APPENDIX G

Geology and Soils Background Information

Geotechnical Feasibility Report for
Canada Ranch Property
East of Hetrick Avenue and Cherokee Place

GEOTECHNICAL FEASIBILTY REPORT
CANADA RANCH PROPERTY
EAST OF HETRICK AVENUE AND CHEROKEE PLACE
NIPOMO AREA
SAN LUIS OBISPO COUNTY, CALIFORNIA

September 11, 2017

Prepared for

Ms. Claire Simoulis, CFO, CCIM
NKT Commercial, LLC

Prepared by

Earth Systems Pacific
2049 Preisker Lane, Suite E
Santa Maria, California 93454

Earth Systems
Pacific

2049 Preisker Lane, Suite E
Santa Maria, CA 93454
Ph: 805.928.2991
esp@earthsystems.com
www.earthsystems.com

September 11, 2017

FILE NO.: SL-18135-SA

Ms. Claire Simoulis, CFO, CCIM
NKT Commercial, LLC
684 Higuera Street, Suite B
San Luis Obispo, California 93401

PROJECT: CANADA RANCH PROPERTY
EAST OF HETRICK AVENUE AND CHEROKEE PLACE
NIPOMO AREA OF SAN LUIS OBISPO COUNTY, CALIFORNIA

SUBJECT: Geotechnical Feasibility Report

REF: Proposal for Geotechnical Feasibility Report, Canada Ranch, West of Hetrick Avenue and Cherokee Place, Nipomo Area of San Luis Obispo County, California, by Earth Systems Pacific, dated July 25, 2017, Doc. No. 1707-057.PRP

Dear Ms. Simoulis:

In accordance with your authorization of the above-referenced proposal, this geotechnical feasibility report has been prepared for your use in planning future development at the site. Two copies and an electronic copy of this geotechnical feasibility report are being furnished for your use.

Additional work, including but not limited to, subsurface exploration, sampling, testing, and engineering analyses will be needed in the future to complete a geotechnical engineering report that will form the basis of a portion of the information contained on the design plans and specifications for the project. 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

Phillip Madrid, PE
Project Engineer

Doc. No. 1709-013.SER/ln

Table of Contents

Appendices

1.0 INTRODUCTION

We understand future development is planned on the Canada Ranch property, an approximately 276-acre parcel of land referred to herein as the site. The site is located east of Hetrick Road and Cherokee Place in the Nipomo area of San Luis Obispo County, California. The site is shown on the Exploration Location Map presented in Appendix A.

We understand portions of the site will be developed with residential and commercial structures and their associated surface and subsurface improvements. We have assumed that residential and commercial structures will be one to two stories, will be of wood and steel frame construction, and will utilize concrete slabs-on-grade. Masonry and/or concrete retaining walls for sitework and/or connected to and forming part of the structures are anticipated. Masonry boundary walls and/or other types of perimeter fencing may also be constructed. Maximum line loads are anticipated to be approximately 2 kips per linear foot, and maximum point loads are anticipated to be approximately 20 kips.

We have assumed surface improvements will consist of hot mix asphalt (HMA) and/or Portland cement concrete pavement over aggregate base (AB) for vehicles and concrete flatwork for pedestrians. We have assumed subsurface improvements will be the underground municipal sewer, water, power, and communications utilities that will provide service to the project. Surface runoff will be transmitted to and disposed of into Low Impact Development (LID) drainage improvements. On-site effluent disposal systems are not anticipated for this project.

We have assumed the site will be graded to develop the building and surface improvement areas, to improve access, and to improve drainage. Cuts and fills are anticipated to be on the order 5 feet or less.

2.0 SCOPE OF SERVICES

The scope of work for the geotechnical feasibility report included a general site reconnaissance, subsurface investigation, infiltration testing, geotechnical analysis of data, and preparation of this report. The analysis and subsequent conclusions were based, in part, upon information provided by the client, and are intended to identify major geotechnical constraints that might preclude development of the site.

It is our intent that this report be used exclusively by the client for planning purposes with respect to geotechnical issues. Application beyond this intent is strictly at the user's risk. If other architects/engineers wish to use this report, such use will be allowed to the extent the report is applicable, only if the user agrees to be bound by the same contractual conditions of the original client or contractual conditions that may be applicable at the time of the report use.

As there are geotechnical issues yet to be resolved, this firm should be retained to provide the geotechnical engineering report; and to provide consultation as necessary as the design progresses, to review project plans, and to assist in verifying that pertinent geotechnical issues have been addressed. In the event that any assumptions used in the preparation of this report prove to be incorrect, the conclusions contained in this report shall not be considered valid unless the changes are reviewed and the conclusions of this report are verified as appropriate or modified by the geotechnical engineer in writing. The opinions presented in this report are considered preliminary and subject to change based upon information obtained during future geotechnical work at the site.

3.0 SITE SETTING

The site is located east of the intersection of Hetrick Road and Cherokee Place in the Nipomo area of San Luis Obispo County, California. Gates along Hetrick Road, Cherokee Place, and

the North Frontage Road provide access to the dirt roads at this wire fenced site. Rural-residential properties and undeveloped open space form the southeast, southwest, and northwest boundaries of the site; US Highway 101 forms the notheast boundary. The approximate central site coordinates and elevation from the Google Earth website are latitude 35.046 north and longitude 120.503 west, and 367 feet above mean sea level.

The site is generally undeveloped except for a few small agricultural use buildings and improvements. The site is covered with a sparse to dense growth of vegetation consisting mostly of grasslands, scrub brush, riparian plants, and mature Oak trees. The site topography is generally characterized as gently rolling terrain; however, the terrain ranges from relatively flat to moderately sloping areas. Drainage is by sheet flow.

4.0 FIELD INVESTIGATION AND INFILTRATION TESTING

On August 14, 2017, five borings were drilled at the site to depths of approximately 5 to 50 feet below the existing ground surface. Two of the borings were drilled for infiltration testing, and the other three borings were drilled for exploratory purposes. 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. Standard Penetration Tests were conducted at selected depths in the borings (ASTM D 1586-11). The approximate locations of the borings are shown on the Exploration Location Map presented in Appendix A.

Soils encountered in the exploratory borings were logged and categorized in general accordance with the Unified Soil Classification System and ASTM D 2488-09a. Copies of the boring logs can also be found in Appendix A. In reviewing the boring logs and the 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, cementation, variations

in soil moisture, presence of groundwater, and other factors. Consequently, the logger must exercise judgment in interpreting soil characteristics, possibly resulting in subsurface descriptions that vary somewhat from the legend.

Infiltration Testing

The infiltration test borings were drilled to an approximate depth of 5 feet. A 2-inch diameter perforated polyvinyl chloride (PVC) pipe was placed in the center of each infiltration test boring. The bottom 2 inches of each boring and the annular spaces around the outside of the PVC pipe were filled with gravel to reduce caving of the area to be tested. The infiltration test borings were then filled with water as needed to maintain a relatively constant elevation or head for a period of 30 minutes. During this process, the volume of water that flowed into the borings was measured with a calibrated flow meter. The volume of water introduced ranged from 32.5 to 48.7 gallons. After completing the 30-minute constant head water volume measurement, the falling head rate of infiltration was subsequently monitored until the borings ran dry. Once the water had drained completely, the holes were refilled as necessary and allowed to drain as the falling head rate was monitored. The infiltration tests were concluded after the holes ran dry for the third time. The total infiltration test duration ranged from 100 to 125 minutes. After testing was concluded, the soil borings and infiltration test borings were backfilled with cuttings. The results are presented in Appendix B.

5.0 GENERAL SUBSURFACE PROFILE

The soil observed in the borings generally consisted of layered sand soils, with varying amounts of silt and clay within the soil matrix. All the soils were in a dry to moist condition. The consistency of the sand soils varied from loose to medium dense. No free subsurface water was observed within the depths explored. Please refer to the boring logs for a more complete description of the subsurface conditions.

6.0 CONCLUSIONS

In our opinion, the site is feasible from a geotechnical standpoint for the planned development as described in the "Introduction" section of this report, provided the preliminary geotechnical recommendations of a future geotechnical engineering report are successfully implemented.

The upper site soils were judged to be generally nonexpansive, therefore no special measures with respect to expansive soils are anticipated. The upper site soils were also judged to provide moderate to high resistance to the type of loads imposed by vehicles; therefore, unusually thick pavement sections are not anticipated. Assuming the upper soils at this site are graded and compacted to provide more uniform moisture and density, we anticipate that shallow continuous and spread (pad) footings may be used to support the structures planned at the site.

In our opinion, the primary concerns during site development from a geotechnical standpoint will be the potential for settlement, the excavation characteristics of the soils, the suitability of the soils for use as fill/backfill, the stability of the soils during grading, the erodible nature of the soils, and the potential for liquefaction and seismically induced settlement of dry sand.

Settlement Potential

Settlement (total and differential) can occur when foundations and surface improvements span materials having variable consolidation characteristics, such as the soils on this site with variable in-situ moisture and density. Such a situation could 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 shallow 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 will be recommended in the future geotechnical engineering report to provide more uniform soil moisture and density, and appropriate support.

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/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 County of San Luis Obispo, the conduit manufacturer, and the utility companies should be anticipated.

Stability of Soil 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.

Soil Erosion

The soils are considered to be highly erodible. Stabilization of 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 structures and improvements.

Liquefaction and Seismically Induced Settlement of Dry Soil

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. Due to the lack of groundwater in the upper 51.5 feet of soil, there is a very low potential for liquefaction to occur at the site.

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. The potential for a significant magnitude of seismically induced settlement of dry soils is also anticipated to be very low after the implementation of the grading program recommended in the future geotechnical engineering report. However, the actual magnitude of seismically induced settlement should be estimated based on a more comprehensive subsurface exploration and laboratory testing program implemented during the preparation of a future geotechnical engineering report. Special design and construction measures with respect to liquefaction and seismically induced settlement of dry sand are not anticipated.

Summary

The site is feasible for the planned development as described in the "Introduction" section of this report. In our opinion, no significant geotechnical engineering constraints were discovered in the borings that would preclude development of this site. It will be necessary to provide additional geotechnical work for this site (additional borings and laboratory testing, analyses, etc.) in order to complete the final geotechnical engineering report. The geotechnical engineering report should provide specific preliminary geotechnical recommendations pertaining to the design and construction of the earthwork, structures, and improvements associated with this site.

7.0 ANTICIPATED FOUNDATION DESIGN CRITERIA

The following anticipated foundation design criteria are intended to be used by the architect/engineer for cost estimation purposes only. Additional field and laboratory work is needed to provide preliminary geotechnical recommendations for site preparation, grading, utility trenches, foundations, slabs-on-grade and exterior flatwork, retaining walls, pavement sections, drainage and maintenance, and construction observation and testing.

1. Continuous and spread footings are anticipated to be designed using maximum allowable bearing capacity of 1,500 psf dead plus live loads. Using this criterion, maximum total and differential settlement are expected to be on the order of 3/4-inch and 1/4-inch in 25 feet, respectively.

2. An ultimate passive equivalent fluid pressure of 350 pcf and a coefficient of friction of 0.40 are anticipated for the foundations. These are ultimate values that may require application of appropriate safety factors, load factors, depth factors, and/or other factors as deemed appropriate by the architect/engineer.

3. The allowable bearing capacity may be increased by one-third when transient loads such as wind or seismicity are included. Based on the boring logs, the Site Class is anticipated to be "D", a "Stiff Soil Profile" (ASCE, 2013). Using the Earthquake Hazards Program website (USGS, 2016), 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.

2016 CBC Mapped Values		Site Class "C" Adjusted Values				Design Values	
Seismic Parameters	Values (g)	Site Coefficients	Values	Seismic Parameters	Values (g)	Seismic Parameters	Values (g)
S_S	1.189	F_a	1.024	S_{MS}	1.218	S_{DS}	0.812
S_1	0.446	F_v	1.554	S_{M1}	0.693	S_{D1}	0.462
Peak Mean Ground Acceleration (PGA_M) = 0.494g **Seismic Design Category** = D							

8.0 CLOSURE

This report is valid for conditions as they exist at this time for planning the type of project described herein. Our intent was to assess the geotechnical feasibility 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 of the client as discussed in the Scope of Services section. Application beyond the stated intent is strictly at the user's risk.

The preliminary opinions and conclusions of this feasibility report are based upon the geotechnical conditions encountered at and near the site at this time, and should be confirmed and augmented by a geotechnical engineering report once the project reaches an appropriate stage.

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

TECHNICAL REFERENCES

ASCE (American Society of Civil Engineers). 2013. *Minimum Design Loads for Buildings and other Structures (7-10, third printing).* Standards ASCE/SEI 7-10, ASCE.

ASTM (American Society for Testing Materials). 2016. Annual Book of Standards. ASTM

Cal/OSHA. 2007 *"Pocket Guide for the Construction Industry - Excavation, Trenches, and Earthwork."*

CBSC (California Building Standards Commission). 2016. *California Building Code (CBC).* CBSC.

Europa Technologies. 2017. U.S. Department of State Geographer. *Google Earth Website.* Retrieved from: http://www.google.com/earth/index.html

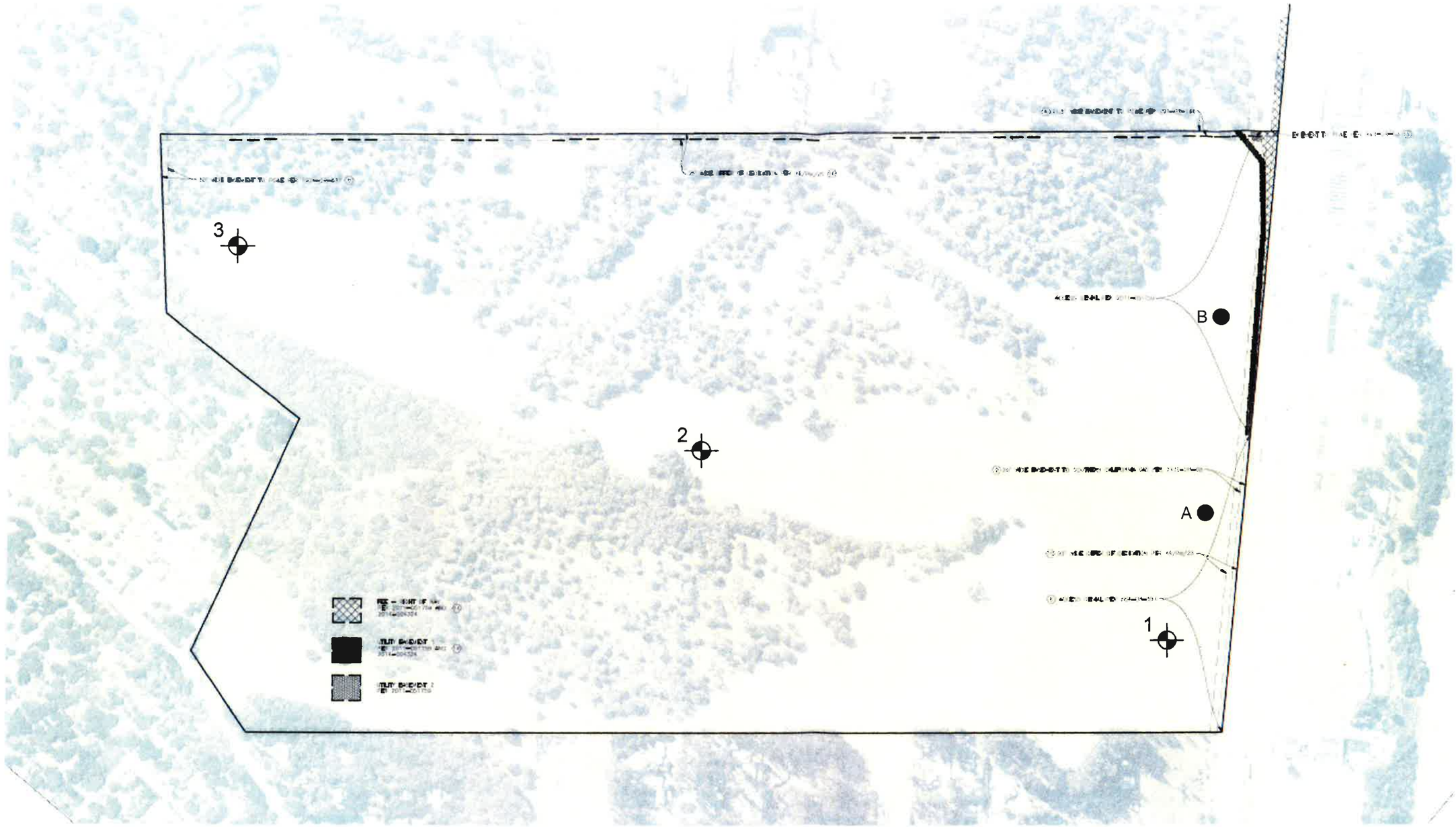
USGS (United States Geological Survey). 2016. "Earthquake Hazards Program." United States Geological Survey. Retrieved from: http://earthquake.usgs.gov/hazards/designmaps/

APPENDIX A

Exploration Location Map

Boring Log Legend

Boring Logs



NOT TO SCALE

Base Map Provided By: The Client

LEGEND

3 — Boring Location (Approx.)

B — Infiltration Test Location (Approx.)

Earth Systems Pacific
2049 Preisker Lane, Suite E, Santa Maria, CA. 93454
www.earthsystems.com
(805) 928-2991 • Fax (805) 928-9253

EXPLORATION LOCATION MAP
CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, California

Date
August 14, 2017

Project No.
SL-18135-SA

Canada Ranch ELM 8-14-2017.dwg

Earth Systems Pacific

BORING LOG LEGEND

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

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP-SM		POORLY GRADED SAND WITH SILT: light brown, dry, loose					
3			slightly moist					
5			medium dense	5.0-6.5	●			3, 5, 6
9			moist					
10			gray mottled orange, trace clay	10.0-11.5	●			9, 11, 13
15			orange-brown, clay ends	15.0-16.5	●			6, 7, 7
20				20.0-21.5	●			6, 9, 8
25			End of Boring @ 25.0' 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

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, dry loose					
3			orange-brown, slightly moist					
5				5.0-6.5	●			2, 1, 2
8	SP-SM		POORLY GRADED SAND WITH SILT: yellow-brown, moist					
10				10.0-11.5	●			3, 4, 5
13			light brown, medium dense					
20				20.0-21.5	●			4, 7, 10

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

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP-SM		POORLY GRADED SAND WITH SILT: as above					
30			light brown mottled orange, some clayey sand lenses ~1" thick	30.0-31.5	●			5, 7, 9
35			trace clay					
40	SC		CLAYEY SAND: brown, moist, medium dense					
46	SP		POORLY GRADED SAND: light brown, moist, medium dense					
50			End of Boring @ 50.0' 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. 3

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: orange-brown, dry, loose, trace silt					
3			slightly moist					
5				5.0-6.5	●			1, 2, 1
9			yellow brown					
10				10.0-11.5	●			2, 4, 5
13			medium dense					
15			light yellow brown	15.0-16.5	●			4, 8, 9
20				20.0-21.5	●			6, 8, 11
25			End of Boring @ 25.0' 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.

