, fine to coarse grained, trace silt, medium dense	SP								
288	12											
287	13											
286	14				B		8.6					
285	15		Boring terminated at 15 feet									
284	16											
283	17											
282	18											
281	19											
280	20											

EXPLORATORY BORING LOGS

Pacific Coast Testing, Inc.

PROPOSED COOLING FACILITY
ARCTIC COLD - E. BETTERAVIA ROAD

PROJECT NO.	DATE	FIGURE NO.
20-9131	**April-20**	**A-5**

LOGGED BY: JM	DRILL RIG: Simco 2400	BORING NO.: B-4
ELEVATION: 300'	BORING DIAMETER (INCH): 5	DATE DRILLED: 2 April 2020
GROUNDWATER DEPTH (FT):		

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
			Sand: light brown, moist, fine to medium grained, some silt, loose	SP								
299	1											
298	2				B		8.7					EI = 0
297	3											
296	4		medium dense									
295	5					17	8.3					
294	6											
293	7											
292	8				B							
291	9											
290	10					22	9.4					
289	11		Boring terminated at 11 feet									
288	12											
287	13											
286	14											
285	15											
284	16											
283	17											
282	18											
281	19											
280	20											

EXPLORATORY BORING LOGS

Pacific Coast Testing, Inc.

PROPOSED COOLING FACILITY
ARCTIC COLD - E. BETTERAVIA ROAD

PROJECT NO.	DATE	FIGURE NO.
20-9131	April-20	A-6

LOGGED BY: **JM**	DRILL RIG: **Simco 2400**	BORING NO.: **B-5**
ELEVATION: **300'**	BORING DIAMETER (INCH): **5**	DATE DRILLED: **2 April 2020**

GROUNDWATER DEPTH (FT):

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
			Sand: tan, moist, fine to medium grained, some silt, loose	SP-SM								
299	1											
298	2				B		7.6					EI = 0
297	3											
296	4		medium dense									
295	5					14	8.3					
294	6											
293	7											
292	8											
291	9											
290	10				B		9.1					
289	11		Boring terminated at 11 feet									
288	12											
287	13											
286	14											
285	15											
284	16											
283	17											
282	18											
281	19											
280	20											

EXPLORATORY BORING LOGS

Pacific Coast Testing, Inc.

PROPOSED COOLING FACILITY
ARCTIC COLD - E. BETTERAVIA ROAD

PROJECT NO.	DATE	FIGURE NO.
20-9131	**April-20**	**A-7**

LOGGED BY: **JM**	DRILL RIG: **Simco 2400**	BORING NO.: **P-1**
ELEVATION: **300'**	BORING DIAMETER (INCH): **5**	DATE DRILLED: **3 April 2020**

GROUNDWATER DEPTH (FT):

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
			Clayey Sand: brown to light brown, moist to very moist, fine to medium grained, some silt, loose	SC-ML								
299	1											
298	2											
297	3				B		14.5					
296	4											
295	5		yellowish brown									
294	6											
293	7											
292	8				B		14.9					
291	9											
290	10		Boring terminated at 10 feet									
289	11											
288	12											
287	13											
286	14											
285	15											
284	16											
283	17											
282	18											
281	19											
280	20											

EXPLORATORY BORING LOGS

Pacific Coast Testing, Inc.

PROPOSED COOLING FACILITY
ARCTIC COLD - E. BETTERAVIA ROAD

PROJECT NO.	DATE	FIGURE NO.
20-9131	**April-20**	**A-8**

LOGGED BY: **JM** DRILL RIG: **Simco 2400** BORING NO.: **P-2**

ELEVATION: **300'** BORING DIAMETER (INCH): **5** DATE DRILLED: **3 April 2020**

GROUNDWATER DEPTH (FT):

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
			Silty Sand: brown to light brown, moist to very moist, fine to medium grained, trace clay, loose	SM								
299	1											
298	2											
297	3				B		15.1					
296	4											
			Clayey Sand: brown to light brown, moist, fine to coarse grained, some silt, loose	SC-CL								
295	5											
294	6											
293	7											
292	8				B		13.4					
291	9											
290	10		Boring terminated at 10 feet									
289	11											
288	12											
287	13											
286	14											
285	15											
284	16											
283	17											
282	18											
281	19											
280	20											

EXPLORATORY BORING LOGS

Pacific Coast Testing, Inc.