APPENDIX B

Infiltration Test Results

INFILTRATION TEST RESULTS

Infiltration Test: A
Date Drilled: August 14, 2017
Date Tested: August 14, 2017
Technician: CA

Test Hole Diameter: 6 inches
Test Hole Depth: 63 inches
Test Duration: 100 minutes

CONSTANT HEAD RESULTS

Time: 30 minutes
Water added: 48.7 gallons (6.5 cu.ft.)
Depth to constant head: 4 inches

FALLING HEAD RESULTS

INTERVAL (minutes)	READING (inches)	INCREMENTAL FALL (inches)	INFILTRATION RATE (minutes / inch)	INFILTRATION RATE (inches / hour)
Begin	6.0	--	--	--
1	28.5	22.5	0.04	1500
1	37.8	9.3	0.1	600
1	44.3	6.5	0.2	300
1	46.8	2.5	0.4	150
1	48.5	1.7	0.6	100
5	53.3	4.8	1.0	60
5	55.5	2.2	2.3	26
5	57.0	1.5	3.3	18
5	57.5	0.5	10	6
Refill	6.0	--	--	--
5	42.3	36.3	0.1	600
5	49.5	7.2	0.7	86
5	52.8	3.3	1.5	40
5	54.0	1.2	4.2	14
5	55.0	1.0	5.0	12
Refill	6.0	--	--	--
5	42.5	36.5	0.1	600
5	49.3	6.8	0.7	86
5	53.8	4.5	1.1	55
5	54.5	0.7	7.1	8

INFILTRATION TEST RESULTS

Infiltration Test: B
Date Drilled: August 14, 2017
Date Tested: August 14, 2017
Technician: CA

Test Hole Diameter: 6 inches
Test Hole Depth: 60 inches
Test Duration: 125 minutes

CONSTANT HEAD RESULTS

Time: 30 minutes
Water added: 32.5 gallons (4.3 cu.ft.)
Depth to constant head: 4 inches

FALLING HEAD RESULTS

INTERVAL (minutes)	READING (inches)	INCREMENTAL FALL (inches)	INFILTRATION RATE (minutes / inch)	INFILTRATION RATE (inches / hour)
Begin	2.0	--	--	--
1	13.5	11.5	0.09	667
1	20.5	7.0	0.1	600
1	25.5	5.0	0.2	300
1	29.5	4.0	0.3	200
1	32.8	3.3	0.3	200
5	42.5	9.7	0.5	120
5	50.0	7.5	0.7	86
5	55.5	5.5	0.9	67
Refill	2.0	--	--	--
1	16.3	14.3	0.1	600
1	23.5	7.2	0.1	600
1	26.8	3.3	0.3	200
1	30.0	3.2	0.3	200
1	32.5	2.5	0.4	150
5	38.8	6.3	0.8	75
5	44.8	6.0	0.8	75
5	48.5	3.7	1.4	43
5	51.0	2.5	2.0	30
5	53.5	2.5	2.0	30
5	55.5	2.0	2.5	24
Refill	2.0	--	--	--
5	33.5	31.5	0.2	300
5	40.0	6.5	0.8	75
5	44.3	4.3	1.2	50
5	47.8	3.5	1.4	43
5	50.8	3.0	1.7	35
5	52.3	1.5	3.3	18
5	54.8	2.5	2.0	30
5	55.5	0.7	7.1	8

Geotechnical Engineering Report and Revised Engineering Geology Report for Dana Reserve Northwest of North Frontage Road

Earth Systems
2049 Preisker Lane, Suite E | Santa Maria, CA 93454 | Ph: 805.928.2991 | www.earthsystems.com

September 15, 2021

FILE NO.: 304746-001

Mr. Nick Tompkins
NKT Development, LLC
684 Higuera Street, Suite B
San Luis Obispo, California 93401

PROJECT: DANA RESERVE
NORTHWEST OF NORTH FRONTAGE ROAD
NIPOMO AREA OF SAN LUIS OBISPO COUNTY, CALIFORNIA

SUBJECT: TRANSMITTAL LETTER

REFERENCES: See Final Page

Dear Mr. Tompkins:

This is a transmittal letter for our Geotechnical Engineering Report and Revised Engineering Geology Report (Reference Nos. 1 and 2) for the Dana Reserve project. The project is located at the northwest of North Frontage Road in the Nipomo area of San Luis Obispo County, California.

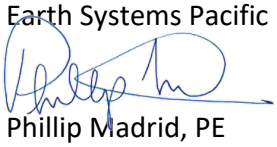
Earth Systems Pacific (ESP) previously prepared a Geotechnical Feasibility Report for the project (then named Canada Ranch) in 2017 (Reference No. 3). LandSet Engineers, Inc. reviewed this report and published a review letter (Reference No. 4). The LandSet reviewer concluded that a more robust program of subsurface exploration should be completed and that supplemental geotechnical engineering and engineering geology reports should be prepared to comply with San Luis Obispo County Land Use Ordinance, the California Geological Survey (CGS) Special Publication 117A, and the San Luis Obispo County Guidelines for Engineering Geology Reports, and CGS Note 52.

As requested by the reviewer, we performed a field investigation consisting of 9 additional soil borings. We also performed laboratory testing of selected soil samples. We prepared a geotechnical engineering report and engineering geology report (Reference Nos. 1 and 2) to identify and discuss the geologic hazards and geotechnical engineering issues of concern and to comply with the applicable considerations of the San Luis Obispo County and CGS references listed above. Reference Nos. 1 and 2 are intended to be used together. We have not identified any geologic or geotechnical engineering issues that would preclude the development of the project as currently planned and have generally concluded that the site is suitable for the proposed development as currently designed

provided that the recommended geotechnical engineering and engineering geology recommendations are implemented in the planning, design, and construction of the project.

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 the undersigned.

Sincerely,
Earth Systems Pacific



Phillip Madrid, PE
Project Engineer

Doc. No. 2109-015.LTR

References:

1) Geotechnical Engineering Report, Dana Reserve, by Earth Systems Pacific, dated September 9, 2021, Doc. No. 2109-001.SER (ATTACHED)
2) Revised Engineering Geology Report, Dana Reserve, by Earth Systems Pacific, dated September 10, 2021, Doc. No. 2108-042.REVGEO (ATTACHED)
3) Geotechnical Feasibility Report, Canada Ranch, by Earth Systems Pacific, dated September 11, 2017, Doc. No. 1709-013.SER
4) Review of Geotechnical Feasibility Report, Dana Reserve (APN's 091-301-073, -030, -031) Nipomo Area of San Luis Obispo County, by LandSet Engineers, Inc., File No.: 0916-01, dated June 25, 2021

GEOTECHNICAL ENGINEERING REPORT
DANA RESERVE
NORTHWEST OF NORTH FRONTAGE ROAD
NIPOMO AREA OF SAN LUIS OBISPO COUNTY, CALIFORNIA

September 9, 2021

Prepared for

Mr. Nick Tompkins
NKT Development, LLC

Prepared by

Earth Systems Pacific
2049 Preisker Lane, Suite E
Santa Maria, California 93454

Earth Systems
2049 Preisker Lane, Suite E | Santa Maria, CA 93454 | Ph: 805.928.2991 | www.earthsystems.com

September 9, 2021

FILE NO.: 304746-001

Mr. Nick Tompkins
NKT Development, LLC
684 Higuera Street, Suite B
San Luis Obispo, California 93401

PROJECT: DANA RESERVE
NORTHWEST OF NORTH FRONTAGE ROAD
NIPOMO AREA OF SAN LUIS OBISPO COUNTY, CALIFORNIA

SUBJECT: Geotechnical Engineering Report

REF: 1) Proposal for a Geotechnical Engineering and Engineering Geology Report, Dana Reserve, by Earth Systems Pacific, dated July 15, 2021, Doc. No. SM-2107-025.PRP

2) Review of Geotechnical Feasibility Report, Dana Reserve (APN's 091-301-073, -030, -031) Nipomo Area of San Luis Obispo County, by LandSet Engineers, Inc., File No.: 0916-01, dated June 25, 2021

Dear Mr. Tompkins:

In accordance with the authorization of the above-referenced proposal, this geotechnical engineering report has been prepared for the Dana Reserve project. This project is planned northwest of North Frontage Road at Sandydale Drive in the Nipomo area of San Luis Obispo County, 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. This report is also intended to respond to geotechnical engineering-related comments by Landset Engineers, Inc. on behalf of the County of San Luis Obispo (Reference 2). 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 the undersigned

Sincerely,
Earth Systems Pacific

Phillip Madrid, PE
Project Engineer

Doc. No. 2109-001.SER/ln

signed 1-13-2021

Table of Contents

Appendices

1.0 INTRODUCTION

The Dana Reserve project is a master planned community that will be constructed within a 288-acre property. The project is located northwest of North Frontage Road at Sandydale Drive in the Nipomo area of San Luis Obispo County, California. The property is referred to herein as "the site", and the site is shown on Figure 1 the Site Vicinity Map presented in Appendix A.

We understand the site will be developed with single and multi-family residences, commercial/retail buildings, recreation areas, open space, and associated surface and subsurface improvements. We have assumed that residential and commercial structures will be one to four stories, will be of wood and steel frame construction, and will utilize Portland cement concrete (PCC) slabs-on-grade. Masonry and/or concrete retaining walls for sitework and/or connected to and forming part of the structures are anticipated. Masonry boundary walls and/or other types of perimeter fencing may also be constructed. Maximum line loads are anticipated to be approximately 4 kips per linear foot, and maximum point loads are anticipated to be approximately 40 kips.

We have assumed surface improvements will consist of hot mix asphalt (HMA) and/or PCC pavement over aggregate base (AB) for vehicles and PCC flatwork for pedestrian use. We have assumed subsurface improvements will be the underground municipal sewer, water, power, and communications utilities that will provide service to the project. Surface runoff will be transmitted to and disposed of into Low Impact Development (LID) drainage disposal improvements. On-site effluent disposal systems are not anticipated for this project and are not addressed in this report.

We have assumed the site will be graded to develop the building and surface improvement areas, to improve access, and to improve drainage. Cuts and fills are anticipated to be on the order 20 feet or less. Cut and fill slopes not exceeding 15 feet in height and inclined at 3:1 or flatter may also be constructed.

2.0 SCOPE OF SERVICES

The scope of work for the geotechnical engineering report included a general site reconnaissance, a review of the geotechnical feasibility report (ESP, 2017), subsurface exploration, laboratory testing of selected samples, geotechnical analysis of data, 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, 2019), as applicable; Special Publication 117a (CDMG, 2008); and common geotechnical engineering practice in this area under similar conditions at this time. The test procedures were performed 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 the 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, temporary slope angles, construction means and methods, etc. Analyses of the soil for asbestos (either naturally occurring or in man-made products), 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, effluent disposal systems, drainage disposal systems, and nonstructural fills are not within our scope and are also not addressed.

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 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 site is an approximately 288-acre parcel located in the Nipomo area or the southwest sector of San Luis Obispo County, California. The site is northwest of North Frontage Road at Sandydale Drive. Gates along Hetrick Road, Cherokee Place, and the North Frontage Road provide access to the site. Rural-residential properties and undeveloped open space form the southeast, southwest, and northwest site boundaries; US Highway 101 forms the northeast boundary. The approximate central site coordinates and elevation obtained from the Google Earth website (Google, 2021) are latitude 35.046 degrees north, longitude 120.503 degrees west, and 371 feet.

The site is generally undeveloped except for a few unimproved access roads and is covered with a sparse to dense growth of vegetation consisting mostly of seasonal grasses, brush, and mature oak trees. The ground surface of the site generally slopes gently to the northeast towards Nipomo Creek; drainage is by sheet flow.

4.0 FIELD INVESTIGATIONS AND LABORATORY ANALYSIS

Previous Investigation

Earth Systems Pacific (ESP) prepared a geotechnical feasibility report (Reference 2) for the site which was known at the time as the Canada Ranch Property. On August 14, 2017, five borings were drilled at the site to depths of approximately 5 to 50 feet below the existing ground surface (bgs). Two of the borings were drilled for infiltration testing, and the other three borings (designated as Boring Nos. 1 through 3) were drilled for exploratory purposes. The borings were drilled with a Mobile Drill Model B-53 truck mounted drill rig, equipped with a 6-inch outside diameter hollow stem auger and an automatic trip hammer for sampling. The approximate locations of the exploratory borings are shown on the Exploration Location Map presented as Figure 2, in Appendix A.

Standard Penetration Tests were conducted at selected depths in the borings (ASTM D 1586-11). Soils encountered in the exploratory borings were logged and categorized in general accordance with the Unified Soil Classification System and ASTM D 2488-09a. Copies of the boring logs can also be found in Appendix A. In reviewing the boring logs and the 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, cementation, variations in soil moisture, presence of groundwater, and other factors. Consequently, the logger must exercise judgment in interpreting soil characteristics, possibly resulting in subsurface descriptions that vary somewhat from the legend.

Current Investigation

Nine additional borings (designated as Boring Nos. 4 through 12) were drilled on July 27 through 29, 2021, to depths ranging from 15 to 50 feet bgs. The borings were drilled with a Mobile Drill Model B-53 truck mounted drill rig, equipped with a 6-inch outside diameter hollow stem auger and an automatic trip hammer for sampling. The approximate locations of the borings are shown on the Exploration Location Map presented as Figure 2, in Appendix A.

Soils encountered in the exploratory borings were logged and categorized in general accordance with the Unified Soil Classification System and ASTM D 2488-17. Copies of the boring logs can also be found in Appendix A. In reviewing the boring logs and the 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, cementation, variations in soil moisture, presence of groundwater, and other factors. Consequently, the logger must exercise judgment in interpreting soil characteristics, possibly resulting in subsurface descriptions that vary somewhat from the legend. The reader should also consider the sampler type used when reviewing the blow counts.

As the borings were drilled, soil samples were obtained using a 3-inch outside diameter ring-lined barrel sampler (ASTM D3550-17 with shoe similar to D2937-17). Standard penetration tests (SPT) using a 2-inch outside diameter split-spoon sampler were also performed in the borings (ASTM D1586-18) at selected depths. Bulk soil samples were obtained from the auger cuttings.

Ring samples were tested for bulk density per ASTM D2937-17 (modified for ring liners). Two bulk samples were tested for maximum density and optimum moisture content (ASTM D1557-12), and direct shear tests (ASTM D3080/D3080M-11) were conducted on the same samples after they were remolded to approximately 90 percent of maximum dry density. One of the bulk samples was tested for particle size per ASTM D1140-17. Another bulk sample was tested for R-value (ASTM D2844/D2844M-18). One dimensional consolidation tests (ASTM D2435/D2435M-11(2020)) were performed on selected ring samples. Two samples were also sent to CERCO Analytical, Inc. of Concord, California for use in preparing a corrosion evaluation report. The corrosion evaluation report 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, Inc. are presented in Appendices B and C, respectively.

5.0 GENERAL SUBSURFACE SOIL PROFILE

The subsurface profile observed in the borings generally consisted of layered sand soils with variable amounts of silt and clay. These soils were generally in a dry to wet condition and ranged from loose to dense in consistency. Groundwater was encountered during drilling in Boring 4 at 40 feet bgs and at 39 feet bgs in Boring 5; the water level stabilized in both borings at 35 feet bgs after drilling was completed. Please refer to the boring logs presented in Appendix A for a more detailed description of the subsurface profile.

6.0 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. Assuming the site is designed and prepared in accordance with the "Preliminary Geotechnical Recommendations" section of this report, the structures may be supported by shallow conventional continuous and spread (pad) footings.

The geotechnical engineering topics addressed in this section are the potential for strong ground shaking, the potential for settlement, the potential for liquefaction and seismically induced settlement of dry sand, the expansion potential of the soils, 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 erodible nature of the soils, and the corrosivity of the soils.

Strong Ground Shaking

The site is in a region of high seismic activity, with the potential for large seismic events that could generate strong ground shaking. The CBC requires that seismic loads be considered in structural design. A seismic analysis was undertaken to provide seismic acceleration design parameters; the results are presented in the "Foundations" section of this report for use by others in the structural design process.

The ASCE 7-16 (ASCE, 2017/2018) method, available on the Structural Engineers Association of California (SEAOC) Seismic Design Map Tool website (SEAOC, 2021), was used for the seismic analysis. The risk category for buildings and structures is assigned by others in accordance with Table 1604.5 (CBSC, 2019); however, based on our current understanding of the project, we selected Risk Category II for our analysis. The site coordinates from the "Site Setting" section of this report were used in the analysis. Based on the general subsurface profile encountered and the sampler blowcounts, the Site Class per Chapter 20 Table 20.3-1 (ASCE, 2017) is "D", a "Stiff Soil Profile". A general ground motion seismic analysis was performed, assuming that Exception 2 listed in Section 11.4.8 (ASCE, 2017) will apply to the project. We also provided seismic parameters if the Simplified Lateral Force Analysis Procedure from Section 12.14.8 (ASCE, 2017) will be used in structural design.

Settlement Potential

Settlement (total and differential) can occur when foundations and surface improvements span materials having variable consolidation, moisture, and density characteristics. 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. Based on our laboratory test data the soils are considered to have a slight to moderate 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.

Another concern with respect to settlement is large-scale subsidence related to groundwater pumping or the extraction of oil or gas. The project area has not been identified as an area of concern for such subsidence (USGS, 2021a).

Settlement due to liquefaction and seismically induced settlement of dry sand is addressed below.

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 screen for 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 presence of groundwater and the density of the soils there appears to be a potential for both liquefaction and seismically induced settlement of dry sand to occur.

To further understand the magnitude and potential effects of liquefaction and seismically induced settlement of dry sand, we analyzed of boring data using the PGA_M of 0.527g from the "Foundations" section of this report, an earthquake mean magnitude over all sources of 6.74 (USGS, 2021b), and a groundwater elevation of 35 feet bgs. Our analyses indicated that the

saturated soils are nonliquefiable; therefore, the potential for liquefaction to cause dynamic settlement, lateral spreading, or loss of soil bearing is considered nil. Based on our analyses of the unsaturated soils and assuming the site is prepared in accordance with the recommendations later in this report, total and differential seismically induced settlement of dry sand is not expected to exceed 0.5 inches and 0.25 inches, respectively.

Accordingly, no special measures will be needed to protect the structures and associated improvements from liquefaction and/or seismically induced settlement of dry sand.

Expansive Soils

The upper site soils were judged to be nonexpansive; therefore, no special measures with respect to expansive soils are considered necessary.

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" soils per the 2019 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 San Luis Obispo County, the conduit manufacturer, and the utility companies should be anticipated.

Stability of the 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.

Soil Erosion

The site soils are considered to be highly erodible. Stabilization of 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 structures and improvements.

Soil Corrosivity

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

7.0 PRELIMINARY GEOTECHNICAL RECOMMENDATIONS

The following preliminary geotechnical 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 basements or cellars, taller or stacked retaining walls, or other such features are incorporated into site development, this firm 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.

- **Building Area:** The building area is defined as the area within and extending a minimum of 5 feet beyond the perimeter of the foundations for a structure or as the entire lot in the case of single family residential or townhome/duplex-style lots. The building area also includes the foundation areas (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 structures could include covered walkways, patio covers, 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 D6938-17a, respectively, or by other methods acceptable to the geotechnical engineer and the governing jurisdiction.

- **Nonexpansive Material:** Nonexpansive material is defined as being a coarse-grained soil (ASTM D2487-17) and having an expansion index of 10 or less (ASTM D4829-19).

Site Preparation

1. The existing ground surface in the building and surface improvements areas should be prepared for construction by removing existing improvements, vegetation, large roots, debris, and other deleterious material. *Any existing fill soils should be completely*

removed and replaced as compacted fill. Any existing utilities that will not remain in service 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.

Grading

1. Following site preparation, the soils in the building area for one- and two-story buildings should be removed to a level plane at a minimum depth of 3 feet below the bottom of the deepest footing or 4 feet below existing grade, *whichever is deeper*. The soils in the building area for three- and four-story buildings should be removed to a level plane at a minimum depth of 4 feet below the bottom of the deepest footing or 5 feet below existing grade, *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. In addition to the recommendations of Paragraph 1 of this section, we recommend that all cut or cut/fill transition areas be overexcavated such that a minimum of 5 feet of compacted fill is provided within all the building areas. Also, the minimum depth of the fill below the building area should not be less than half of the maximum depth of fill below the building area. For example, if the maximum depth of fill below the building area is 20 feet, then the minimum depth of fill below the same building area grades should be no less than 10 feet. In no case should the depth of fill be less than 5 feet on the building areas.

3. 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 2 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

4. Following site preparation, the soils in fill areas beyond the building and surface improvement areas should be removed to a depth of 2 feet below existing grade. 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.

5. 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.

6. On-site material and approved import materials may be used as general fill. All imported soil should be nonexpansive. The proposed imported soils should be evaluated by the geotechnical engineer before being used, and on an intermittent basis during placement on the site.

7. 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.

8. The soils are estimated to shrink by approximately 15 to 20 percent when prepared and graded as recommended above.

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 D.

2. Utilities that must pass beneath foundations 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. 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.

5. Utility trench backfill should be moisture conditioned and compacted; however, 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. For utility trench backfill in current or future San Luis Obispo County right of way a minimum of 95 percent of maximum dry density should also be obtained for all trench backfill (SLOCO, 2019).

6. 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.

7. The Corrosion Evaluation Report prepared by CERCO Analytical, Inc. and presented in Appendix C should be used by the architect/engineer in specifying appropriate corrosion protection measures for the utility improvements.

8. 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 on soil compacted per the "Grading" section of this report may be used to support the new structures. Grade beams should also be placed across all large entrances into the buildings. Footings and grade beams should have a minimum depth of 12 inches below lowest adjacent grade; however, footings and grade beams for commercial buildings and residential buildings two stories or greater should have a minimum depth of 18 inches below lowest adjacent grade. All spread footings should be a minimum of 2 feet square. Footing and grade beam dimensions should also conform to the applicable requirements of Section 1809 (CBSC, 2019). Footing 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.

2. Footings should be designed using a maximum allowable bearing capacity of 2,000 psf dead plus live load. The allowable bearing capacity may be increased by 200 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 3,000 psf dead plus live loads. Using these criteria, maximum total and differential settlement under static conditions are expected to be on the order of 3/4-inch and 1/4-inch in 25 feet, respectively. Footings should also be designed to withstand total and differential dynamic settlement of 1/2-inch and 1/4- inch across the largest building dimension, respectively.

3. 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. A passive equivalent fluid pressure of 375 pcf and a coefficient of friction of 0.39 may be used in design. No factors of safety, load factors, and/or other factors have been applied to any of the values.

4. The allowable bearing capacity may be increased by one-third when transient loads such as wind or seismicity are included if the structural engineer determines they are allowed per Sections 1605.3.1 and 1605.3.2 (CBSC, 2019). The following seismic parameters are presented for use in structural design.

SEISMIC DESIGN PARAMETERS

2019 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	1.056	F_a	1.078*	S_{MS}	1.138	S_{DS}	0.759*
S_1	0.386	F_v	1.914	S_{M1}	0.739	S_{D1}	0.493
Peak Mean Ground Acceleration (PGA_M) = 0.527g **Seismic Design Category** = D * F_a should be taken as 1.4 and S_{DS} as 0.996 if the Simplified Lateral Force Analysis Procedure in Section 12.14.8 (ASCE, 2017) is used in structural design							

5. Foundation excavations should be observed by the geotechnical engineer prior to placement of reinforcing steel or any formwork. Foundation 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 paragraph 1 of the "Grading" section of this report. Conventional foundations for retaining walls should have a minimum depth of 12 inches below lowest adjacent grade

not including the keyway. We have 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 Section 1803.5.12.1 (CBSC, 2019) is not required. If retaining walls will retain more than 6 feet of soil, seismic design will be required by the geotechnical engineer.

3. Retaining wall design should be based on the following parameters:

Active equivalent fluid pressure	
(native soil, imported sand or gravel backfill)	35 pcf
At-rest equivalent fluid pressure	
(native soil, imported sand or gravel backfill)	55 pcf
Passive equivalent fluid pressure (compacted fill)	375 pcf
Maximum toe pressure (compacted fill)	2,000 psf
Coefficient of sliding friction (compacted fill)	0.39

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, 2018) Section 96-1.02B – Class "C," should be placed between the two. Manufactured geocomposite wall drains conforming to the Standard Specifications (Caltrans, 2018) 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; however, the thickness of heavy duty slabs and flatwork should be specified by the architect/engineer. Conventional interior slabs-on-grade should be doweled to footings and grade beams with dowels.

2. Reinforcement size, placement, and dowels should be as directed by the architect/engineer. Interior slabs-on-grade and light duty exterior flatwork should be reinforced, at a minimum, with No. 3 rebar at 18 inches on-center each way. Heavy duty exterior flatwork should have minimum rebar sizing and spacing that meets the criteria of American Concrete Institute (ACI) 318 (ACI, 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 150 psi/inch if the slab is underlain with a minimum of 6 inches of compacted Class 2 AB (Caltrans, 2018), and to 200 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. Where specified, vapor retarders should conform to ASTM E1745-17. This standard specifies properties for three performance classes, Class “A”, “B” and “C”. The appropriate class should be selected based on the potential for damage to the vapor retarder during placement of slab reinforcement and concrete.

5. 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 concrete in direct contact with a Class “A” vapor retarder*, particularly during wet weather construction.

However, placing the concrete directly on the vapor retarder requires special attention to using the proper vapor retarder (see discussion below), a very low water-cement ratio in the concrete mix, and special finishing and curing techniques.

6. Probably the next most effective option would be the *use of vapor-inhibiting admixtures in the slab concrete mix and/or application of a sealer* to the surface of the slab. This would also require special concrete mixes and placement procedures, depending upon the recommendations of the admixture or sealer manufacturer.

7. 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*, however this would increase the potential for moisture damage to floor coverings and for mold growth or other microbiological contamination. If a Class "A" vapor retarder (see discussion below) is specified, the retarder can be placed directly on the material at pad grade. 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 on top of the material at pad grade, and the retarder should be placed in the center of the clean sand layer. Clean sand is defined as well or poorly graded sand (ASTM D2487-17) of which less than 3 percent passes the No. 200 sieve. The site soils do not fulfill the criteria to be considered "clean" sand.

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. Installation should conform to ASTM E1643-18a.

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 four to six 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 of the thickened edge or grade beam.

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 the tested R-value of 63 and should only be used for cost estimation purposes. The soil exposed at the roadway 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, 7.0, 7.5, and 8.0. 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, 2020). 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)
63	4.5	2.50	4.0
	5.0	2.75	4.0
	5.5	3.00	4.0
	6.0	3.25	6.0
	6.5	3.75	6.0
	7.0	4.00	6.0
	7.5	4.25	6.0
	8.0	4.50	6.0

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 items 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 Section 1804.4 (CBSC, 2019) 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, and other improvements during construction. Where this is not practicable due to other improvements, etc., swales with improved surfaces, area drains, or other drainage facilities, should be used to collect and discharge runoff.

2. The eaves of the buildings 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. Erosion protection should be placed at all discharge points unless the discharge is to a pavement surface.

3. To reduce the potential for planter drainage 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 structure and in landscape areas that would not otherwise freely drain.

4. The on-site soils are highly erodible. If soils are disturbed during construction, stabilization of soils 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. Maintenance of drainage and other improvements is critical to the long-term stability of the site and the integrity of the structures. Site improvements should be maintained on a regular basis.

6. Finished flatwork and pavement surfaces should be sloped to freely drain toward appropriate drainage facilities. Water should not be allowed to stand or pond on or

adjacent to exterior pedestrian flatwork, vehicle pavement, or other improvements as it could infiltrate into the AB and/or subgrade, causing premature deterioration of pavement, flatwork, or other improvements. Any cracks that develop in the pavement should be promptly sealed.

7. All exterior drains and drain outlets should be maintained to be free-flowing. Care should be taken to establish and maintain vegetation. Vegetation and erosion matting (if utilized) should be maintained or augmented as needed. Irrigation systems should be maintained so that soils around structures are maintained at a relatively uniform year-round moisture content, and are neither over-watered nor allowed to dry and desiccate.

8. 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 should be provided as per Section 1705.6 and CBC Table 1705.6 (CBSC, 2019). The special inspector should be under the direction of the geotechnical engineer. 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 County of San Luis Obispo, the special 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.

8.0 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. 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 the project 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 should comply with the CBC of other applicable standards, and the requirements of the governing jurisdiction.

The preliminary recommendations presented in this geotechnical report are based upon the geotechnical conditions encountered at the site, and may be augmented by additional requirements of the client, or by additional recommendations provided by the geotechnical engineer based on peer or jurisdiction reviews, or conditions exposed at the time of construction.

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

TECHNICAL REFERENCES

ACI (American Concrete Institute). 2015. "Guide for Concrete Floor and Slab Construction." Documents 302.1R-15, ACI.

ACI (American Concrete Institute). 2014. "Building Code Requirements for Structural Concrete." Document 318, ACI.

ASCE (American Society of Civil Engineers). 2017. *Minimum Design Loads for Buildings and other Structures (7-16).* Standards ASCE/SEI 7-16, ASCE.

ASCE (American Society of Civil Engineers). 2018. *Minimum Design Loads for Buildings and other Structures* Supplement 1, effective December 12, 2018.

ASTM International. 2021. Annual Book of Standards. ASTM.

California Division of Mines and Geology. [1997] 2008. Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication 117a. California Division of Mines and Geology.

Cal/OSHA. 2019 “Pocket Guide for the Construction Industry - Excavation, Trenches, and Earthwork.”

Caltrans (California Department of Transportation). 2020. “Flexible Pavement, Chapter 630.” Highway Design Manual.

Caltrans (California Department of Transportation). 2018. "Standard Specifications." Caltrans.

CBSC (California Building Standards Commission). 2019. California Building Code (CBC). CBSC.

Earth Systems Pacific (ESP). Geotechnical Feasibility Report, Canada Ranch. Dated September 11, 2017

Earth Systems Pacific (ESP). Revised Engineering Geology Report, Dana Reserve. Dated September 10, 2021

Google. 2021. U.S. Department of State Geographer. Google Earth Website. Retrieved from: http://www.google.com/earth/index.html

SEAOC (Structural Engineers Association of California). 2020. “Seismic Design Map Tool.” Retrieved from: https://seismicmaps.org/

SLOCO (San Luis Obispo County). 2019. Department of Public Works Public Improvement Standards and Drawings

USGS (United States Geologic Survey). 2021a. “Areas of Land Subsidence in California.” Retrieved from: https://ca.water.usgs.gov/land_subsidence/california-subsidence-areas.html

USGS (United States Geological Survey), 2021b. “Unified Hazard Tool." United States Geological Survey. Retrieved from: http://earthquake.usgs.gov/hazards/interactive/

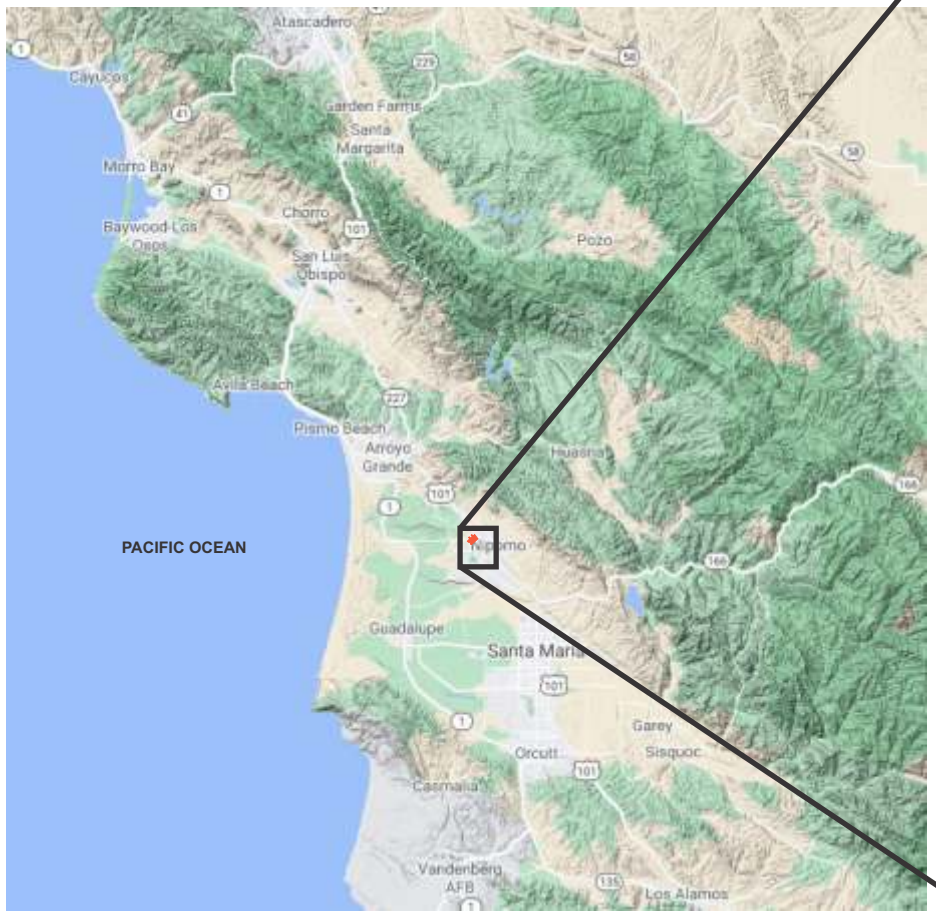
APPENDIX A

Figure 1 – Site Vicinity Map

Figure 2 – Exploration Location Map

Boring Log Legend

Boring Logs (ESP, 2017 and this report)



EARTH SYSTEMS PACIFIC
2049 Preisker Lane. Suite E, Santa Maria, CA 93454
www.earthsystems.com - email: esp@earthsystems.com
(805) 928-2991 Fax: (805) 928-9253

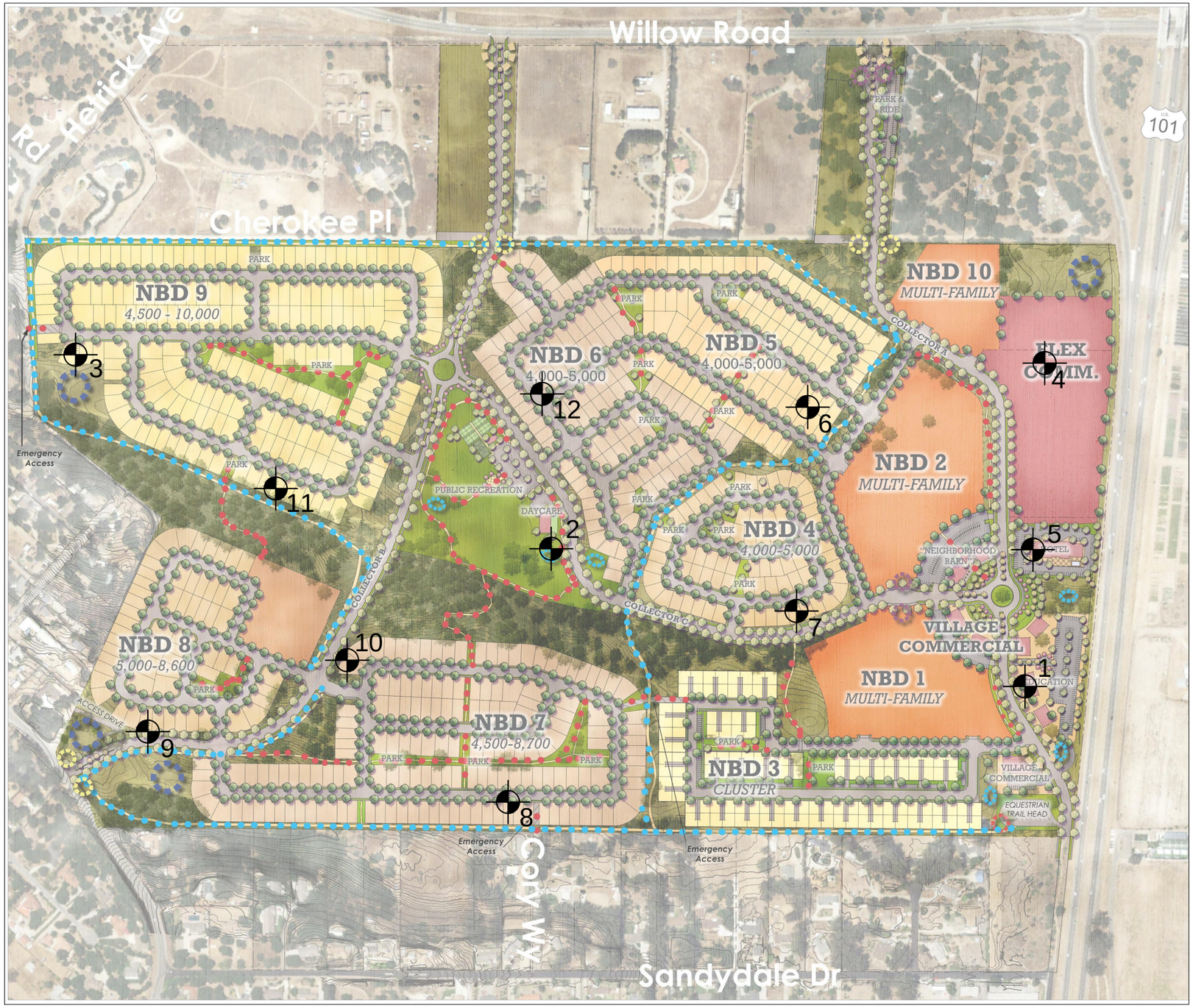
SITE VICINITY MAP

DANA RESERVE
Northeast of North Frontage Road
Nipomo Area of San Luis Obispo County, California

FIGURE 1

Date
September 2021

Project No.
304746-001



LEGEND

12 Boring Location (Approx.)

NOT TO SCALE

BASE MAP PROVIDED BY: RRM DESIGN GROUP

Earth Systems
2049 Preisker Lane, Suite E, Santa Maria, CA. 93454
www.earthsystems.com
(805) 928-2991 ● Fax (805) 928-9253

EXPLORATION LOCATION MAP

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis Obispo County, California

Date
September 2021

Figure 2

Project No.
304746-001

Dana Reserve, ELM 9-2021.dwg

Earth Systems Pacific

BORING LOG LEGEND

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			FINE GRAINED SOILS		
BLOWS/FOOT		DESCRIPTIVE TERM	BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER		SPT	CA SAMPLER	
0-10	0-16	LOOSE	0-2	0-3	VERY SOFT
11-30	17-50	MEDIUM DENSE	3-4	4-7	SOFT
31-50	51-83	DENSE	5-8	8-13	MEDIUM STIFF
OVER 50	OVER 83	VERY DENSE	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

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP-SM		POORLY GRADED SAND WITH SILT: light brown, dry, loose					
3			slightly moist					
5			medium dense	5.0-6.5	●			3, 5, 6
9			moist					
10			gray mottled orange, trace clay	10.0-11.5	●			9, 11, 13
15			orange-brown, clay ends	15.0-16.5	●			6, 7, 7
20				20.0-21.5	●			6, 9, 8
25			End of Boring @ 25.0' 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

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, dry loose					
3			orange-brown, slightly moist					
5				5.0-6.5	●			2, 1, 2
8	SP-SM		POORLY GRADED SAND WITH SILT: yellow-brown, moist					
10				10.0-11.5	●			3, 4, 5
13			light brown, medium dense					
20				20.0-21.5	●			4, 7, 10

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

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP-SM		POORLY GRADED SAND WITH SILT: as above					
30			light brown mottled orange, some clayey sand lenses ~1" thick	30.0-31.5	●			5, 7, 9
35			trace clay					
40	SC		CLAYEY SAND: brown, moist, medium dense					
46	SP		POORLY GRADED SAND: light brown, moist, medium dense					
50			End of Boring @ 50.0' 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. 3

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: orange-brown, dry, loose, trace silt					
3			slightly moist					
5				5.0-6.5	●			1, 2, 1
9			yellow brown					
10				10.0-11.5	●			2, 4, 5
13			medium dense					
15			light yellow brown	15.0-16.5	●			4, 8, 9
20				20.0-21.5	●			6, 8, 11
25			End of Boring @ 25.0' 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. 4

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/27/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: pale brown, loose, slightly moist	0.0 - 5.0	◯			
4			light yellowish brown	5.0 - 6.5	■	96.7	2.5	4 6 9
				5.0 - 10.0	◯			
9			medium dense, moist	10.0 - 11.5	■	105.0	5.0	4 8 11
11	SP-SM		POORLY GRADED SAND WITH SILT: brown, medium dense, moist					
15	SP		POORLY GRADED SAND: yellowish brown, medium dense, moist, oxidation staining	15.0 - 16.5	■	113.0	9.0	5 16 27
20				20.0 - 21.5	●			7 11 14
21			pale brown					
26								

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. 4

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/27/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27			POORLY GRADED SAND: as above					
30			mottled brown, light brown, yellowish brown	30.0 - 31.5	●			6 10 10
35			groundwater stabilized after drilling					
40			pale brown, dense, wet, water encountered during drilling	40.0 - 41.5	●			9 16 17
45			very dense	45.0 - 46.5	●			16 32 36
49			dense					
50				50.0 - 51.5	●			15 17 24
52			End of Boring @ 51.5' Subsurface water encountered @ 40.0' during drilling, stabilized at 35.0' after drilling					

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. 5

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/27/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: brown, loose, slightly moist	0.0 - 5.0	◯			
5			light brown	5.0 - 6.5	■	102.1	2.8	2 4 8
8			light yellowish brown					
10			moist	10.0 - 11.5	■	99.3	4.3	4 5 11
12			dark yellowish brown, dense, some oxidation staining					
15				15.0 - 16.5	■	113.1	13.1	11 21 31
17			light brown, medium dense					
20				20.0 - 21.5	●			5 11 14

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. 5

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/27/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27 - 28 - 29 - 30 - 31 - 32 - 33 - 34 - 35 - 36 - 37 - 38 - 39 - 40 - 41 - 42 - 43 - 44 - 45 - 46 - 47 - 48 - 49 - 50 - 51 - 52 - 53 -			POORLY GRADED SAND: as above	30.0 - 31.5	●			9 11 12
			pale brown					
			groundwater stabilized after drilling					
			dense, wet, water encountered during drilling	40.0 - 41.5	●			15 21 27
			medium dense	45.0 - 46.5	●			7 13 17
			dense	50.0 - 51.5	●			16 24 20
			End of Boring @ 51.5' Subsurface water encountered @ 39.0' during drilling, stabilized at 35.0' after drilling					

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. 6

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: light brown, loose, slightly moist	0.0 - 5.0	◯			
5				5.0 - 6.5	■	98.1	1.8	2, 4, 6
10			yellowish brown medium dense, moist	10.0 - 11.5	■	101.3	4.2	4, 7, 11
15				15.0 - 16.5	●			4, 8, 9
16			End of Boring @ 16.5' 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. 7

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: dark yellowish brown, loose, slightly moist	0.0 - 5.0	◯			
5			medium dense	5.0 - 6.5	■	108.4	3.6	7 12 21
9			light yellowish brown					
10				10.0 - 11.5	■	124.8	2.2	7 11 16
15				15.0 - 16.5	●			7 8 11
16			End of Boring @ 16.5' 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. 8

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: brown, loose, slightly moist	0.0 - 4.0	◯			
4			light brown	5.0 - 6.5	■	99.3	2.6	3, 5, 8
9			light yellowish brown, medium dense	10.0 - 11.5	■	107.7	4.0	4, 8, 11
14			yellowish brown	15.0 - 16.5	■	107.5	3.5	6, 11, 16
19				20.0 - 21.5	●			5, 9, 12
24			oxidation staining	25.0 - 26.5	●			7, 10, 14
26			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. 9

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: reddish brown, loose, slightly moist	0.0 - 5.0	◯			
5			yellowish brown, medium dense	5.0 - 6.5	▬	96.0	3.7	5, 8, 13
				5.0 - 10.0	◯			
10				10.0 - 11.5	▬	99.0	2.4	5, 9, 12
15				15.0 - 16.5	▬	104.9	2.7	5, 11, 14
20				20.0 - 21.5	●			5, 9, 14

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. 9

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27			POORLY GRADED SAND: as above					
30				30.0 - 31.5	●			7 11 12
31			oxidation staining					
39			light yellowish brown					
40				40.0 - 41.5	●			8 12 15
49			yellowish brown					
50				50.0 - 51.5	●			7 12 13
52			End of Boring @ 51.5' 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. 10

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: light brown, loose, slightly moist	0.0 - 5.0	◯			
5				5.0 - 6.5	■	101.7	1.1	3, 5, 6
9			light yellowish brown, medium dense	10.0 - 11.5	■	102.1	2.2	4, 8, 10
13			loose	15.0 - 16.5	●			2, 4, 4
16			End of Boring @ 16.5'					
			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. 11

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: brown, medium dense, slightly moist					
5				5.0 - 6.5	■	110.2	3.1	4 9 17
10				10.0 - 11.5	■	105.6	1.6	7 11 15
11			light brown					
15				15.0 - 16.5	●			4 6 9
17			End of Boring @ 16.5' 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. 12

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: dark yellowish brown, loose, slightly moist	0.0 - 5.0	◯			
5			medium dense	5.0 - 6.5	■	110.0	3.7	7 11 15
9			yellowish brown					
10			moist	10.0 - 11.5	■	105.5	4.5	5 9 12
15			slightly moist	15.0 - 16.5	■	101.1	3.9	7 14 17
20				20.0 - 21.5	●			5 8 11
25				25.0 - 26.5	●			6 10 15
26			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.