PROPOSED COOLING FACILITY
ARCTIC COLD - E. BETTERAVIA ROAD

PROJECT NO.	DATE	FIGURE NO.
20-9131	**April-20**	**A-9**

LOGGED BY: **JM**	DRILL RIG: **Simco 2400**	BORING NO.: **P-3 to 5**
ELEVATION: **300'**	BORING DIAMETER (INCH): **5**	DATE DRILLED: **2 April 2020**
	GROUNDWATER DEPTH (FT):	

ELEVATION (FT)	DEPTH (FT)	GRAPHIC LOG	GEOTECHNICAL DESCRIPTION	SOIL TYPE	SAMPLE	CONV. SPT BLOW COUNT	WATER CONTENT (%)	DRY DENSITY (PCF)	LIQUID LIMIT	PLASIT. INDEX	UNC. COMP. STRENGTH (PSF)	COMMENTS AND ADDITIONAL TESTS
			Silty Sand: light brown, moist to very moist, fine to medium grained, trace clay, loose	SM-SP								
299	1											
298	2											
297	3				B		13.2					
296	4											
295	5											
			Borings terminated at 5 feet									
294	6											
293	7											
292	8											
291	9											
290	10											
289	11											
288	12											
287	13											
286	14											
285	15											
284	16											
283	17											
282	18											
281	19											
280	20											

EXPLORATORY BORING LOGS

Pacific Coast Testing, Inc.

PROPOSED COOLING FACILITY
ARCTIC COLD - E. BETTERAVIA ROAD

PROJECT NO.	DATE	FIGURE NO.
20-9131	**April-20**	**A-10**

APPENDIX B

Moisture-Density Tests
Direct Shear Tests
R-Value Test
Expansion Index Tests
Consolidation Test
Grain Size Analysis

LABORATORY TESTING

Moisture-Density Tests

The field moisture content, as a percentage of the dry weight of the soil, was determined by weighing samples before and after oven drying. Dry densities, in pounds per cubic foot, were also determined for the undisturbed samples. Results of these determinations are shown in the Exploration Drill Hole Logs.

Direct Shear Test

Direct shear tests were performed on undisturbed samples, to determine strength characteristics of the soil. The test specimens were soaked prior to testing. Results of the shear strength tests are attached.

Resistance (R) Value Test

An R-Value test was estimated based on sieve analysis and plasticity on a bulk sample obtained from boring B-2. The results of the tests indicate that the silty sand soils have an R-Value of 30.

Expansion Index Tests

Expansion indices of 22 and 0 was obtained for the near surface clayey sands and silty sands encountered across the property. The test procedure was performed in accordance with ASTM D4829 – Standard Test Method for Expansion Index of Soils.

Consolidation-Pressure Test

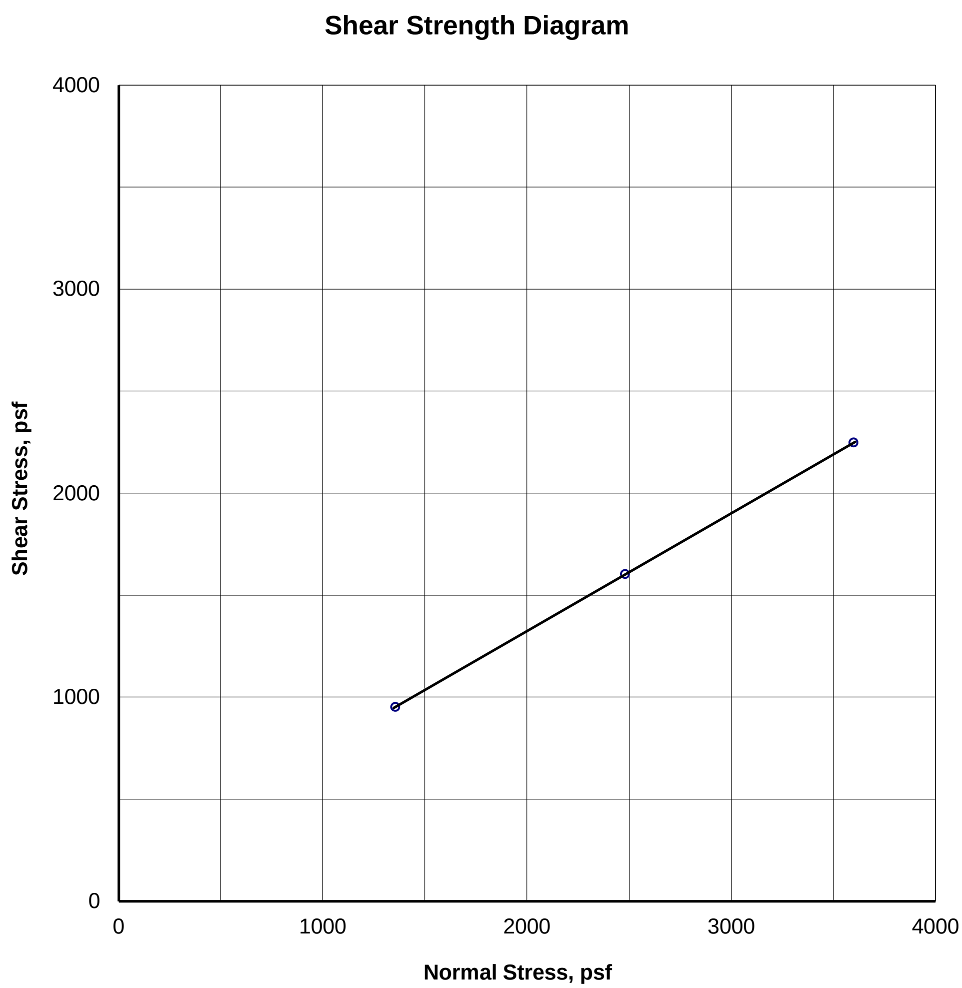
Consolidation characteristics of potentially compressive native soils were determined by using undisturbed soil specimens subjected to dead weight loading increments in a consolidometer. The samples were wetted when loading reached their approximate overburden pressure. Test results are illustrated by a curve, indicating the percent volume change of the soil, under various loads. Results of the Consolidation-Pressure test are attached.

Grain Size Analysis

Selected samples were tested to determine the grain size distribution in accordance with ASTM C33.

DIRECT SHEAR TEST

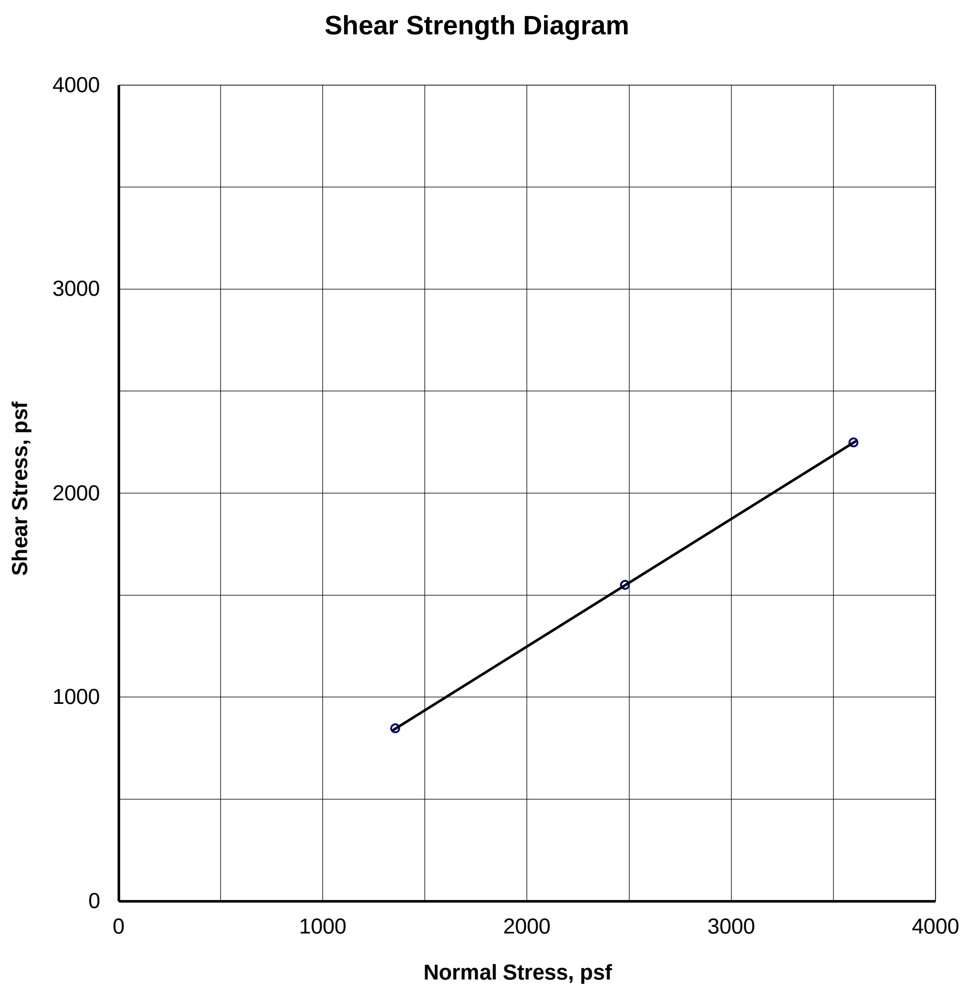
ASTM D3080-11 (Modified for unconsolidated-undrained conditions)