APPENDIX B

Laboratory Test Results

Dana Reserve 304746-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

August 26, 2021

Boring #4 @ 0.0 - 5.0'

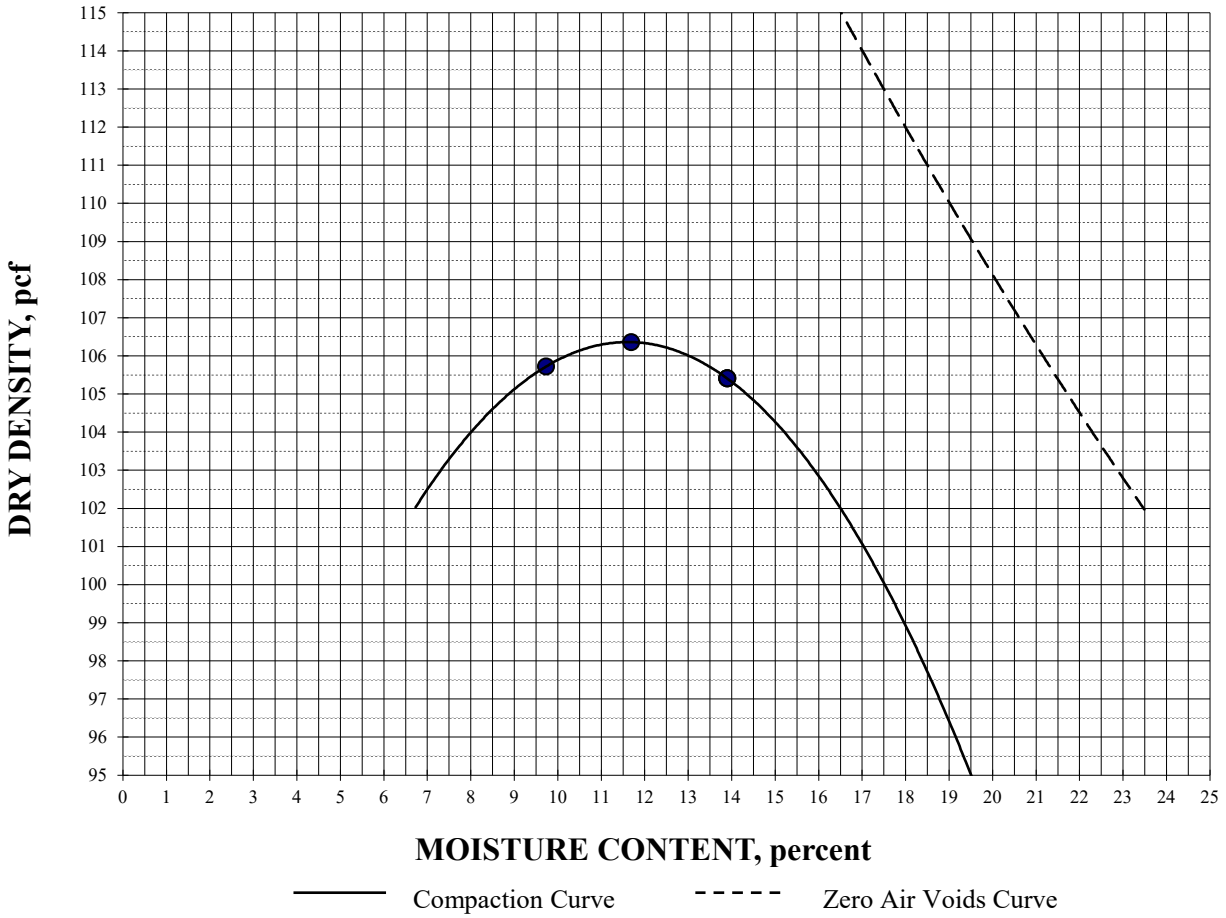
Pale Brown Poorly Graded Sand (SP)

SIEVE DATA:

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

MAXIMUM DRY DENSITY: 106.4 pcf

OPTIMUM MOISTURE: 11.6%



Dana Reserve 304746-001

BULK DENSITY TEST RESULTS

ASTM D 2937-17 (modified for ring liners)

August 26, 2021

BORING NO.	DEPTH feet	MOISTURE CONTENT, %	WET DENSITY, pcf	DRY DENSITY, pcf
4	6.0 - 6.5	2.5	99.1	96.7
4	11.0 - 11.5	5.0	110.2	105.0
4	16.0 - 16.5	9.0	123.2	113.0
5	6.0 - 6.5	2.8	105.0	102.1
5	11.0 - 11.5	4.3	103.6	99.3
5	16.0 - 16.5	13.1	127.9	113.1
6	6.0 - 6.5	1.8	99.9	98.1
6	11.0 - 11.5	4.2	105.6	101.3
7	6.0 - 6.5	3.6	112.3	108.4
7	11.0 - 11.5	2.2	127.5	124.8
8	6.0 - 6.5	2.6	101.9	99.3
8	11.0 - 11.5	4.0	112.0	107.7
8	16.0 - 16.5	3.5	111.3	107.5
9	6.0 - 6.5	3.7	99.5	96.0
9	11.0 - 11.5	2.4	101.4	99.0
9	16.0 - 16.5	2.7	107.7	104.9
10	6.0 - 6.5	1.1	102.8	101.7
10	11.0 - 11.5	2.2	104.3	102.1
11	6.0 - 6.5	3.1	113.6	110.2
11	11.0 - 11.5	1.6	107.3	105.6
12	6.0 - 6.5	3.7	114.1	110.0
12	11.0 - 11.5	4.5	110.3	105.5
12	16.0 - 16.5	3.9	105.0	101.1

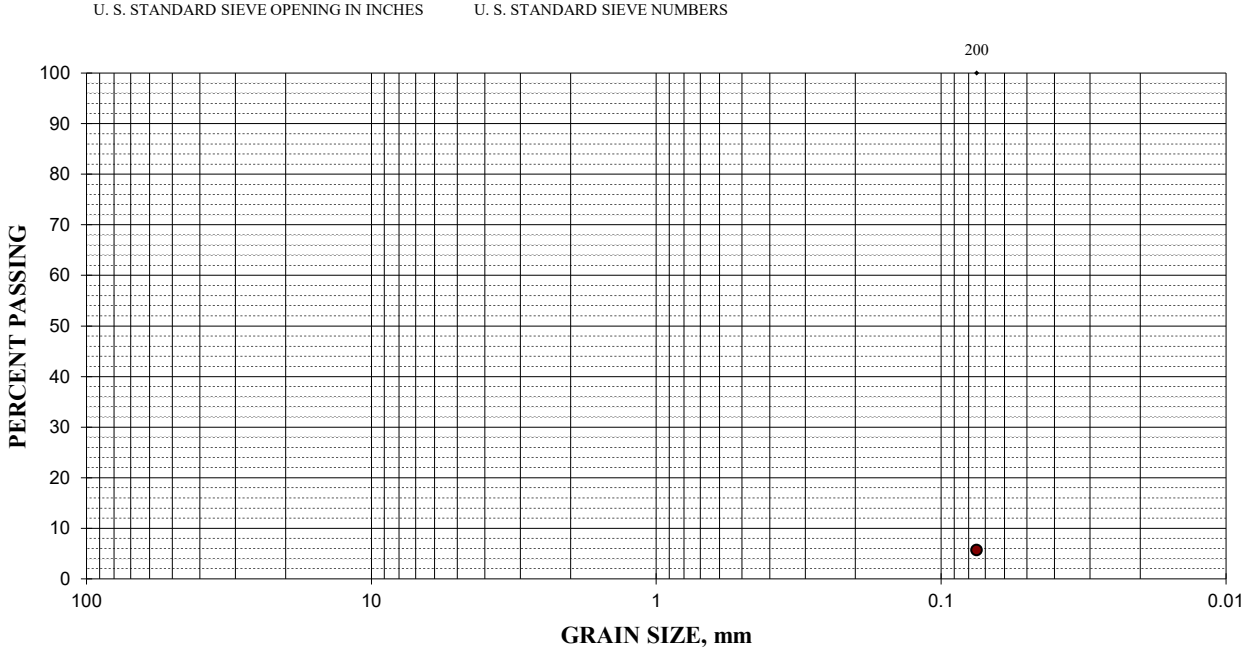
Dana Reserve 304746-001

PARTICLE SIZE ANALYSIS

ASTM D 422-63/07; D 1140-017

Boring #4 @ 0.0 - 5.0' August 26, 2021
Poorly Graded Sand (SP)
Cu = 1.4; Cc = 0.9

Sieve size	% Retained	% Passing
#200 (75-µm)	94.3	5.7



Dana Reserve 304746-001

DIRECT SHEAR

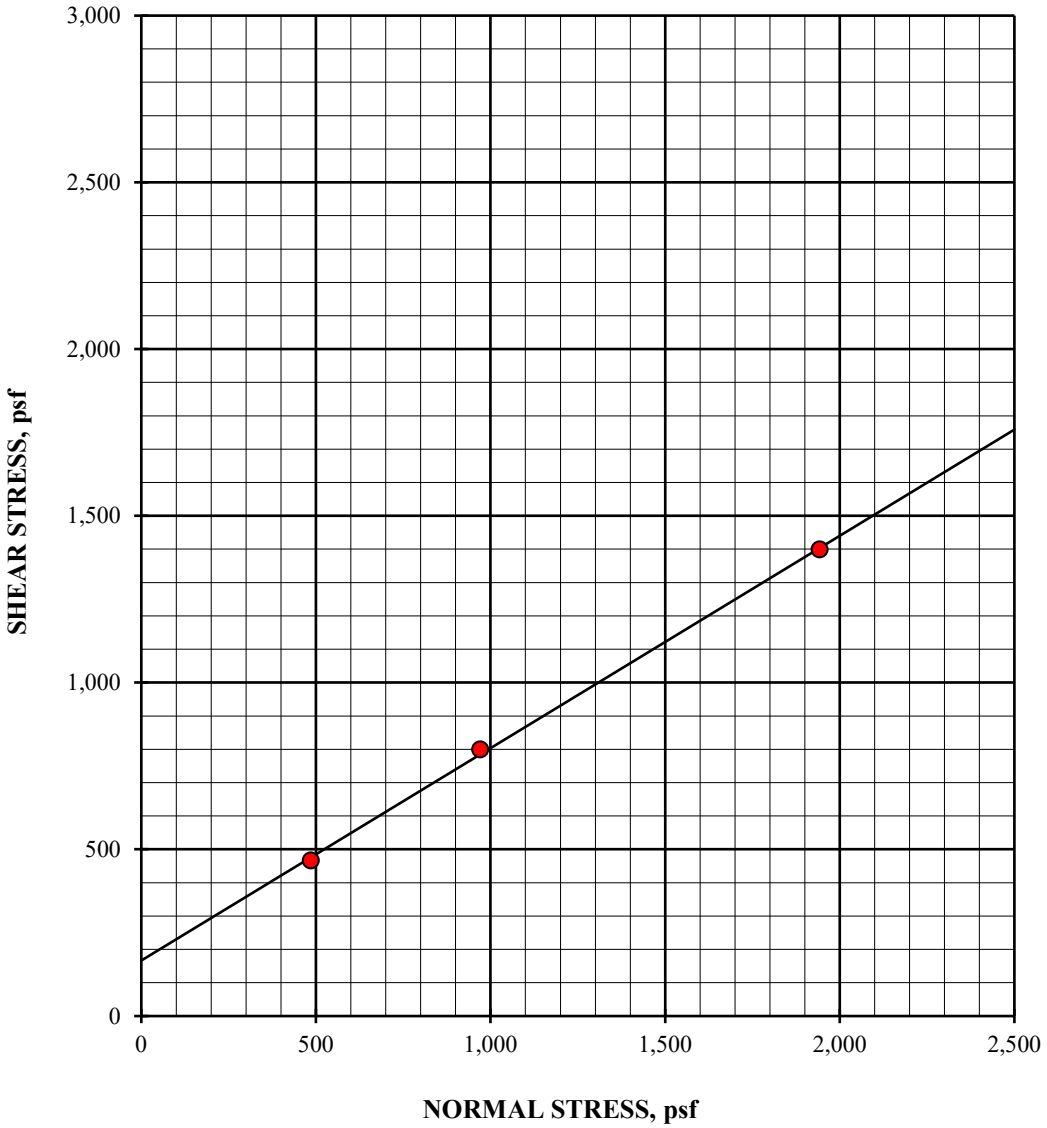
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

August 26, 2021

Boring #4 @ 0.0 - 5.0'
Poorly Graded Sand (SP)
Compacted to 90% RC, saturated

INITIAL DRY DENSITY: 95.7 pcf
INITIAL MOISTURE CONTENT: 11.6 %
PEAK SHEAR ANGLE (Ø): 32°
COHESION (C): 167 psf

SHEAR vs. NORMAL STRESS



DIRECT SHEAR continued

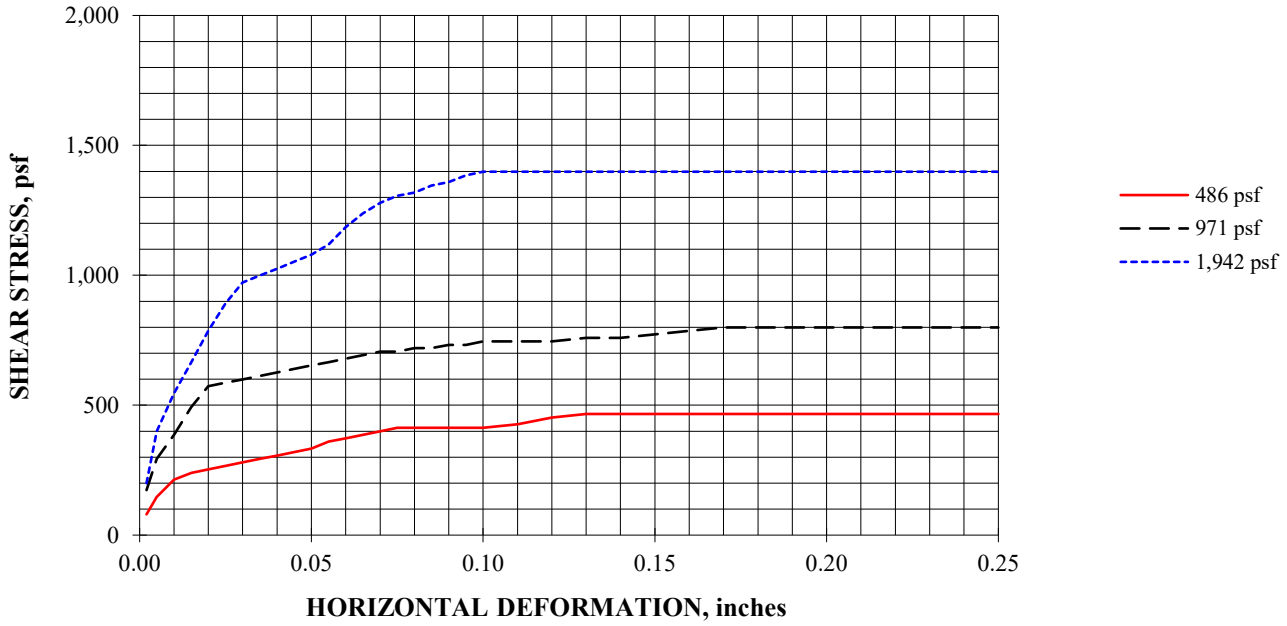
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #4 @ 0.0 - 5.0' August 26, 2021

Poorly Graded Sand (SP)

Compacted to 90% RC, saturated SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	11.6	11.6	11.6	11.6
DRY DENSITY, pcf	95.7	95.7	95.7	95.7
SATURATION, %	42.3	42.3	42.3	42.3
VOID RATIO	0.727	0.727	0.727	0.727
DIAMETER, inches	2.410	2.410	2.410	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	20.0	20.0	20.7	
DRY DENSITY, pcf	96.5	97.4	99.7	
SATURATION, %	74.1	75.8	83.1	
VOID RATIO	0.714	0.698	0.658	
HEIGHT, inches	0.99	0.98	0.96	



Dana Reserve 304746-001

MOISTURE-DENSITY COMPACTION TEST

ASTM D 1557-12 (Modified)

PROCEDURE USED: A

PREPARATION METHOD: Moist

RAMMER TYPE: Mechanical

SPECIFIC GRAVITY: 2.65 (assumed)

August 26, 2021

Boring #9 @ 0.0 - 5.0'

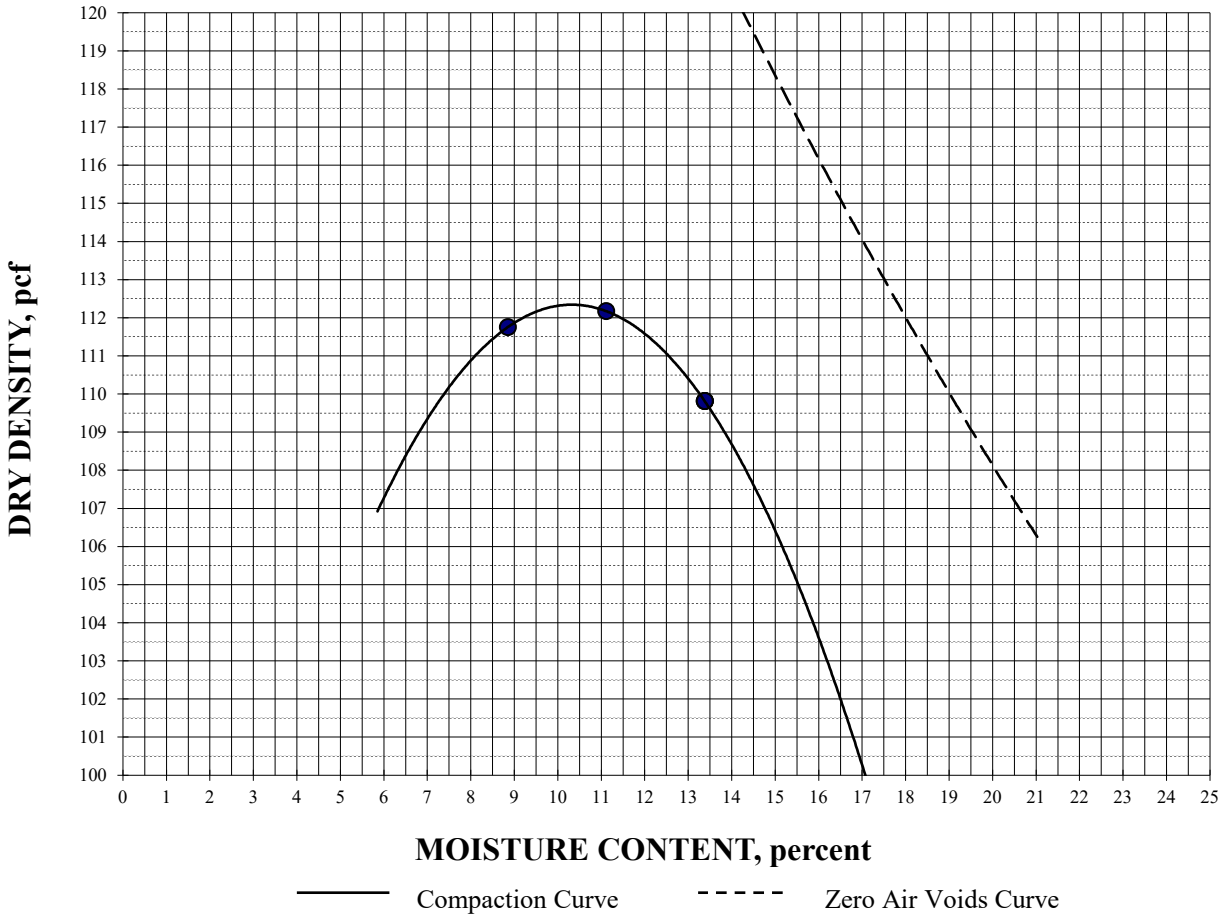
Reddish Brown Poorly Graded Sand (SP)

SIEVE DATA:

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

MAXIMUM DRY DENSITY: 112.3 pcf

OPTIMUM MOISTURE: 10.3%



Dana Reserve 304746-001

DIRECT SHEAR

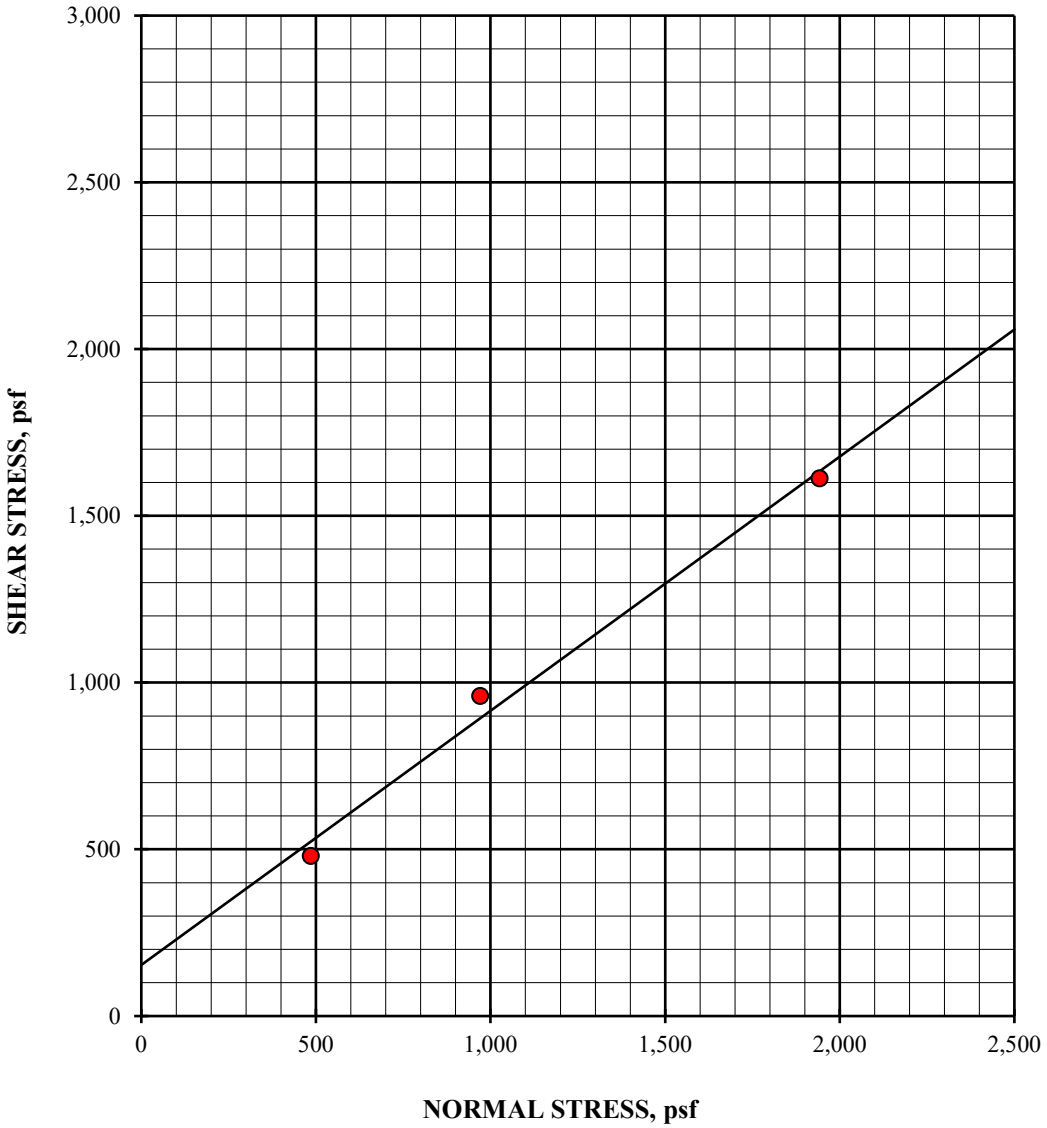
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

August 26, 2021

Boring #9 @ 0.0 - 5.0'
Poorly Graded Sand (SP)
Compacted to 90% RC, saturated

INITIAL DRY DENSITY: 101.1 pcf
INITIAL MOISTURE CONTENT: 10.3 %
PEAK SHEAR ANGLE (Ø): 37°
COHESION (C): 153 psf

SHEAR vs. NORMAL STRESS



DIRECT SHEAR continued

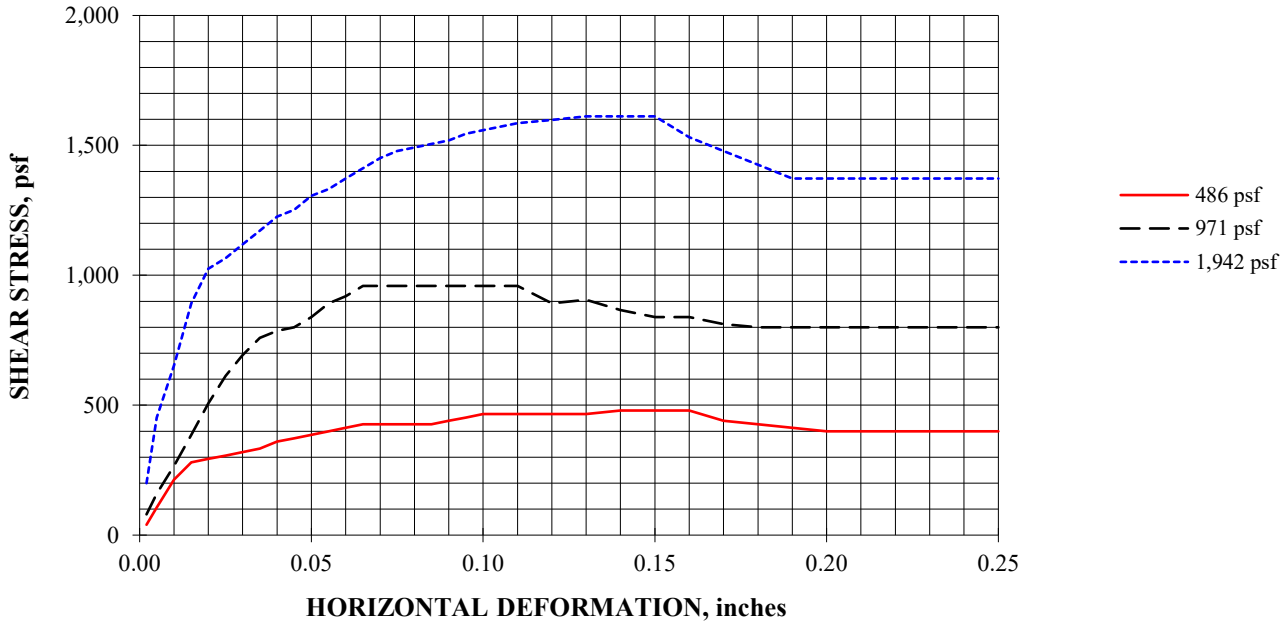
ASTM D 3080/D3080M-11 (modified for consolidated, undrained conditions)

Boring #9 @ 0.0 - 5.0' August 26, 2021

Poorly Graded Sand (SP)

Compacted to 90% RC, saturated SPECIFIC GRAVITY: 2.65 (assumed)

SAMPLE NO.:	1	2	3	AVERAGE
INITIAL				
WATER CONTENT, %	10.3	10.3	10.3	10.3
DRY DENSITY, pcf	101.1	101.1	101.1	101.1
SATURATION, %	43.0	43.0	43.0	43.0
VOID RATIO	0.635	0.635	0.635	0.635
DIAMETER, inches	2.410	2.410	2.410	
HEIGHT, inches	1.00	1.00	1.00	
AT TEST				
WATER CONTENT, %	18.7	19.2	19.2	
DRY DENSITY, pcf	102.3	104.5	106.7	
SATURATION, %	80.4	87.2	92.4	
VOID RATIO	0.616	0.583	0.550	
HEIGHT, inches	0.99	0.97	0.95	



Dana Reserve 304746-001

RESISTANCE '*R* ' VALUE AND EXPANSION PRESSURE

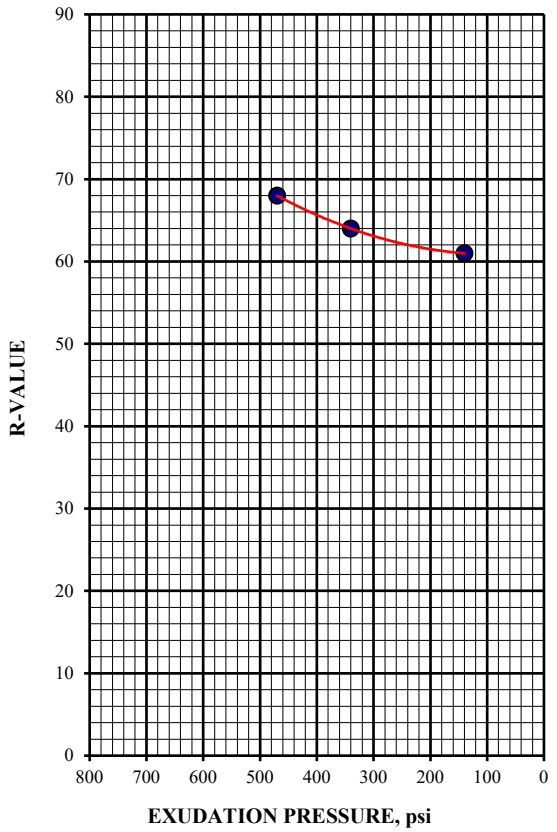
ASTM D 2844/D2844M-18

August 26, 2021

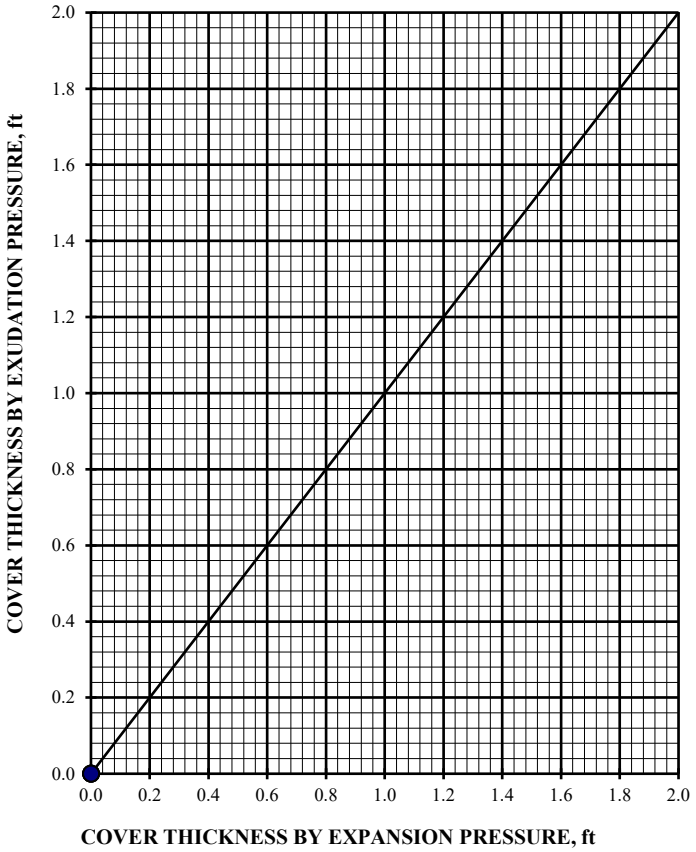
Boring #9 @ 0.0 - 5.0'
Reddish Brown Poorly Graded Sand (SP)

Dry Density @ 300 psi Exudation Pressure: 115.8-pcf
%Moisture @ 300 psi Exudation Pressure: 12.0%
R-Value - Exudation Pressure: 63
R-Value - Expansion Pressure: N/A
R-Value @ Equilibrium: 63

EXUDATION PRESSURE CHART



EXPANSION PRESSURE CHART



Dana Reserve 304746-001

CONSOLIDATION TEST

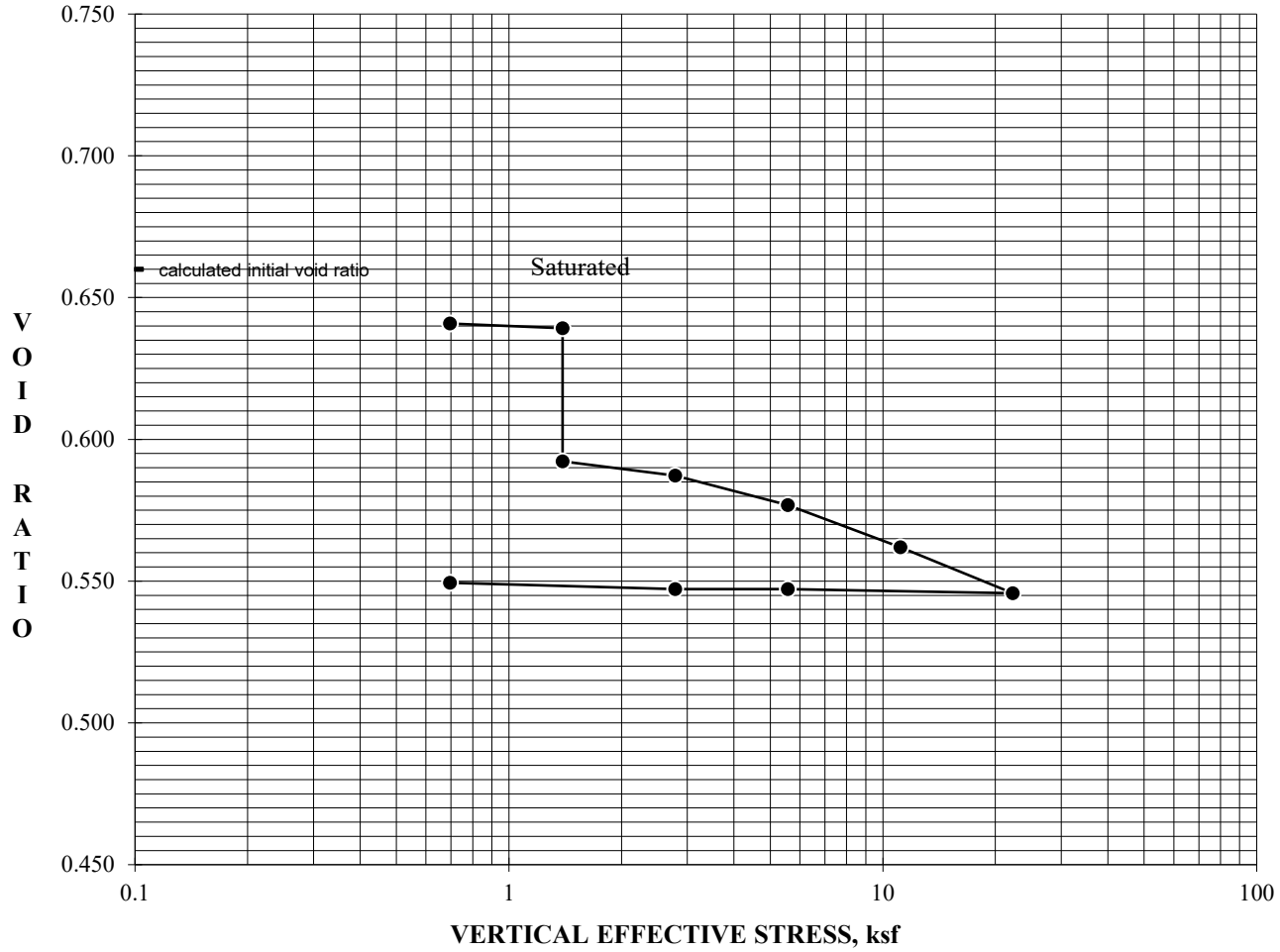
ASTM D 2435/D2435M-11(2020)

August 26, 2021

Boring #6 @ 6.0 - 6.5'
Poorly Graded Sand (SP)
Ring Sample

DRY DENSITY: 99.7 pcf
MOISTURE CONTENT: 1.8%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.660

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



Dana Reserve 304746-001

CONSOLIDATION TEST

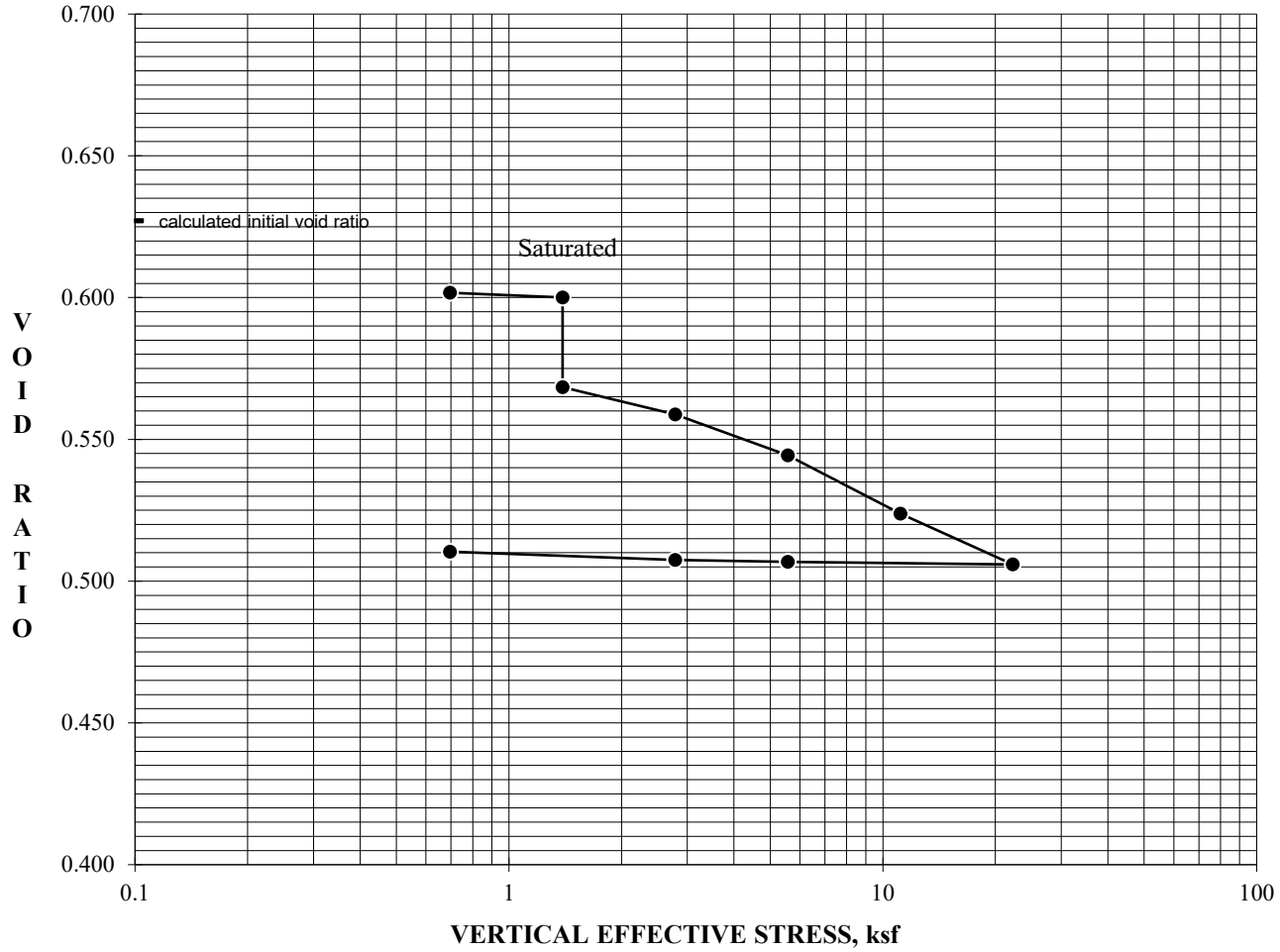
ASTM D 2435/D2435M-11(2020)

August 26, 2021

Boring #10 @ 6.0 - 6.5'
Poorly Graded Sand (SP)
Ring Sample

DRY DENSITY: 101.7 pcf
MOISTURE CONTENT: 1.1%
SPECIFIC GRAVITY: 2.65 (assumed)
INITIAL VOID RATIO: 0.627

VOID RATIO vs. NORMAL PRESSURE DIAGRAM



APPENDIX C

Corrosion Evaluation Report by CERCO Analytical, Inc.

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.: 304746-001
Client's Project Name: Dana Reserve
Date Sampled: 07/27-28/21
Date Received: 6-Aug-21
Matrix: Soil
Authorization: Transmittal on 8/3/2021

Date of Report: 17-Aug-2021

Job/Sample No.	Sample I.D.	Redox (mV)	pH	Conductivity (umhos/cm)*	Resistivity (100% Saturation) (ohms-cm)	Sulfide (mg/kg)*	Chloride (mg/kg)*	Sulfate (mg/kg)*
2108010-001	B-4 @ 0-5'	460	6.66	-	23,000	-	N.D.	N.D.
2108010-002	B-9 @ 0-5'	440	6.11	-	50,000	-	N.D.	N.D.