Project:	PROPOSED COOLING FACILITY	Project No.	20-9131
Sample Location:	B-1 @ 3 Feet	Initial Dry Density (pcf)	101.4
Soil Description:	Clayey Sand	Initial Moisture (%)	13.7
Sample Type:	○ Remolded ◉ Ring	**Peak Shear Angle** **Cohesion (psf)**	**30** **170**

DIRECT SHEAR TEST

ASTM D3080-11 (Modified for unconsolidated-undrained conditions)



Project:	PROPOSED COOLING FACILITY	Project No.	20-9131
Sample Location:	B-5 @ 5 Feet	Initial Dry Density (pcf)	100.3
Soil Description:	Sand	Initial Moisture (%)	8.3
Sample Type:	◯ Remolded ◉ Ring	**Peak Shear Angle** **Cohesion (psf)**	**32** **0**

CONSOLIDATION TEST
ASTM D2435

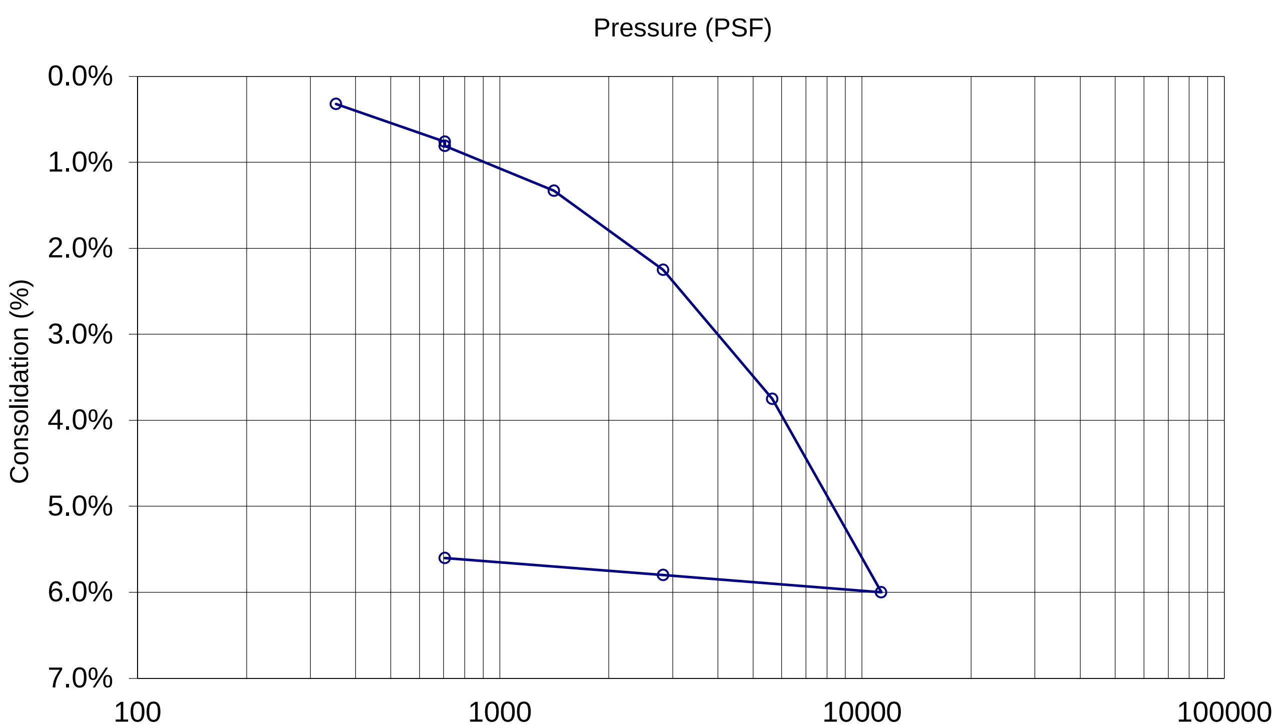
DATE: 04/17/20

SOIL TYPE: Silty Sand

LOCATION: B-1 at 9 feet

PROJECT: Cooling Facility

SITE LOCATION: East Betteravia Road, Santa Maria



GRADATION ANALYSIS
(ASTM C136)

DATE: 04/17/20

SOIL TYPE: Clayey Sand

LOCATION: B-2 @ 6 Feet

PROJECT: Cooling Facility

SITE LOCATION: East Betteravia Road, Santa Maria

GRADATION:

Sieve	25mm	19mm	12.5mm	9.5mm	4.75mm	2.36mm	1.18mm	600 um	300 um	150 um	75 um
size	1"	3/4"	1/2"	3/8"	#4	#8	#16	#30	#50	#100	#200
Percent Passing	100	100	100	100	99	98	91	73	44	32	26