Method:	ASTM D1498	ASTM D4972	ASTM D1125M	ASTM G57	ASTM D4658M	ASTM D4327	ASTM D4327
Reporting Limit:	-	-	10	-	50	15	15
Date Analyzed:	13-Aug-2021	13-Aug-2021	-	11-Aug-2021	-	13-Aug-2021	13-Aug-2021

Cheryl McMillen
Laboratory Director

* Results Reported on "As Received" Basis
N.D. = None detected

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

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

17 August, 2021

Job No. 2108010
Cust. No.12651

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

Subject: Project No.: 304746-001
Project Name: Dana Reserve
Corrosivity Analysis – ASTM Test Methods

Dear Mr. Madrid:

Pursuant to your request, CERCO Analytical has analyzed the soil samples submitted on Aug 6, 2021. Based on the analytical results, a brief corrosivity evaluation is enclosed for your consideration.

Based upon the resistivity measurements, Sample No. 001 is classified as "mildly corrosive," and Sample No. 002 as "negligibly 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 at 15 mg/kg.

The sulfate ion concentrations are none detected at 15 mg/kg.

The pH of the soils range from 6.11 to 6.66 which does not present corrosion problems for buried iron, steel, mortar-coated steel and reinforced concrete structures.

The redox potentials range from 440 to 460-mV and are classified as "noncorrosive," which is indicative of aerobic soil conditions.

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.

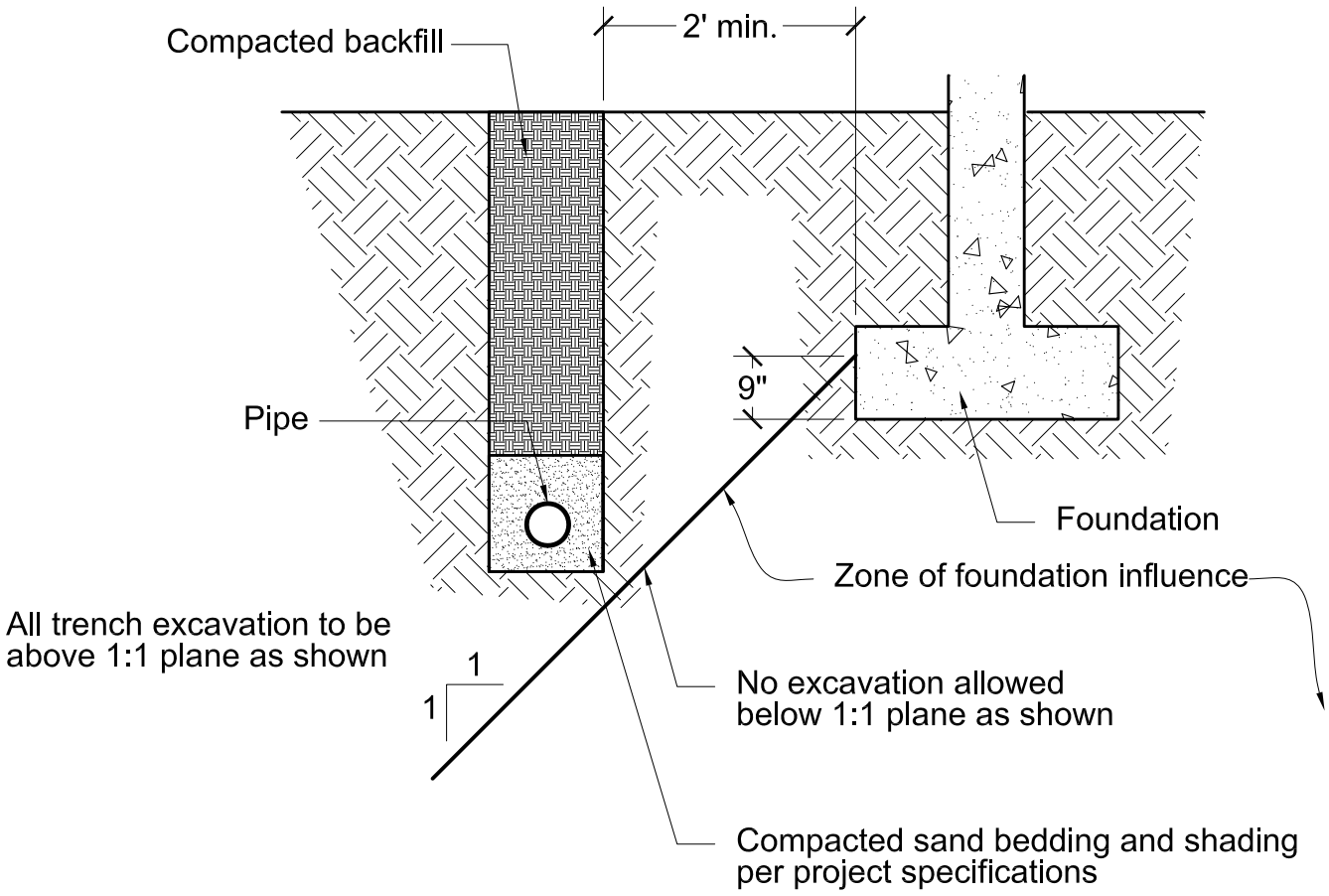
J. Darby Howard, Jr., P.E.
President

JDH/jdl
Enclosure

APPENDIX D

Typical Detail A: Pipe Placed Parallel to Foundations

TYPICAL DETAIL A:
PIPE PLACED PARALLEL TO FOUNDATIONS



SCHEMATIC ONLY
NOT TO SCALE

Earth Systems

2049 Preisker Lane, Suite E
Santa Maria, California 93454

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

Intentionally Blank

REVISED ENGINEERING GEOLOGY REPORT
DANA RESERVE
NORTHWEST OF NORTH FRONTAGE ROAD
NIPOMO AREA OF SAN LUIS OBISPO COUNTY, CALIFORNIA

September 10, 2021

Prepared for

Mr. Nick Tompkins
NKT Development, LLC

Prepared by

Earth Systems Pacific
2049 Preisker Lane, Suite E
Santa Maria, California 93454

Earth Systems
2049 Preisker Lane, Suite E | Santa Maria, CA 93454 | Ph: 805.928.2991 | www.earthsystems.com

September 10, 2021

FILE NO.: 304746-001

Mr. Nick Tompkins
NKT Development, LLC
684 Higuera Street, Suite B
San Luis Obispo, California 93401

PROJECT: DANA RESERVE
NORTHWEST OF NORTH FRONTAGE ROAD
NIPOMO AREA OF SAN LUIS OBISPO COUNTY, CALIFORNIA

SUBJECT: Revised Engineering Geology Report

REF: 1) Proposal for a Geotechnical Engineering and Engineering Geology Report, Dana Reserve, by Earth Systems Pacific, dated July 15, 2021, Doc. No. SM-2107-025.PRP

2) Review of Geotechnical Feasibility Report, Dana Reserve (APN's 091-301-073, -030, -031) Nipomo Area of San Luis Obispo County, by LandSet Engineers, Inc., File No.: 0916-01, dated June 25, 2021

Dear Mr. Tompkins:

In accordance with your authorization of the above-referenced proposal, this engineering geology report has been prepared for the Dana Reserve project. The project is located at the northwest of North Frontage Road in the Nipomo area of San Luis Obispo County, California. This report was revised based on a phone conference with you and your consultants from RRM Design Group and Urban Planning Concepts.

This report describes the general geologic characteristics, identifies existing and potential geologic hazards, and discusses the impacts the geologic conditions may have on the project. This report is also intended to respond to comments by Landset Engineers, Inc. on behalf of the County of San Luis Obispo (Reference 2). 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 the undersigned.

Sincerely,
Earth Systems Pacific

Darrin Hasham, CEG
Associate Geologist

Doc. No. 2108-042.REVGEO/ln

Table of Contents

Appendices

1.0 INTRODUCTION

The Dana Reserve project is a planned community that will be constructed within a 288-acre property. The project is located northwest of North Frontage Road in the Nipomo area of San Luis Obispo County, California. The property is referred to herein as "the Site", and the site is shown on the Site Vicinity Map presented in Appendix A.

We understand portions of the site will be developed with single and multi-family residential structures, commercial structures, recreation areas, open space, and associated surface and subsurface improvements. We have assumed that residential and commercial structures will be one to four stories, will be of wood and steel frame construction, and will utilize Portland cement concrete (PCC) slabs-on-grade. Masonry and/or concrete retaining walls for sitework and/or connected to and forming part of the structures are anticipated. Masonry boundary walls and/or other types of perimeter fencing may also be constructed. Maximum line loads are anticipated to be approximately 4 kips per linear foot, and maximum point loads are anticipated to be approximately 40 kips.

We have assumed surface improvements will consist of hot mix asphalt (HMA) and/or PCC pavement over aggregate base (AB) for vehicles and PCC flatwork for pedestrian use. We have assumed subsurface improvements will include municipal sewer, water, power, and communications utilities. Surface runoff will be transmitted to and disposed of into Low Impact Development (LID) drainage disposal improvements. On-site effluent disposal systems are not anticipated for this project and are not addressed in this report.

We have assumed the site will be graded to develop the building and surface improvement areas, to improve access, and to improve drainage. Cuts and fills are anticipated to be on the order 20 feet or less. Cut and fill slopes not exceeding 15 feet in height and inclined at 3:1 or flatter may also be constructed.

2.0 SCOPE OF SERVICES

The scope of work for this engineering geology report included a review of available published geologic and geotechnical information on or near the site, conducting a geotechnical investigation including soil borings and laboratory testing (ESP, 2021), and preparation of this report. The analysis and subsequent conclusions were based, in part, upon information provided by the client and are intended to identify major geologic or geotechnical constraints that might impact the planned development of the site.

This report and preliminary geotechnical recommendations are intended to comply with the applicable considerations of the San Luis Obispo County Guidelines for Engineering Geology Reports (SLO Co, 2013), CGS Note 52 (2013) and Special Publication 117a (CDMG, 2008); and common engineering geology and geotechnical engineering practice in this area under similar conditions at this time. The test procedures were performed in general conformance with the standards noted, as modified by common engineering geology and geotechnical engineering practice in this area under similar conditions at this time.

3.0 SITE SETTING

The site is an approximately 288-acre parcel located in the Nipomo area of the southwest sector of San Luis Obispo County, California. The site is northwest of North Frontage Road. Gates along Hetrick Road, Cherokee Place, and the North Frontage Road provide access to the site. Rural-residential properties and undeveloped open space form the southeast, southwest, and northwest site boundaries; US Highway 101 forms the northeast boundary.

The site is located on the eastern part of the Nipomo Mesa. The Nipomo Mesa is a roughly triangular-shaped area of older sand dunes that are truncated by the Santa Maria Valley to the south, the Cienega Valley to the northwest, and lap onto the Newsom and Temettate Ridges of the Sierra Madre Mountains, which are parts of the Santa Lucia Ranges, to the northeast.

The site is generally undeveloped and is covered with a sparse to dense growth of vegetation consisting mostly of seasonal grasses, brush, and mature oak trees. The ground surface of the

site generally slopes gently to the northeast towards Nipomo Creek, which flows southeast to the Santa Maria River through the Nipomo Valley. The approximate central site coordinates from the USGS website are latitude 35.046 degrees north and longitude 120.503 degrees west, and the elevation ranges from approximately 415 feet in the southwest to 360 feet in the northeast (USGS 2021).

NRCS Soil Resource

The Dana Reserve property is mapped by the United States Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) as soil units 184 (Oceano sand, 0-9 percent slopes) and 185 (Oceano sand, 9-30 percent slopes) (NRCS, 2021). Both units are assigned to Hydrologic Soil Group "A", indicating a high infiltration rate when thoroughly wet. Both units also have an irrigated land capability classification of 4s and an unirrigated classification of 6s. Class 4 soils "have very severe limitations that restrict the choice of plants or that require very careful management, or both"; Class 6 soils "have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat" (NRCS, 2021). Map unit 184 is assigned the "Farmland of statewide importance" classification, while map unit 185 is classified as "Not prime farmland".

4.0 FIELD AND LABORATORY INVESTIGATIONS

Previous Investigation

In 2017 Earth Systems Pacific (ESP) prepared a Geotechnical Feasibility Report (Reference 3). On August 14, 2017, five borings were drilled at the site to depths of approximately 5 to 50 feet below the existing ground surface (bgs). Two of the borings were drilled for infiltration testing, and the other three borings (designated Nos. 1 through 3) were drilled for exploratory purposes. The borings were drilled with a Mobile Drill Model B-53 truck mounted drill rig, equipped with a 6-inch outside diameter hollow stem auger and an automatic trip hammer for sampling. The approximate locations of the exploratory borings are shown on the Exploration Location Map presented as Figure 2, in Appendix A.

Standard Penetration Tests were conducted at selected depths in the borings (ASTM D 1586-11).

Soils encountered in the exploratory borings were logged and categorized in general accordance with the Unified Soil Classification System and ASTM D 2488-09a. Copies of the boring logs can also be found in Appendix A. In reviewing the boring logs and the 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, cementation, variations in soil moisture, presence of groundwater, and other factors. Consequently, the logger must exercise judgment in interpreting soil characteristics, possibly resulting in subsurface descriptions that vary somewhat from the legend.

Current Investigation

To further characterize the subsurface conditions at the site, nine additional borings (designated Nos. 4 through 12) were drilled on July 27 through 29, 2021, to depths ranging from 15 to 50 feet bgs. The borings were drilled with a Mobile Drill Model B-53 truck mounted drill rig, equipped with a 6-inch outside diameter hollow stem auger and an automatic trip hammer for sampling. The approximate locations of the borings are shown on the Exploration Location Map presented as Figure 2, in Appendix A.

Soils encountered in the exploratory borings were logged and categorized in general accordance with the Unified Soil Classification System and ASTM D 2488-17. Copies of the boring logs can also be found in Appendix A. In reviewing the boring logs and the 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, cementation, variations in soil moisture, presence of groundwater, and other factors. Consequently, the logger must exercise judgment in interpreting soil characteristics, possibly resulting in subsurface descriptions that vary somewhat from the legend. The reader should also consider the sampler type used when reviewing the blow counts.

As the borings were drilled, soil samples were obtained using a 3-inch outside diameter ring-lined barrel sampler (ASTM D3550-17 with shoe similar to D2937-17). Standard penetration tests (SPT) using a 2-inch outside diameter split-spoon sampler were also performed in the borings (ASTM D1586-18) at selected depths. Bulk soil samples were obtained from the auger cuttings.

Ring samples were tested for bulk density per ASTM D2937-17 (modified for ring liners). Two bulk samples were tested for maximum density and optimum moisture content (ASTM D1557-12), and a direct shear test (ASTM D3080/D3080M-11) was conducted on each sample after they were remolded to approximately 90 percent of maximum dry density. A bulk sample was tested for R-value (ASTM D2844/D2844M-18). Consolidation tests (ASTM D2435/D2435M-11(2020)) were performed on selected ring samples. The laboratory test results are presented in ESP's geotechnical engineering report (2021).

5.0 GENERAL SUBSURFACE PROFILE

The subsurface profile observed in the borings generally consisted of layered sand soils with variable amounts of silt and clay. These soils were generally in a dry to wet condition and ranged from loose to dense in consistency. Groundwater was encountered during drilling in Boring 4 at 40 feet bgs and at 39 feet bgs in Boring 5; the water level stabilized in both borings at 35 feet bgs after drilling was completed. Please refer to the boring logs presented in Appendix A for a more detailed description of the subsurface profile.

6.0 GEOLOGY

Geologic Setting

Regionally, the subject site is located within the Coast Ranges geomorphic province of California, which are northwest trending mountain ranges that reach a maximum elevation of about 6,000 feet and are generally parallel to the San Andreas fault (CGS 2002). The ranges are formed by an asymmetrical uplifted block that forms a rugged coastline at the Pacific Ocean and dips eastward towards the Great Valley province. The Coast Ranges are geologically complex with rocks that span from middle Mesozoic to late Quaternary in age (GSA 2018). The Nipomo Mesa, is primarily an area of late Pleistocene sand dunes that are generally inactive and stabilized by vegetation

and locally dissected by ephemeral streams, map symbol Qoe, however a strip of active sand dunes (Oceano and Pismo Dunes) are between the Nipomo Mesa and the Pacific Ocean to the west, as indicated on the Geologic Maps of the Oceano Quadrangle by Holland (2013) and the Nipomo Quadrangle by Delattre and Wiegers (2014). The mapped geology is consistent with the soils observed in the borings.

The Santa Lucia Range is bounded between the Pacific Ocean to the west and the Salinas River to the east (USGS 2021). Structurally, the Santa Lucia Range is bordered on the northeast by the Rinconada fault zone and to the southwest by Hosgri-San Simeon, Oceanic-West Huasna fault zone (USGS, 2013). Tectonically, the region is dominated by northwest-trending, faults, which include the Rinconada, Hosgri-San Simeon, Oceanic-West Huasna and San Luis Range faults (Lettis and Hall, 1994).

Groundwater

Limited groundwater level data is available for the eastern Nipomo Mesa area but records for wells located at Nipomo Regional Park located approximately 1 mile south of the site indicate a depth to groundwater over 250 feet bgs (DWR 2021).

Groundwater was encountered during drilling in Boring 4 at 40 feet bgs and at 39 feet bgs in Boring 5; the water level stabilized in both borings at 35 feet bgs after drilling was completed. Groundwater was not encountered in any of our other borings. The groundwater level encountered in borings 4 and 5 is consistent with groundwater levels reported for a site at the intersection of Teft Street and Carillo Street, approximately 1 mile southeast of the site (GeoTracker 2021). The groundwater condition at the eastern part of the site is probably the result of mounded groundwater proximal to Nipomo Creek and shallower bedrock associated with the proximity of Temattate Ridge and thinning sediments that lap onto the ridge. The proximity of the Wilmar Avenue fault (which is part of the San Luis Range So Margin fault system) depicted on the Regional Geologic Map, Figure 3, may also contribute to the variable depth to groundwater by creating a step in the bedrock beneath the sand dune deposits.

Groundwater is not considered to be a limiting factor for the development of the site.

Faulting

Faults are classified by the State of California based on the likelihood of generating ground motions and surface rupture. The classification system applies to known faults that have been compiled by numerous researchers through various methods of investigation. The State evaluates faults with documented ground rupture during the last 11,700 years and considers them for inclusion in Earthquake Fault Zones requiring investigation (A-P Zones) which encompass traces of *Holocene-active* faults, as defined by the State's Alquist-Priolo Earthquake Fault Zoning Act (1972). The State's guidance is intended to prohibit developments and structures for human occupancy across the trace of active faults.

There are no known *Holocene-Active* faults on the site that are included in State A-P Zones or County special studies zones. Other active faults capable of generating strong ground motion are present in the region but are not included in A-P Zones because they do not meet the criteria of "sufficiently active and well-defined." A list of faults within approximately 65 miles of the site is included in Table 1- Fault Parameters. Note that several faults are presented in the table as interpretations for fault model (FM) 3.1 and 3.2 as defined by the USGS in the Third California Earthquake Rupture Forecast (UCERF3 2013); these faults are duplicates and represent different geometry scenarios for the same fault.

Table 1 - Fault Parameters

Fault Section Name	Distance (miles)	Distance (km)	Upper Seis. Depth (km)	Lower Seis. Depth (km)	Avg Dip Angle (deg.)	Avg Dip Direction (deg.)	Trace Length (km)	Mean Mag
San Luis Range (So Margin) FM3.2	0.4	0.7	0	12	45	37	115.0	7.10
San Luis Range 2011 CFM, FM3.1	0.7	1.1	0	12	52	na	78.9	7.22
San Luis Range - Oceano 2011 CFM, FM3.1	2.1	3.3	0	12	45	na	21.0	6.64
Los Osos 2011 CFM FM3.1, 3.2	5.6	9.1	0	12	45	208	57.9	6.90
Oceanic-West Huasna FM3.1, 3.2	5.7	9.1	0	7	58	49	121.9	7.13
Casmalia 2011 CFM	10.0	16.1	0	12	75	na	47.9	6.87
San Luis Range - Pecho FM3.1, 3.2	10.5	16.9	0	12	90	na	25.6	6.58
East Huasna 2011 CFM FM3.1, 3.2	12.2	19.6	0	15	90	na	74.0	7.18
Lions Head 2011 CFM FM3.1, 3.2	14.0	22.5	0	12	75	29	65.2	6.70
San Luis Bay 2011 CFM FM3.2	14.7	23.7	0	10	90	na	16.2	6.30
Shoreline FM3.1, 3.2	14.8	23.7	0	12	90	na	22.6	6.52
South Cuyama FM3.1, 3.2	16.5	26.6	0	13.9	33	210	82.7	7.51
Rinconada 2011 CFM FM3.1, 3.2	17.7	28.4	0	8.5	82	233	122.8	7.45
Hosgri FM3.1, 3.2	17.8	28.6	0	6.8	80	59	171.2	7.25
Hosgri (Extension) FM3.1, 3.2	19.1	30.7	0	7.5	80	79	28.6	6.43
La Panza FM3.1, 3.2	20.6	33.2	0	13.9	51	45	71.9	7.26
Los Alamos 2011 CFM FM3.1, 3.2	22.0	35.5	0	12	30	na	26.9	6.91
San Juan FM3.1, 3.2	27.8	44.8	0	13	90	243	82.1	7.05
Santa Ynez River FM3.1, 3.2	27.9	44.9	0	12	70	na	72.8	7.09
Morales (West) FM3.1, 3.2	33.9	54.5	0	8.6	32	49	28.2	6.75
Los Alamos extension FM3.1, 3.2	36.6	58.9	0	12	30	na	22.3	6.82
Santa Ynez (West) FM3.1, 3.2	36.8	59.3	0	9.2	70	182	79.6	6.90
San Andreas (Cholame) rev FM3.1, 3.2	39.3	63.3	0	12	90	51	62.5	6.84
San Andreas (Carrizo) rev FM3.1, 3.2	40.4	65.1	0	15.1	90	224	59.0	6.84
Ozena FM3.1, 3.2	46.4	74.7	0	13.9	33	na	41.5	7.16
Morales (East) FM3.1, 3.2	47.1	75.8	0	8.6	32	14	17.8	6.55
Red Mountain FM3.1, 3.2	48.0	77.3	0	14.1	56	2	100.5	7.40
San Andreas (Parkfield) FM3.1, 3.2	50.1	80.6	0	10.2	90	50	36.4	6.43
Mission Ridge-Arroyo Parida-Santa Ana FM3.1, 3.2	54.7	88.0	0	7.6	70	176	68.8	6.80
North Channel FM3.2	55.5	89.4	1.1	4.5	26	10	50.6	6.70
Pitas Point (Upper) FM3.2	56.1	90.3	1.4	10	42	15	34.9	6.75
Big Pine (West) FM3.1, 3.2	56.2	90.4	0	11	50	2	18.1	6.50
Lost Hills FM3.1, 3.2	58.1	93.5	4.2	12	29	233	32.6	6.81
Pitas Point (Lower, West), FM 3.1	58.8	94.7	1.5	8.8	13	3	34.7	7.20
Oak Ridge (Offshore), west extension FM3.2	59.0	94.9	0	3.1	67	195	28.1	6.07
Channel Islands Western Deep Ramp FM3.1, 3.2	59.4	95.7	4.8	12.5	21	204	62.1	7.28
Santa Ynez (East) FM3.1, 3.2	62.0	99.8	0	13.3	70	172	68.4	7.15
San Andreas (Big Bend) FM3.1, 3.2	62.6	100.8	0	15.1	90	198	49.7	6.84

Reference: USGS OFR 2013-1165 (CGS SP 228)

Based on Site Coordinates of 35.046 Latitude, -120.503 Longitude

Mean Magnitude for Type A Faults based on 0.1 weight for unsegmented section, 0.9 weight for segmented model (weighted by probability of each scenario with section listed as given on Table 3 of Appendix G in OFR 2008-1437). Mean magnitude is average of Ellworths-B and Hanks & Bakun moment area relationship.

We reviewed geologic maps produced by multiple investigators, including the California Geological Survey (CGS) and the United States Geological Survey (USGS); each has published reports or maps that locate strands of the San Luis Range fault system near the northeastern side of the site approximately parallel to the Nipomo Valley and US Route 101. Preliminary Geologic Maps by Delattre and Wiegers (2014) locate the fault on the northeast side of US Route 101 (indicated as FM3.1 in Table 1); however, fault model 3.2 locates the San Luis Ranch So Margin, Subsection 10 on the southwest side of US Route 101 within the Dana Reserve property. The San Luis Range fault is considered active but is not classified as "sufficiently active and well defined" to be included in an Alquist-Priolo Special Studies Zone.

The UCERF3 database is an earthquake rupture forecast model for estimating the magnitude, location, and probability of significant ground shaking in California. Faults included in the model are mapped as nodes connected by straight line segments. These nodes are often miles apart and the UCERF3 report notes that faults may be several kilometers from their mapped locations. The nodes of the mapped segment that crosses the Dana Reserve Property are widely spaced, at approximately 5.5 miles to the northwest and 6.5 miles to the southeast. Therefore, we agree with Delattre and Wiegers that the San Luis Range fault is likely on the northeast side of US Route 101, aligned with Nipomo Creek, as described in fault model 3.1. The Regional Geologic map, depicting the mapped locations of the San Luis Range faults is presented in Appendix B as Figure 3.

In addition, San Luis Obispo County has mapped an inactive-inferred fault trending across the southwest portion of the site. Because poorly consolidated sand dune deposits, such as those present on site, are generally highly erodible and form subdued landforms the location of these faults are poorly constrained.

Public domain aerial photographs were reviewed and no indications of fault scarps or lineaments were observed on the site. The earliest photographs reviewed dated from 1939 and agricultural activities were occurring on the parcel prior to that date and subtle fault features may have been obscured by disking or other similar activities.

Seismicity

The site is located within a seismically active region with several mapped faults in the general vicinity of the site. A deaggregation of the probabilistic seismic hazard at the site from the USGS (2021b) indicates that an earthquake of magnitude 6.74 has a 2% probability of occurring within a 50-year period. This earthquake is anticipated to produce a peak ground acceleration (PGA) of 0.54g at the site, assuming seismic Site Class "D – a Stiff Soil Profile".

The California Building Code requires that buildings and structures be designed for seismic forces. Future *design level* geotechnical engineering report(s) should include ground motion analysis and seismic design parameters for use in the structural design process of buildings and structures.

Slope Stability and Landsliding

The site is gently sloping with subdued landforms. The site is within an area classified by the County as low landslide potential (SLO Co 2021). No indications of slope instability were observed in the public domain aerial photographs or site reconnaissance.

Flooding

According to the Flood Insurance Rate Maps Numbers 06079C1617G and 06079C1636G (FEMA, 2012), published by the Federal Emergency Management Agency, the site is located within Flood Zone X, an area of minimal flood hazard. Local flood hazards are depicted by FEMA as being confined to the area of Nipomo Creek northeast of US Route 101. Figure 4 – the Flood Zone Map is presented in Appendix B.

Tsunami and Seiche Potential

The site is located approximately 7 miles from the Pacific Ocean at an elevation of over 300 feet; therefore, the potential for a tsunami to flood the site is considered nil.

A seiche is a single water wave that can be generated in a reservoir, lake or pond as the result of barometric pressure anomalies or long-period seismic waves generated by strong local earthquakes. There are no reservoirs, lakes, or ponds in the vicinity of the site, therefore, there is no potential for a seiche to affect the project site.

Naturally Occurring Asbestos

Asbestos minerals are generally limited to only a few types of rocks known to be present in the central coast area of California; these are ultra-mafic igneous rocks and their metamorphic equivalents, which include serpentinite and some types of schist. The regional geologic maps depict the site as being underlain by older eolian deposits (Late Pleistocene sand dune deposits) which are not considered asbestos bearing units. The potential for asbestos to be present on site in hazardous quantities is very low.

Radon

Radon is a naturally-occurring, colorless, odorless gas present in certain soils and rock, which is derived from the decay of uranium atoms. The occurrence of radon correlates with the presence of specific minerals, and its concentrations in soil or rock will vary depending on the mineralogy of the surrounding bedrock, temperature, barometric pressure, moisture and other factors. Prolonged exposure to elevated levels of radon is associated with an increased risk of lung cancer. The route of exposure is via inhalation.

The eolian deposits observed during our investigation are not considered a source of radon gas. According to the State of California interactive data viewer, the site is in an area mapped as low radon potential (Churchill 2008)). The Indoor Radon Potential Map is presented as Figure 5 in Appendix B.

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). A quantitative analysis of liquefaction and seismically induced settlement of dry sand was performed as described in ESP's geotechnical engineering report (2021). The analyses indicated that the saturated soils are nonliquefiable and that seismically induced settlement of dry sand is not expected to exceed 0.5-inch. Accordingly, no special measures will be needed to protect the structures and associated improvements from liquefaction and/or seismically induced settlement of dry sand. Please refer to ESP's geotechnical engineering report (2021) for further discussion of liquefaction and seismically induced settlement of dry sand.

7.0 CONCLUSIONS

Engineering Geology

The site appears suitable for the project as generally described in the "Introduction" section of this report. In our opinion, there are no significant geologic constraints that have been identified at this point in the project that would preclude development of this site as currently planned.

Geotechnical Engineering

Geotechnical issues of concern and conclusions are presented in ESP's geotechnical engineering report (2021).

8.0 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. 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 planning the type of project described herein. Our intent was to assess the geologic and geotechnical concerns for this project 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 use of the client as discussed in the Scope of Services section. Application beyond the stated intent is strictly at the user's risk. The preliminary opinions and conclusions of this report are based upon the geologic and geotechnical conditions encountered at and near the site at this time.

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.

TECHNICAL REFERENCES

ASTM (ASTM International. 2021). *Annual Book of Standards*. ASTM.

California, State of, 1972. Department of Conservation, California Public Resources Code, Division 2, Chapter 7.5, *Alquist-Priolo Earthquake Fault Zoning Act*.

CBSC (California Building Standards Commission). 2019. *California Building Code (CBC).* CBSC.

CDMG (California Division of Mines and Geology) 2008. "*Guidelines for Evaluating and Mitigating Seismic Hazards in California, Special Publication* 117a."

CGS, California Geologic Survey, 2002. *California Geomorphic Provinces*. Note 36.

CGS, California Geologic Survey, 2013. *Guidelines for Preparing Geological Reports for Regional-Scale Environmental and Resource Management Planning*. Note 52.

Churchill, R. K. 2008. "Radon Potential in San Luis Obispo County." *Special Report 208,* California Geologic Survey.

Delattre, Marc, and Mark O. Wiegers, 2014, Preliminary Geologic Map of the Nipomo 7.5' Quadrangle, San Luis Obispo County, California: A Digital Database, scale 1:24,000

DWR (California Department of Water Resources). 2021. *Water Data Library,* Retrieved from http://water.ca.gov/waterdatalibrary/

Earth Systems Pacific (ESP). Geotechnical Feasibility Report, Canada Ranch. Dated September 11, 2017

Earth Systems Pacific (ESP). Revised Engineering Geology Report, Dana Reserve. Dated September 9, 2021

FEMA (Federal Emergency Management Agency). November 16, 2012. "Flood Insurance Rate Map," Map Numbers, 06079C1617G and 06079C1636G

GSA (Geological Society of America), 2018, GSA Geologic Time Scale, v. 5.0

GeoTracker, 2021, State Water Resource Control Boards' data management system, accessed at GeoTracker (ca.gov)

Holland, Peter J., 2013, Preliminary Geologic Map of the Oceano 7.5' Quadrangle, San Luis Obispo County, California: A Digital Database, scale 1:24,000

Lettis, W.R. and N.T. Hall, 1994, Los Osos Fault Zone, San Luis Obispo County California; in Seismotectonics of the Central California Coast Ranges, Geological Society of America Special Paper 292, Ina B. Alterman, Richard B. McMullen. Lloyd S. Cluff, and D. Burton Slemmons eds.

NRCS (Natural Resources Conservation Service – United States Department of Agriculture), 2021. *Web Soil Survey Tool*, Retrieved from https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx

SLO Co (San Luis Obispo County), 2021, Department of Planning & Building, Land Use View, a web based GIS tool for accessing County zoning maps

SLO Co (San Luis Obispo County), 2013, *Guidelines for Engineering Geologic Reports*, San Luis Obispo County Planning & Building Department. Revised October 2013.

USGS (United States Geological Survey). 2013. The Uniform California Earthquake Rupture Forecast, Version 3 (UCERF3) – The Time Dependent Model, USGS Open File Report 2013-1165.

USGS (United States Geological Survey). 2021a. "The National Map." An interactive web-based application to access public domain maps and data. Accessed at https://viewer.nationalmap.gov/advanced-viewer/

USGS (United States Geological Survey), 2021b. “Unified Hazard Tool." United States Geological Survey. Retrieved from: http://earthquake.usgs.gov/hazards/interactive/

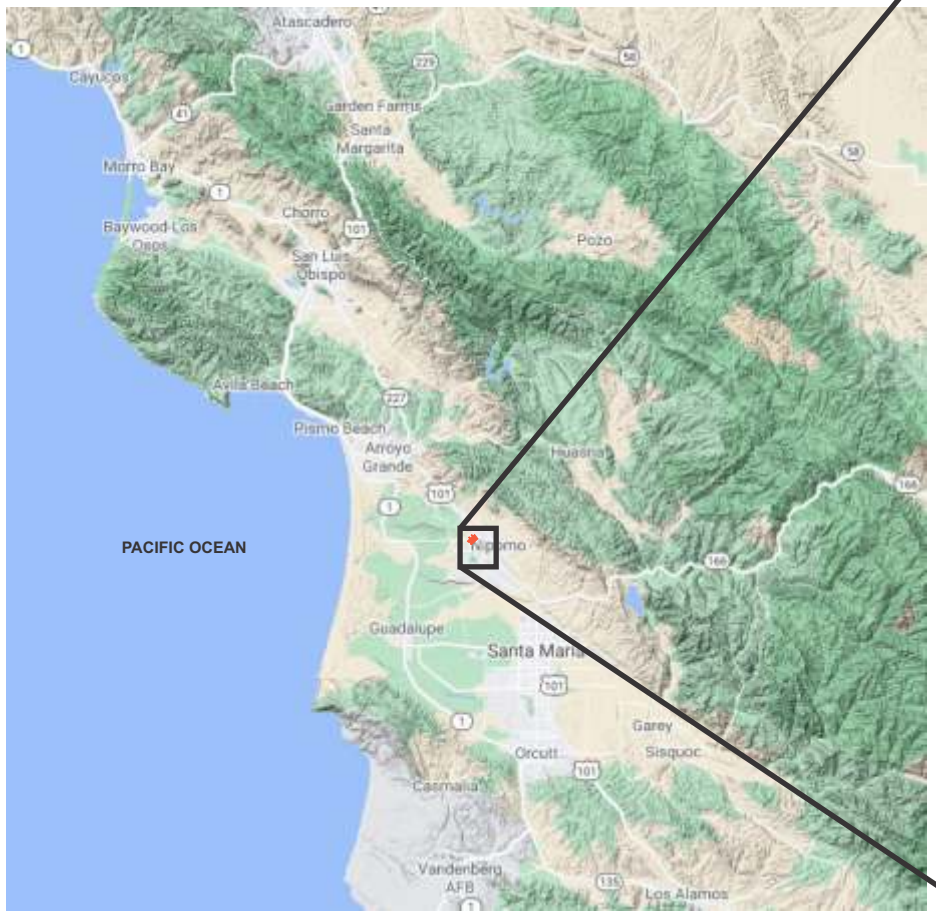
APPENDIX A

Figure 1 – Site Vicinity Map

Figure 2 – Exploration Location Map

Boring Log Legend

Boring Logs



EARTH SYSTEMS PACIFIC
2049 Preisker Lane. Suite E, Santa Maria, CA 93454
www.earthsystems.com - email: esp@earthsystems.com
(805) 928-2991 Fax: (805) 928-9253

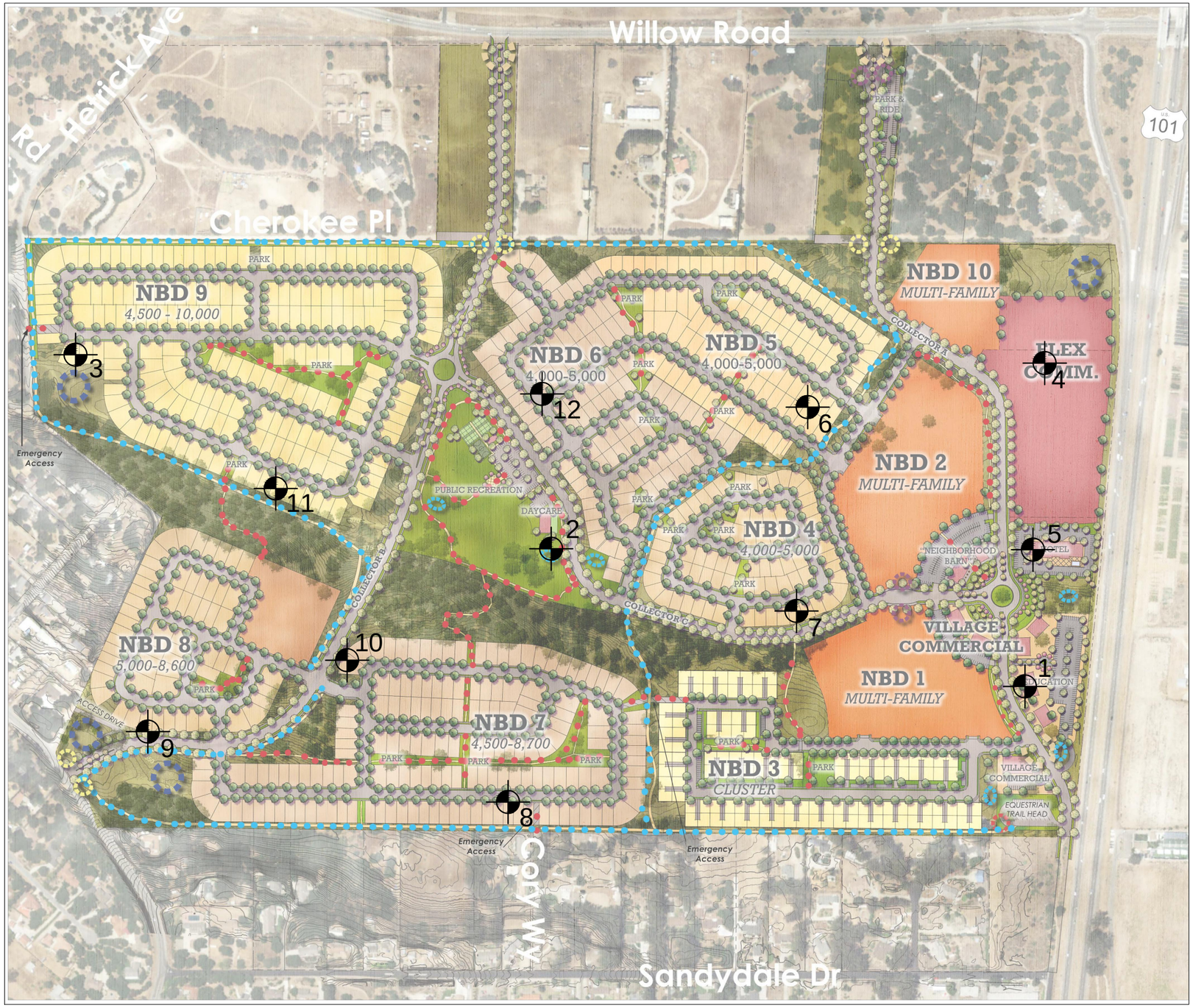
SITE VICINITY MAP

DANA RESERVE
Northeast of North Frontage Road
Nipomo Area of San Luis Obispo County, California

FIGURE 1

Date
September 2021

Project No.
304746-001



LEGEND

12 Boring Location (Approx.)

NOT TO SCALE

BASE MAP PROVIDED BY: RRM DESIGN GROUP

Earth Systems
2049 Preisker Lane, Suite E, Santa Maria, CA. 93454
www.earthsystems.com
(805) 928-2991 ● Fax (805) 928-9253

EXPLORATION LOCATION MAP

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis Obispo County, California

Date
September 2021

Figure 2

Project No.
304746-001

Dana Reserve, ELM 9-2021.dwg

Earth Systems Pacific

BORING LOG LEGEND

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			FINE GRAINED SOILS		
BLOWS/FOOT		DESCRIPTIVE TERM	BLOWS/FOOT		DESCRIPTIVE TERM
SPT	CA SAMPLER		SPT	CA SAMPLER	
0-10	0-16	LOOSE	0-2	0-3	VERY SOFT
11-30	17-50	MEDIUM DENSE	3-4	4-7	SOFT
31-50	51-83	DENSE	5-8	8-13	MEDIUM STIFF
OVER 50	OVER 83	VERY DENSE	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

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP-SM		POORLY GRADED SAND WITH SILT: light brown, dry, loose					
3			slightly moist					
5			medium dense	5.0-6.5	●			3, 5, 6
9			moist					
10			gray mottled orange, trace clay	10.0-11.5	●			9, 11, 13
15			orange-brown, clay ends	15.0-16.5	●			6, 7, 7
20				20.0-21.5	●			6, 9, 8
25			End of Boring @ 25.0' 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

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SM		SILTY SAND: brown, dry loose					
3			orange-brown, slightly moist					
5				5.0-6.5	●			2, 1, 2
8	SP-SM		POORLY GRADED SAND WITH SILT: yellow-brown, moist					
10				10.0-11.5	●			3, 4, 5
13			light brown, medium dense					
20				20.0-21.5	●			4, 7, 10

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

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27	SP-SM		POORLY GRADED SAND WITH SILT: as above					
30			light brown mottled orange, some clayey sand lenses ~1" thick	30.0-31.5	●			5, 7, 9
35			trace clay					
40	SC		CLAYEY SAND: brown, moist, medium dense					
46	SP		POORLY GRADED SAND: light brown, moist, medium dense					
50			End of Boring @ 50.0' 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. 3

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

JOB NO.: SL-18135-SA
DATE: 08/14/2017

CANADA RANCH PROPERTY
East of Hetrick Avenue and Cherokee Place
Nipomo Area of San Luis Obispo County, CA

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: orange-brown, dry, loose, trace silt					
3			slightly moist					
5				5.0-6.5	●			1, 2, 1
9			yellow brown					
10				10.0-11.5	●			2, 4, 5
13			medium dense					
15			light yellow brown	15.0-16.5	●			4, 8, 9
20				20.0-21.5	●			6, 8, 11
25			End of Boring @ 25.0' 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. 4

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/27/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: pale brown, loose, slightly moist	0.0 - 5.0	◯			
4			light yellowish brown	5.0 - 6.5	■	96.7	2.5	4 6 9
				5.0 - 10.0	◯			
9			medium dense, moist	10.0 - 11.5	■	105.0	5.0	4 8 11
11	SP-SM		POORLY GRADED SAND WITH SILT: brown, medium dense, moist					
15	SP		POORLY GRADED SAND: yellowish brown, medium dense, moist, oxidation staining	15.0 - 16.5	■	113.0	9.0	5 16 27
20				20.0 - 21.5	●			7 11 14
21			pale brown					
26								

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. 4

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/27/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27			POORLY GRADED SAND: as above					
30			mottled brown, light brown, yellowish brown	30.0 - 31.5	●			6 10 10
35			groundwater stabilized after drilling					
40			pale brown, dense, wet, water encountered during drilling	40.0 - 41.5	●			9 16 17
45			very dense	45.0 - 46.5	●			16 32 36
49			dense					
50				50.0 - 51.5	●			15 17 24
52			End of Boring @ 51.5' Subsurface water encountered @ 40.0' during drilling, stabilized at 35.0' after drilling					

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. 5

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/27/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: brown, loose, slightly moist	0.0 - 5.0	◯			
5			light brown	5.0 - 6.5	■	102.1	2.8	2 4 8
8			light yellowish brown					
10			moist	10.0 - 11.5	■	99.3	4.3	4 5 11
12			dark yellowish brown, dense, some oxidation staining					
15				15.0 - 16.5	■	113.1	13.1	11 21 31
17			light brown, medium dense					
20				20.0 - 21.5	●			5 11 14

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. 5

LOGGED BY: S. Hemmer
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/27/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27 - 28 - 29 - 30 - 31 - 32 - 33 - 34 - 35 - 36 - 37 - 38 - 39 - 40 - 41 - 42 - 43 - 44 - 45 - 46 - 47 - 48 - 49 - 50 - 51 - 52 - 53 -			POORLY GRADED SAND: as above	30.0 - 31.5	●			9 11 12
			pale brown					
			groundwater stabilized after drilling					
			dense, wet, water encountered during drilling	40.0 - 41.5	●			15 21 27
			medium dense	45.0 - 46.5	●			7 13 17
			dense	50.0 - 51.5	●			16 24 20
			End of Boring @ 51.5' Subsurface water encountered @ 39.0' during drilling, stabilized at 35.0' after drilling					

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. 6

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: light brown, loose, slightly moist	0.0 - 5.0	◯			
5				5.0 - 6.5	■	98.1	1.8	2, 4, 6
10			yellowish brown medium dense, moist	10.0 - 11.5	■	101.3	4.2	4, 7, 11
15				15.0 - 16.5	●			4, 8, 9
16			End of Boring @ 16.5' 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. 7

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: dark yellowish brown, loose, slightly moist	0.0 - 5.0	◯			
5			medium dense	5.0 - 6.5	■	108.4	3.6	7 12 21
9			light yellowish brown					
10				10.0 - 11.5	■	124.8	2.2	7 11 16
15				15.0 - 16.5	●			7 8 11
16			End of Boring @ 16.5' 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. 8

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: brown, loose, slightly moist	0.0 - 4.0	◯			
4			light brown	5.0 - 6.5	■	99.3	2.6	3, 5, 8
9			light yellowish brown, medium dense	10.0 - 11.5	■	107.7	4.0	4, 8, 11
14			yellowish brown	15.0 - 16.5	■	107.5	3.5	6, 11, 16
19				20.0 - 21.5	●			5, 9, 12
24			oxidation staining	25.0 - 26.5	●			7, 10, 14
26			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. 9

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: reddish brown, loose, slightly moist	0.0 - 5.0	◯			
5			yellowish brown, medium dense	5.0 - 6.5	▬	96.0	3.7	5, 8, 13
				5.0 - 10.0	◯			
10				10.0 - 11.5	▬	99.0	2.4	5, 9, 12
15				15.0 - 16.5	▬	104.9	2.7	5, 11, 14
20				20.0 - 21.5	●			5, 9, 14

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. 9

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
27			POORLY GRADED SAND: as above					
30				30.0 - 31.5	●			7 11 12
31			oxidation staining					
39			light yellowish brown					
40				40.0 - 41.5	●			8 12 15
49			yellowish brown					
50				50.0 - 51.5	●			7 12 13
52			End of Boring @ 51.5' 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. 10

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: light brown, loose, slightly moist	0.0 - 5.0	◯			
5				5.0 - 6.5	■	101.7	1.1	3, 5, 6
9			light yellowish brown, medium dense	10.0 - 11.5	■	102.1	2.2	4, 8, 10
13			loose	15.0 - 16.5	●			2, 4, 4
16			End of Boring @ 16.5'					
			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. 11

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: brown, medium dense, slightly moist					
5				5.0 - 6.5	■	110.2	3.1	4 9 17
10				10.0 - 11.5	■	105.6	1.6	7 11 15
11			light brown					
15				15.0 - 16.5	●			4 6 9
17			End of Boring @ 16.5' 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. 12

LOGGED BY: A. Flynn
DRILL RIG: Mobile B-53 with Automatic Hammer
AUGER TYPE: 6" Hollow Stem

PAGE 1 OF 1
JOB NO.: 304746-001
DATE: 7/28/2021

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis
Obispo County, California

SOIL DESCRIPTION

DEPTH (feet)	USCS CLASS	SYMBOL	SOIL DESCRIPTION	SAMPLE DATA: INTERVAL (feet)	SAMPLE TYPE	DRY DENSITY (pcf)	MOISTURE (%)	BLOWS PER 6 IN.
0	SP		POORLY GRADED SAND: dark yellowish brown, loose, slightly moist	0.0 - 5.0	◯			
5			medium dense	5.0 - 6.5	■	110.0	3.7	7 11 15
9			yellowish brown					
10			moist	10.0 - 11.5	■	105.5	4.5	5 9 12
15			slightly moist	15.0 - 16.5	■	101.1	3.9	7 14 17
20				20.0 - 21.5	●			5 8 11
25				25.0 - 26.5	●			6 10 15
26			End of Boring @ 26.5' No subsurface water encountered					

LEGEND: ■ Ring Sample ◯ Grab Sample ▭ Shelby Tube Sample ● SPT

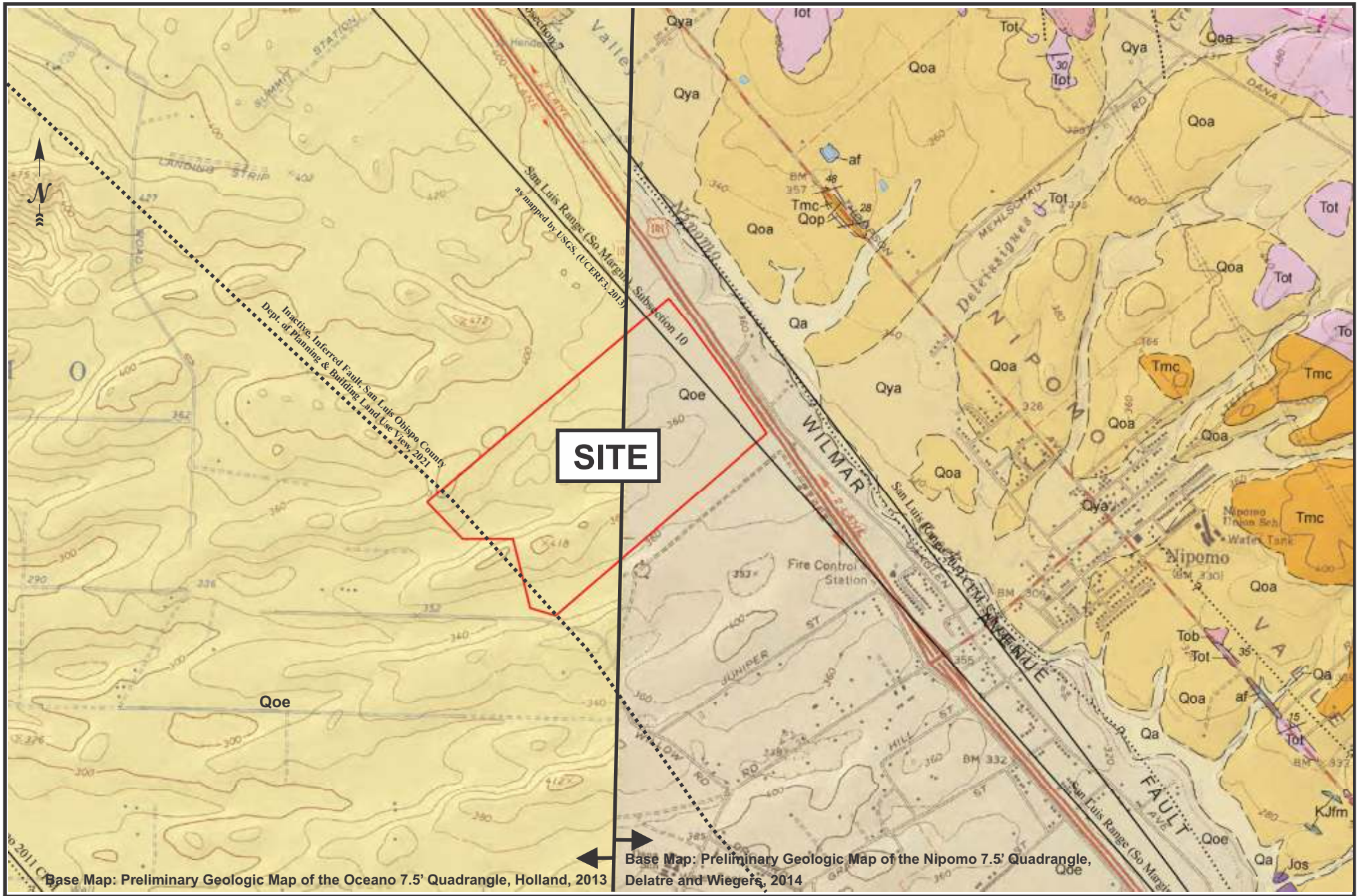
NOTE: This log of subsurface conditions is a simplification of actual conditions encountered. It applies at the location and time of drilling. Subsurface conditions may differ at other locations and times.

APPENDIX B

Figure 3 – Regional Geologic Map

Figure 4 – Flood Zone Map

Figure 5 – Indoor Radon Potential Map



EARTH SYSTEMS PACIFIC
2049 Preisker Lane. Suite E, Santa Maria, CA 93454
www.earthsystems.com - email: esp@earthsystems.com
(805) 928-2991 Fax: (805) 928-9253

REGIONAL GEOLOGIC MAP

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis Obispo County, California

FIGURE 3

Date
September 2021

Project No.
304746-001

Legend

- SLO County Boundary
- Flood Hazard Zones
  - 1% Annual Chance Flood Hazard
  - Regulatory Floodway
  - Special Floodway
  - Area of Undetermined Flood Hazard
  - 0.2% Annual Chance Flood Hazard
  - Future Conditions 1% Annual Chance Flood Ha
  - Area with Reduced Risk Due to Levee
  - Area with Risk Due to Levee

N

Source: San Luis Obispo County, Land Use View, scale 1:36,112

EARTH SYSTEMS PACIFIC
2049 Preisker Lane. Suite E, Santa Maria, CA 93454
www.earthsystems.com - email: esp@earthsystems.com
(805) 928-2991 Fax: (805) 928-9253

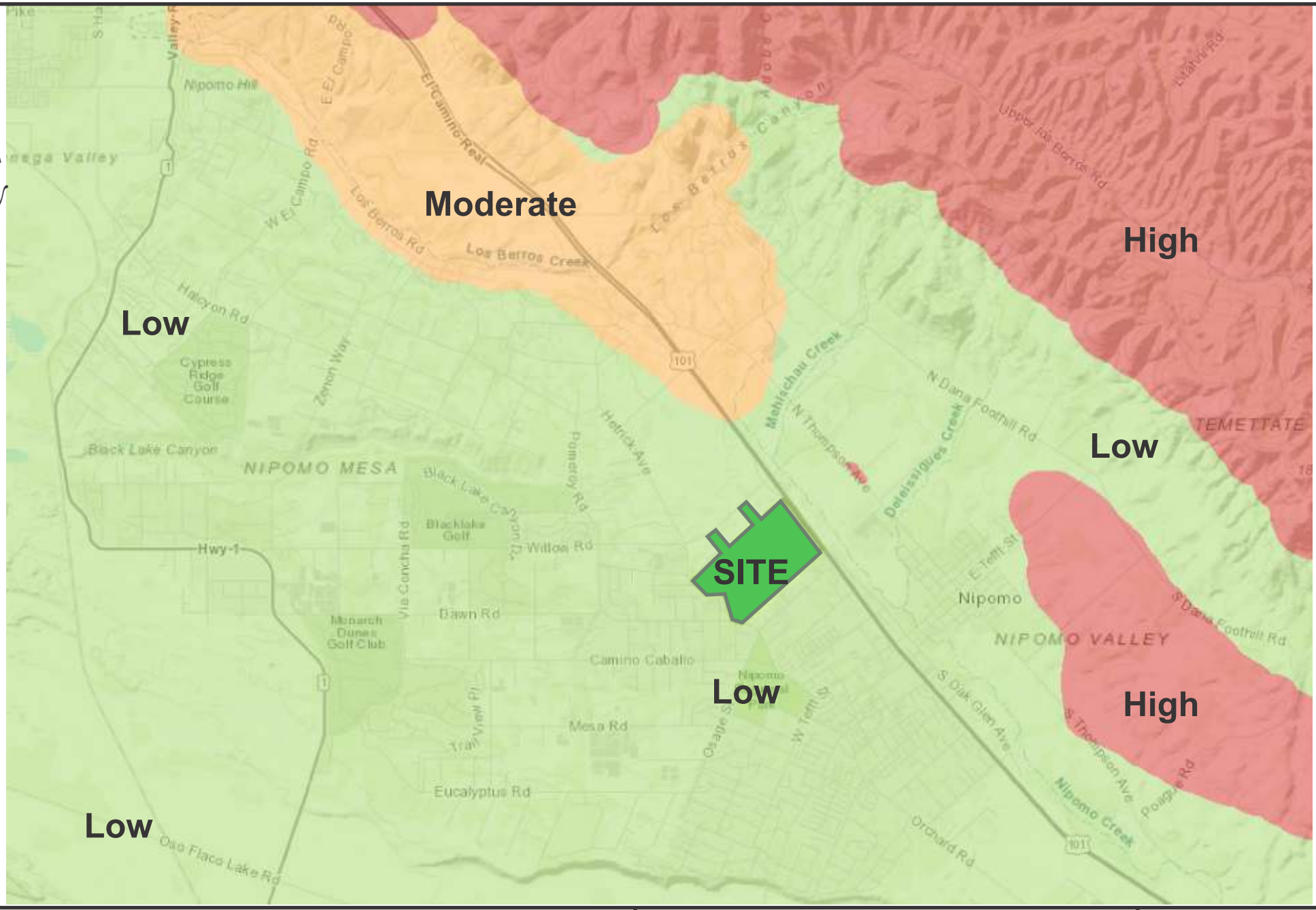
FLOOD ZONE MAP

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis Obispo County, California

FIGURE 4

Date
September 2021

Project No.
304746-001



EARTH SYSTEMS PACIFIC
2049 Preisker Lane. Suite E, Santa Maria, CA 93454
www.earthsystems.com - email: esp@earthsystems.com
(805) 928-2991 Fax: (805) 928-9253

INDOOR RADON POTENTIAL MAP

DANA RESERVE
Northwest of North Frontage Road
Nipomo Area of San Luis Obispo County, California

FIGURE 5

Date
September 2021

Project No.
304746-001

Review of Geotechnical Feasibility Report for Dana Reserve

LANDSET ENGINEERS, INC.

June 25, 2021

File No.: 0916-01
SLO Co. File No. LRP2020-0007

Ms. Jennifer Guetschow, Senior Planner
County of San Luis Obispo
Department of Planning & Building
976 Osos Street, Room 300
San Luis Obispo, California 93408

Subject **Review of Geotechnical Feasibility Report**

Project: **Dana Reserve (APN's 091-301-073, -030 & -031)**
Nipomo Area of San Luis Obispo County, California

References:
1. Geotechnical Feasibility Report, Canada Ranch Property, East of Hetrick Avenue and Cherokee Place, Nipomo Area, San Luis Obispo County, California, File No. SL-18135-SA, Doc. No. 1709-013.SER, prepared by Earth Systems Pacific, dated September 11, 2017.
2. Dana Reserve Specific Plan, prepared by RRM Design Group & Urban Planning Concepts, Inc., dated June 2020, *revised April 2021*.
3. California Geological Survey Special Publication 117A, Guidelines for Evaluating and Mitigating of Seismic Hazards in California, dated September 2008.
4. San Luis Obispo County Guidelines for Engineering Geologic Reports, San Luis Obispo County Planning & Building Department, dated January 2005, revised October 2013.
5. California Geological Survey Note 52, Guidelines for Preparing Geological Reports for Regional-Scale Environmental and Resource Management Planning, dated January 2013.

Dear Ms. Guetschow:

The purpose of this letter is to summarize our review findings of the above referenced geotechnical feasibility report (Reference 1) for the proposed approximate 288-acre Dana Reserve master-planned mixed-use development located in the Nipomo area of San Luis Obispo County, California. The geotechnical feasibility report was reviewed for conformance with California Geological Survey (CGS) Special Publication 117A, the San Luis Obispo County Guidelines for Engineering Geology Reports and CGS Note 52 (References 3, 4 & 5).

Review of the County of San Luis Obispo physical environment GIS layers indicates that the subject parcels are underlain by Quaternary dune deposits with a moderate liquefaction hazard potential. Additionally, an inactive fault has been mapped to be present along the southwesterly perimeter of the proposed development area (APN 091-301-073).

The geotechnical feasibility report (Reference 1) was limited to the drilling of five borings on August 14, 2017 to depths ranging from 5 to 50 feet below the ground surface, performed four years prior to the preparation of the revised specific plan (Reference 2). The project geotechnical feasibility report did not address site geology and concluded that the potential for liquefaction is very low and seismically induced settlement is also very low. It is our opinion that insufficient subsurface exploration and engineering analysis was performed to categorically substantiate these conclusions. We recommend that a more robust subsurface exploration program to include cone penetrometer testing (CPT) should be performed. This opinion is further supported by the conclusion of the project geotechnical engineer that *"the actual magnitude for seismically induced settlement should be estimated based on a more comprehensive subsurface exploration and laboratory testing program implemented during the preparation of a future geotechnical engineering report"* (Reference 1, p.7).

We recommend that the applicant submit a supplemental engineering geology report and geotechnical report for the proposed development. These reports should be based on the latest development plans/maps as depicted in the latest version of the project specific plan and/or draft EIR. The scope of these recommended supplemental reports should be sufficient to identify existing and potential geologic and geotechnical hazards and present measures to mitigate their significance to the environment relative to the proposed project development in accordance with the requirements of the California Environmental Quality Act (CEQA).

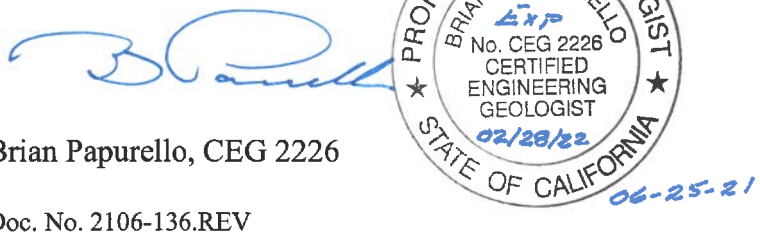
The recommended supplemental engineering geologic and geotechnical reports for the proposed project development must be prepared in compliance with the San Luis Obispo County Land Use Ordinance, CGS Special Publication 117A, the San Luis Obispo County Guidelines for Engineering Geology Reports and CGS Note 52 (References 3, 4 & 5). Sufficient geologic and geotechnical information should be presented in accordance with the references noted above to

substantiate that the site is suitable for the proposed development as designed and that existing or potential geologic and geotechnical hazards have been identified and mitigation measures have been proposed.

Upon completion, the recommended supplemental engineering geologic and geotechnical reports should be forwarded to the County's reviewing geologist for review. Once the additional information requested is received, the report(s) will be reconsidered for acceptance per CEQA requirements.

Please contact me at (831) 443-6970 or bpapurello@landseteng.com if you have questions regarding this matter.

Respectfully,
LandSet Engineers, Inc.



Brian Papurello, CEG 2226

Doc. No. 2106-136.REV